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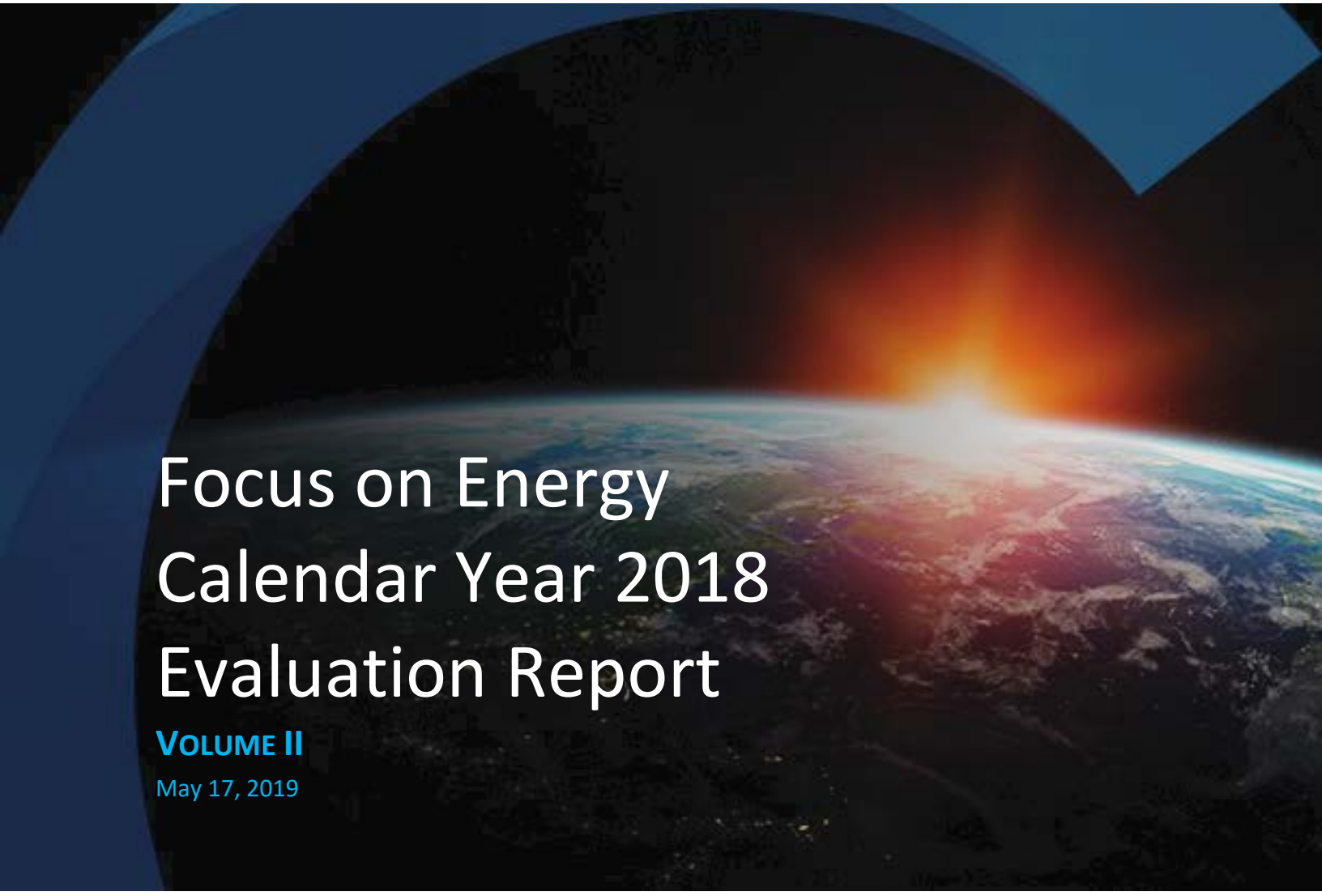

Focus on Energy Calendar Year 2018 Evaluation Report

VOLUME II

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List of Acronyms and Abbreviations

Acronym	Description
APS	Advanced power strip
ASHP	Air-source heat pump
BPI	Building Performance Institute
CALP	Common Area Lighting Package
CREED	Consortium for Retail Energy Efficiency Data
CY	Calendar year
DEET	Delivering Energy Efficiency Together
DHEA Pilot	Rural Direct-Mail Home Energy Assessment Pilot
DIO	Days incentive outstanding
DIY	Do-it-yourself
DOE	U.S. Department of Energy
DSM	Demand-side management
ECM	Electronically commutated motor
EISA	Energy Independence and Security Act of 2007
EM&V	Evaluation, measurement, and verification
EPA	U.S. Environmental Protection Agency
ERV	Energy recovery ventilation
EUL	Effective useful life
GSHP	Ground-source heat pump
IQT	Income-qualified track
ISP	Internet service provider
ISR	In-service rate
KAM	Key account manager
KPI	Key performance indicator
MOU	Memorandum of understanding
NEO	Net energy optimizer
NPS	Net promoter score
NTG	Net-to-gross
PPS	Probability proportional to size
PSC	Public Service Commission of Wisconsin
PTAC	Packaged terminal air conditioner
PTHP	Packaged terminal heat pump
PV	Photovoltaic
RECIP	Renewable Energy Competitive Incentive Program
RFP	Request for proposal
RPP	Retail Products Platform
TRC	Total resource cost test
TRM	Technical reference manual
UEC	Unit energy consumption
UES	Unit energy savings
UMP	*Uniform Methods Project*
VFD	Variable frequency drive
VSD	Variable speed drive
WSP	Wastewater service provider
WUDC	Wisconsin Uniform Dwelling Code
WWPEA	Wastewater Treatment Plant Energy Assessment Bonus

Introduction

Volume II of the Focus on Energy CY 2018 Evaluation Report presents program-specific evaluation findings and details about specific evaluation approaches and results for the residential and nonresidential programs, including pilot programs. This introduction presents additional details on the overall roles and responsibilities of the Evaluation Team,[1] as well as descriptions of standard evaluation practices and approaches the Team used across multiple program evaluations.

The diagram presented in Figure 3 of Volume I, and repeated below as Figure 1 of Volume II of the CY 2018 Evaluation Report, is a useful summary of the steps involved in the calculation of net savings from the gross savings recorded in the program tracking databases. In addition to these steps, there are many planning and coordination activities that are a part of the evaluation process. The remainder of Volume II of the evaluation report presents program-specific evaluation findings and greater details about specific evaluation approaches and results.

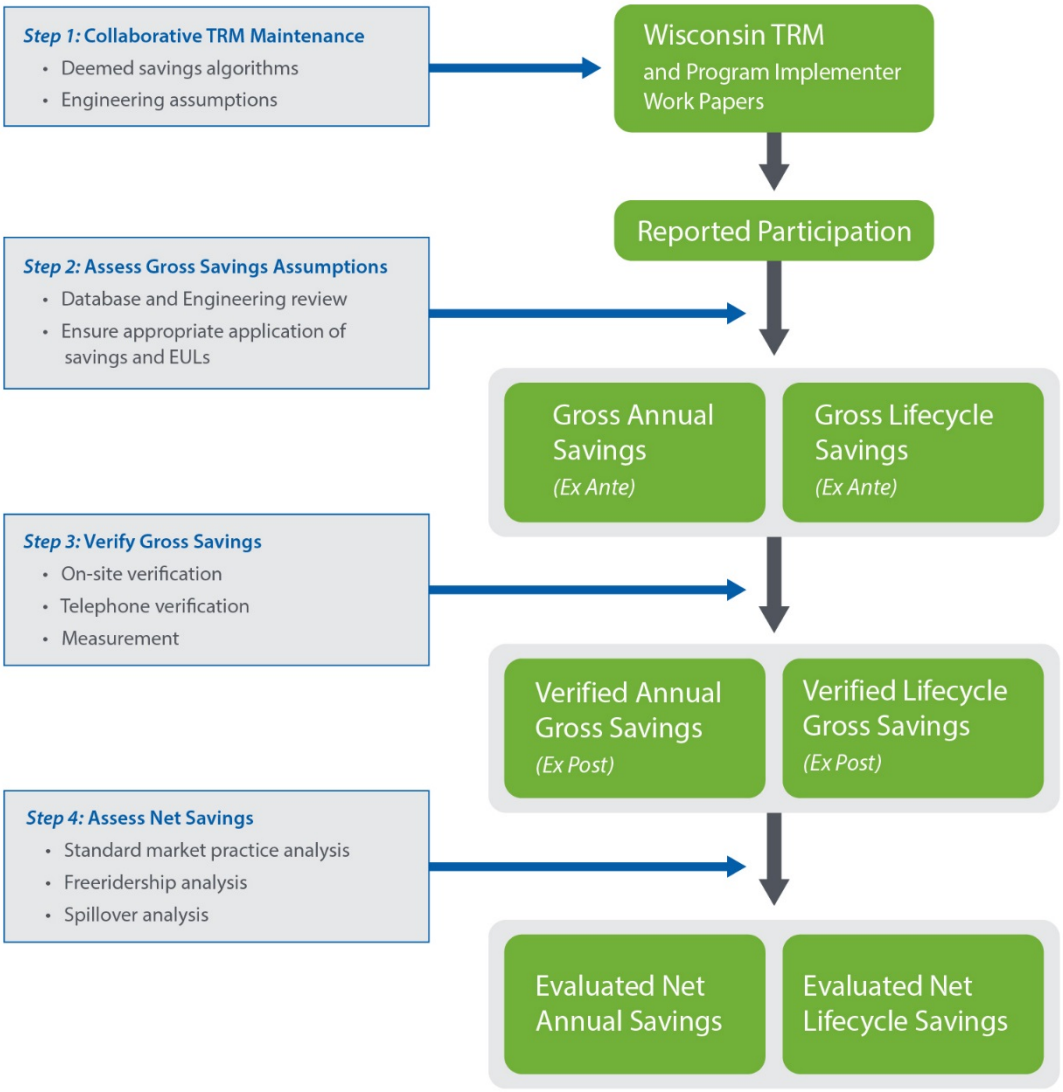
To accomplish steps 1 through 3 in Figure 1, the Evaluation Team coordinates with staff from the Public Service Commission of Wisconsin (PSC), the Program Administrator, and Program Implementers to assess the measures expected to be installed across programs in future years. To determine priorities for additional research, the Evaluation Team also reviews the deemed savings or algorithms contained in the Wisconsin Technical Reference Manual (TRM) and entered into Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management (SPECTRUM), the program tracking database. The Evaluation Team prioritizes measures for evaluation, measurement, and verification (EM&V) that demonstrate the highest priority by meeting one or more of the following criteria:

- New to the programs
- Expected to contribute an increasing share of savings
- Have 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.

[1] The Evaluation Team comprises Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute.

Figure 1. Quadrennium Evaluation Steps



Wisconsin Technical Reference Manual

The Wisconsin 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 programs. The TRM is publicly available on the Focus on Energy website.[2]

[2] Public Service Commission of Wisconsin. *Focus on Energy, Wisconsin Focus on Energy Technical Reference Manual.* Prepared by Cadmus. May 2018. Available online: https://focusonenergy.com/sites/default/files/Spring_2018_TRM_Update_Final3-6-27-18.pdf

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

- **Deemed Savings.** Specific per-unit savings (or demand reduction) values the Program Administrator, Program Implementer, 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 program stakeholders classify measures in SPECTRUM, the programs' tracking database. The Evaluation Team revises the document annually to account for any changes to the programs 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 including the Program Administrator, and the Program 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, Program Implementers can also initiate revisions or additions to the TRM. Rather than a deemed savings report, Program Implementers prepare work papers to present the savings assumptions for new measures or, when appropriate, revisions to the savings calculations for existing measures. Implementers submit these work papers to the Program 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 programs: tracking database review, project audits, and on-site inspections. This chapter details each of these methods. Individual program chapters specify when the Evaluation Team applied these (or other methods) during the current or previous evaluation cycles.

Tracking Database Review

For each program, the Evaluation Team reviews the tracking database, SPECTRUM, for completeness and quality of data. The review includes the following activities:

- Downloading and reviewing data for projects completed during the program year (January 1 to December 31 for each calendar year [CY], based on the "payment approved date" in SPECTRUM)
- Checking program totals against program status reports generated by SPECTRUM

- Verifying the presence and completeness of key data fields (savings, incentives, quantities, etc.)
- Checking for duplicate entries
- Reassigning 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

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.)

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Residential Segment Programs

Multifamily Programs

Through the Multifamily Energy Savings Program and Multifamily New Construction Program (collectively called the Multifamily Programs), Focus on Energy provides multifamily owners with education and incentives for energy-efficient upgrades. In CY 2018, APTIM (the Program Administrator) continued to administer the Multifamily Programs, with Franklin Energy as the Program Implementer.

Focus on Energy offers two reward types through the Multifamily Programs: prescriptive incentives for eligible measures, typically installed under standardized building operating conditions, and custom incentives for projects with unique or varying performance.

Focus on Energy offers additional support and incentives to property owners and developers for multifamily new construction projects and for measures generated by the Program Implementer staff for the Multifamily New Construction Program. Project leads are routed to the Program from the Design Assistance Program, including projects or measures arising after completion of the building design phase, or after funds from the Design Assistance Program have been exhausted.

At the end of CY 2017, Focus on Energy discontinued the Multifamily Direct Install Program, which offered free, direct installations of lighting and water-saving measures as well as water heater temperature setback services. Tenant- or owner-installed offerings continued through the Simple Energy Efficiency Program.

Table 1 lists actual spending, savings, participation, and cost-effectiveness for the Multifamily Programs. The table includes results of the Multifamily Direct Install Program, which was discontinued at the end of CY 2017, to show total Multifamily Programs details for the quadrennial.

Table 1. Multifamily Programs Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)[a]
Multifamily Energy Savings Program				
Incentive Spending	$	$766,693	$913,289	$4,871,174
Participation[b]	Number of Participants	320	270	1,403
Verified Gross Lifecycle Savings	kWh	89,859,033	110,801,510	497,713,252
	kW	574	791	3,601
	therms	3,034,011	2,062,155	16,560,010
Verified Gross Lifecycle Realization Rate	MMBtu	94%	96%	94%
Net Annual Savings	kWh/yr	5,827,180	6,522,913	30,719,843
	kW	465	637	2,903
	therms/yr	140,511	106,828	840,889
Annual Net-to-Gross Ratio	MMBtu	81%	81%	81%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.66	3.33	2.51

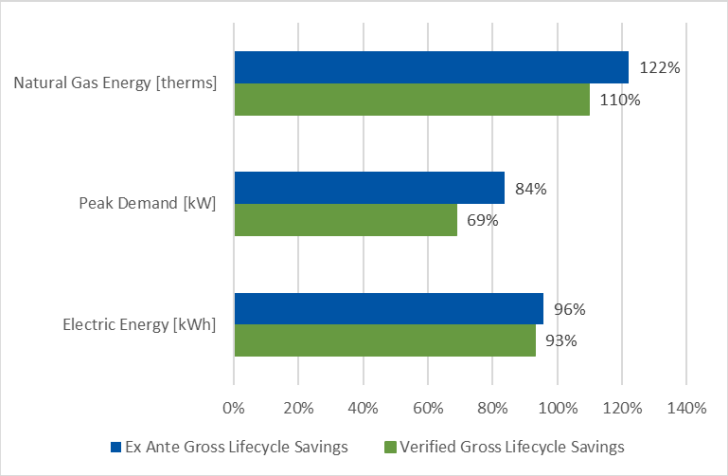
Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)[a]
Multifamily New Construction Program				
Incentive Spending	$	$467,972	$225,983	$693,955
Participation[b]	Number of Participants	43	38	81
Verified Gross Lifecycle Savings	kWh	45,842,693	31,373,887	77,216,580
	kW	497	364	861
	therms	2,284,163	1,283,988	3,568,151
Verified Gross Lifecycle Realization Rate	MMBtu	99%	83%	93%
Net Annual Savings	kWh/yr	2,767,920	1,289,043	4,056,962
	kW	402	293	696
	therms/yr	108,129	63,979	172,108
Annual Net-to-Gross Ratio	MMBtu	81%	81%	81%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	3.88	1.64	2.58
Multifamily Direct Install Program				
Incentive Spending	$	n/a	$329,684	$1,015,915
Participation[b]	Number of Participants		177	430
Verified Gross Lifecycle Savings	kWh		63,890,954	158,617,739
	kW		235	703
	therms		1,063,945	3,660,180
Verified Gross Lifecycle Realization Rate	MMBtu		91%	93%
Net Annual Savings	kWh		4,212,647	11,200,690
	kW		235	703
	therms		105,175	362,212
Annual Net-to-Gross Ratio	MMBtu		100%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio		3.48	3.45

[a] Focus on Energy launched the Multifamily New Construction Program in CY 2017; therefore, quadrennial totals include CY 2017 and CY 2018 results.

[b] The total number of participants represents the sum of unique participants for both Programs during each year. Participants are defined as the multifamily building owners or managers.

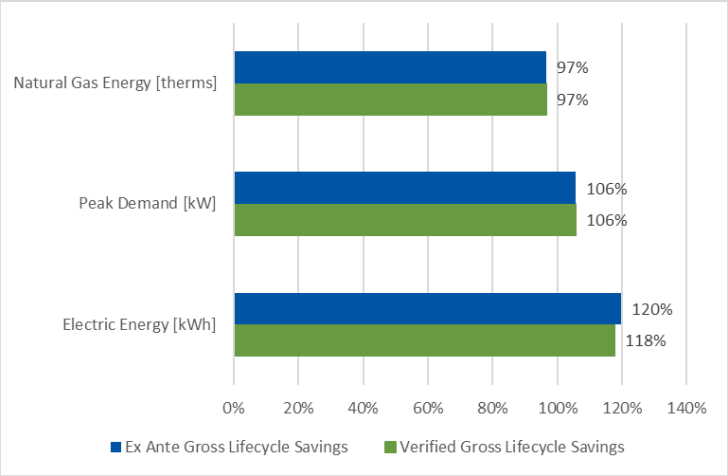
Figure 2 and Figure 3 show the percentage of gross lifecycle savings goals achieved by the Multifamily Programs in CY 2018. The Multifamily Energy Savings Program achieved its therms savings goal but did not achieve its *ex ante* electric savings and demand goals. The Multifamily New Construction Program achieved its *ex ante* electric savings and demand goals but did not quite achieve its *ex ante* therm savings goal. The Multifamily Energy Savings Program decreased its savings and demand goals to accommodate the reduced therm activity and the EUL adjustments for LEDs, and it generated fewer electric and demand savings but was able to achieve more therm savings compared to CY 2017. With more projects in the pipeline, the Program Implementer increased its savings and demand goals for the CY 2018 Multifamily New Construction Program and was able to increase electric, therm, and demand savings. Both Multifamily Programs increased the number of participants over CY 2017.

Figure 2. Multifamily Energy Savings Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. Verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Figure 3. Multifamily New Construction Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. Verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

The Multifamily set of programs have shifted between CY 2015 and CY 2018. The Multifamily Energy Savings Program has been consistently offered each of these four years and has received the largest share of participation. The Multifamily Direct Install Program was available in CY 2015, CY 2016, and CY 2017, but was discontinued for CY 2018. The Multifamily New Construction Program was a new offering in CY 2017 and continued through CY 2018. Table 2 shows the participation and savings across all three programs for the quadrennial. The number of participants and the verified gross lifecycle savings (MMBtu) collectively across all programs have generally decreased each year during the quadrennial. The average verified gross lifecycle realization rate for the quadrennial across all programs is 94%.

Table 2. Multifamily Programs Participant and Savings Summary

Program Year	Energy Savings Program	New Construction Program	Direct Install Program	Multifamily Summary	
Number of Participants					
CY 2015	472	-	124	**596**	
CY 2016	341	-	129	**470**	
CY 2017	270	38	177	**485**	
CY 2018	320	43	-	**363**	
Quad (CY 2015–CY 2018)	**1,403**	**81**	**430**	**1,914**	
Verified Gross					
Lifecycle Savings (MMBtu)					**Realization Rate**
CY 2015	1,125,455	-	236,446	**1,361,901**	94%
CY 2016	1,034,473	-	346,385	**1,380,858**	94%
CY 2017	584,270	235,447	324,390	**1,144,107**	91%
CY 2018	610,288	384,561	-	**994,849**	96%
Quad (CY 2015–CY 2018)	**3,354,487**	**620,008**	**907,222**	**4,881,716**	94%

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted limited impact activities for the Multifamily Energy Savings Program in CY 2018. Engineering desk reviews and verification site visits were not conducted for Multifamily Energy Savings Program because the Team determined that the evaluation effort should concentrate on the new Multifamily New Construction Program.

In CY 2018, the Evaluation Team conducted impact and process evaluations of the Multifamily Programs to answer the following key questions:

- What were the gross and net electric and natural gas savings?
- How can the Multifamily Programs increase energy savings and demand reduction?
- How satisfied are participant end users with the Multifamily Programs and with their energy -efficient upgrades?

The Evaluation Team designed its evaluation, measurement, and verification (EM&V) approach to integrate multiple perspectives in assessing the performance of the Multifamily Programs. Table 3 lists specific data collection activities and sample sizes used in the evaluations for each Program.

Table 3. Multifamily Programs' Data Collection Activities and Sample Sizes

Activity	Multifamily Energy Savings Program	Multifamily New Construction Program
Program Actor Interviews	2	
Tracking Database Review	Census	
Ongoing Participant Satisfaction Survey[a]	37	
Engineering Desk Review	0	43
Verification Site Visits	0	10

[a] Multifamily Energy Savings and Multifamily New Construction Program participants received the same survey in CY 2018.

Program Actor Interviews

In July 2018, the Evaluation Team interviewed the Program Administrator and Program Implementer about the status of the Multifamily Programs to assess objectives and performance and investigate implementation challenges and solutions. The interview topics emphasized changes to the Programs' design and delivery.

Tracking Database Review

The Evaluation Team reviewed a census of projects in the Multifamily Programs' tracking database, SPECTRUM, which involved completing the following tasks:

- Thoroughly review the data to ensure that SPECTRUM totals matched the totals reported by the Program Administrator
- Reassign savings from a number of database adjustment measures to the corresponding Program measures
- Check for complete and consistent application of information across data fields (measure names, application of lifetime savings, application of EUL)

Ongoing Participant Satisfaction Surveys

The Public Service Commission of Wisconsin (PSC) requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. These surveys sought to provide quick and easy opportunities for recent Program participants to provide feedback shortly after their experience so that Focus on Energy could find out about problems at any time of year and identify energy efficiency opportunities for follow-up with interested participants. The Team also used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfaction key performance indicators (KPIs).

Through SPECTRUM, the Program Administrator deployed online surveys to all CY 2018 participants with an email address and within two weeks of their completing Program participation. The Evaluation Team gathered online survey results via SPECTRUM and collected mailed survey responses, combining them with online results for quarterly and annual reporting.

In CY 2018, 37 Multifamily Energy Savings and Multifamily New Construction Program participants responded to the participant satisfaction survey.

Engineering Desk Review

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 43 measures from the Multifamily New Construction Program. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation Team relied on the applicable Focus on Energy technical reference manuals (TRMs) (current and historic) and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue).

For prescriptive measures in Wisconsin, the Team used the Focus on Energy TRM and associated workpapers as the primary sources to determine methodology and data in nearly all cases. For custom and hybrid measures, the Evaluation Team reviewed the Focus on Energy TRM and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The evaluation sample for these reviews was selected using a weighted, random stratified sampling approach known as PPS (probability proportional to size, which for this evaluation refers to lifecycle total energy savings).

The Evaluation Team did not conduct engineering desk reviews and verification site visits for the Multifamily Energy Savings Program in CY 2018 because the Team determined it was important to focus evaluation effort on the new Multifamily New Construction Program.

Verification Site Visits

The Evaluation Team conducted 10 verification site visits for the CY 2018 Multifamily New Construction Program. Site visits involved verifying the type and quantity of equipment installed, determining how the installed equipment was controlled, and documenting the operating hours of the installed equipment.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Programs:

- Tracking database review
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data to determine reported installations then applied the results from engineering desk reviews and verification site visits to calculate verified gross savings.

As a part of the tracking database review, the Team evaluated the census of CY 2018 Multifamily Energy Savings Program and Multifamily New Construction Program data contained in SPECTRUM to verify appropriate and consistent application of unit-level savings and EUL values in alignment with the applicable TRM (2018 TRM Update or 2018 TRM). The Evaluation Team found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices.

In the Multifamily New Construction Program, the Evaluation Team identified several inaccuracies that were corrected in the *ex post* verified savings calculations, described as follows. These adjustments had a minimal effect on the overall Program realization rate.

- The Evaluation Team found that for two prescriptive boiler measures (MMID 2760), the savings calculations used a standby loss value not supported by the default value in the 2018 TRM or supported by the actual standby loss value reported in the boiler AHRI. The Team verified five additional measures under MMID 2760 where the actual standby loss value was used rather than the default TRM value.
- For one prescriptive boiler measure (MMID 2743), the Team found that the output capacity of the boiler was used instead of the rated input capacity, as specified in the TRM. The Team adjusted the verified savings from this measure using rated input capacity inputs.

The Team identified a number of measures in the Non-Residential portfolio which were adjusted inaccurately in CY 2017. In these cases, boiler measures which were submitted using claimed savings values based on the input capacity instead of the output (AHRI) capacity. The commercial boiler measures in the TRM were based on a billing analysis and used a coefficient to correct for these rating issues. The Team has revised the evaluated savings values for CY 2017 to back-out these adjustments. These impact changes will not be retroactively applied to the CY 2017 savings data already published, but rather applied in CY 2018 to establish accurate figures for the four-year quadrennial period. In Multifamily New Construction, *ex post* gross and *ex post* net savings values increase as a result of these adjustments. For the Multifamily Energy Savings Program, one of the affected measures also received a change in methodology. The Team originally applied an algorithm with site specific inputs to derive the evaluated savings for that measure, but as part of this process, the Team changed to a deemed savings approach to align with all of the other measures.

In-Service Rates

The in-service rate (ISR) represents the percentage of measures still installed, in use, and operating properly following installation by the Program Implementer. In CY 2018, participant impact surveys were not conducted for the Multifamily Programs, so the Evaluation Team derived the ISR from the combined weighted average ISRs of CY 2015, CY 2016 and CY 2017. The Team also conducted site visits for the Multifamily New Construction Program to verify the installed measures and calculate a site-specific ISR. The Team applied a combined, weighted ISR of 98.6% to all Multifamily Energy Savings Program and Multifamily New Construction engineering reviews without a completed site visit.

Verified Gross Savings Results

Table 4 and Table 5 present the annual and lifecycle realization rates for the CY 2018 Multifamily Program offerings. Overall, the Multifamily Energy Savings Program achieved a 90% realization rate for first-year annual MMBtu and a 94% realization rate for lifecycle MMBtu.[3] Note that no engineering desk reviews were completed for the Multifamily Energy Savings Program in CY 2018, so the Evaluation Team

[3] The Evaluation Team calculated realization rates by dividing annual verified gross savings by *ex ante* savings.

calculated the realization rates using a weighted average of CY 2015 through CY 2017. During years when impact evaluation activities were performed (CY 2015, CY 2016, and CY 2017), results indicate an upward trend in the MMBtu verified gross lifecycle realization rate.

Table 4. CY 2018 Multifamily Energy Savings Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate		
kWh	kW	Therms	MMBtu	kWh	therms	MMBtu
88%	82%	93%	90%	97%	91%	94%

The Multifamily New Construction Program achieved a 99% first year and lifecycle evaluated realization rate, weighted by total MMBtu energy savings.[1] First-year and lifecycle realization rates are generally the same for a given demand reduction or energy savings type unless they are influenced by an adjustment to the EUL.

Table 5. CY 2018 Multifamily New Construction Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate		
kWh	kW	Therms	MMBtu	kWh	therms	MMBtu
99%	100%	99%	99%	99%	100%	99%

Table 6 and Table 7 list the *ex ante* and verified annual gross savings for the CY 2018 Multifamily Energy Savings Program and the Multifamily New Construction Program, respectively.

Table 6. CY 2018 Multifamily Energy Savings Program Annual Gross Savings Summary

Measure	Ex Ante Gross First Year			Verified Gross First Year		
	kWh	kW	Therms	kWh	kW	Therms
Aeration	15,449	0	11,040	13,617	0	10,253
Boiler	0	0	125,808	0	0	116,841
Chiller	483,507	30	0	426,174	25	0
Controls	61,100	1	2,370	53,855	0	2,201
Delamping	3,825	1	0	3,371	0	0
Furnace	18,000	7	2,844	15,866	6	2,641
Insulation	69,126	7	17,032	60,929	6	15,818
LED	7,189,952	609	0	6,337,391	500	0
Motor	3,542	1	0	3,122	0	0
Other	12,692	0	21,642	11,187	0	20,099
Packaged Terminal Unit (PTAC, PTHP)	6,406	0	0	5,646	0	0
Rooftop Unit/Split System Air Conditioner	18,811	34	0	16,581	28	0
Steam Trap	0	0	6,699	0	0	6,222
Variable Speed Drive	256,558	11	0	226,136	9	0
Window	22,888	0	835	20,174	0	775
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	-1,388
Total First Year	**8,161,856**	**699**	**188,270**	**7,194,050**	**574**	**173,462**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 7. CY 2018 Multifamily New Construction Program Annual Gross Savings Summary

Measure	Ex Ante Gross First Year			Verified Gross First Year		
	kWh	kW	Therms	kWh	kW	Therms
Aeration	107,406	4	18,529	106,113	4	18,391
Boiler	0	0	35,752	0	0	35,485
Controls	20,430	2	0	20,184	2	0
Energy Recovery	44,447	9	8,943	43,912	9	8,876
Furnace	202,375	87	27,244	199,938	87	27,041
Insulation	1,644	24	3,382	1,625	24	3,356
LED	1,958,624	199	0	1,935,040	199	0
Motor	396,217	60	0	391,447	60	0
Other	20,758	0	38,720	20,508	0	38,431
Packaged Terminal Unit (PTAC, PTHP)	474,308	-3	0	468,597	-3	0
Rooftop Unit/Split System Air Conditioner	60,975	92	0	60,241	92	0
Variable Speed Drive	173,648	24	0	171,557	24	0
Water Heater	-2,000	-2	1,000	-1,976	-2	993
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	925
Total First Year	**3,458,833**	**497**	**133,570**	**3,417,185**	**497**	**133,498**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 8 and Table 9 list the *ex ante* and verified gross lifecycle savings by measure category for the CY 2018 Multifamily Energy Savings Program and the Multifamily New Construction Program, respectively.

Table 8. CY 2018 Multifamily Energy Savings Program Lifecycle Gross Savings Summary

Measure	Ex Ante Gross First Year			Verified Gross First Year		
	kWh	kW	Therms	kWh	kW	Therms
Aeration	154,491	0	110,400	150,159	0	100,464
Boiler	0	0	2,516,145	0	0	2,289,681
Chiller	9,670,140	30	0	0	25	0
Controls	494,766	1	12,808	9,398,989	0	0
Delamping	38,250	1	0	480,893	0	11,655
Furnace	324,000	7	51,192	37,177	6	0
Insulation	1,728,647	7	297,436	314,915	6	46,584
LED	75,165,891	609	0	1,680,176	500	270,666
Motor	63,760	1	0	73,058,239	0	0
Other	126,920	0	324,651	61,972	0	0
Packaged Terminal Unit (PTAC, PTHP)	96,090	0	0	123,361	0	295,431
Rooftop Unit/Split System Air Conditioner	282,199	34	0	93,396	28	0
Steam Trap	0	0	40,194	274,286	0	0
Variable Speed Drive	3,848,457	11	0	0	9	36,576
Window	457,760	0	16,700	3,740,546	0	0
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	-32,242
Total Lifecycle	**92,451,371**	**699**	**3,369,526**	**89,859,033**	**574**	**3,034,011**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 9. CY 2018 Multifamily New Construction Program Lifecycle Gross Savings Summary

Measure	Ex Ante Gross First Year			Verified Gross First Year		
	kWh	kW	Therms	kWh	kW	Therms
Aeration	1,074,340	4	185,475	1,060,455	4	184,108
Boiler	0	0	715,046	0	0	709,777
Controls	163,476	2	0	161,363	2	0
Energy Recovery	666,705	9	134,145	658,088	9	133,156
Furnace	4,304,260	87	570,920	4,248,630	87	566,713
Insulation	41,112	24	85,067	40,581	24	84,440
LED	22,239,441	199	0	21,952,009	199	0
Motor	7,131,511	60	0	7,039,340	60	0
Other	207,580	0	580,785	204,897	0	576,505
Packaged Terminal Unit (PTAC, PTHP)	7,114,620	-3	0	7,022,667	-3	0
Rooftop Unit/Split System Air Conditioner	914,631	92	0	902,810	92	0
Variable Speed Drive	2,605,266	24	0	2,571,594	24	0
Water Heater	-20,000	-2	10,000	-19,742	-2	9,926
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	19,538
Total Lifecycle	**46,442,942**	**497**	**2,281,438**	**45,842,693**	**497**	**2,284,163**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Evaluation of Net Savings

The Evaluation Team did not perform any new participant surveys in CY 2018 for either of the Multifamily Programs and, therefore, did not calculate new freeridership or spillover estimates. The Team determined the net-to-gross (NTG) ratio for the CY 2018 Multifamily Energy Savings Program using the CY 2015, CY 2016 and CY 2017 net savings data (sum of net savings from these three years, divided by the sum of gross savings from the same years), which was based on participant surveys in CY 2015 and CY 2016. This yielded an overall estimate of 81% NTG for the Multifamily Energy Savings Program. The Team applied this NTG rate to the Multifamily New Construction Program as well because the New Construction Program was new in CY 2017, no previous data were available, and the Multifamily Energy Savings Program provided the best available data for NTG.

Table 10 shows total annual gross and net savings in MMBtu and the NTG ratios for the Multifamily Programs.

Table 10. CY 2018 Annual Net Savings and Net-to-Gross

Program	Total First-Year Gross Verified Savings (MMBtu)	Total First-Year Net Savings (MMBtu)	Program First-Year NTG Ratio
Multifamily Energy Savings Program	41,971	33,997	81%
Multifamily New Construction Program	24,994	20,245	81%

Table 11 and Table 12 show the annual net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category for the Multifamily Energy Savings Program and the Multifamily New Construction Program, respectively. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 11. CY 2018 Multifamily Energy Savings Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Aeration	11,030	0	8,305
Boiler	0	0	94,641
Chiller	345,201	20	0
Controls	43,623	0	1,782
Delamping	2,731	0	0
Furnace	12,851	5	2,139
Insulation	49,353	5	12,813
LED	5,133,286	405	0
Motor	2,529	0	0
Other	9,061	0	16,281
Packaged Terminal Unit (PTAC, PTHP)	4,574	0	0
Rooftop Unit/Split System Air Conditioner	13,430	22	0
Steam Trap	0	0	5,039
Variable Speed Drive	183,170	7	0
Window	16,341	0	628
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	-1,119
Total First Year	**5,827,180**	**465**	**140,511**

a CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 12. CY 2018 Multifamily New Construction Program Annual Net Savings Summary

Measure Category	Annual Net Savings		
	kWh	kW	therms
Aeration	85,951	4	14,897
Boiler	0	0	28,743
Controls	16,349	2	0
Energy Recovery	35,569	7	7,190
Furnace	161,950	71	21,903
Insulation	1,316	19	2,719
LED)	1,567,382	161	0
Motor	317,072	49	0
Other	16,612	0	31,129
Packaged Terminal Unit (PTAC, PTHP)	379,563	-2	0
Rooftop Unit/Split System Air Conditioner	48,795	74	0
Variable Speed Drive	138,961	19	0
Water Heater	-1,600	-2	804
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	745
Total First Year	**2,767,920**	**402**	**108,129**

a CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 13 and Table 14 list the lifecycle net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category for the offerings in the Multifamily Energy Savings Program and the Multifamily New Construction Program, respectively.

Table 13. CY 2018 Multifamily Energy Savings Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Aeration	121,629	0	81,375
Boiler	0	0	1,854,642
Chiller	7,613,181	20	0
Controls	389,523	0	9,440
Delamping	30,114	0	0
Furnace	255,081	5	37,733
Insulation	1,360,942	5	219,239
LED	59,177,173	405	0
Motor	50,197	0	0
Other	99,923	0	239,299
Packaged Terminal Unit (PTAC, PTHP)	75,650	0	0
Rooftop Unit/Split System Air Conditioner	222,172	22	0
Steam Trap	0	0	29,627
Variable Speed Drive	3,029,842	7	0
Window	360,389	0	12,310
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	-25,976
Total Lifecycle	**72,785,817**	**465**	**2,457,690**

a CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 14. CY 2018 Multifamily New Construction Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Aeration	858,968	4	149,127
Boiler	0	0	574,919
Controls	130,704	2	0
Energy Recovery	533,051	7	107,857
Furnace	3,441,390	71	459,037
Insulation	32,870	19	68,396
LED	17,781,127	161	0
Motor	5,701,866	49	0
Other	165,967	0	466,969
Packaged Terminal Unit (PTAC, PTHP)	5,688,361	-2	0
Rooftop Unit/Split System Air Conditioner	731,276	74	0
Variable Speed Drive	2,082,991	19	0
Water Heater	-15,991	-2	8,040
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	15,740
Total Lifecycle	**37,132,581**	**402**	**1,850,086**

a CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Process Evaluation

In CY 2018, the Evaluation Team conducted interviews, a participant satisfaction survey, and a materials review. The process evaluation focused on property owner and manager satisfaction with the Multifamily Programs' components and with the effectiveness of the Multifamily Programs' design, marketing, and Program processes.

The Team also used interviews to follow up on CY 2017 process evaluation recommendations to consider monitoring targeted marketing material use and tracking web visits to quantify interest in the Multifamily New Construction Program.

Program Design, Delivery, and Goals

In CY 2001, Focus on Energy began providing prescriptive and custom incentives through the Multifamily Energy Savings Program. In the middle of CY 2017, Focus on Energy introduced the Multifamily New Construction Program, with the Program fully operational by CY 2018. At the end of CY 2017, Focus on Energy discontinued the Multifamily Direct Install Program and revised the Simple Energy Efficiency Program's eligibility criteria to include multifamily customers. The Program Administrator made this change to create a more cost-effective way to reach a larger number of customers within this market segment.

Multifamily Energy Savings Program Design

Through the Multifamily Energy Savings Program, Focus on Energy offers prescriptive incentives for eligible retrofit projects and custom incentives for performance-based retrofit projects that fall outside of prescriptive offerings. Property owners also may take advantage of increased retrofit prescriptive incentives through the Common Area Lighting Package (CALP) offering.

The Program Implementer introduced CALP in CY 2013. Participating property owners and managers provided a co-pay, determined by the amount of wattage reduced, to receive the following common area lighting upgrades:[4]

- LED fixtures, exit signs, retrofit kits, and linear lamps
- Occupancy sensors

Only registered Trade Allies could promote CALP, and, currently, only specific Trade Allies (currently 12) have been authorized to deliver CALP.[5] CALP contributions to the Multifamily Energy Savings Program savings increased considerably from CY 2016 to CY 2017, but savings decreased from CY 2017 to CY 2018. The Program Implementer said that budget limitations constrained overall CALP promotion in CY 2016, and that many of the projects secured in CY 2016 were not realized until CY 2017. An increased budget in CY 2017 helped capture participant interest. Although the Program Implementer also

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[4] Fixtures must operate for 12 or more hours per day

[5] The list of authorized CALP Trade Allies is available on the Focus on Energy website: https://focusonenergy.com/sites/default/files/Application_PDFs/CALP_TA_List.pdf

increased the CY 2018 CALP budget (from an internal budget of $200,000 in CY 2017 to $430,000 in CY 2018), similar to CY 2016, there was adequate interest to reserve the budget, but these projects were not completed by the end of the year, and the Program had not experienced the same level of CALP overflow in CY 2018 for funds reserved in CY 2017. The Program Implementer also indicated that reduced incentives–interior lighting reduced to $1.10 per kilowatt-hour saved in 2018 from $1.60 in CY 2017, exterior lighting to $0.85 per kilowatt-hour in CY 2018 from $1.50 in CY 2017, and lighting controls to $0.35 per kilowatt-hour in CY 2018 from $0.50 in CY 2017—resulted in a decrease incentives per project in CY 2018. Therefore, although the Program Implementer received 317 applications in CY 2018, effectively reserving the budget set aside for CALP, and it paid incentives for more applications in CY 2018 (193) compared to CY 2017 (103), fewer customers used CALP in CY 2018 (32 participants) compared to CY 2017 (41 participants), and the Program Implementer spent less in CY 2018 on CALP projects ($186,614 in incentives) compared to CY 2017 ($324,225).

Table 15 shows *ex ante* electric savings for CALP measures from CY 2015 to CY 2018.

Table 15. CALP Lifecycle Electric Savings

CALP Measure	CY 2018 *Ex Ante* Gross Lifecycle kWh	CY 2017 *Ex Ante* Gross Lifecycle kWh	CY 2016 *Ex Ante* Gross Lifecycle kWh	CY 2015 *Ex Ante* Gross Lifecycle kWh
CFL fixtures	n/a	721,838	342,875	27,292,200
LED fixtures	9,269,776	14,307,725	2,264,729	4,376,159
LED exit signs	-	1,087,062	1,124,760	2,003,501
Linear Fluorescent Fixtures	n/a	410,490	1,628,610	4,266,276
Occupancy Sensors and Controls	91,440	672,638	103,837	2,710,851
Total (Percentage of Program MMBtu Contribution)	**9,361,216 (5%)**	**17,199,753 (11%)**	**5,464,811 (2%)**	**40,648,987 (12%)**

The Program Implementer made the following changes to its standard prescriptive offerings:

- Added incentives for smart thermostats, aerators, and showerheads
- Introduced Trade Ally incentives for boiler tune-ups
- Discontinued incentives for 14 SEER direct expansion cooling systems and for all fluorescent lighting measures (except those offered through CALP)
- Revised incentives for exterior lighting measures, from a fixed offer per measure to an offer based on wattage reduction

Property owners and managers also became eligible to receive energy-savings rewards for retrofit projects not qualifying for prescriptive incentives. Focus on Energy provided custom incentives based on anticipated project energy savings performance.

In CY 2018, the Program Implementer discontinued the tiered incentive structure for Multifamily Energy Savings Program custom measures, which provided higher incentives for projects achieving greater energy savings. Per the Program Implementer, it did so as only one participant obtained the higher incentive in CY 2017, and the higher incentive levels did not improve the return on investment for most

projects as project costs increased substantially to obtain the higher tiered incentive. The Program Implementer made no other changes to the custom incentive levels.[6]

Multifamily New Construction Program Design

Through the Multifamily New Construction Program, Focus on Energy offers prescriptive and custom incentives for projects or measures in multifamily building construction or in complete rehabilitation. Energy Advisors and Trade Allies work primarily with developers and property owners to encourage and reward energy-efficient equipment installations.

A multifamily new construction developer, architect, or owner could bring any project to the Multifamily New Construction Program, regardless of the project's stage in the design or implementation phases. Developers and property owners could receive prescriptive or custom incentives for any eligible building or equipment upgrade. This distinguished the Multifamily New Construction Program from the Design Assistance Program, where projects were eligible if developers had not finalized design decisions, and incentives were customized to energy savings achieved throughout the building.

The Program Implementer and Program Administrator reported the Program as fully operational in CY 2018, despite delays during CY 2017 in launching this Program due to establishing differences in the Program's theory with those of the Design Assistance Program. The Program Implementer focused its CY 2018 efforts on building relationships with developers and developing a project pipeline.

Program Management and Delivery Structure

The Program Manager is supported by Energy Advisors, engineers, field technicians, and staff who handle marketing, Trade Ally and participant engagement, and application processing.

For the Multifamily Programs, Energy Advisors conduct outreach to two audiences: Trade Allies and property managers, owners, and developers. Program staff encourage property managers and owners to pursue energy-efficient upgrades by contacting a Trade Ally. For the Multifamily Energy Savings Program, Energy Advisors support property managers and owners by providing free energy assessments, involving a property walkthrough to document common area energy-saving opportunities, including CALP. Following the walkthrough, the Energy Advisor generates an assessment report for the property manager's or owner's review.

Program Goals

Overall, the Multifamily Programs' sought to encourage multifamily building owners and managers to use more energy-efficient products. Table 16 presents the Multifamily Programs' savings goals and CY 2018 results.

[6] Custom incentives for multifamily projects are $0.80 per therm, $100 per kilowatt, and $0.05 per kilowatt-hour.

Table 16. Multifamily Programs' CY 2018 Goals and Achievements

Performance Metric	CY 2018 Goal	CY 2018 Actual *Ex Ante*
Multifamily Energy Savings Program		
Lifecycle electric savings (kWh)	96,573,228	92,451,371
Lifecycle natural gas savings (therms)	2,762,814	3,369,526
Demand reduction (kW)	835	699
Multifamily New Construction Program		
Lifecycle electric savings (kWh)	38,792,426	46,442,942
Lifecycle natural gas savings (therms)	2,362,524	2,281,438
Demand reduction (kW)	470	497

In addition to energy and participation achievements, the Program Implementer tracked KPIs to measure Program performance. New in CY 2018, the Program Administrator and Program Implementer set achievement goals for the Multifamily Energy Savings Program to produce additional prescriptive savings from CALP participants. The Program Implementer and Program Administrator added a goal to generate at least 10% of total kilowatt-hour savings from CALP participants through non-CALP, prescriptive Multifamily Energy Savings Program measures.

As shown in Table 17, 54% of CY 2017 CALP participants' total project savings came from non-CALP measures, while 32% of total savings from CY 2018 CALP participants were through non-CALP measures.

Table 17. Participant Prescriptive Project Savings Beyond CALP

Year	CALP Lifecycle Gross kWh	Non-CALP Lifecycle Gross kWh	Total Lifecycle Gross kWh	Percentage from Non-CALP MESP Measures
CY 2017	17,199,753	20,575,690	37,775,443	54%
CY 2018	9,361,216	4,366,018	13,727,234	32%

In CY 2018, the Program established Trade Ally recruitment goals specific to engaging new or re-engaging past-participating Trade Allies as well as a goal to cross-promote other Focus on Energy programs.

Table 18 shows KPIs and CY 2018 results reported by the Program Implementer and, where possible, verified through the Evaluation Team using SPECTRUM.

Table 18. Multifamily Programs' CY 2018 Key Performance Indicators

KPI	Goal	CY 2018 Result	CY 2018 Result Source
Multifamily Energy Savings Program			
Satisfaction[a]	Maintain or improve the CY 2017 overall satisfaction score of 9.2 (on a scale of 0 to 10)	Did not reached goal (9.1)	Evaluation Team's ongoing participant satisfaction survey
Support Marketing Efforts	Provide Program Administrator at least four success stories	Reached goal (4 stories)	Reported by Program Implementer
	Coordinate at least two direct mail marketing efforts with utilities by end of third quarter CY 2018	Reached goal (3 mailings)	Reported by Program Implementer

KPI	Goal	CY 2018 Result	CY 2018 Result Source
	Develop at least two tactics that cross-promote other Focus on Energy programs	Reached goal (2 tactics)	Reported by Program Implementer
Rural Territory Reach	25% of buildings in communities with a population under 30,000	Reached goal (48%)	Reported by Program Implementer
Deepen CALP customer participation	At least 10% additional prescriptive kilowatt-hour savings achieved through CALP participants, beyond CALP measures.	Reached goal (32%)	SPECTRUM
Trade Ally Participation	Recruit three new Trade Allies to participate (complete projects) by end of third quarter	Reached goal (5 new or re-engaged Trade Allies)	Reported by Program Implementer
Processing Time	32 business days from receipt of prescriptive application to providing incentive payment	Reached goal (27 days)	SPECTRUM. Application Received/Received Complete Date compared to Date of Status Change to Paid
Multifamily New Construction Program			
Satisfaction[a]	Maintain or improve the CY 2017 overall satisfaction score of 8.8 (on a scale of 0 to 10)	Reached goal (9.1)	Evaluation Team's ongoing participant satisfaction survey
Processing Time	32 business days from receipt of prescriptive application to providing incentive payment	Did not reach goal (34 days)	SPECTRUM. Application Received/Received Complete Date compared to Date of Status Change to Paid
Quality Initiative Improvement	Implement at least one new quality initiative improvement by end of third quarter	Reached goal (created team to provide independent quality control verification)	Reported by Program Implementer
Enhance Decision Maker Outreach	Provide outreach to at least 16 new construction decision makers	Reached goal (28 contacts)	Reported by Program Implementer

[a] Due to a small sample size in CY 2017 (n=2) Multifamily New Construction Program respondents), the Evaluation Team combined the Multifamily Programs' population and administered one survey.

Data Management and Reporting

The Program Administrator and Program Implementer did not identify any changes to tracking system or reporting features from CY 2017 to CY 2018. The Program Implementer continued to manage data and generate reports through SPECTRUM, and tracks prospective projects through SPECTRUM after learning of them through property owner and manager outreach or when sharing or receiving leads with staff from other Focus on Energy programs.

Marketing and Outreach

During interviews, the Program Implementer highlighted the Program's marketing and outreach tactics and campaigns for the Multifamily Programs. The CY 2018 marketing strategies included the following elements:

- Direct outreach to property owners and managers and building developers through sell sheets and email blasts
- Articles in multifamily industry association newsletters
- Participation in industry meetings and trade shows
- Direct mail campaigns to property owners, in collaboration with Wisconsin utilities
- Program collateral for outreach staff or Trade Allies' use with prospective customers
- Email blasts, webinars, direct mail, and sell sheets promoted directly to Trade Allies

In CY 2018, the Program Implementer coordinated its marketing campaigns and material development with the Business Incentive and Small Business Programs to market the Multifamily Energy Savings Program to Trade Allies. Staff implemented a direct-mail campaign that spanned the programs' Trade Allies. This campaign included a personalized piece that introduced Trade Allies to their respective Energy Advisors, providing Trade Allies with an opportunity to request a formal introduction or to update their contact information with Focus on Energy. Of the 934 Trade Allies who received the mailing across the three programs, the Program Implementer said 14% returned the postcard or used the URL to update their information or request a meeting.

The Program Implementer reported that discontinuation of the Multifamily Direct Install Program affected the marketing of the Multifamily Energy Savings Program. Prior to CY 2018, Program Implementer staff used direct-install activities as a way to increase awareness of other opportunities available to property managers and owners through the Multifamily Energy Savings Program.

The Program Implementer said the number of leads recorded for the Multifamily Energy Savings Program decreased 8%–10% from CY 2017. In response to losing leads generated from its direct-installs, the Program Implementer revised its outreach strategy in early CY 2018: Energy Advisors increased in--person outreach to Trade Allies by 50% (scheduling and attending meetings with 50% more Trade Allies than originally planned), and each Energy Advisor was tasked with supporting at least two new Trade Allies in completing projects by the year's end.

With the Multifamily New Construction Program established in late CY 2017 as complementary to but separate from the Design Assistance Program, the Program Implementer developed marketing materials to highlight it as a secondary, stand-alone offer, available to multifamily building developers and owners. Outreach staff and Trade Allies distinguished the Multifamily New Construction Program from the Design Assistance Program as a Program targeting projects beyond the design stage, where developers have approved plans and broken ground.

Although this is the Program's target market, the Program theory sought to generate savings from projects based on the Program Implementer's relationships with building owners and developers and

their Trade Allies. Therefore, both the Program Administrator and the Program Implementer said that the Program did not explicitly exclude projects eligible for the Design Assistance Program.

In addition to direct outreach, marketing materials included construction site banners, trade show signage, and a Program overview brochure that promotes building equipment as optimal energy-saving opportunities eligible for a Program incentive.

Energy Assessments for Multifamily Properties

The Program Implementer offered property managers and owners free energy assessments of their existing buildings. The Evaluation Team reviewed an example of an energy assessment report and found it highlighted building-specific energy-savings opportunities, with pictures of existing fixtures and equipment and recommendations for upgrades.[7]

The report provided links to incentive, qualified product, and Trade Ally information, along with the Energy Advisor's contact information (see Figure 4). Although the report concisely summarized opportunities and ways to move forward with a project, the document's opening paragraphs generalized the process, saying a building had some opportunities, and Energy Advisors were available (rather than identifying the listed Energy Advisor as the property manager or owner's source for moving to the next step), but it did not identify a specific next step or call to action (such as: the Energy Advisor will follow up regarding these opportunities or contact the Energy Advisor to discuss interest in these opportunities).

[7] Building-specific opportunities, with the exception of exterior lighting, are limited to the building's interior. Program Implementer staff generally do not assess mechanical systems located on building roofs.

Figure 4. Excerpt from Example Site Assessment Report

focus on energy
Partnering with Wisconsin utilities

May 3, 2018
XXXX:
Example Apartments
Example Street
City, WI XXXXX

XXXX,

Thank you for allowing the Focus on Energy Multifamily Energy Savings Program the opportunity to conduct energy assessment at Example Apartments. Several energy efficiency upgrade opportunities were identified for you to reduce your monthly energy bills while improving the quality of the property. You and your residents can start enjoying immediate benefits from these energy saving upgrades.

Taking advantage of these opportunities is simple. We have a dedicated staff of Energy Advisors who can work with you to select qualifying equipment for prescriptive and custom rebates, guide you through the application process, and assist with any paperwork. Links to the catalogs and application can be found at the end of this letter.

As the property is paying all the hot water bills, it would be extremely beneficial for management to take advantage of incentives for hot water heaters, pipe insulation and showerheads/faucet aerators.

Lighting Opportunities:

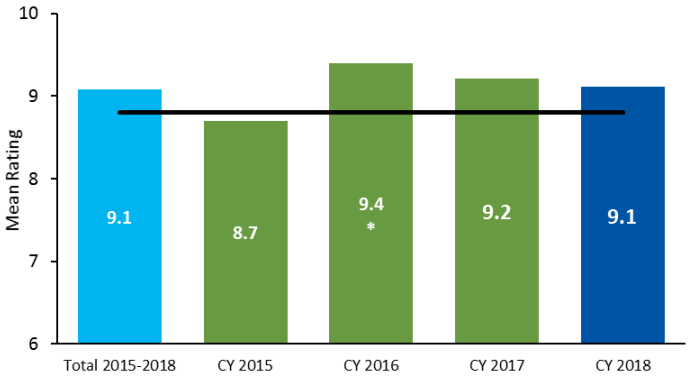
- A project to change over the standard **fixtures** in-unit or in common areas to LED fixtures or retrofit kits would see an incentive of $0.20 per watt reduced. See pages 18 and 19 of the Lighting Catalog for measure information.
    - Alternatively, you can utilize existing fixtures, replacing interior incandescent or CFL lamps with **LED lamps** can be a quick and easy way to start reducing energy consumed. Pages 22, 23, and 24 of the Lighting Catalog provide information on the incentives available for switching standard lamps. Replacement of standard 60W equivalent lamps could get an incentive of $3-$5. *Please note that lamps (bulbs) sold at retailers, found on this website: https://focusonenergy-findaretailer.com are not eligible for prescriptive incentives.

Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2018, the Evaluation Team surveyed participating building owners and property managers to measure their satisfaction with various aspects of the Multifamily Programs. Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.

As shown in Figure 5, the average overall satisfaction in CY 2018 was 9.1, statistically equivalent to the CY 2017 rating (9.2) and the portfolio baseline.[8]

Figure 5. Overall Multifamily Energy Savings Program Satisfaction



Source: Multifamily Energy Savings Program Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=87, CY 2016 n=35, CY 2017 n=31 including two Multifamily New Construction responses, CY 2018 n=37). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

Table 19 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, none of these ratings were significantly different from the CY 2017 results.

Table 19. CY 2018 Average Ratings for Multifamily Energy Savings Program

Item	CY 2015	CY 2016	CY 2017[a]	CY 2018
Satisfaction with upgrade(s)	8.7	9.7	9.4	9.3
Satisfaction with Energy Advisor	9.3	9.7	9.7	9.4
Satisfaction with Trade Ally	8.7	9.5	9.5	9.1
Satisfaction with incentive	8.3	8.8	8.4	7.9
Likelihood of more improvements	7.7	7.6	8.5	7.7
Likelihood of recommending the Program	*Not asked*	9.8	9.5	9.1

[a] Two of the 31 respondents included in CY 2017 results for Multifamily Energy Savings Program findings were Multifamily New Construction survey respondents who received similar questions.

Using these survey data, the Evaluation Team calculated a net promoter score (NPS) based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters

[8] Two of the 31 respondents included in CY 2017 results for Multifamily Energy Savings Program findings took the Multifamily New Construction survey which had equivalent questions.
The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

(respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Multifamily Energy Savings Program's NPS was +73 for CY 2018, compared to +84 for CY 2017.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities. Of the five respondents who answered this question, two gave the highest rating of *much more favorable* and three gave the next highest rating of *somewhat more favorable*.[9] No survey respondents reported that their opinion of their utility had become less favorable, nor that their opinion was unaffected.

Suggestions for Improvement

The ongoing participant satisfaction surveys also included questions about whether respondents had any comments or suggestions for improving the Programs.

Of the 37 participants who responded to the Multifamily Energy Savings Program survey, 11 (30%) provided open-ended feedback which the Evaluation Team coded into a total of 12 mentions. Of these mentions, four were positive or complimentary (33%), and eight included suggestions for improvement (67%). All four of the positive comments complimented the helpfulness of Program staff. The eight suggestions for improvement included two comments about making the approval process easier (including difficulty categorizing qualifying equipment), two comments about improving communications (notify customers when incentives are coming and be more responsive to inquiries), two comments about Program incentives being changed during the project period, and one comment each about dissatisfaction with measures (new lighting was not bright enough) and increasing Program scope (offer more incentives for motion-sensing equipment).

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 20 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Multifamily Energy Savings Program.

Table 20. Multifamily Energy Savings Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$766,693	$912,839	$1,265,281	$1,925,153

The Evaluation Team found the CY 2018 Multifamily Energy Savings Program was cost effective (2.66). Table 21 lists the evaluated costs and benefits.

[9] This question was asked only in the online version of the ongoing customer satisfaction surveys. In CY 2018, most participants responded to the paper version of the survey by mail.

Table 21. Multifamily Energy Savings Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$202,773	$256,931	$329,869	$305,431
Delivery Costs	$1,048,914	$585,918	$752,249	$696,518
Incremental Measure Costs	$1,378,568	$1,307,220	$3,400,605	$5,231,112
Total Non-Incentive Costs	**$2,630,255**	**$2,150,070**	**$4,482,724**	**$6,233,060**
Benefits				
Electric Benefits	$4,060,046	$4,973,392	$6,769,894	$7,388,053
Gas Benefits	$1,959,579	$1,135,204	$3,087,346	$3,942,209
Emissions Benefits	$972,626	$1,043,315	$1,647,883	$1,841,351
Total TRC Benefits	**$6,992,251**	**$7,151,912**	**$11,505,123**	**$13,171,613**
Net TRC Benefits	**$4,361,996**	**$5,001,842**	**$7,022,399**	**$6,938,553**
TRC B/C Ratio	**2.66**	**3.33**	**2.57**	**2.11**

Table 22 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Multifamily New Construction Program.

Table 22. Multifamily New Construction Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$467,972	$329,684	$286,026	$405,581

The Evaluation Team found the CY 2018 Multifamily New Construction Program was cost-effective (3.88). Table 23 lists the evaluated costs and benefits.

Table 23. Multifamily New Construction Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$70,951	$244,627	$251,800	$221,822
Delivery Costs	$355,061	$557,859	$574,217	$505,852
Incremental Measure Costs	$775,564	$646,616	$542,024	$365,091
Total Non-Incentive Costs	**$1,201,576**	**$1,449,102**	**$1,368,042**	**$1,092,764**
Benefits				
Electric Benefits	$2,653,474	$3,509,816	$3,368,800	$1,931,482
Gas Benefits	$1,431,756	$763,917	$1,049,055	$804,243
Emissions Benefits	$573,732	$772,285	$793,084	$506,075
Total TRC Benefits	**$4,658,963**	**$5,046,018**	**$5,210,938**	**$3,241,800**
Net TRC Benefits	**$3,457,386**	**$3,596,917**	**$3,842,896**	**$2,149,035**
TRC B/C Ratio	**3.88**	**3.48**	**3.81**	**2.97**

Evaluation Outcomes and Recommendations

To improve the Multifamily Programs, the Evaluation Team identified the following outcomes and recommendations.

Outcome 1. The CALP offering proved lucrative again in CY 2018, despite changes to incentive levels. However, many property managers and owners who reserved CY 2018 funding did not complete projects in CY 2018. The Program experienced a strong interest in the CALP offering in CY 2018, with the Program Implementer receiving 318 applications and nearly doubling the number of applications paid from CY 2017 to CY 2018. Because of the reduction in the amount of the incentives, the Program Implementer was able to distribute funds across more applications than in CY 2017; however, many customers who secured CY 2018 funding did not complete their projects. Although these projects are in the CY 2019 pipeline, project delays meant the Program did not meet its electric savings goal.

Recommendation 1. Although Program incentive changes helped control property owner and manager interest, the Program may benefit from setting special deadlines or offering bonus incentives to customers who complete CALP projects within the year in which funds are reserved. Consider contacting customers or Trade Allies a certain period before and after the estimated completion date to check on the likelihood of completing the project. To apply Program funding from cancelled projects, consider establishing a wait list for property managers and owners who are interested in moving forward only at CALP incentive levels.

Outcome 2. The Program Implementer assists property managers and owners in identifying building opportunities, but the assessment report's executive summary would benefit from providing a clearer call to action. The Program Implementer performs walkthroughs and provides a comprehensive report, helpful in identifying building-specific energy-saving opportunities. The report includes photos and descriptions of existing equipment that could be replaced to improve building efficiency, along with links to Program incentive information and products qualified for Focus on Energy incentives. However, the report's opening paragraphs do not detail the property manager's or owner's next steps.

Recommendation 2. Because property managers and owners may not read the entire report to determine their next steps in the process, consider incorporating some specific actions for prospective customers. Incorporate a visual element that identifies a few opportunities with the greatest potential for energy savings at a reasonable return on the property manager's or owner's investment. Personalize the content by noting that the Energy Advisor's contact information is provided at the end of the report, and property managers and owners can expect their Energy Advisors to follow up with them within a set time period.

Appliance Recycling Program

In January 2017, Focus on Energy relaunched the Appliance Recycling Program to expedite the retirement of old, inefficient appliances in order to reduce peak demand and increase annual energy savings. The Program was suspended temporarily from November 2015 through December 2016 because of complications with the Program Implementer at that time. ARCA has implemented the Program since calendar year (CY) 2017, and APTIM serves as the Program Administrator.

Through the CY 2018 Program, Focus on Energy offered customers free pick-up and recycling of old appliances, with a $35 incentive for each refrigerator or freezer recycled (limited to two per address every three years). To be eligible for pick-up through the Program, a customer's refrigerator or freezer had to be in working condition and between 10 and 30 cubic feet in size in addition to other logistical requirements. The Program Implementer arranged for these appliances to be dismantled and recycled in an environmentally responsible manner.

This section presents the impact and process findings for the CY 2018 Appliance Recycling Program. Table 24 lists the Program's actual spending, savings, participation, and cost-effectiveness for CY 2018, CY 2017, and for the quadrennial from CY 2015 through CY 2018.

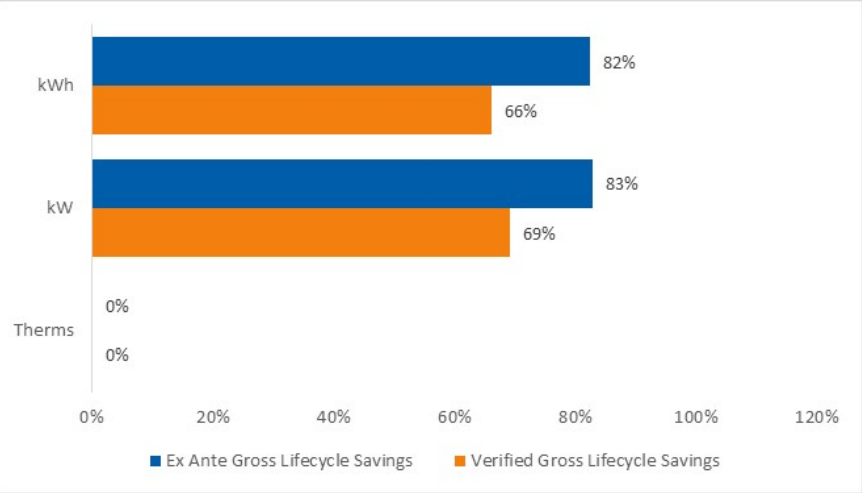
Table 24. Appliance Recycling Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)[a]
Incentive Spending	$	$465,675	$446,845	$1,654,600
Verified Gross Lifecycle Savings	kWh	100,878,456	98,578,539	340,349,280
	kW	1,228	1,233	4,517
	therms	0	0	0
Verified Gross Lifecycle Realization Rate	% (MMBtu)	80%	85%	85%
Net Annual Savings	kWh	5,389,308	5,448,059	17,581,191
	kW	654	660	2,105
	therms	0	0	0
Net Annual Net-to-Gross	% (MMBtu)	53%	54%	53%
Participation	Number of Participants	12,074	11,423	40,282
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.92	1.10	1.66

[a] Quadrennial results reflect the Program's suspension in CY 2016.

Figure 6 shows the percentage of gross lifecycle savings goals achieved by the Program in CY 2018. The Program did not meet any of its CY 2018 goals, but achieved 69% of verified gross lifecycle kilowatt savings goal, 66% of verified gross lifecycle kilowatt-hour savings, 82% of *ex ante* gross kilowatt-hour savings, and 83% of *ex ante* kilowatt savings. As discussed in the *Program Goals* section, the Program met 84% of its CY 2018 unit goal; this directly affected its ability to meet the CY 2018 ex ante savings goals. Verified savings goals were further impacted by CY 2018 realization rates, which decreased due to the Program's measure mix and measure characteristics (see the *Impact Evaluation* section for additional details).

Figure 6. Appliance Recycling Program Achievement of CY 2018 Gross Lifecycle Savings Goals



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Program in CY 2018. The Team designed its EM&V approach to integrate multiple perspectives in assessing the Program's performance over the quadrennial. Table 25 lists the specific data collection activities and sample sizes used in the evaluations.

Table 25. Appliance Recycling Program Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Program Administrator Interview	1
Tracking Database Review	Census
Ongoing Participant Satisfaction Surveys	1,572

Program Actor Interviews

In September 2018, the Evaluation Team interviewed Program Administrator staff to learn about the status of the Program at that time. The interview covered topics such as Program design and goals, marketing strategies, and data tracking to gain a better understanding of high-level changes, successes, and Program concerns.

Tracking Database Review

The Evaluation Team reviewed the census of Program SPECTRUM tracking data via several tasks:

- Thoroughly reviewed the data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigned adjustment measures to measure names
- Checked for complete and consistent application of data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct quarterly satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. In the prior evaluation cycle (CY 2011–CY 2014), the Program Administrator had designed, administered, and reported on customer satisfaction metrics. There were two goals of the CY 2015–CY 2018 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

The Evaluation Team also used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfaction KPIs.

The Team used SPECTRUM data to sample CY 2018 participants and administered web-based satisfaction surveys. In total, 1,572 customers responded to the CY 2018 survey regarding several topics, such as:

- Overall satisfaction
- Satisfaction with Program staff
- Satisfaction with the incentive
- Likelihood of recommending the Program
- Likelihood of initiating another energy efficiency improvement
- Open feedback regarding the Program (comments and suggestions)

Impact Evaluation

To calculate gross savings, the Evaluation Team reviewed the Program tracking data provided by the Program Implementer, then combined these data with results from the participant surveys conducted in CY 2017. To calculate net savings, the Evaluation Team applied the verified NTG ratio derived from CY 2017 participant survey data.

This section provides impact evaluation findings for the Program, derived from the tracking database reviews, CY 2017 participant surveys, and multivariate regression modeling.

Evaluation of Gross Savings

The Evaluation Team reviewed SPECTRUM and the Program Implementer's tracking database then applied the most recent research findings to estimate gross savings, as described below.

Tracking Database Review

The Evaluation Team reviewed the CY 2018 data in SPECTRUM and in the Program Implementer's tracking database for completeness and quality. The Program tracking database review was necessary because SPECTRUM does not contain many of the appliance characteristics necessary for estimating verified gross savings; most importantly, the size, age, and configuration of Program units.

The Evaluation Team received Program tracking data in January 2019. The Evaluation Team made no other adjustments to the SPECTRUM *ex ante* savings after reviewing the tracking data.

Verified Unit Energy Savings

In CY 2018, as in prior evaluations, the Team calculated gross savings for the Appliance Recycling Program following three steps. A detailed explanation of the multivariate regression modeling methodology and results can be found in Appendix H.

1. Model the unit energy consumption (UEC) by applying CY 2018 Program measure characteristics to regression models that are based on metered data
2. Apply part-use factors (derived through CY 2017 participant surveys) to the UEC to calculate the average per-unit gross savings for the CY 2018 appliances
3. Apply the per-unit energy savings (UES) to all measures in the tracking data to calculate gross Program savings

Table 26 shows the modeled UEC and calculated part-use factors for refrigerators and freezers. The UEC has decreased throughout the quadrennial, from maximum UECs of 1,158 for refrigerators and 1,077 for freezers in CY 2015. This decrease in UEC is due to newer, more efficient units being recycled through the Program. It is common for appliance recycling programs to experience this decrease as they mature and deplete the inventory of older appliances in service territory homes.

The Team also applied refrigerator and freezer part-use factors from the CY 2017 participant survey: 0.86 for refrigerators and 0.76 for freezers.

Table 26. CY 2018 Appliance Recycling Program Gross Per-Unit Savings by Measure

Measure	Unit Energy Consumption (kWh/Year)	CY 2018 Part-Use Factor	Verified Gross Per-Unit Energy Savings (kWh/Year) (UEC * Part-Use Factor)
Refrigerator	943	0.86	809
Freezer	799	0.76	606

CY 2018 Verified Gross Savings Results

Overall, the Program achieved an evaluated annual MMBtu realization rate of 80% (Table 27).[10] Verified gross savings were lower than *ex ante* savings because of adjustments for measured energy consumption and the application of part-use factors. Compared to CY 2017, refrigerator realization rates decreased slightly due to differences in measure mix and measure characteristics between CY 2017 and CY 2018. Freezer realization rates dropped more significantly compared to CY 2017 because the UEC decreased approximately 100 kWh per unit in CY 2018. This decrease was largely driven by CY 2018

[10] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

freezers being approximately two years younger than CY 2017 units and the number of pre-1990 freezers decreasing by approximately 13% in CY 2018.

Table 27. CY 2018 Appliance Recycling Program Annual and Lifecycle Realization Rates by Measure

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Freezer	77%	72%	n/a	77%	77%	72%	n/a	77%
Refrigerator	81%	87%	n/a	81%	81%	87%	n/a	81%
Total	**80%**	**83%**	**n/a**	**80%**	**80%**	**83%**	**n/a**	**80%**

Table 28 lists the *ex ante* and verified annual gross savings for the CY 2018 Program.

Table 28. CY 2018 Appliance Recycling Program Annual Gross Savings Summary by Measure

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Freezer	2,609,520	322	0	2,013,081	232	0
Refrigerator	9,955,045	1,148	0	8,074,765	996	0
Total Annual	**12,564,565**	**1,470**	**0**	**10,087,846**	**1,228**	**0**

Table 29 lists the *ex ante* and verified gross lifecycle savings by measure type for the CY 2018 Program.

Table 29. CY 2018 Appliance Recycling Program Lifecycle Gross Savings Summary by Measure

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Freezer	26,095,200	322	0	20,130,806	232	0
Refrigerator	99,550,450	1,148	0	80,747,650	996	0
Total Lifecycle	**125,645,650**	**1,470**	**0**	**100,878,456**	**1,228**	**0**

Evaluation of Net Savings

The Evaluation Team did not conduct participant surveys to update net savings in CY 2018. Rather, the Team applied the verified NTG ratio from the CY 2017 evaluation, which employed a decision-tree approach as described in the *Uniform Methods Project* (UMP)[11] to calculate and present net Program savings. The decision tree—populated by the responses of surveyed CY 2017 Program participants and information gathered from interviewed market actors in other appliance recycling program evaluations—presents all the Program's possible savings scenarios.

[11] The *Uniform Methods Project* is a framework and set of protocols established for determining energy savings from energy efficiency measures and programs.
National Renewable Energy Laboratory. September 2017. *Uniform Methods Project for Determining Energy Efficiency Program Savings for Specific Measures.* "Chapter 7: Refrigerator Recycling Evaluation Protocol." https://www.nrel.gov/docs/fy17osti/68563.pdf

The Team applied the CY 2017 measure-level NTG ratios to the appliance recycling measures (51% NTG ratio for refrigerators and 64% NTG ratio for freezers), resulting in a Program-level NTG ratio of 53%. This Program-level NTG ratio is slightly less than the CY 2017 Program-level NTG ratio (54%) due to the different distribution of freezers and refrigerators between CY 2017 and CY 2018. A detailed description of the net savings analysis was included in Appendix I of the *CY 2017 Evaluation Report*.[12]

Table 30 shows the annual net energy impacts (kilowatt-hours and kilowatts) by Program measure. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 30. CY 2018 Appliance Recycling Program Annual Net Savings

Measure	Annual Net	
	kWh	kW
Freezer	1,281,413	148
Refrigerator	4,107,895	506
Total Annual	**5,389,308**	**654**

Table 31 shows the lifecycle net energy impacts (kilowatt-hours and kilowatts) by Program measure.

Table 31. CY 2018 Appliance Recycling Program Lifecycle Net Savings

Measure	Lifecycle Net	
	kWh	kW
Freezer	12,814,131	148
Refrigerator	41,078,948	506
Total Lifecycle	**53,893,080**	**654**

Process Evaluation

In CY 2018, the Evaluation Team addressed key process research questions by conducting in-depth interviews with Program actors and surveying participating customers on several topics:

- Program accomplishments
- Opportunities to streamline Program delivery
- Drivers of participation
- Customer awareness and satisfaction

This section outlines the Program design, delivery, and goals, marketing and outreach, and customer experience based on the survey and interview results.

[12] Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute. May 22, 2018. *Focus on Energy Calendar Year 2017 Evaluation Report Appendices*. Refer to Appendix I.

Program Design, Delivery, and Goals

The Program Implementer operated the CY 2018 Program as designed with no significant changes from CY 2017.

According to the Program Administrator, the CY 2018 Program ran smoothly with few customer issues or complaints. The Program Implementer made incremental improvements to provide better coverage statewide and reduce average pick-up times, which the Program Administrator attributed to subcontracting pick-up trucks and crews (see the *Program Management and Delivery Structure* section). The Program Administrator reported having a positive working relationship with the Program Implementer and frequent contact among staff members.

Program Administrator and Program Implementer data systems have been successfully integrated and operated effectively. In CY 2018, the Program Implementer provided the Program Administrator with access to dashboard reporting, which the Program Administrator reported has met expectations and proved as a useful tool that provides sufficiently detailed information about the Program.

Program Management and Delivery Structure

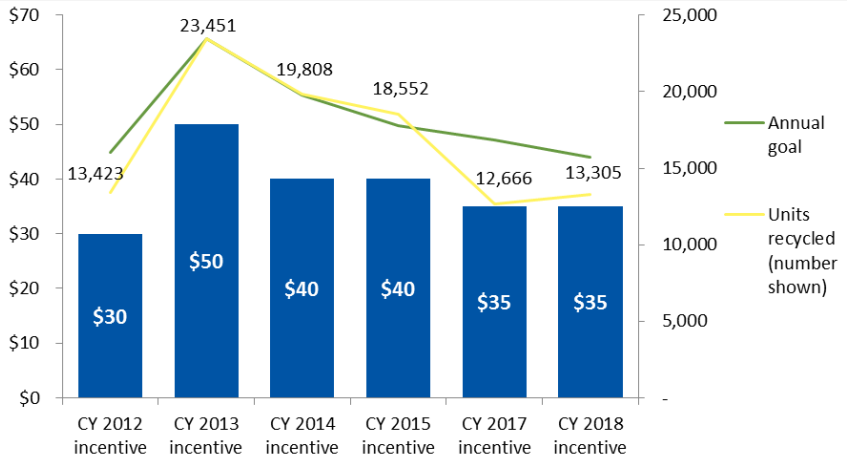
In CY 2018, the Program Administrator was responsible for management and administration of the Program, which involved general management, monthly reports to the PSC, and overseeing marketing. The Program Implementer oversaw all aspects of Program delivery including appliance pick-up and recycling, producing and distributing marketing materials, managing the call center and online scheduler, and data reporting. Toward the end of CY 2017, the Program Implementer hired a subcontractor to provide trucks and pick-up crews, which improved scheduling and logistics by distributing more drivers and dispatch points around the state. Although scheduling cycle times did not improve immediately following this change, average cycle times have remained in a stable range as participation has increased.

Program Goals

In CY 2018, participants recycled 13,305 appliances through the Appliance Recycling Program, which was 84% of the annual goal of 15,793 units. This represented an improvement from CY 2017, when the Program achieved 75% of its annual unit goal.

Incentive levels have historically played a major role in the achievement of Program goals, as demonstrated by the relationship between the incentive levels and recycled units over that last five years. Figure 7 shows a consistent pattern of higher participation in the Program when the incentive levels were higher and less participation when incentives were lower. When the Appliance Recycling Program was relaunched in CY 2017, the Program Administrator established a lower incentive amount and lower unit goal in part out of concern that pent-up demand from the Program's suspension could outpace the budget available for the year (that is, that higher incentives would cause the Program to run out of money before December).The Program offered the same incentive amount in CY 2018 and participation remained relatively stable from CY 2017.

Figure 7. Appliance Recycling Program Annual Goals, Units Recycled, and Incentive Levels



Source: SPECTRUM database and Program Administrator interview.

Key Performance Indicators

For CY 2018, the Program Administrator required the Program Implementer to track progress against several KPIs for the Appliance Recycling Program, as shown in Table 32.

The Program achieved or nearly achieved all KPIs. The cross-promotion KPI was nearly met, with only one marketing tactic fielded instead of the targeted two. The Program achieved KPIs for days an incentive was outstanding (averaged less than 5 weeks) Program satisfaction (9.27), cancellation and rescheduling (1.56%), and customer likelihood of making more improvements (6.63).

Table 32. Appliance Recycling Program CY 2018 Key Performance Indicators

KPI	Measurement	Results	Source
Reduce/maintain the number of days an incentive is outstanding	Maintain an average of 25 business days (5 calendar weeks) or less for an outstanding incentive	**Accomplished**: Average 32.0 calendar days (less than 5 weeks)[a]	SPECTRUM
Increase/maintain customer satisfaction	Meet or exceed baseline customer satisfaction score of 9.26	**Accomplished**: Average score of 9.27	Annual Customer Satisfaction Surveys
Reduce/maintain the number of cancelled or rescheduled pick-ups	Maintain an average of 3% or less pick-ups cancelled or rescheduled	**Accomplished:** 1.56% of orders cancelled or rescheduled	Reported by Program Implementer
Cross-promote Focus on Energy programs	Design at least two marketing tactics to encourage existing customers to engage with other Focus on Energy programs	**Nearly Accomplished**: Customers given collateral promoting Simple Energy Efficiency	Reported by Program Implementer
Increase/maintain customer likelihood to initiate more efficiency improvements	Meet or exceed baseline likelihood to initiate other efficiency improvements score of 6.46	**Accomplished:** Average score of 6.63	Annual Customer Satisfaction Surveys

[a] The days an incentive is outstanding is the difference between the *Pick-Up Date* in supplemental Program Implementer data and *Date of Status Change to Paid* in SPECTRUM data.

Data Management and Reporting

The Program Implementer continued to track Program participation in Focus on Energy's SPECTRUM database. The Program Administrator did not report any major concerns with using the database but did note that the Program Implementer had requested improvements to the system for bulk data uploading.

Marketing and Outreach

The Program Implementer produced marketing materials for the Program, which convey Focus on Energy branding and are sometimes co-branded with participating utilities. The Program Implementer also purchased media for advertising (including online) and on some occasions the Program Administrator and the Program Implementer combined advertising budgets to achieve lower bulk rates. The Program Implementer also tracked advertising effectiveness and shifted funds to better-performing channels as needed. The Program Administrator maintained the Focus on Energy website and managed outreach through social media, with content provided by the Program Implementer. The Program Administrator reported that in CY 2018, the Program Implementer did not make any significant changes to the marketing channels and messaging used to promote the Program in CY 2017.

Customer Experience

The Evaluation Team analyzed scheduling and check payment cycle times from Program records and surveyed 1,572 participants regarding satisfaction with their Program experience.

Scheduling and Check Payment Cycle Times

The Evaluation Team used Program records from SPECTRUM and supplemental Program data from the Program Implementer to measure cycle times for scheduling (number of days from enrollment to pick-up) and check payment (number of days from pick-up to check mailing; that is, days an incentive is outstanding). Results of both cycle times are shown in Table 33.

Similar to CY 2017, in CY 2018 scheduling cycle times were consistent across quarters, despite a six-fold increase in participation from Q1 (average 15.3 days between scheduling and pick-up) to Q4 (average 21.0 days). For CY 2018 overall, the average scheduling cycle was 19.5 days, and 31% of participants waited 21 days or more for pick-up (comparable to the KPI of 14 business days, or about three weeks, for scheduling in outlying areas). For comparison, in CY 2017 the average schedule cycle was 16.5 days and only 23% waited 21 days or more for pick-up. Check payment cycles showed greater variance between quarters in CY 2018, increasing from an average of 22.3 days in Q1 to 38.1 days in Q4, with 61% of Q4 customers waiting 35 days or more for their checks to be mailed. The larger variance in CY 2018 was due to the Program Administrator transitioning how it tracked cycle times midyear. Overall, the average check cycle for CY 2018 was 32 days, which was an improvement from 34 days in CY 2017 and was comparable to the KPI of 25 business days (five weeks) for check payment.

Table 33. Scheduling and Check Payment Cycle Times

Period	Scheduling Cycle Time[a]			Check Payment Cycle Time[b]		
	Valid Count	Average in Days	% 21 Days or More	Valid Count	Average in Days	% 35 Days or More
Q1	781	15.3	22%	781	22.3	0%
Q2	3,076	17.5	26%	3,077	27.1	13%
Q3	2,786	20.1	32%	2,785	29.4	16%
Q4	4,934	21.0	35%	4,935	38.1	61%
CY 2018 Total	**11,577**	**19.5**	**31%**	**11,578**	**32.0**	**33%**

[a] Scheduling cycle time is the time difference between the *Date Submitted* and the *Pick-Up Date* in supplemental Program Implementer data. The Evaluation Team has historically calculated scheduling cycle time by comparing the Application Received Date from SPECTRUM to Pick-up Date in the Implementer's supplemental data. In CY 2018, these fields were frequently the same date, implying that the pickup was scheduled and completed on the same day. Because Date Submitted in the Implementer's supplemental data did not match the Application Received Date field in SPECTRUM, the Team used both Date Submitted Date and Pick-up Date from the supplemental data to calculate scheduling cycle time.
[b] Check payment cycle time is the difference between the *Pick-Up Date* in supplemental Program Implementer data and the *Status Changed To Paid Date* in SPECTRUM.

Annual Results from Ongoing Customer Satisfaction Surveys

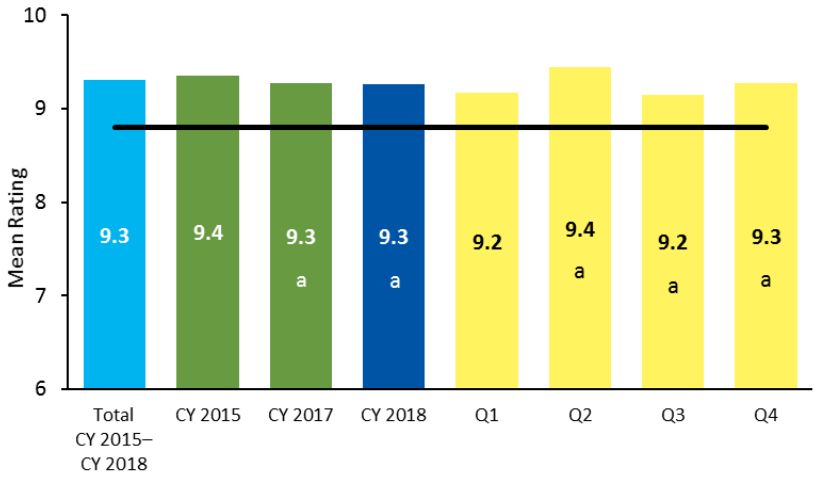
Throughout CY 2018, the Evaluation Team surveyed Program participants to measure their satisfaction with various aspects of the Program. Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.[13]

As shown in Figure 8, the average overall Appliance Recycling Program satisfaction rating among CY 2018 participants was 9.3, equivalent to the average rating from CY 2017 participants (also 9.3). This Program's satisfaction rating was significantly higher than the portfolio baseline for CY 2018 and for the last three quarters of the year.[14] Appliance Recycling Program participants gave this Program the highest satisfaction ratings of any Focus on Energy residential program in CY 2018, CY 2017, and over the entire quadrennial (all 9.3).

[13] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[14] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value was used to establish a KPI for the Program Implementer to meet or exceed over the last three years of the CY 2015–CY 2018 quadrennial.
The Evaluation Team found that some surveys did not include identifying information to match survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Figure 8. CY 2018 Overall Program Satisfaction



Source: Appliance Recycling Program Customer Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=420, CY 2017 n=2,016, CY 2018 n=1,567, Q1 n=18, Q2 n=290, Q3 n=449, Q4 n=714) Total CY 2015–CY 2018 is the participation-weighted average of three annual results (the Appliance Recycling Program was suspended in CY 2016).

[a] This result is statistically significantly different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 34 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, the only rating that was significantly different from the previous year was the likelihood of making more energy-saving improvements (averaging 6.6, down from 7.2 in CY 2017).

Table 34. CY 2018 Average Ratings for Appliance Recycling Program

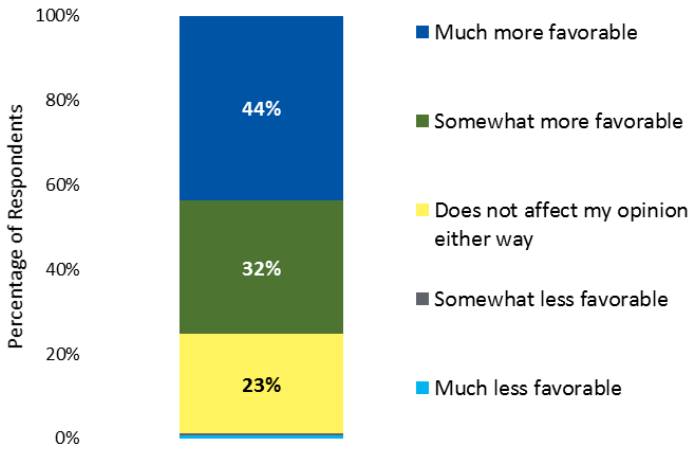
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with Program staff	9.3	Program and surveys were suspended	9.3	9.2
Satisfaction with incentive	8.5		8.5	8.6
Likelihood of making more improvements	6.4		7.2	6.6[a]
Likelihood of recommending the Program	Not asked		9.5	9.5

[a] This result is statistically significantly different from the result for CY 2017 (p<0.05 using a binomial t-test).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 the percentage of detractors (respondents giving a rating of 0 to 6). The NPS for CY 2018 participants was +84, identical to the +84 NPS in CY 2017. The Appliance Recycling Program NPS was one of the highest in the residential portfolio for CY 2018.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 44% gave the highest rating of *much more favorable* (Figure 9). Just 23% said that their opinion was not affected, and only 1% survey respondents (17 out of 1,445) reported that their opinion of their utility had become *somewhat less favorable* or *much less favorable*.

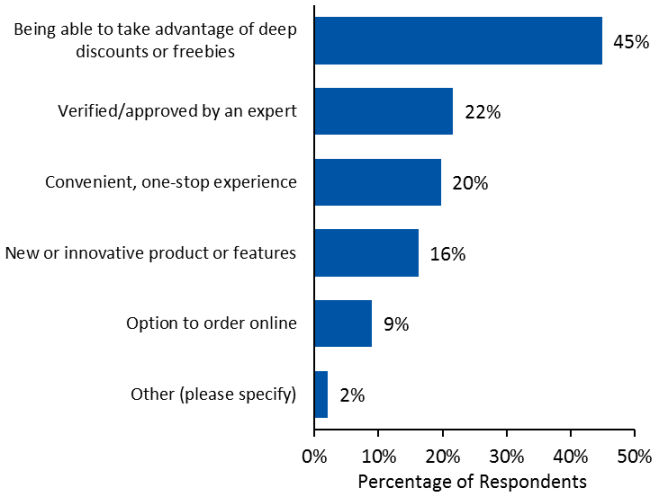
Figure 9. CY 2018 Effect of Focus on Energy Offerings on Opinion of Utilities



Source: Appliance Recycling Program Customer Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (CY 2018 n=1,445)

Program participants were asked to identify the two factors they value most in making purchase decisions (Figure 10). The most frequent response was deep discounts and "freebies" (45%), followed by verification and approval from an expert (22%) and a convenient shopping experience (20%), while only 9% mentioned ordering online.

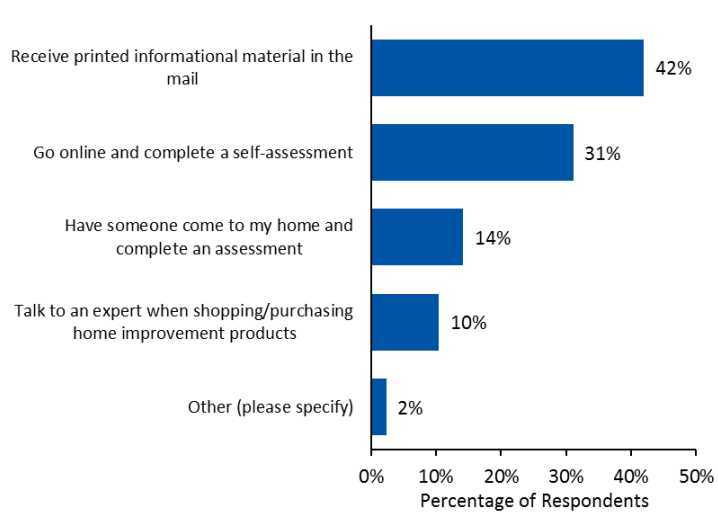
Figure 10. CY 2018 Most Valued Factors in Purchase Decisions



Source: Appliance Recycling Program Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=1,458)

Program participants were asked how they most preferred to learn about opportunities to improve the energy efficiency of their homes (Figure 11). The two top responses were printed material in the mail (42%) and online self-assessments (31%).

Figure 11. CY 2018 Preferred Methods for Learning About Energy Efficiency Opportunities

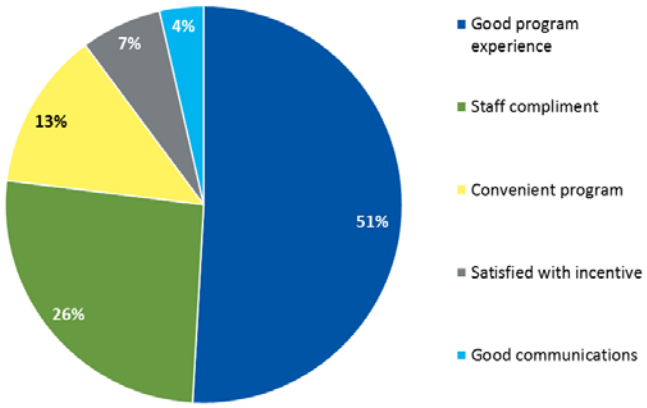


Source: Appliance Recycling Program Ongoing Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (CY 2018 n=1,292)

The customer satisfaction survey respondents also provided comments or suggestions for improving the Program. Of the 1,572 participants who responded to the survey, 441 (or 28%) provided open-ended feedback, which the Evaluation Team coded into a total of 547 mentions. Of these mentions, 334 were positive or complimentary comments (61%) and 213 were suggestions for improvement (39%).

The positive responses are shown in Figure 12, with 51% reflecting a generally positive experience, 26% complimenting the Program staff and pick-up crew, and 13% reflecting the ease and convenience of participating in the Program. These results were similar to the results in CY 2017.

Figure 12. CY 2018 Positive Comments about the Program



Source: Appliance Recycling Program Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (CY 2018 total positive mentions n=334)

Participants' suggestions for improvement are shown in Figure 13. In CY 2018, the most frequent customer suggestions involved improving customer service (32%), reducing the wait for pick-up (24%), improving Program communications (15%), and reducing the wait for receiving payment (8%). In

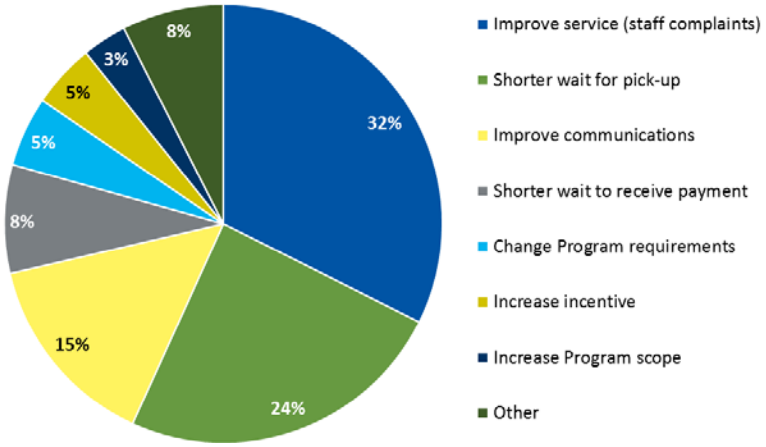
CY 2017, there were more suggestions relating to Program communications (31%) and reducing the wait for payment (20%), but fewer mentions of improving customer service (16%) or reducing the wait for pick-up (8%). The increase in CY 2018 participant suggestions to reduce the wait for pick-up and decrease in suggestions to reduce the wait for payment correspond to trends in scheduling and payment cycle times since CY 2017: these suggestions increased when cycle times grew longer (scheduling) and decreased when cycle times grew shorter (payment). Suggestions to increase incentives have been consistently uncommon, at 5% of suggestions in CY 2018 and 4% to 6% in previous years.

Suggestions for improving communications tended to focus on three areas:

- Too many confirmation calls from the automated calling system, including calls continuing after a date was not confirmed
- Not receiving a call to confirm an appointment time
- Lack of promotion and awareness of Appliance Recycling Program rebates

A smaller number of suggestions about communication reflected a desire for more clear and accurate information about Program requirements, such as the acceptable condition of units for pick-up and the amount of the rebate.

Figure 13. CY 2018 Suggestions for Improving the Program



Source: Appliance Recycling Program Customer Satisfaction Survey Question. “Please tell us more about your experience and any suggestions.” (CY 2018 total suggestions for improvement mentions n=213)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 35 lists the CY 2017 and CY 2018 incentive costs for the Appliance Recycling Program.

Table 35. Appliance Recycling Program Incentive Costs

	CY 2018	CY 2017
Incentive Costs	$465,220	$446,565

The Evaluation Team found that the CY 2018 Appliance Recycling Program was cost-effective (1.92). Table 36 lists the evaluated costs and benefits.

Table 36. Appliance Recycling Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017
Costs		
Administration Costs	$0	$530,547
Delivery Costs	$1,608,904	$1,209,883
Incremental Measure Costs	$611,406	$347,262
Total Non-Incentive Costs	**$2,220,310**	**$2,087,692**
Benefits		
Electric Benefits	$3,599,329	$1,941,575
Gas Benefits	$0	$0
Emissions Benefits	$656,272	$363,509
Total TRC Benefits	**$4,255,601**	**$2,305,084**
Net TRC Benefits	**$2,035,291**	**$217,392**
TRC B/C Ratio	**1.92**	**1.10**

Evaluation Outcomes and Recommendations

The Evaluation Team identified several outcomes and recommendations to improve the Appliance Recycling Program.

Outcome 1. The Evaluation Team found discrepancies between dates recorded in SPECTRUM and supplemental data provided by the Program Implementer. When performing the cycle time analysis, the Evaluation Team found that enrollment dates in SPECTRUM did not correspond to enrollment dates provided by the Implementer. Beginning in quarter 2, SPECTRUM enrollment dates are mostly the same as the Implementer's pick-up dates, while the Implementer's enrollment dates are earlier than the corresponding dates in SPECTRUM. It is important that these dates are consistent and accurate because they are used to analyze check payment cycle time (days an incentive is outstanding), which is a Program KPI.

Recommendation 1. Provide more quality control checks to ensure that all data relating to Program KPIs is correct in SPECTRUM and corresponds to data the Program Implementer uses to track KPIs. Any midyear changes to data structure should be well documented for performing evaluation analysis and calculating KPIs accurately.

Outcome 2. Improving customer service was the most common suggestion for improvement from participants this year. In CY 2018 customer satisfaction surveys, 32% of customers' suggestions for Program improvement were related to customer service, an increase from 16% in CY 2017. Also, while positive comments about staff continued to outnumber complaints, the ratio of compliments decreased

notably in CY 2018: participants reported 1.3 times as many compliments than complaints in CY 2018 compared to four times more compliments than complaints in CY 2017. Because satisfaction with Program staff remained high (9.2 in CY 2018 versus 9.3 in CY 2017), the Evaluation Team does not necessarily think customer service is a problem for the Program at this point. However, the increased number of customer service recommendations could be an early indicator of decreased satisfaction.

Recommendation 2. Establish and follow a continuous improvement plan to ensure adequate quality control, oversight, and regular training of all staff, including subcontractor crews, in order to maintain or improve on the current high level of customer service levels. A continuous improvement model will allow Program staff to proactively address customer service concerns early, instead of reacting to problems after they arise.

Outcome 3. Some customers were unhappy with repetitive robo-call reminders. In CY 2018, some customers noted that after they had rescheduled or cancelled an appointment, they continued to receive automated reminder calls for the originally scheduled appointment.

Recommendation 3. Ensure that the data used to generate automated appointment reminder calls is updated for rescheduled or cancelled appointments in a timely fashion.

Outcome 4. Reducing the check payment cycle time (days incentive outstanding [DIO]) was a common suggestion from participants. Although the Program KPI to keep the average check payment cycle time under 5 weeks was met for CY 2018 overall, most Q4 participants waited more than 5 weeks for their rebate checks to be mailed. There was a clear relationship between participation levels and payment cycle times, with Q4 having the largest number of participants and the longest average payment cycle time.

Recommendation 4. Streamline the approval and payment process. If the Program Implementer is not already doing so, consider starting the payment approval process as soon as customers are qualified for enrollment rather than following pick-up. This will allow a quicker payment turnaround because checks will only need to be printed and mailed following confirmation that qualifying units were picked up.

If the Program Implementer already begins the payment approval process upon enrollment, the Program Administrator and Implementer should examine the process to identify and mediate bottlenecks that may delay check delivery.

Home Performance with ENERGY STAR Program

The Home Performance with ENERGY STAR® Program encourages comprehensive energy efficiency retrofits in single-family homes with three or fewer units. Focus on Energy designed the Program to address customers' uncertainty about home improvements, possible costs, and potential energy savings by providing information and recommendations specific to each customer's home. The Program offers four participation paths:

- A whole home path for building shell improvements
- An HVAC path for heating and cooling improvements
- A Renewable Rewards path, available to residential and small business customers
- A Rural Home Performance path, offering enhanced incentives for rural customers

The whole home and HVAC Program components offer two incentive tiers for energy efficiency improvements:

- Tier 1, the standard track, offers incentives to all homeowners
- Tier 2, the income-qualified track (IQT), offers enhanced incentives to homeowners with a household income at or below 80% of the state median income

As part of the PSC's initiative to enhance Focus on Energy services to rural customers, Home Performance with ENERGY STAR continued to offer enhanced rebates to rural customers in CY 2018. Because the Program's uptake from its rural offer in CY 2017[15] was slower than anticipated, Focus on Energy replaced the offer in CY 2018 with a $250 rebate for a furnace tune-up and smart thermostat installation, bundled together.

In August 2018, areas of central and southern Wisconsin[16] suffered widespread flooding. The PSC approved Focus on Energy's plan to provide relief to flooding victims, including those whose mechanical systems were destroyed in the flooding. The plan increased standard (Tier 1) HVAC incentives by 50% to 150% for equipment installed between August 17, 2018 and March 1, 2019.

In CY 2018, Focus on Energy also pursued an initiative to train home inspectors to become certified Home Energy Score Certified Assessors™ and administer Home Energy Scores.[17]

This chapter provides aggregated and independent findings for all Program components and incentive tiers. Table 37 lists the Program's actual spending, savings, participation, and cost-effectiveness for

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[15] In CY 2017, the Program offered customers in rural zip codes an exclusive incentive of $300 off a home energy assessment.

[16] Adams, Columbia, Dodge, Green Lake, Jefferson, Marquette, Ozaukee, Monroe, Fond du Lac, Juneau, La Crosse, Vernon, Dane, Richland, Crawford, and Sauk counties.

[17] More information is available at the Home Energy Score's website: https://betterbuildingssolutioncenter.energy.gov/home-energy-score/

whole home and HVAC projects. These totals include Flood Relief projects, which comprised 194 participants and 204 units that would normally fall mostly under the HVAC path. These totals do not include Rural Home Performance path projects, which are accounted for separately below.

Table 37. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Summary

Item	Units	CY 2018	CY 2017[a]	Quad (CY 2015–CY 2018)[b]
Incentive Spending	$	$6,655,875	$6,167,919	$25,216,121
Participation[c]	Number of Participants	24,464	21,678	87,952
Verified Gross Lifecycle Savings	kWh	214,518,586	238,305,868	887,447,244
	kW	3,328	2,807	11,232
	therms	30,784,872	29,761,898	123,977,249
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	99%	100%
Net Annual Savings	kWh	9,869,621	9,566,078	38,015,737
	kW	2,639	2,302	9,598
	therms	1,453,499	1,146,071	4,809,678
Annual Net-to-Gross Ratio	% (MMBtu)	78%	78%	80%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.14	1.69	1.31

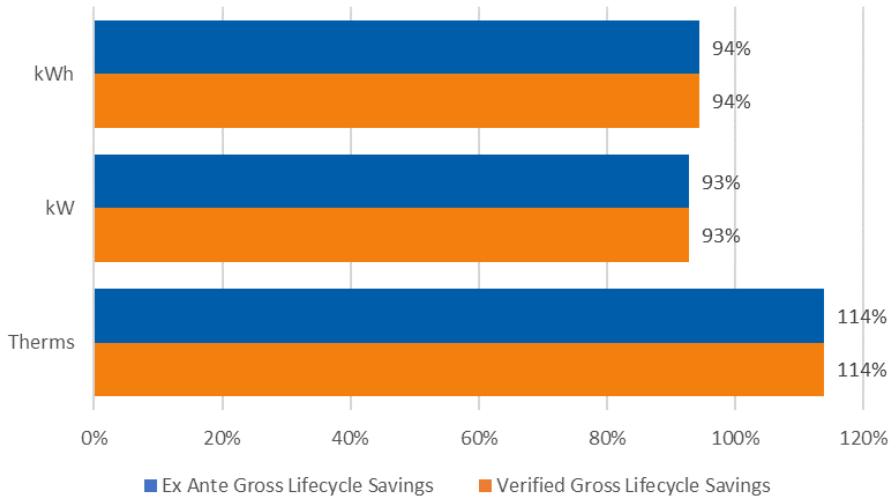
[a] These numbers differ from the CY 2017 Evaluation Report; they have been altered by four adjustments not registered in CY 2017.

[b] During CY 2017 review, an error became apparent in the CY 2016 electronically commutated motor (ECM) net calculations, as discussed in on page 105 of the *CY 2017 Evaluation Report, Volume II*. CY 2016 net kilowatt-hour savings should have been 8,965,649 kWh, with an overall annual NTG ratio of 86% for CY 2016. This error is rectified in the summary of quadrennial activities.

[c] Participation counts do not include Home Energy Score participants, as savings are not associated with the Home Energy Score initiative.

Figure 14 shows the percentage of gross lifecycle savings goals achieved by the whole home and HVAC paths in CY 2018. The Program met 94% and 93% of its CY 2018 goals for kilowatt-hour and kilowatt savings, respectively, and exceeded its CY 2018 therm goals for both *ex ante* and verified gross savings. The Program fell short of its kilowatt-hour and kilowatt goals due, in part, to the effective useful life (EUL) for combination furnace and air conditioner measures decreasing by eight years in CY 2018, which has a larger impact on electric savings than gas savings.

Figure 14. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementation contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

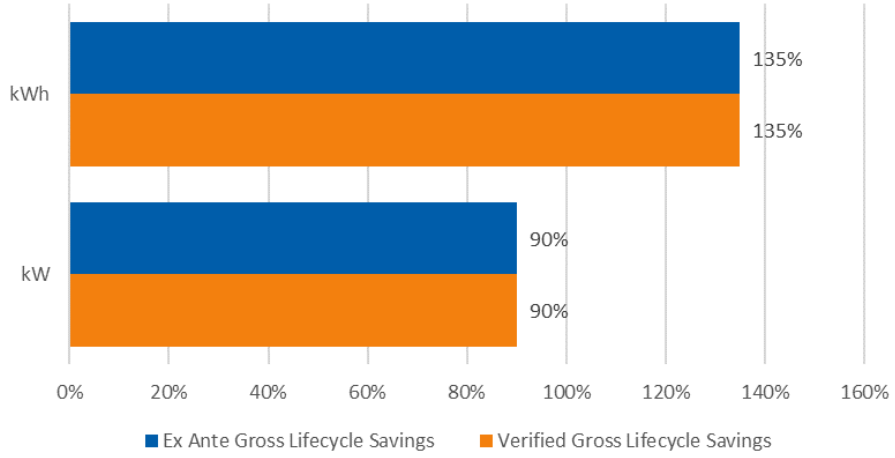
Table 38 lists the Program's actual spending, savings, participation, and cost-effectiveness for the Renewable Rewards path.

Table 38. Home Performance with ENERGY STAR Program Renewable Rewards Path Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015-CY 2018)
Incentive Spending	$	$1,766,638	$1,099,702	$4,902,636
Participation	Number of Participants	819	552	2,395
Verified Gross Lifecycle Savings	kWh	285,473,328	189,149,337	660,131,315
	kW	3,978	2,774	9,714
	therms	0	0	3,465
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	117%	108%
Net Annual Savings	kWh	8,294,897	5,455,105	19,104,990
	kW	2,875	2,013	6,868
	therms	0	0	56
Annual Net-to-Gross Ratio	% (MMBtu)	72%	72%	70%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.14	1.11	1.08

Figure 15 shows the percentage of gross lifecycle savings goals achieved by the Renewable Rewards path in CY 2018. The Program met 90% of its CY 2018 goal for kilowatt savings and exceeded electric CY 2018 goals for both *ex ante* and verified gross savings. These savings' achievements differ because the actual measure mix varied from the forecasted mix and because solar photovoltaic (PV) savings were updated in the TRM for CY 2018, increasing kilowatt-hours more significantly than kilowatts.

Figure 15. Home Performance with ENERGY STAR Program Renewable Rewards Path Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementation contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Table 39 lists the Program's actual spending, savings, participation, and cost-effectiveness for the Rural Home Performance path. The Program began offering this path in CY 2017; CY 2018 was the first year the Program claimed savings for it.

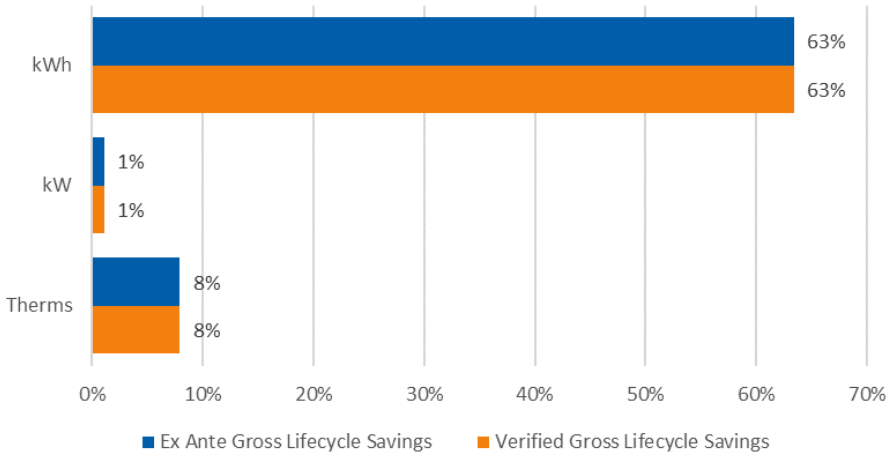
Table 39. Home Performance with ENERGY STAR Program Rural Home Performance Path Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2017-CY 2018)
Incentive Spending	$	$139,240	$0	$139,240
Participation	Number of Participants	317	0	317
Verified Gross Lifecycle Savings	kWh	1,487,872	0	1,487,872
	kW	1	0	1
	therms	139,520	0	139,520
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	0%	100%
Net Annual Savings	kWh	107,462	0	107,462
	kW	1	0	1
	therms	8,825	0	8,825
Annual Net-to-Gross Ratio	% (MMBtu)	61%	0%	61%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	0.27	n/a	0.27

Figure 16 shows the percentage of two-year (CY 2017–CY 2018) gross lifecycle savings goals achieved by the Rural Home Performance path in CY 2018. The Program met 63% of its two-year goal for kilowatt-hour savings, but met only 1% of its goal for kilowatt savings and only 8% of its goal for therms savings. The Program achieved a larger percentage of its kilowatt-hour goal than the kilowatt or therms goals because the Program structure was greatly changed after goals were set, switching from a building shell emphasis to a tune-up and smart thermostat one. The original Whole Home design offered greater kilowatt and therms savings opportunities, while kilowatt-hour savings were fairly similar between the

two designs. As noted above, CY 2018 was the first year the Program claimed savings; therefore, all achievement against the two-year goals occurred in CY 2018.

Figure 16. Home Performance with ENERGY STAR Program Rural Home Performance Path Achievement of CY 2017–CY 2018 Gross Lifecycle Savings Goal



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementation contract two-year goals for CY 2017 and CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals. This table shows achievement against a two-year goal; however, the Program did not claim savings in CY 2017.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the Home Performance with ENERGY STAR Program in CY 2018. The Team designed its EM&V approach to integrate multiple perspectives in assessing the Program's performance, largely applying applicable results from previous evaluation years to CY 2018 Program activity. Table 40 lists specific data collection activities conducted in CY 2018 and sample sizes used in the evaluations for each Home Performance with ENERGY STAR Program path.

Table 40. CY 2018 Home Performance with ENERGY STAR Program Data Collection Activities and Sample Sizes

Activity	Whole Home Path	HVAC Path	Renewable Rewards	Rural Home Performance
Program Actor Interviews	2			
Tracking Database Review	Census			
Ongoing Participant Satisfaction Surveys	253	1,064	218	Included in Whole Home Surveys

Program Actor Interviews

The Evaluation Team interviewed APTIM (the Program Administrator) and CLEAResult (the Program Implementer) initially in September 2018 and again in December 2018 and January 2019 to assess the

Program's status. Interview topics included Program performance and goals, marketing and outreach, Trade Ally networks, recent Program changes, and upcoming Program changes.

Tracking Database Review

The Evaluation Team's review of the Program's SPECTRUM tracking data census included the following tasks:

- Thoroughly reviewing the data to ensure SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Ongoing Participant Satisfaction Surveys

For the CY 2015–CY 2018 quadrennial, PSC requested that the Evaluation Team conduct satisfaction surveys, beginning in CY 2015. These surveys sought to provide a quick and easy feedback opportunity to recent Program participants, ensured timely feedback close to the participation experience, enabled problem identification at any time of year, and identified energy efficiency opportunities for delivering follow-up information to interested participants.

Through SPECTRUM, the Program Administrator deployed online surveys to all CY 2018 participants, provided they had email addresses, within two weeks of their participation. The Evaluation Team mailed paper surveys to HVAC and Renewable Rewards participants who did not have email addresses in SPECTRUM. The Evaluation Team gathered online survey results via SPECTRUM, and received and scanned mail survey responses, combining these with the online results for quarterly and annual reporting.

In CY 2018, 1,535 Home Performance with ENERGY STAR Program participants (253 whole home, 1,064 HVAC, and 218 Renewable Rewards) responded to the customer satisfaction survey (137 HVAC and 18 Renewable Rewards surveys were completed by mail and the rest online).

Impact Evaluation

This section presents impact evaluation findings for the whole home path and HVAC path by income track, as well as the Renewable Rewards path. The Evaluation Team based the impact evaluations on the methods shown in Table 41. Rural Home Performance path projects consisted of a mix of measures normally in the Whole Home and HVAC paths, and their evaluation followed the methods of those paths as appropriate.

Table 41. CY 2018 Home Performance with ENERGY STAR Impact Evaluation Methods

Activity	Whole Home Path	HVAC Path	Renewable Rewards
Tracking Database Review	✓	✓	✓
Billing Analysis	✓[a]	--	--
Participant Surveys	--	✓[b]	✓[c]
Standard Market Practice	--	✓[d]	--

[a] The Team applied CY 2017 whole home billing analysis results to CY 2018 whole home measures.

[b] The Team applied CY 2015 Residential Rewards participant survey self-report NTG results to CY 2018 HVAC path measures that were not included in the standard market practice analysis.

[c] The Team applied CY 2016 Renewable Rewards participant survey self-report NTG results to CY 2018 Renewable Rewards measures.

[d] The Team applied CY 2017 Standard Market Practice results to the same measures for CY 2018.

Evaluation of Gross Savings

The Evaluation Team assessed gross Program savings through a tracking database review.

Tracking Database Review

The Evaluation Team reviewed the census of CY 2018 Home Performance with ENERGY STAR Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EULs in adherence with the TRM.

Whole Home Path

The Evaluation Team adjusted unit kilowatt-hour, kilowatt, therms savings, and EUL for one measure and therms savings for one measure, as shown in Table 42, in accordance with the TRM. The adjustments had little effect on whole home path realization rates because of the small number of installed units for each measure.

Table 42. CY 2017 Whole Home Path Database Tracking Review Adjustments

Measure (MMID)	Value	SPECTRUM Per Unit	Adjusted Per Unit
Heat Pump Water Heater, Residential (MMID 4108)	Therms	0	-23
Water Heater, ≥0.82 EF, Tankless, Residential, Natural Gas (MMID 4828)[a]	kWh	0	-50
	kW	0	-0.0050
	Therms	34	52
	EUL	0	20

[a] Tracking data contained one unit of this MMID, but it should have been MMID 4836 (Tankless Water Heater, NG, EF ≥0.90). The Evaluation Team adjusted savings to match MMID 4836.

HVAC Path

The Evaluation Team found no discrepancies for the HVAC path during the tracking database review.

Renewable Rewards Path

The Evaluation Team found no discrepancies for the Renewable Rewards path during the tracking database review.

Renewable Rewards Path Savings

The Evaluation Team recommended changes to both ground-source heat pump (GSHP) and solar PV measures in the CY 2017 deemed savings report,[18] based on CY 2016 desk reviews of measure applications. These reviews revealed that GSHP-installed heating and cooling capacities were higher than the previously deemed capacities listed in the TRM, and that installed solar PV measures had different values for tilt, system size, and azimuth than the previously deemed values in the TRM.

These changes were implemented in the CY 2018 TRM and are reflected in SPECTRUM savings for CY 2018. Therefore, no gross savings adjustments were made to Renewable Rewards path savings for CY 2018.

CY 2018 Verified Gross Savings Results

Overall, the Home Performance with ENERGY STAR Program achieved an evaluated annual realization rate of 100% weighted by MMBtu.[19] Because previous adjustments have been implemented in the CY 2018 TRM, and almost all existing discrepancies between SPECTRUM and TRM savings have been eliminated, verified gross savings are in very close alignment with *ex ante* savings.

Table 43 shows realization rates by Program component, and Table 44 through Table 47 show realization rates by measure type for each Program component.

Table 43. CY 2018 Home Performance with ENERGY STAR Program
Annual and Lifecycle Realization Rates by Program Component

Program Component	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
HVAC—Flood Relief	100%	100%	100%	100%	100%	100%	100%	100%
HVAC—Standard Track	100%	100%	100%	100%	100%	100%	100%	100%
HVAC—IQT	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home—Standard Track	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home—IQT	100%	100%	100%	100%	106%	100%	100%	100%
Renewable Rewards	100%	100%	n/a	100%	100%	100%	n/a	100%
Rural Home Performance	100%	100%	100%	100%	100%	100%	100%	100%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

[18] Cadmus. August 31, 2017. *Focus on Energy Evaluated Deemed Savings Changes*. https://focusonenergy.com/sites/default/files/FoE_Deemed%20Savings%20Report_%20CY%2017_v1.7.pdf

[19] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 44. CY 2018 Whole Home Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Whole Home - Standard Track[a]	Adjustment Measure	100%	100%	100%	100%	100%	100%	100%	100%
	Project Completion	100%	100%	100%	100%	100%	100%	100%	100%
	Water Heater	100%	100%	62%	80%	100%	100%	62%	80%
Whole Home - Standard Track Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Whole Home - IQT[a]	Project Completion	100%	100%	100%	100%	106%	100%	100%	100%
Whole Home - IQT Total		**100%**	**100%**	**100%**	**100%**	**106%**	**100%**	**100%**	**100%**
Whole Home Total		**100%**	**100%**	**100%**	**100%**	**101%**	**100%**	**100%**	**100%**

[a] Tracking data included projects with air sealing, duct sealing, and insulation, but all savings for these measures were attributed to Project Completion measures.

Table 45. CY 2018 HVAC Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
HVAC—Flood Relief	Boiler	n/a	n/a	100%	100%	n/a	n/a	100%	100%
	Ductless Mini-Split Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
	Furnace and Air Conditioner	100%	100%	100%	100%	100%	100%	100%	100%
	Water Heater	97%	94%	99%	99%	95%	94%	101%	100%
	Furnace	100%	100%	n/a	100%	100%	100%	n/a	100%
	Furnace with ECM	100%	100%	100%	100%	100%	100%	100%	100%
HVAC—Flood Relief Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
HVAC—Standard Track	Adjustment Measure	100%	100%	100%	100%	100%	100%	100%	100%
	Air Source Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
	Tune-Up	n/a	n/a	100%	100%	n/a	n/a	100%	100%
	Boiler	n/a	n/a	100%	100%	n/a	n/a	100%	100%
	Ductless Mini-Split Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
	ECM	100%	100%	n/a	100%	100%	100%	n/a	100%
	Furnace and Air Conditioner	100%	100%	100%	100%	100%	100%	100%	100%
	Furnace with ECM	100%	100%	100%	100%	100%	100%	100%	100%
	Smart Thermostat	100%	100%	100%	100%	100%	100%	100%	100%
	Water Heater	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC—Standard Track Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
HVAC—IQT	Boiler	n/a	n/a	100%	100%	n/a	n/a	100%	100%
	Ductless Mini-Split Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
	Furnace and Air Conditioner	101%	101%	101%	101%	101%	101%	101%	101%
	Furnace with ECM	100%	100%	100%	100%	100%	100%	100%	100%
	Water Heater	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC—IQT Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
HVAC Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 46. CY 2018 Renewable Rewards Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Renewable Rewards	Ground-Source Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
	Solar PV	100%	100%	n/a	100%	100%	100%	n/a	100%
Renewable Rewards Total		**100%**	**100%**	**n/a**	**100%**	**100%**	**100%**	**n/a**	**100%**

Table 47. CY 2018 Rural Home Performance Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Rural Home Performance	Tune-Up	n/a	n/a	100%	100%	n/a	n/a	100%	100%
	Project Completion	100%	100%	100%	100%	100%	100%	100%	100%
	Smart Thermostat	100%	n/a	100%	100%	100%	n/a	100%	100%
Renewable Rewards Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 48 lists the *ex ante* and verified annual gross savings for each Home Performance with ENERGY STAR Program component for CY 2018. Table 49 through Table 52 show verified annual gross savings by measure type for each Program component.

Table 48. CY 2018 Home Performance with ENERGY STAR Program
Annual Gross Savings Summary by Program Component

Program Component	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
HVAC—Flood Relief	88,314	19	6,484	88,264	19	6,479
HVAC—Standard Track	10,552,954	2,896	1,263,515	10,552,020	2,895	1,263,456
HVAC—IQT	443,853	108	192,543	444,371	108	192,734
Whole Home—Standard Track	655,931	275	328,032	655,931	275	327,779
Whole Home—IQT	100,043	31	93,978	100,043	31	93,978
Renewable Rewards	11,557,728	3,978	0	11,557,728	3,978	0
Rural Home Performance	140,381	1	15,785	140,381	1	15,785
Total Annual	**23,539,204**	**7,308**	**1,900,337**	**23,538,738**	**7,308**	**1,900,211**

Table 49. CY 2018 Whole Home Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Whole Home—Standard Track[a]	Adjustment Measure	-151	0	-416	-151	0	-416
	Water Heater	18,264	1	658	18,264	1	405
	Project Completion	637,817	275	327,790	637,817	275	327,790
Whole Home—Standard Track Total Annual		**655,931**	**275**	**328,032**	**655,931**	**275**	**327,779**
Whole Home—IQT[a]	Project Completion	100,043	31	93,978	100,043	31	93,978
Whole Home—IQT Total Annual		**100,043**	**31**	**93,978**	**100,043**	**31**	**93,978**
Whole Home Total Annual		**755,974**	**306**	**422,010**	**755,974**	**306**	**421,757**

[a] Tracking data included projects with air sealing, duct sealing, and insulation, but all savings for these measures were attributed to Project Completion measures.

Table 50. CY 2018 HVAC Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
HVAC—Flood Relief	Boiler	0	0	1,913	0	0	1,913
	Ductless Mini-Split Heat Pump	11,398	1	0	11,398	1	0
	Furnace and Air Conditioner	10,360	6	580	10,360	6	580
	Water Heater	1,660	0	478	1,610	0	473
	Furnace	18,304	3	0	18,304	3	0
	Furnace with ECM	46,592	9	3,513	46,592	9	3,513
HVAC - Flood Relief Total Lifecycle		**88,314**	**19**	**6,484**	**88,264**	**19**	**6,479**

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
HVAC—Standard Track	Adjustment Measure	-267	0	57	-267	0	57
	Air-Source Heat Pump	28,923	9	0	28,923	9	0
	Tune-Up	0	0	690	0	0	690
	Boiler	0	0	89,958	0	0	89,958
	Ductless Mini-Split Heat Pump	840,010	-173	0	840,010	-173	0
	ECM	48,140	9	0	48,140	9	0
	Furnace and Air Conditioner	1,944,054	1,040	108,999	1,944,054	1,040	108,999
	Furnace with ECM	6,673,362	1,271	437,271	6,672,428	1,271	437,212
	Smart Thermostat	1,018,732	740	613,148	1,018,732	740	613,148
	Water Heater	0	0	13,392	0	0	13,392
HVAC—Standard Track Total Lifecycle		**10,552,954**	**2,896**	**1,263,515**	**10,552,020**	**2,895**	**1,263,456**
HVAC—IQT	Boiler	0	0	10,499	0	0	10,499
	Ductless Mini-Split Heat Pump	10,889	-1	0	10,889	-1	0
	Furnace and Air Conditioner	77,700	42	28,650	78,218	42	28,841
	Furnace with ECM	355,264	68	152,836	355,264	68	152,836
	Water Heater	0	0	558	0	0	558
HVAC—IQT Total Lifecycle		**443,853**	**108**	**192,543**	**444,371**	**108**	**192,734**
HVAC Total Lifecycle		**11,085,122**	**3,023**	**1,462,542**	**11,084,656**	**3,022**	**1,462,669**

Table 51. CY 2018 Renewable Rewards Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Renewable Rewards	Ground-Source Heat Pump	346,936	70	0	346,936	70	0
	Solar PV	11,210,792	3,908	0	11,210,792	3,908	0
Renewable Rewards Total Annual		**11,557,728**	**3,978**	**0**	**11,557,728**	**3,978**	**0**

Table 52. CY 2018 Rural Home Performance Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Rural Home Performance	Tune-Up	0	0	4,555	0	0	4,555
	Project Completion	8,407	1	1,811	8,407	1	1,811
	Smart Thermostat	131,974	0	9,419	131,974	0	9,419
Renewable Rewards Total Annual		**140,381**	**1**	**15,785**	**140,381**	**1**	**15,785**

Table 53 lists the *ex ante* and verified gross lifecycle savings by Program component for the Home Performance with ENERGY STAR Program in CY 2018. Table 54 through Table 57 show verified gross lifecycle savings by measure type for each Program component.

Table 53. CY 2018 Home Performance with ENERGY STAR Program
Lifecycle Gross Savings Summary by Program Component

Program Component	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
HVAC—Flood Relief	1,680,069	19	124,224	1,679,069	19	124,285
HVAC—Standard Track	189,390,168	2,896	18,517,697	189,366,730	2,895	18,517,061
HVAC—IQT	8,473,412	108	3,707,893	8,481,210	108	3,710,768
Whole Home - Standard Track	12,998,977	275	6,556,486	12,990,714	275	6,553,197
Whole Home—IQT	1,891,768	31	1,879,560	2,000,864	31	1,879,560
Renewable Rewards	285,252,792	3,978	0	285,473,328	3,978	0
Rural Home Performance	1,487,872	1	139,520	1,487,872	1	139,520
Total Lifecycle	**501,175,057**	**7,308**	**30,925,380**	**501,479,786**	**7,308**	**30,924,392**

Table 54. CY 2018 Whole Home Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
Whole Home—Standard Track[a]	Adjustment Measure	-3,010	0	-8,320	-3,010	0	-8,320
	Water Heater	237,431	1	8,556	237,431	1	5,267
	Project Completion	12,764,556	275	6,556,250	12,756,293	275	6,556,250
Whole Home—Standard Track Total Lifecycle		**12,998,977**	**275**	**6,556,486**	**12,990,714**	**275**	**6,553,197**
Whole Home—IQT[a]	Project Completion	1,891,768	31	1,879,560	2,000,864	31	1,879,560
Whole Home—IQT Total Lifecycle		**1,891,768**	**31**	**1,879,560**	**2,000,864**	**31**	**1,879,560**
Whole Home Total Lifecycle		**14,890,745**	**306**	**8,436,046**	**14,991,578**	**306**	**8,432,757**

[a] Tracking data included projects with air sealing, duct sealing, and insulation, but all savings for these measures were attributed to Project Completion measures.

Table 55. CY 2018 HVAC Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
HVAC—Flood Relief	Boiler	0	0	38,260	0	0	38,260
	Ductless Mini-Split Heat Pump	205,164	1	0	205,164	1	0
	Furnace and Air Conditioner	155,400	6	8,700	155,400	6	8,700
	Water Heater	21,585	0	7,004	20,585	0	7,065
	Furnace	366,080	3	0	366,080	3	0
	Furnace with ECM	931,840	9	70,260	931,840	9	70,260
HVAC—Flood Relief Total Lifecycle		**1,680,069**	**19**	**124,224**	**1,679,069**	**19**	**124,285**

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
HVAC—Standard Track	Adjustment Measure	-4,235	0	725	-4,235	0	725
	Air-Source Heat Pump	520,614	9	0	520,614	9	0
	Tune-Up	0	0	1,380	0	0	1,380
	Boiler	0	0	1,799,160	0	0	1,799,160
	Ductless Mini-Split Heat Pump	15,120,180	-173	0	15,120,180	-173	0
	ECM	866,520	9	0	866,520	9	0
	Furnace and Air Conditioner	29,198,016	1,040	1,636,992	29,198,016	1,040	1,636,992
	Furnace with ECM	133,501,754	1,271	8,747,078	133,478,316	1,271	8,746,442
	Smart Thermostat	10,187,319	740	6,131,482	10,187,319	740	6,131,482
	Water Heater	0	0	200,880	0	0	200,880
HVAC—Standard Track Total Lifecycle		**189,390,168**	**2,896**	**18,517,697**	**189,366,730**	**2,895**	**18,517,061**
HVAC—IQT	Boiler	0	0	209,980	0	0	209,980
	Ductless Mini-Split Heat Pump	196,002	-1	0	196,002	-1	0
	Furnace and Air Conditioner	1,169,634	42	431,284	1,177,432	42	434,159
	Furnace with ECM	7,107,776	68	3,058,259	7,107,776	68	3,058,259
	Water Heater	0	0	8,370	0	0	8,370
HVAC—IQT Total Lifecycle		**8,473,412**	**108**	**3,707,893**	**8,481,210**	**108**	**3,710,768**
HVAC Total Lifecycle		**199,543,648**	**3,023**	**22,349,814**	**199,527,008**	**3,022**	**22,352,114**

Table 56. CY 2018 Renewable Rewards Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
Renewable Rewards	Ground-Source Heat Pump	5,204,040	70	0	5,204,040	70	0
	Solar PV	280,048,752	3,908	0	280,269,288	3,908	0
Renewable Rewards Total Lifecycle		**285,252,792**	**3,978**	**0**	**285,473,328**	**3,978**	**0**

Table 57. CY 2018 Rural Home Performance Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
Rural Home Performance	Tune-Up	0	0	9,110	0	0	9,110
	Project Completion	168,132	1	36,220	168,132	1	36,220
	Smart Thermostat	1,319,740	0	94,190	1,319,740	0	94,190
Rural Home Performance Total Lifecycle		**1,487,872**	**1**	**139,520**	**1,487,872**	**1**	**139,520**

Evaluation of Net Savings

This section details the Evaluation Team's methods to estimate verified net savings, which largely used results from previous evaluation years.

Billing Analysis—Whole Home Path

In CY 2018, the Evaluation Team did not perform a whole home path billing analysis because the Program did not undergo significant changes between CY 2016 (the timeframe analyzed in the most recent billing analysis) and CY 2017 (the timeframe that would have been analyzed in a CY 2018 billing

analysis). Instead, the Evaluation Team applied CY 2017 billing analysis NTG estimates to the CY 2018 Snugg Pro modeling software *ex ante* savings estimates from the whole home path. A summary of the original CY 2017 billing analysis findings is presented below for context.

In the CY 2017 billing analysis, the Team used weather normalized regression models to measure the impact of energy efficiency measures on consumption for participants where the Snugg Pro software was used in CY 2016 and CY 2017. By evaluating the pre- and post-installation energy consumption, and accounting for variables such as weather, the Evaluation Team measured impacts for Program-related installations. The CY 2017 analysis included a control group of nonparticipants, which allowed the billing analysis to provide an estimate of net savings. The Evaluation Team compared the change in energy consumption for participants to the results of a similar analysis conducted for nonparticipants to estimate total verified net savings from the Program. The nonparticipant group was identified by sampling future Program participants—that is, customers who participated *after* the analysis period. This treatment group helped account for exogenous factors that may have occurred simultaneous to Program activity.

The Evaluation Team conducted four separate billing analyses in CY 2017 to evaluate verified net savings for the Home Performance with ENERGY STAR Program. Table 58 lists NTG rates and precision achieved for each analysis in CY 2017. These Evaluation Team applied these CY 2017 billing analysis NTG estimates to the CY 2018 whole home *ex ante* savings estimates.

Table 58. CY 2017 Billing Analysis Results Applied to CY 2018 Whole Home Projects

Track	Savings Type	NTG	Precision at 90% Confidence
Standard Track (Tier 1)	Electricity	105%	±16%
	Natural Gas	39%	±9%
Income-Qualified Track (Tier 2)	Electricity	153%	±28%
	Natural Gas	43%	±15%
Overall	**MMBtu**	**46%**	**n/a**

More details regarding the billing analysis methods and findings from can be found in the CY 2017 evaluation report.

Freeridership

For the standard track HVAC path, the Evaluation Team used the standard market practice methodology to determine freeridership for furnaces, joint furnaces, air conditioners, and ECMs. This methodology used sales data to estimate a market baseline efficiency and calculated verified net savings by comparing the market baseline efficiency with the average consumption of equipment installed through the HVAC path. The Evaluation Team applied results from the CY 2017 standard market practice analysis to CY 2018 projects.

For the remaining standard track HVAC path measures, the Evaluation Team applied participant self-response freeridership scores from the CY 2015 Residential Rewards surveys because there were no substantial changes to the measures offered or to the delivery of the Program component to customers from CY 2015 to CY 2018.

For the Renewables Rewards path, the Evaluation Team applied participant self-response freeridership from the CY 2016 Renewable Rewards surveys, which targeted participants who purchased solar PV systems and GSHPs through the Program. For smart thermostats, the Evaluation Team applied participant self-response freeridership from the CY 2016 Smart Thermostat Pilot surveys.

Table 59 lists the freeridership methodology by measure for the standard track HVAC and renewables paths and Smart Thermostat Pilot.

Table 59. CY 2018 Freeridership Methodology by Program Component and Measure Type

Program Component	Measure	Freeridership Methodology	Freeridership
Standard Track HVAC Path (including Flood Relief)	Adjustment Measure	CY 2015 Residential Rewards Participant Surveys	77%
	Air-Source Heat Pump	CY 2015 Residential Rewards Participant Surveys	77%
	Boiler	CY 2015 Residential Rewards Participant Surveys	77%
	Ductless Mini-Split Heat Pump	CY 2015 Residential Rewards Participant Surveys	77%
	ECM	Standard Market Practice[a]	Varies
	Furnace and Air Conditioner	Standard Market Practice[a]	Varies
	Furnace with ECM	Standard Market Practice[a]	Varies
	Smart Thermostat, Existing HVAC System	CY 2016 Smart Thermostat Pilot Surveys	29%
	Smart Thermostat, Installed w/ HVAC Measure	CY 2016 Smart Thermostat Pilot Surveys	29%
	Water Heater	CY 2015 Residential Rewards Participant Surveys	77%
HVAC Path Total Freeridership		**Varies**	**19%**
Renewable Rewards	GSHP, Electric Backup	CY 2016 Renewable Rewards Participant Surveys	69%
	Solar PV	CY 2016 Renewable Rewards Participant Surveys	30%
Renewable Rewards Total Freeridership		**Varies**	**31%**

[a] Freeridership scores were determined using standard market practice, which varies by savings and measure type.

In CY 2016, smart thermostats installed with HVAC measures received the 77% freeridership value associated with those HVAC measures, from the CY 2015 residential rewards surveys. However, the true freeridership likely falls between that value and the 29% value for stand-alone thermostats from the CY 2016 Smart Thermostat Pilot surveys. Therefore, as with CY 2017, for CY 2018 the Evaluation Team elected to apply that 29% value to all smart thermostats.

CY 2017 standard market practice analysis results were applied to furnace, ECM, and furnace with air conditioner measures in CY 2018. Like in CY 2017, this heavily weighted the HVAC path's freeridership, as these measures contribute the majority of savings to the HVAC path. The full standard market practice analysis and results can be found in Appendix I of the *CY 2017 Evaluation Report* (Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute 2018).

Spillover

Spillover results when customers invest in additional efficiency measures or make additional energy-efficient behavior choices beyond those rebated through the Program. Table 60 shows that the Evaluation Team applied spillover at 6% of the Residential Reward's evaluated gross savings, 3% of the

Renewable Rewards evaluated gross savings, and 1% of the Smart Thermostat Pilot evaluated gross savings based on CY 2015 and CY 2016 self-report surveys.

Table 60. CY 2017 Participant Spillover Estimates Applied to CY 2018 Projects

Program Component	Participant Spillover Savings (MMBtu)	Verified Gross Savings (MMBtu)	Percentage of Participant Spillover
HVAC Path	n/a	n/a	6%[a]
Renewable Rewards	95.79	3,507.81	3%[b]
Smart Thermostat Measures	4.28	668.55	1%[b]

[a] The Team applied CY 2015 Residential Rewards NTG results to HVAC path measures not included in the standard market practice analysis because no surveys were conducted with non-standard market practice HVAC path measure participants in CY 2018.

[b] The Team applied CY 2016 Renewable Rewards and Smart Thermostat Pilot NTG results to the same measures in CY 2018 because no new surveys were conducted in CY 2018.

CY 2018 Verified Net Savings Results

To calculate the Home Performance with ENERGY STAR Program NTG ratios, the Evaluation Team weighted the results of the whole home path billing analysis, standard market practice analysis, modeling software calibration, and surveys (self-reported freeridership and spillover) by energy savings. These weightings can be seen in Table 61, which shows MMBtu-based verified gross savings fractions, spillover, freeridership, and NTG ratios split out by Program components and measures. The table shows that the relatively low freeridership values for the furnace measures—derived from the standard market practice methodology—drive the overall NTG ratio for the HVAC path. The overall NTG of 87% for the HVAC path combined with the overall 44% NTG ratio for the Whole Home path—derived via billing analysis—and the 72% NTG for the Renewable Rewards path drives the Program NTG to 77%.

Table 61. CY 2018 Verified Gross Savings, Spillover, Freeridership, and Net-to-Gross Values by Measure

Program Component	Measure	Percentage Verified Gross Program Savings (Annual MMBtu)	Spillover	Freeridership	NTG Ratio
HVAC—Flood Relief	Adjustment	0.0%	6%	77%	29%
	Furnace and Air Conditioner	0.0%	6%	-5%	111%
	Water Heater	0.0%	6%	66%	40%
	Boiler	0.1%	6%	77%	29%
	LP Furnace with ECM	0.0%	6%	19%	87%
	Natural Gas Furnace with ECM, 95%	0.0%	6%	2%	104%
	Natural Gas Furnace with ECM, 96%	0.2%	6%	5%	101%
	Natural Gas Furnace with ECM, 97%	0.0%	6%	0%	106%
	Natural Gas Furnace with ECM, 98%	0.0%	6%	-9%	115%

Program Component	Measure	Percentage Verified Gross Program Savings (Annual MMBtu)	Spillover	Freeridership	NTG Ratio
HVAC—Standard Track	Adjustment	0.0%	6%	77%	29%
	Air-Source Heat Pump	0.0%	6%	77%	29%
	Tune-Up	0.0%	6%	77%	29%
	Boiler	3.3%	6%	77%	29%
	Ductless Mini-Split Heat Pump	1.1%	6%	77%	29%
	ECM	0.1%	6%	18%	88%
	Furnace and Air Conditioner	6.5%	6%	-5%	111%
	LP Furnace with ECM	1.0%	6%	19%	87%
	Natural Gas Furnace with ECM, 95%	0.5%	6%	2%	104%
	Natural Gas Furnace with ECM, 96%	19.2%	6%	5%	101%
	Natural Gas Furnace with ECM, 97%	3.4%	6%	0%	106%
	Natural Gas Furnace with ECM, 98%	0.5%	6%	-9%	115%
	Smart Thermostat	24.0%	1%	29%	72%
	Water Heater	0.5%	6%	77%	29%
HVAC—IQT	IQT Measures	7.7%	0%	0%	100%
HVAC Path Total		**68.1%**	**4%**	**17%**	**87%**
Whole Home—Standard Track	Whole Home Measure	13.0%	n/a	n/a	0%
Whole Home—IQT	Adjustment, Whole Home	0.0%	6%	77%	29%
	Whole Home Measure	3.6%	n/a	n/a	0%
Whole Home Path Total		**16.6%**	**n/a**	**n/a**	**44%**
Renewable Rewards	Solar PV	14.1%	3%	30%	73%
	Ground-Source Heat Pump	0.4%	1%	69%	32%
	Adjustment	0.0%	6%	n/a	n/a
Renewable Rewards Total		**14.6%**	**3%**	**31%**	**72%**
Rural Home Performance	Tune-Up	0.2%	6%	77%	29%
	Smart Thermostat	0.5%	1%	29%	72%
	Whole Home Measure	0.0%	n/a	n/a	40%
	IQT Measure	0.0%	0%	25%	75%
Rural Home Performance Total		**0.8%**	**n/a**	**n/a**	**61%**
Program Total					**77%**

In addition to this overall NTG ratio, Table 62 shows total net-of-freeridership savings, participant spillover savings, total net savings in MMBtu by Program component.

Table 62. CY 2018 Program Annual Net Savings and Net-to-Gross Ratio

Program Component	Net-of-Freeridership Savings (MMBtu)	Participant Spillover (MMBtu)	Total Annual Net Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Program NTG Ratio
HVAC—Flood Relief	713	56	768	949	81%
HVAC—Standard Track	131,265	6,501	137,766	162,349	85%
HVAC—IQT	20,790	0	20,790	20,790	100%
Whole Home - Standard Track	n/a	n/a	15,138	35,016	43%
Whole Home—IQT	n/a	n/a	4,563	9,739	47%
Renewable Rewards	27,119	1,183	28,302	39,435	72%
Rural Home Performance	1,208	41	1,249	2,057	61%
Total	**181,094**	**7,781**	**208,576**	**270,335**	**77%**

Table 63 shows the annual net energy impacts (kilowatt-hour, kilowatt, and therms) by Program component. The Evaluation Team attributed these savings net of what would have occurred without the Program. Table 64 through Table 67 show annual net energy impacts by measure type for each Program component.

Table 63. CY 2018 Home Performance with ENERGY STAR Program Annual Net Savings by Program Component

Program Component	Annual Net		
	kWh	kW	therms
HVAC—Flood Relief	70,583	14	5,274
HVAC—Standard Track	8,512,760	2,180	1,087,205
HVAC—IQT	444,371	108	192,734
Whole Home—Standard Track	688,842	289	127,875
Whole Home—IQT	153,066	47	40,411
Renewable Rewards	8,294,897	2,875	0
Rural Home Performance	107,462	1	8,825
Total Annual	**18,271,980**	**5,515**	**1,462,325**

Table 64. CY 2018 Whole Home Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
Whole Home—Standard Track[a]	Adjustment Measure	-44	0	-121
	Project Completion	669,708	289	127,838
	Water Heater	19,177	1	158
Whole Home—Standard Track Total Annual		**688,842**	**289**	**127,875**
Whole Home—IQT[a]	Project Completion	153,066	47	40,411
Whole Home—IQT Total Annual		**153,066**	**47**	**40,411**
Whole Home Total Annual		**841,908**	**336**	**168,286**

[a] Tracking data included projects with air sealing, duct sealing, and insulation, but no savings were attributed to these measures.

Table 65. CY 2018 HVAC Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
HVAC—Flood Relief	Boiler	0	0	555
HVAC—Flood Relief	Ductless Mini-Split Heat Pump	3,305	0	0
HVAC—Flood Relief	Furnace and Air Conditioner	8,792	3	736
HVAC—Flood Relief	Water Heater	1,729	0	151
HVAC—Flood Relief	Furnace	16,008	3	0
HVAC—Flood Relief	Furnace with ECM	40,748	8	3,832
HVAC—Flood Relief Total Annual		**70,583**	**14**	**5,274**
HVAC—Standard Track	Adjustment Measure	-77	0	17
HVAC—Standard Track	Air-Source Heat Pump	8,388	3	0
HVAC—Standard Track	Tune-Up	0	0	200
HVAC—Standard Track	Boiler	0	0	26,088
HVAC—Standard Track	Ductless Mini-Split Heat Pump	243,603	-50	0
HVAC—Standard Track	ECM	42,196	8	0
HVAC—Standard Track	Furnace and Air Conditioner	1,649,841	576	138,179
HVAC—Standard Track	Furnace with ECM	5,835,322	1,111	477,371
HVAC—Standard Track	Smart Thermostat	733,487	533	441,467
HVAC—Standard Track	Water Heater	0	0	3,884
HVAC—Standard Track Total Annual		**8,512,760**	**2,180**	**1,087,205**
HVAC—IQT	Boiler	0	0	10,499
HVAC—IQT	Ductless Mini-Split Heat Pump	10,889	-1	0
HVAC—IQT	Furnace and Air Conditioner	78,218	42	28,841
HVAC—IQT	Furnace with ECM	355,264	68	152,836
HVAC—IQT	Water Heater	0	0	558
HVAC—IQT Total Annual		**444,371**	**108**	**192,734**
HVAC Total Annual		**9,027,713**	**2,303**	**1,285,213**

Table 66. CY 2018 Renewable Rewards Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
Renewable Rewards	Ground-Source Heat Pump	111,020	22	0
Renewable Rewards	Solar PV	8,183,878	2,853	0
Renewable Rewards Total Annual		**8,294,897**	**2,875**	**0**

Table 67. CY 2018 Rural Home Performance Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
Rural Home Performance	Tune-Up	0	0	1,321
Rural Home Performance	Project Completion	12,441	1	723
Rural Home Performance	Smart Thermostat	95,021	0	6,782
Renewable Rewards Total Annual		**107,462**	**1**	**8,825**

Process Evaluation

The Evaluation Team focused its process evaluation on these key research tasks for the Home Performance with ENERGY STAR Program:

- Document Program design and implementation
- Report Program accomplishments
- Identify opportunities for process improvements

Program Design, Delivery, and Goals

The Evaluation Team drew from stakeholder interviews, ongoing customer surveys, and Program materials to document the Program's design and implementation process in CY 2018.

Program Design

The Program consists of the Whole Home, HVAC, and Renewable Rewards paths, all of which generally remained unchanged from CY 2017 in terms of design and implementation. Focus on Energy also introduced a stand-alone Home Energy Score initiative in CY 2018, as discussed under *Program Changes*.

Whole Home and HVAC Paths

Participants interested in building shell (Whole Home) improvements receive a home energy assessment from a registered Trade Ally, certified by the Building Performance Institute (BPI) in building science and energy assessments. The Trade Ally then provides the customer with a written report, recommending specific building shell and/or HVAC improvements based on how the participant's home uses energy. Participants proceeding with any suggested improvements remain eligible for an incentive.

Participants interested in HVAC improvements but not building shell improvements can work directly with an HVAC Trade Ally to receive incentives for eligible heating and cooling equipment. They are not required to have a home energy assessment from a registered Trade Ally to pursue HVAC improvements.

The Program offers two participation tiers for whole home and HVAC measures:

- Tier 1, the standard track, is available to all Focus on Energy customers who own residential properties with three units or less
- Tier 2, the IQT, offers higher incentives and a subsidized energy assessment to owners of the same property types, with household incomes at or below 80% of the state median income

Standard track and IQT participants who installed Whole Home and HVAC measures (dual-path project) within 90 days of each other could receive an additional $250 incentive.[20] IQT participants are eligible to receive discounted home energy assessments and larger incentives for certain whole home and HVAC measures (shown in Table 68 and Table 69). Focus on Energy required Trade Allies to check each

[20] Excluding stand-alone smart thermostats.

customer's income and, for those eligible, submit completed energy assessment reports via Snugg Pro to reserve incentive funds for reimbursements of remaining unpaid assessment costs.

Table 68. CY 2018 Eligibility and Incentives: Whole Home Path

Program Features	Standard Track	Income-Qualified Track
Household Income Qualification	None	80% or less of state median income
Assessment Type	Comprehensive (must include blower door and combustion safety tests)	
Assessment Cost	Market rate (average cost $200-$400)	$50 copay (Trade Allies reimbursed $150 by Program)
Eligible Major Measures	Air sealing, attic insulation, exterior and interior wall insulation, sill box insulation, and HVAC equipment	
Incentives	10% to 19% reduced energy use: $850 20% to 29% reduced energy use: $1,250 30%+ reduced energy use: $2,000	10% to 19% reduced energy use: $1,000 20% to 29% reduced energy use: $1,500 30%+ reduced energy use: $2,250
	$250 bonus for installing both whole home and HVAC measures	

Table 69. CY 2018 Eligibility and Incentives: HVAC Path (Statewide Offerings)

Eligibility	Standard Track	Income-Qualified Track
Household income qualification	None	80% or less of State Median Income
Measures	**Incentive**	
Propane multistage furnace with ECM, 90%+ AFUE	$100	$300
Natural gas furnace, 95%+ AFUE	n/a	$350[a]
Natural gas multistage furnace with ECM, 95%+ AFUE	$125[a]	$525[a]
Natural gas multistage furnace with ECM, 95%+ AFUE installed with a 16+ SEER air conditioner	$250[a]	$750[a]
Air-source heat pump 16+ SEER and 8.4+ HSPF (propane, oil, or electric furnace only; cannot be a mini-split or ductless system)		$300[a]
ECM replacement (must replace existing permanent split capacitor motor)		$100
Natural gas home heating boiler, 95%+ AFUE	$400[a]	$550[a]
Indirect water heater (installed at same time as qualified boiler)	$100	$150
Natural gas combination boiler, 95%+ AFUE	$500[a]	$675[a]
Ductless/mini-split heat pump, 18+ SEER and 9.0+ HSPF (only for homes heated solely with electric resistance heat)		$500
Heat pump water heater (ENERGY STAR-qualified)		$300
Smart thermostat—stand-alone		$75
Smart thermostat—installed with eligible furnace, heat pump, or boiler		$125
HVAC and whole home measure installation bonus		$250

Note: Focus on Energy temporarily augmented incentives in designated areas of Wisconsin in response to flood relief, as summarized in *Program Changes*.

[a] These measures are eligible for a larger smart thermostat rebate when installed with a smart thermostat.

The Program encourages participation in hard-to-reach rural areas by offering customers located within designated rural zip codes a $250 rebate for tuning up their furnace and installing a smart thermostat at

the same time. Per the CY 2018 Operating Plan, rural incentive applications are processed similarly to HVAC Program applications.

Renewable Rewards

The Program also offers residential and small business customers incentives for GSHP systems and solar PV installations. Unlike the whole home and HVAC paths, these incentives are not stratified by income. Table 70 provides details on Renewable Rewards measures.

Table 70. CY 2018 Eligibility and Incentives: Renewable Rewards Path

Measure	Residential	Small Business
GSHP	$650	$650
Solar PV	12% of total cost ($2,000 maximum)	12% of total cost ($4,000 maximum)

Program Changes

Though Focus on Energy made few changes to the designs of the Whole Home path, the HVAC path, and Renewable Rewards, it overhauled the Rural Home Performance offering and separated the Home Energy Score offering from the Whole Home path. Program changes are outlined below.

Whole Home Path

In CY 2018, the Program changed the rural offering to provide customers in rural zip codes with a $250 rebate, bundling a furnace tune-up and a smart thermostat installation. Originally, in CY 2017, the Program delivered coupons for $300 off a home energy assessment, including a Home Energy Score, and specifically targeted customers that completed EnergySavvy self-assessments through the Direct Mail Home Energy Assessment Pilot. This offer was discontinued in favor of the current incentive due to low uptake; the original offering's outreach campaign not only targeted a limited population, resulting in a small pool of potential participants, but also generated tepid interest among customers.

The Program also discontinued compensating Trade Allies for distance traveled, done in CY 2017 to encourage Trade Ally participation in rural areas.[21] The offering's original scope narrowed the list of available Trade Allies to only those certified to provide Home Energy Scores. The updated design allows the entire Trade Ally network to complete Rural Home Performance projects, expanding geographic reach, and thereby limiting long-distance travel for rural projects. Accordingly, Program staff discontinued the travel incentive for Trade Allies.

Two HVAC contractors expressed concerns to the Program Implementer that the Connected Devices Kits Program, which offered free and discounted smart thermostats to eligible rural customers, would undermine contractors' ability to market to customers the Home Performance Program's Rural Home Performance offer. The Program Implementer forwarded these concerns to the Program Administrator, which speculated the Connected Devices Kits Program interfered minimally with the Home Performance Program because Home Performance customers likely learned about thermostat offerings from their

[21] Trade Allies were reimbursed 80 cents per mile driven, after the first 20 miles.

Home Performance contractor. Moreover, Home Performance Trade Allies could install qualified HVAC-branded thermostats (Trane or Bryant) that they typically install with new HVAC equipment, while the Connected Devices Kits Program offered limited models of smart thermostats from Nest, ecobee, and Sensi.

Home Energy Score Initiative

The Program's Home Energy Score initiative was composed of two offerings:

- Trainings for home inspectors to become Home Energy Score Certified Assessors
- Stand-alone Home Energy Scores for customers (separate from Home Energy Scores included with whole home projects)

Certified Assessor Trainings

In CY 2018, Focus on Energy trained home inspectors, realtors, appraisers, and existing Trade Allies to become Home Energy Score Certified Assessors through the Program. To recruit Home Energy Score Certified Assessors, the Program Implementer primarily engaged with home inspectors who were not yet certified to complete Home Energy Scores.

Although Home Energy Score certification can be acquired via online simulation training, Focus on Energy organizes day-long, in-person trainings, administered in a classroom setting where trainers can work directly with home inspectors to provide instruction and to answer questions. Once a home inspector becomes newly certified as a Home Energy Score Certified Assessor, the Program Implementer adheres to the U.S. Department of Energy's (DOE) mentoring protocols, which require the Program Implementer to monitor the Scorer's first home assessment and to review the Scorer's first five scores.

As discussed in *Key Performance Indicators*, the Program set a goal of certifying 50 Home Energy Score Assessors who would not be part of Focus on Energy's standard Trade Ally network, but would be able to provide stand-alone Home Energy Scores. Although the Program certified over 100 Trade Allies to provide Home Energy Scores, it only certified 30 assessors outside of the Trade Ally network.

Stand-Alone Scores

Having offered Home Energy Scores as part of the whole home path in CY 2017, Focus on Energy also sought, in CY 2018, to administer stand-alone Home Energy Scores, which are less expensive than full home audits using Snugg Pro. Program staff intended to leverage Home Energy Scores as a customer education and acquisition tool. as with most other Program elements, stand-alone Home Energy Scores were marketed directly to customers via Trade Allies and were supplemented by outreach from Focus on Energy and participating utilities.

As discussed in *Key Performance Indicators*, Focus on Energy completed 67 stand-alone Home Energy Scores, falling short of its goal of 1,000. Program Implementation staff attributed the tepid interest in stand-alone scores to the offering's structure, the lack of budget (stand-alone scores do not generate savings for the Program) to incent stand-alone scores and encourage Trade Allies to market them, and the lack of certain legal requirements in Wisconsin that, when present in other States, have shown to boost Home Energy Score uptake. Because of tepid interest, the Program Implementer turned its

attention from stand-alone Home Energy Scores to other initiatives in late spring and early summer of CY 2018, contributing to the low number of completed stand-alone Home Energy Scores.

The Program Implementer noted that, despite the small number of completed Home Energy Scores, the initiative cultivated interest among realtors with whom the Program had minimal previous contacts and who were eager to distinguish themselves from other realtors. After witnessing slow uptake for stand-alone scores and in light of enthusiasm from realtors, the Program Implementer coordinated with the Program Administrator in CY 2018 to restructure the offering for CY 2019.

Instead of relying on and marketing Home Energy Scores broadly for lead generation, the restructured offering would tap into realtors as "ambassadors" for Focus on Energy programs. Realtors would market Focus on Energy programming directly to customers at their moment of decision (for example, a HVAC tune-up or Simple Energy Efficiency kit after purchasing a new home) in a targeted attempt to more directly generate leads.

Flood Relief Campaign

In August 2018, areas of central and southern Wisconsin[22] suffered widespread flooding. The PSC approved Focus on Energy's plan to provide relief to flooding victims, including those whose mechanical systems were destroyed in the flooding. The plan increased standard (Tier 1) HVAC incentives, leveraging roughly $135,000 of available Rural Home Performance budget to fund the initiative. Flood relief incentives are available for equipment installed between August 17, 2018 and March 1, 2019. Table 71 outlines the equipment categories for which Focus on Energy increased incentives for customers affected by flooding.

Table 71. CY 2018 Eligibility and Incentives: HVAC Path (Flood Relief Offerings)

Measures	Incentive
Propane multistage furnace with ECM, 90%+ AFUE	$200
Natural gas multistage furnace with ECM, 95%+ AFUE	$250[a]
Natural gas multistage furnace with ECM, 95%+ AFUE installed with a 16+ SEER air conditioner	$500[a]
Air-source heat pump 16+ SEER and 8.4+ HSPF (propane, oil, or electric furnace only; cannot be a mini-split or ductless system)	$600[a]
Natural gas home heating boiler, 95%+ AFUE	$800[a]
Indirect water heater (installed at same time as qualified boiler)	$200
Ductless/mini-split heat pump, 18+ SEER and 9.0+ HSPF (homes heated solely with electric resistance heat)	$1,000
Electric heat pump water heater (ENERGY STAR-qualified)	$100
High-efficiency natural gas storage water heater (ENERGY STAR-qualified)	$200
Tankless natural gas water heater (ENERGY STAR-qualified)	$400
High-capacity natural gas storage water heater (ENERGY STAR-qualified)	$400
HVAC and whole home measure installation bonus	$250

[a] These measures are eligible for a larger smart thermostat rebate when installed with a smart thermostat.

[22] Adams, Columbia, Dodge, Green Lake, Jefferson, Marquette, Ozaukee, Monroe, Fond du Lac, Juneau, La Crosse, Vernon, Dane, Richland, Crawford, and Sauk counties.

Renewable Rewards

Although the Renewable Rewards Program structure did not change, the PSC allocated a larger budget to the path to ensure the Program could offer incentives all year.[23]

Program Management and Delivery Structure

The Program Administrator oversees the Program's performance. The Program Implementer delivers the Program (including the management of Program-specific marketing and outreach, reviewing home energy assessment results, tracking data, processing applications, and managing the Trade Ally network). The Program Implementer also tracks KPIs through SPECTRUM, an online database managed by the Program Administrator.

Each Program path relies on Trade Allies to serve as the primary delivery channel. Whole home and HVAC path Trade Allies are assigned to a regional manager, whom they can consult for Program information. The Program structure allows each customer to choose the contractor he or she wants to complete their home energy assessments.

Program delivery varies by path, as described below.

Whole Home Path

Whole Home Trade Allies must complete home energy assessments before installing any eligible Whole Home path measures. During the assessment, Trade Allies enter the participants' household data into Snugg Pro software to model each home's energy consumption, identifying potential energy savings. The Trade Allies report the results to the homeowners, recommend home improvements, and provide estimated incentive amounts for eligible measures, based on estimated energy savings from Snugg Pro and the participant's household income.

After installing eligible measures, the Trade Allies update Snugg Pro to calculate the projects' achieved energy savings and resulting incentives available to participants. Program staff said Snugg Pro usage went smoothly, like last year, with no Trade Allies reporting issues with the software.

Whole Home Trade Allies must be certified by the BPI to complete home energy assessments through the Whole Home path. Program Implementation staff are certified to conduct trainings and administer tests to Trade Allies to achieve BPI certification. The Program Implementer also provided BPI certification training to Trade Allies periodically throughout the year.

When targeting rural customers regarding the exclusive furnace tune-up and smart thermostat incentives, Trade Allies use direct mail and similar targeted communication channels with customers known by Trade Allies as eligible for rebate qualification. In addition to Trade Ally outreach, Focus on

[23] Beginning mid-year CY 2017, the Program had to waitlist Renewable Rewards reservations due to budget limitations. All Renewable Rewards incentive applications received in CY 2017 were paid.

Energy provides supplemental marketing and partners with municipal utilities to help inform rural customers of the offer.

HVAC Path

HVAC-path customers can choose any contractor from the Trade Ally network (which all contractors are eligible to join) to install eligible HVAC measures. After completing the installation, the participant or Trade Ally completes and submits the application to receive rebates for eligible measures.

Renewable Rewards Path

Customers can reserve incentive funds via an online form that includes documentation of a $500 down payment prior to the Trade Ally completing the installations.[24] Once a Trade Ally has installed eligible renewable technologies, the participant submits a separate application online to redeem his or her eligible incentives. Budget constraints limit incentive funding; so participants risk not having incentives available if they do not reserve their incentives before applying to receive them. While it is recommended that customers reserve incentives prior to installing eligible measures, it is not required for participation.

Program Goals

As shown in Figure 14, the HVAC and whole home paths exceeded their goal for therms savings, but they missed their goal for kilowatt-hour and kilowatt savings. Figure 15 shows that the Renewable Rewards Program met its kilowatt-hour savings goal but missed its goal for kilowatt savings.

Table 72 show participation changes for all paths from CY 2017 to CY 2018.

Table 72. Changes in Participation by Path from CY 2017 to CY 2018

Program	CY 2017	CY 2018	Percentage Change
Whole Home Total	**1,711**	**1,469**	**-14%**
Standard Track	1,441	1,280	-11%
IQT	270	189	-30%
HVAC Total	**19,967**	**22,995**	**15%**
Standard Track	18,920	21,673	15%
IQT	1,047	1,128	8%
Flood Relief	n/a	194	n/a
Renewable Rewards Total	**552**	**819**	**48%**
Residential	498	680	37%
Business	54	139	157%
Rural Home Performance Path	n/a	**317**	**n/a**

[24] Whole home and HVAC path projects need not make a reservation as the Program guaranteed incentive funding for those paths.

Key Performance Indicators

As shown in Table 73, the Program Administrator required the Program Implementer to track progress against several KPIs for the Home Performance with ENERGY STAR Program in CY 2018.

Table 73. Home Performance with ENERGY STAR CY 2018 KPIs

KPI	Measurement	Results	Source
Reduce/maintain DIO	Maintain an average of 28 DIO	**Accomplished**: Whole Home: 29 HVAC: 42 Renewable Rewards: 28	SPECTRUM
Increase/maintain customer satisfaction	Meet or exceed a baseline customer satisfaction score of 8.52	**Accomplished**: Whole Home: 8.7 HVAC: 9.1 Renewable Rewards: 9.2	Ongoing survey
Establish stand-alone Home Energy Score offering	Complete 1,000 stand-alone scores	**Not Accomplished**: 67	Program Administrator/ Implementer
	Train 50 Home Energy Score stakeholders in their respective certifications	**Not Accomplished**: 30	
Cross-promote Focus on Energy programs	Design at least two promotions to encourage existing customers to engage with other Focus on Energy programs	**Accomplished**: 3	Program Administrator/ Implementer
Increase participation in rural zip codes	Achieve 10% increase over CY 2017 in the number of projects conducted in rural zip codes	**Accomplished**: 39%	SPECTRUM

In CY 2018, the Program achieved almost all of its KPIs except for those related to Home Energy Score Certified Assessor certification trainings.

Unlike CY 2017, the Program Implementer reported delays when processing incentive applications in CY 2018. The Program Implementer reported experiencing a higher volume of projects than expected. As Program staff enter all customer data into SPECTRUM manually, the increased volume caused the Program Implementer's DIO numbers to increase beyond the Program's goal of 28 days. Program Administrator and Implementer staff indicated DIO numbers improved once the delays were resolved and ultimately achieved its KPI related to DIO by year's end

The Program fell short of its KPIs of completing 1,000 stand-alone Home Energy Scores (67 completed) and training 50 home inspectors to become Home Energy Score Certified Assessors (30 trained), both due to a lack of interest.

Marketing and Outreach

The Trade Ally network continues to serve as the primary Program delivery channel.

The Program Implementer conducted general Program marketing directly to customers. Most of this activity occurred in collaboration with utilities, which sent direct mail, bill inserts, and email blasts to their customers. The Program Implementer did not tailor Program marketing to specific customer segments (standard and income-qualified). Instead, all collateral included information about income-qualified rebates, and customers who thought they might qualify could pursue the augmented rebates

accordingly. This approach helps prevent uncomfortable situations that might arise from contractors attempting to strategically market the Program by income level.

Additionally, the Program Implementer continued its "reach-back" campaign, which began late in the second quarter of CY 2016 to encourage dual-path projects. Through this effort, the Program Implementer reached out to participants who completed projects through one path (HVAC path) to encourage them to complete projects through another path (Whole Home path) and to participate in other Focus on Energy programs.

In addition to delivering the Program, the Trade Ally network is expected to market the Program to customers and to recruit them as participants. Applying to all paths, this is the critical outreach channel for Rural Home Performance and Home Energy Score offerings. As the Rural Home Performance offering targets rural customers, the burden of responsibility falls on the Trade Ally (and not the Program Implementer) to ensure each customer lives in a rural zip code and therefore qualifies for the offering. Similarly, the Program did not engage in outreach specifically catering to the Home Energy Score offering's marketing.

Customer Experience

Annual Results from Ongoing Customer Satisfaction Survey

Throughout CY 2018, the Evaluation Team surveyed Home Performance with ENERGY STAR participants to measure their satisfaction with various aspects of each Program path. 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.[25]

The subsections that follow detail the complete results of these each Program path's[26] customer satisfaction surveys by quarter for CY 2018 and compared them with those of previous years' Programs.[27]

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[25] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

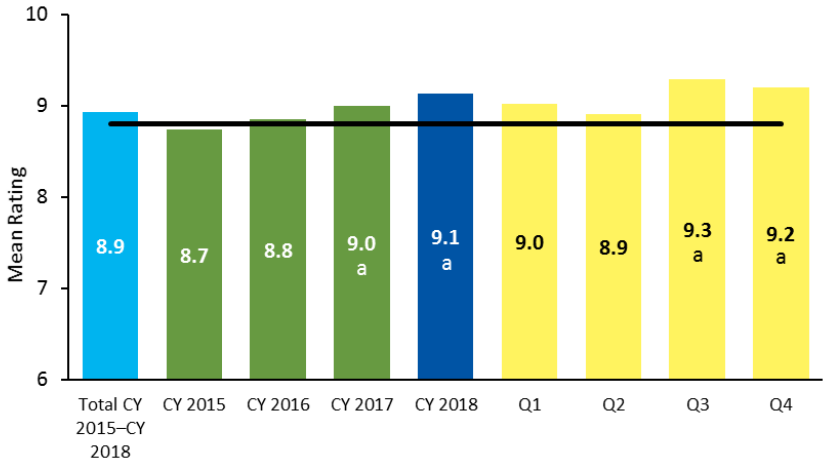
[26] CY 2018 whole home path surveys include Rural Home Performance participants.

[27] The Home Performance with ENERGY STAR Program has had two paths and two surveys since CY 2016. The CY 2015 results reported in this chapter are from the most comparable predecessor programs: the HVAC path is compared to the CY 2015 Residential Rewards/Enhanced Rewards Program, and the whole home path is compared to the former version of the Home Performance with ENERGY STAR Program (before it had two paths).

HVAC Path

Figure 17 shows the overall satisfaction ratings for the CY 2016-CY 2018 HVAC path and comparable CY 2015 Programs. The overall HVAC path satisfaction rating among CY 2018 participants was 9.1, similar to the average rating from CY 2017 participants (9.0). This Program's satisfaction rating was significantly higher than the portfolio baseline for CY 2018.[28]

Figure 17. CY 2018 Overall Satisfaction with Home Performance with ENERGY STAR Program HVAC Path



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Surveys Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=542, CY 2016 n=597, CY 2017 n=412, CY 2018 n=1,035, Q1 n=57, Q2 n=202, Q3 n=349, Q4 n=358). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

[a] This result is statistically significantly different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 74 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, the satisfaction rating with the incentive amount was statistically higher than the previous year (8.2, up from 7.8 in CY 2017) and the likelihood to recommend the Program was also statistically higher than the previous year (9.2, up from 8.9 in CY 2017).

[28] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value was used to establish a KPI for the Program Implementer to meet or exceed over the last three years of the CY 2015–CY 2018 quadrennial.
The Evaluation Team found that some surveys did not include identifying information to match survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Table 74. CY 2018 Average Ratings for Home Performance with ENERGY STAR Program HVAC Path

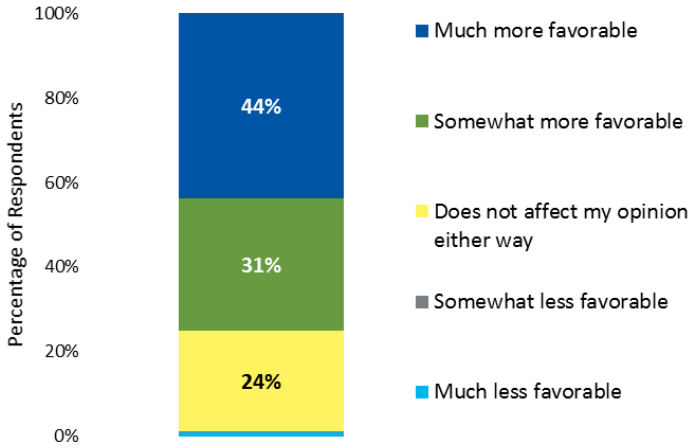
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.1	9.3	9.3	9.4
Satisfaction with Trade Ally	9.2	9.3	9.4	9.4
Satisfaction with incentive	7.6	7.7	7.8	8.2 [a]
Likelihood of more improvements	5.9	4.9	5.2	5.4
Likelihood of recommending the Program	*Not asked*	8.9	8.9	9.2[a]

[a] This result is statistically significantly different from the result for CY 2017 ($p<0.05$ using a binomial t-test).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 Home Performance with ENERGY STAR HVAC Program's NPS was +74 for CY 2018, which was an increase from CY 2017 (+64).

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and almost half (44%) gave the highest rating of *much more favorable* (Figure 18). Only 24% said their opinion was not affected, and 1% said their opinion of their utility had become less favorable.

Figure 18. CY 2018 Effect of Focus on Energy Offerings on Home Performance with ENERGY STAR Program HVAC Path Participants' Opinion of Utilities



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (n=116; this question was asked in online surveys but was not included in mail surveys)

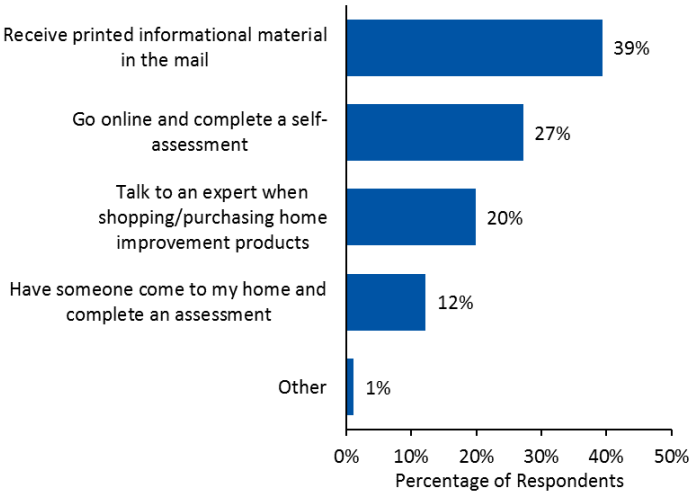
Program participants were asked to identify the two factors they value most in making purchase decisions (Figure 19). The most frequent response was reviews from other customers who purchased the same thing (43%), followed by verification and approval from an expert (39%) and deep discounts and freebies (36%).

Figure 19. CY 2018 Home Performance with ENERGY STAR Program HVAC Path Participants' Most Valued Factors in Purchase Decisions

Source: Home Performance with ENERGY STAR HVAC Program Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=867)

Program participants were asked how they most preferred to learn about energy efficiency opportunities for their home (Figure 20). The two top methods cited were paper mailings from Focus on Energy (mentioned by 39%) and completing an online self-assessment (27%); the least-mentioned responses were speaking with an expert when shopping for home improvement products (20%) and having someone complete a home assessment (12%).

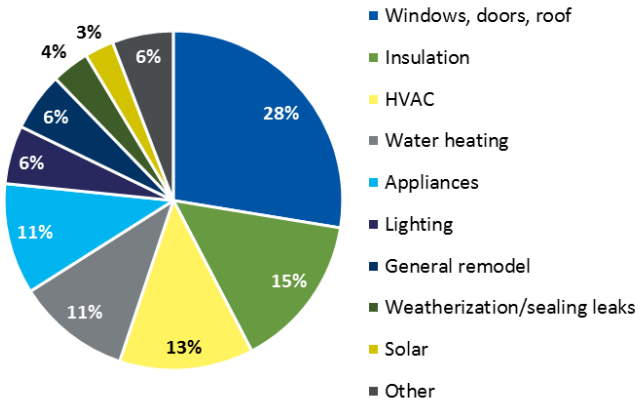
Figure 20. CY 2018 Home Performance with ENERGY STAR Program HVAC Path Participants' Preferred Methods for Learning About Energy Efficiency Opportunities



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (n=753; this question was asked in online surveys but was not included in mail surveys)

The Evaluation Team also asked participants what future improvements they were considering. Of the 1,064 participants who responded to the survey, 309 (29%) provided specific examples, which the Evaluation Team coded into a total of 359 mentions shown in Figure 21. The most frequently mentioned projects involved windows, doors, and roofs (28%), followed by insulation (15%) and HVAC upgrades (13%). The most common appliances mentioned were refrigerators, clothes washers, and clothes dryers. Six percent of mentions were classified as *other*, a category that included smart thermostats and aesthetic improvements.

Figure 21. CY 2018 Intentions for Future Improvements—HVAC Path

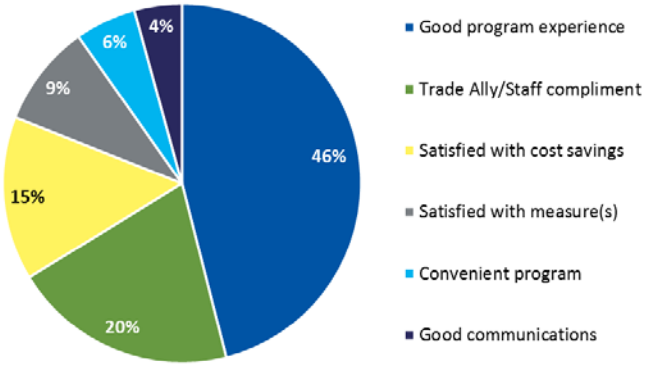


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question. "What improvements do you plan to complete over the next 12 months, if applicable?" (Total mentions n=359)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 1,064 participants who responded to the survey, 259 (24%) provided open-ended feedback, which the Evaluation Team coded into a total of 280 mentions. Of these mentions, 163 were positive or complimentary comments (58%) and 117 were suggestions for improvement (42%).

The positive responses are shown in Figure 22, with 46% reflecting a generally positive experience, 20% complimenting the contractor or Focus on Energy staff and 15% satisfied with cost savings.

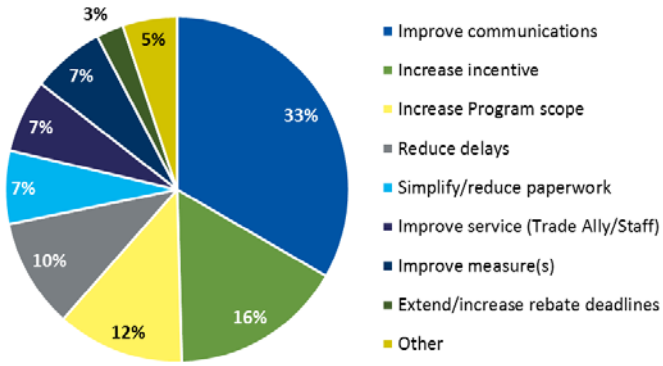
Figure 22. CY 2017 Positive Comments about the Program—HVAC Path



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=163)

Suggestions for improvement are shown in Figure 23. The three most common suggestions were improving communications (33%), increasing incentives (16%), and increasing the Program's scope (12%). Suggestions about improving communications related to miscommunications about incentive amounts, not being able to track rebate status, and increasing promotion for the Program.

Figure 23. CY 2018 Suggestions for Improving the Program—HVAC Path



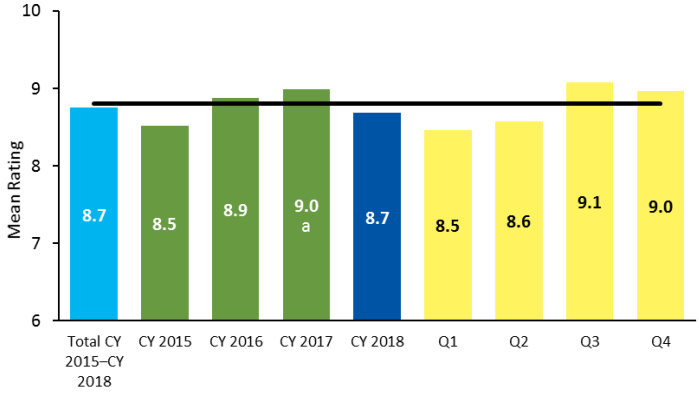
Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=117)

Whole Home Path

Figure 24 shows that whole home participants gave the Home Performance with ENERGY STAR Program an overall satisfaction rating of 8.7 in CY 2018. This rating was statistically lower than the average overall

satisfaction rating from CY 2017 (9.0),[29] but remained not statistically different from the portfolio baseline of 8.8.[30]

Figure 24. CY 2018 Overall Satisfaction with the Home Performance with ENERGY STAR Program Whole Home Path



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=352, CY 2016 n=471, CY 2017 n=970, CY 2018 n=250, Q1 n=69, Q2 n=95, Q3 n=38, Q4 n=31). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

[a] This result is statistically significantly different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 75 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, average satisfaction ratings for incentive amounts and Trade Allies were significantly lower than those of the previous year (8.0 down from 8.4 in CY 2017, and 9.1 down from 9.3 in CY 2017).

[29] p<0.05 using binomial t-test.

[30] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value was used to establish a KPI for the Program Implementer to meet or exceed over the last three years of the CY 2015–CY 2018 quadrennial.
The Evaluation Team found that some surveys did not include identifying information to match survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Table 75. CY 2018 Average Ratings for Home Performance with ENERGY STAR Program Whole Home Path

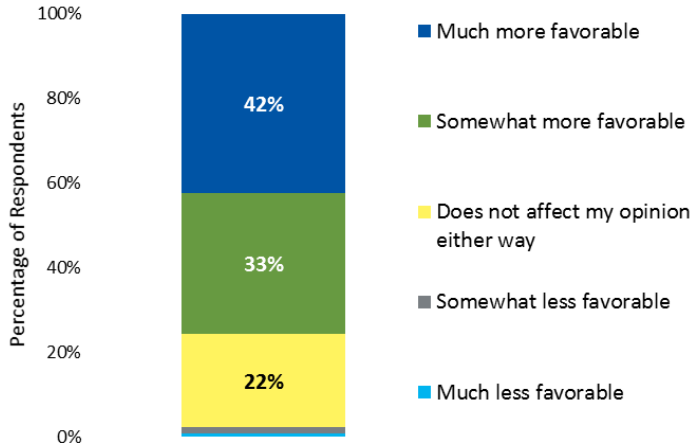
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	8.6	9.1	9.3	9.1
Satisfaction with Trade Ally	8.4	9.1	9.3	9.1 [a]
Satisfaction with incentive	8.5	8.0	8.4	8.0 [a]
Likelihood of more improvements	5.7	5.3	5.5	5.3
Likelihood of recommending the Program	*Not asked*	9.2	9.2	9.1

[a] This result is statistically significantly different from the result for CY 2017 ($p<0.10$ or better using a binomial t-test).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 Whole Home path NPS was +73 for CY 2018, consistent with an NPS of +74 in CY 2017.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and nearly half (42%) gave the highest rating of *much more favorable* (Figure 25). Only 22% said their opinion was not affected, and 2% of survey respondents reported that their opinion of their utility had become less favorable.

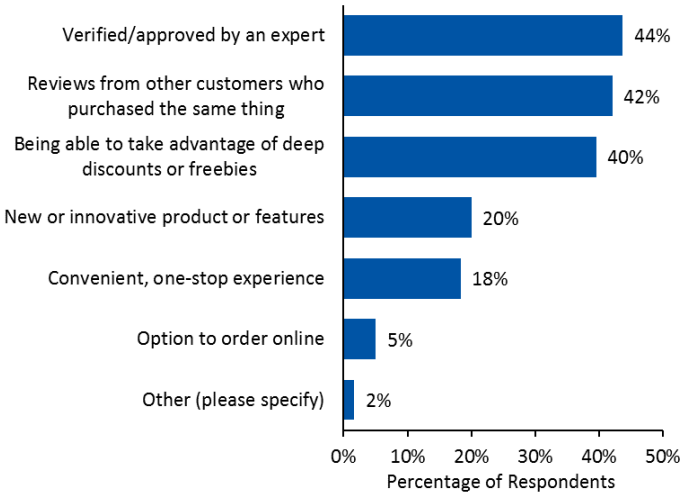
Figure 25. CY 2018 Effect of Focus on Energy Offerings on Home Performance with ENERGY STAR Program Whole Home Path Participants' Opinion of Utilities



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (CY 2018 n=234)

Program participants were asked to identify the two factors they value most in making purchase decisions (Figure 26). The most frequent response was verification and approval from an expert (44%), followed by reviews from other customers who purchased the same thing (42%) and deep discounts and freebies (40%).

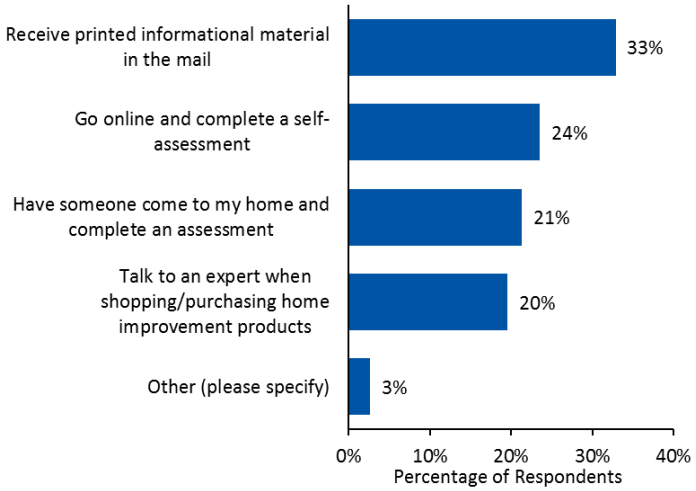
Figure 26. CY 2018 Home Performance with ENERGY STAR Program Whole Home Path Participants' Most Valued Factors in Purchase Decisions



Source: Home Performance with ENERGY STAR Whole Home Program Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=240)

Program participants were asked how they most preferred to learn about energy efficiency opportunities for their home (Figure 27). The two top responses were informational paper mailings (mentioned by 33%) and completing an online self-assessment (24%).

Figure 27. CY 2018 Home Performance with ENERGY STAR Program Whole Home Path Participants' Preferred Methods for Learning About Energy Efficiency Opportunities

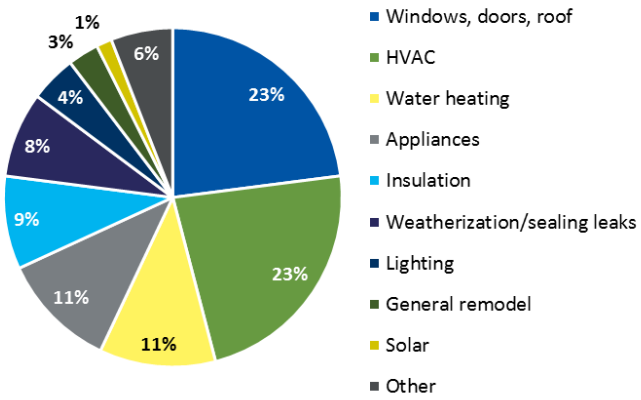


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (CY 2018 n=225)

The Evaluation Team also asked participants what future improvements they were considering. Of the 253 participants who responded to the survey, 105 (or 42%) provided specific examples, which the

Evaluation Team coded into a total of 135 mentions shown in Figure 28. The most commonly mentioned improvements involved windows, doors, and roofs (23%) and HVAC upgrades (23%), followed by water heating (11%) and appliance upgrades (11%). Six percent of mentions were classified as *other*, a category that included smart thermostats and water-saving measures.

Figure 28. CY 2018 Intentions for Future Improvements—Whole Home Path

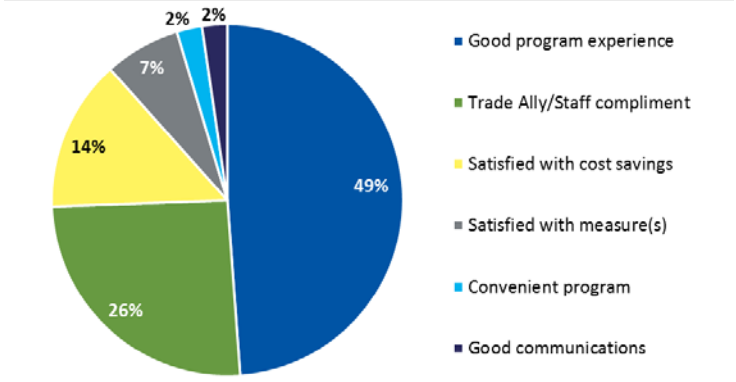


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "What improvements do you plan to complete over the next 12 months, if applicable?" (Total mentions n=135)

During the customer satisfaction surveys, the Evaluation Team also asked participants if they had any comments or suggestions for improving the Program. Of the 253 participants who responded to the survey, 82 (32%) provided open-ended feedback, which the Evaluation Team coded into a total of 89 mentions. Of these mentions, 43 (48%) were positive or complimentary comments, and 46 (52%) were suggestions for improvement.

The positive responses are shown in Figure 29, with most comments reflecting a generally positive experience (49%) and compliments for Focus on Energy staff and Trade Allies (26%).

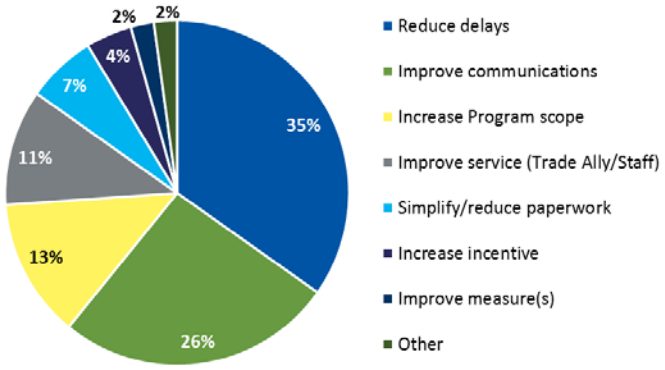
Figure 29. CY 2018 Positive Comments about the Home Performance with ENERGY STAR Program Whole Home Path



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=43)

Suggestions for improvement are shown in Figure 30; the most common suggestions were to reduce delays (35%), improve communications (26%), and increase the Program's scope (13%). Suggestions about improving communications typically focused on a lack of follow-up after a project was completed or after a rebate application was submitted.

Figure 30. CY 2018 Suggestions for Improving the Home Performance with ENERGY STAR Program Whole Home Path



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=46)

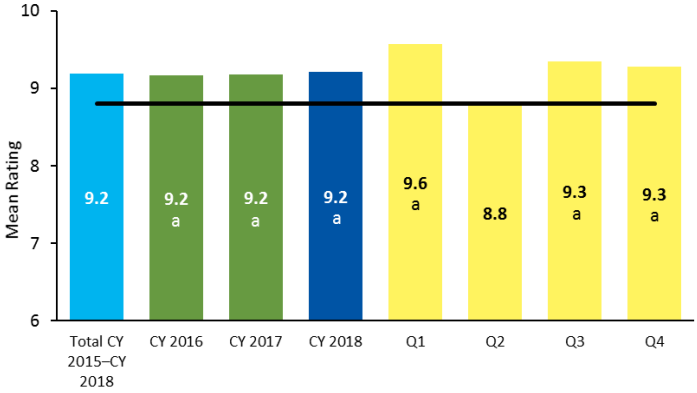
During the customer satisfaction surveys, the Evaluation Team also asked participants if they had received a Home Energy Score as part of their assessment. Almost half (42% of 252) said they had not, 35% said they did not know if they had, and only 23% confirmed that they had received a Home Energy Score. Participants who had received a Home Energy Score said the most useful aspects were learning how improvements reduced energy use, what types of improvements could help them reduce energy use, and what impact the improvements could make on reducing their utility bill. These responses are consistent with CY 2017 participants' feedback to the Home Energy Score.

Renewable Rewards Path

Figure 31 shows that the average overall Home Performance with ENERGY STAR Program satisfaction rating among CY 2018 Renewable Rewards participants was 9.2, which was statistically unchanged from CY 2017 and remained significantly above than the portfolio baseline of 8.8.[31]

[31] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value was used to establish a KPI for the Program Implementer to meet or exceed over the last three years of the CY 2015–CY 2018 quadrennial.
The Evaluation Team found that some surveys did not include identifying information to match survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Figure 31. CY 2018 Overall Satisfaction with the Renewable Rewards Program



Source: Renewable Rewards Program Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2016 n=148, CY 2017 n=148, CY 2018 n=216, Q1 n=7, Q2 n=18, Q3 n=52, Q4 n=127). Total CY 2015–CY 2018 is the participation-weighted average of three annual results (this Program and its survey began in CY 2016).

[a] This result is statistically significantly different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 76 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial that this Program was active. In CY 2018, there were two ratings that were significantly lower than for CY 2017: satisfaction with contractors (9.0, down from 9.3) and the likelihood of implementing more improvements (5.5, down from 6.5).

Table 76. CY 2018 Average Ratings for Renewable Rewards Program

Item	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.5	9.5	9.4
Satisfaction with Trade Ally	9.4	9.3	9.0 [a]
Satisfaction with incentive	8.4	8.1	8.3
Likelihood of more improvements	7.2	6.5	5.5 [a]
Likelihood of recommending the Program	9.6	9.5	9.5

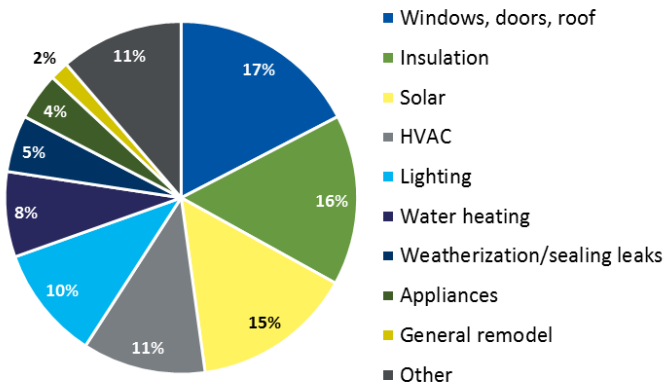
[a] This result is statistically significantly different from the result for CY 2017 (p<0.10 or better using a binomial t-test).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 Home Performance with ENERGY STAR Program NPS rating among CY 2018 Renewable Rewards participants was +84, consistent with the Program's NPS of +83 in CY 2017.

The Evaluation Team also asked participants what future improvements they were considering. Of the 218 participants who responded to the survey, 88 (40%) provided specific examples, which the Evaluation Team coded into a total of 115 mentions shown in Figure 32. The most frequently mentioned projects involved windows, doors, and roofs (17%), insulation (16%), and additional solar upgrades (15%). The most common appliances mentioned were refrigerators, clothes washers, and clothes dryers.

Eleven percent of mentions were classified as *other*, a category that included electric vehicle charging stations, battery storage, and smart thermostats.

Figure 32. CY 2018 Intentions for Future Improvements—Renewable Rewards

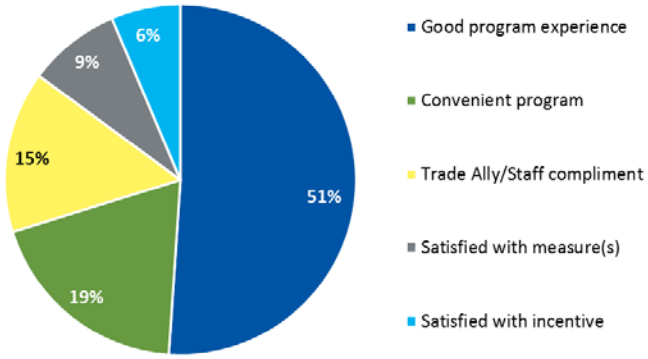


Source: Home Performance with ENERGY STAR Renewable Rewards Program Participant Satisfaction Survey Question. "What improvements do you plan to complete over the next 12 months, if applicable?" (Total mentions n=115)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 218 participants who responded to the survey, 84 (39%) provided open-ended feedback, which the Evaluation Team coded into a total of 95 mentions. Of these, 47 were positive or complimentary comments (49%), and 48 were suggestions for improvement (51%).

The positive responses are shown in Figure 33, with 51% reflecting a generally positive experience, 19% commenting on the Program's convenience, and 15% complimenting their contractor or Program staff.

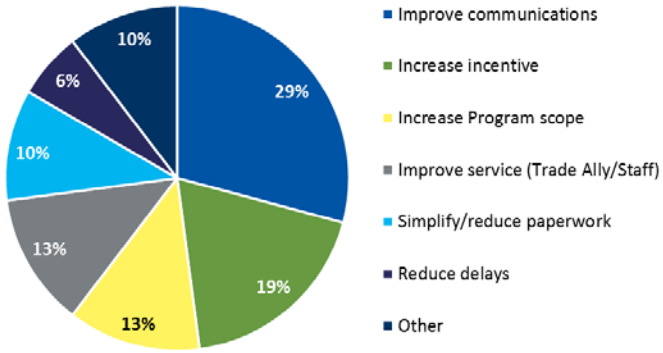
Figure 33. CY 2018 Positive Comments about the Renewable Rewards Program



Source: Renewable Rewards Program Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=47)

Suggestions for improving the Program are shown in Figure 34. The most common suggestions involved improving communications about the Program (29%) and increasing the incentive amount (19%).

Figure 34. CY 2018 Suggestions for Improving the Renewable Rewards Program



Source: Renewable Rewards Program Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=114)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 77 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Home Performance with ENERGY STAR Program whole home and HVAC paths.

Table 77. Whole Home and HVAC Path Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$6,596,675	$6,165,794	$5,409,905	$1,667,813

The Evaluation Team found that the CY 2018 whole home and HVAC paths was cost-effective (1.14). Table 78 lists the evaluated costs and benefits.

Table 78. Whole Home and HVAC Path Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$206,428	$1,226,573	$1,077,241	$272,801
Delivery Costs	$4,149,070	$2,797,134	$2,456,590	$622,109
Incremental Measure Costs	$32,396,901	$20,602,521	$33,289,125	$3,530,955
Total Non-Incentive Costs	**$36,752,400**	**$24,626,228**	**$36,822,956**	**$4,425,865**
Benefits				
Electric Benefits	$15,794,198	$16,236,636	$15,381,498	$841,975
Gas Benefits	$21,734,631	$21,044,655	$25,501,072	$4,292,688
Emissions Benefits	$4,210,636	$4,219,194	$4,505,567	$585,474
Total TRC Benefits	**$41,739,465**	**$41,500,485**	**$45,388,136**	**$5,720,137**
Net TRC Benefits	**$4,987,065**	**$16,874,257**	**$8,565,180**	**$1,294,272**
TRC B/C Ratio	**1.14**	**1.69**	**1.23**	**1.29**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Home Performance with ENERGY STAR Program.

Outcome 1. Increased incentives offered through the Flood Relief Campaign appear to have contributed to an uptick in Program participation. Prior to the enactment of flood relief incentives, 10% of total HVAC path participation occurred in flood-affected zip codes. After the enactment of flood relief incentives, participation in affected zones increased to 14%.

While the Flood Relief Campaign was designed to address damage from flooding that occurred in CY 2018, the state has experienced additional flooding in CY 2019.

Recommendation 1. Consider reviewing regions affected by flooding or other natural hardships and assess targeted opportunities to spur additional HVAC participation among customers affected by the events. Continued discussions with HVAC contractors and distributors could help identify underserved customers who would benefit from a program similar to the CY 2018 Flood Relief Campaign.

Outcome 2. The initiative for stand-alone Home Energy Scores did not generate the level of interest Focus on Energy had originally expected. Contractors completed 67 Home Energy Scores, falling short of the Program's KPI target of 1,000. The initiative intended to provide a simpler and more affordable home audit option without the customer having to participate in the Program through the Whole Home path.

In reaction to the low participation, the Program Administrator indicated it was reconsidering how to promote the Program and indicated partnering with local realtors as "ambassadors" of the Home Energy Score.

Recommendation 2. The Evaluation Team believes the stand-alone Home Energy Score can add value under a different Program design and recommends repackaging it as part of another initiative, such as the realtor partnership that the Program is considering.

Outcome 3. Although the Program achieved its KPI pertaining to DIO, it experienced delays in DIO early in CY 2018. The Program Implementer experienced high internal turnover, causing the Program to fall behind in processing applications. The Program Administrator reported the issue to the Evaluation Team during stakeholder interviews in August 2018 and successfully remedied the deficit before the end of the calendar year. Despite longer times to deliver incentive checks early in CY 2018, participant satisfaction remained statistically equivalent to or above the baseline for all Program paths, indicating the delays did not dramatically impair Program performance.

Recommendation 3. Continue to monitor and track the DIO to ensure improvement on the KPI in the future.

New Homes Program

Through the New Homes Program, Focus on Energy provides information, implementation assistance, and incentives for builders of new single-family homes in Wisconsin who meet the Program energy efficiency requirements. In CY 2018, Focus on Energy introduced a new Program design, following a CY 2015 finding that non-Program homes were constructed, on average, nearly as efficiently as Program homes in Wisconsin. The new design raised the Program per-home savings requirements and offers higher incentives for builders. These changes are intended to clearly differentiate Program homes from homes constructed outside of the Program.

Because the CY 2015 evaluation found that new Program and non-Program homes consumed similar amounts of energy, Focus on Energy introduced a new market baseline to calculate home savings in CY 2018, rather than using the code requirement baseline that had been applied in previous years. This new baseline was developed using Seventhwave's 2017 Baseline and Market Characterization Study,[32] which Focus on Energy commissioned to support the Program redesign. Although the Program calculated energy savings from the new market baseline, in CY 2018 it continued to rely on the Wisconsin Uniform Dwelling Code (WUDC) as the Program's primary home performance metric.[33]

In CY 2018, Focus on Energy paired prospective Program homeowners with builders and energy experts to construct new homes that were between 25% and 100% more efficient than homes built according to WUDC. In CY 2017 builders could receive an incentive for homes constructed 25% more efficiently than the code requirements, but in CY 2018 the New Homes Program offered financial incentives only for homes that were at least 30% more efficient than code (builders could receive certification, but no incentives, for homes that were between 25% and 29.9% more efficient than code). The Program's tiered design also offered additional incentives for more efficient homes in CY 2018, with the highest incentives offered for homes that are energy neutral.[34]

Focus on Energy delivers the Program to eligible homeowners throughout Wisconsin through the Program Administrator (APTIM), the Program Implementer (WECC, which after a CY 2019 merger is now called Slipstream), participating Trade Allies (home builders), and Building Performance Consultants. Home builders hire BPCs affiliated with the Program to guide them on better building techniques and to model and verify the new homes' energy performance using the REM/Rate software. Focus on Energy

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[32] Seventhwave. October 5, 2017. "New Homes Baseline and Market Characterization Study." https://www.focusonenergy.com/sites/default/files/2018-04/New%20Homes%20Baseline%20and%20Market%20Characterization%20Study.pdf

[33] Wisconsin Department of Health and Human Services. January 2016. "One and Two Family (UDC) – Administrative Code." Chapter SPS 320. https://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/320_325/320.pdf

[34] An energy neutral home is designed and built to consume minimal energy. The total annual amount of energy used, as modeled with REM/Rate software, is equal to the amount of renewable energy produced on site.

also offers training on advanced building techniques to help home builders meet Program requirements and construct more efficient homes.

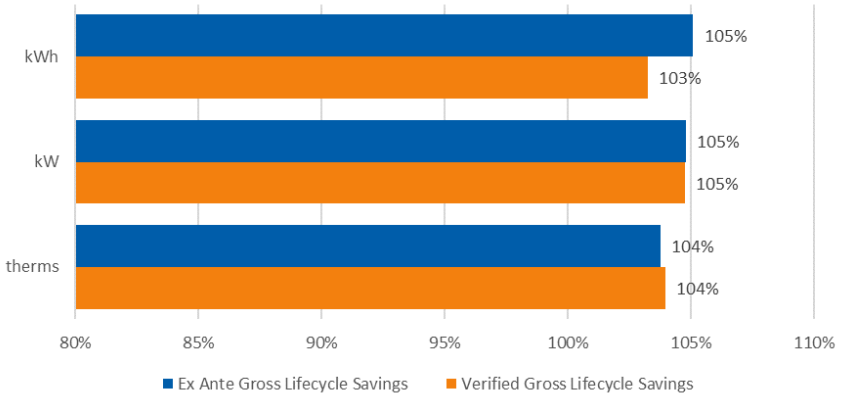
Table 79 lists the actual Program spending, savings, participation, and cost-effectiveness for CY 2017, CY 2018, and the quadrennial from CY 2015 through CY 2018.

Table 79. New Homes Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015-CY 2018)
Incentive Spending	$	$1,966,850	$696,950	$5,439,000
Participation	Number of Participants	2,403	2,228	9,093
Verified Gross Lifecycle Savings	kWh	53,862,060	130,198,800	428,751,301
	kW	571	1,403	4,485
	therms	13,788,450	29,582,010	104,382,090
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	100%	100%
Net Annual Savings	kWh	1,795,402	0	1,795,402
	kW	571	0	571
	therms	459,615	72,740	682,379
Annual Net-to-Gross Ratio	% (MMBtu)	100%	6%	19%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	0.99	1.39	1.09

Figure 35 shows the percentage of gross lifecycle savings goals achieved by the New Homes Program in CY 2018. The Program met all CY 2018 goals for both *ex ante* and verified gross savings.

Figure 35. New Homes Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the New Homes Program in CY 2018. Table 80 lists the specific data collection activities and sample sizes used in the evaluations.

Table 80. CY 2017 New Homes Program Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
REM/Rate model review	3

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and Program Implementer in November 2018 to learn about implementation of the new Program design as well as Program goals, marketing strategies, outreach to home builders, and the Program impact on the new construction market in CY 2018.

Tracking Database Review

The Evaluation Team's review of the census of Program SPECTRUM tracking data involved two tasks:

- Thoroughly reviewing the data to ensure that SPECTRUM totals matched the totals reported by the Program Administrator
- Checking for complete and consistent application of data fields (including measure names, application of first-year savings, and application of effective useful lives)

REM/Rate Model Review

The Evaluation Team reviewed the REM/Rate models for three homes with very high kilowatt-hour savings to determine if the models supported the high savings. This review confirmed the reasonableness of model inputs, such as home size, insulation levels, and infiltration levels. Additionally, the Team confirmed that the recorded savings matched the REM/Rate Model output.[35]

Impact Evaluation

In CY 2018, the Program certified 2,403 new homes. Of these homes, 97 were classified as "Certification Only" participants. The Program Implementer temporarily allowed a "Certification Only" rating for homes that were contracted in CY 2017 to be Focus on Energy Certified Homes in CY 2018, and which

[35] The Focus on Energy-specific version of REM/Rate generates an energy savings report. This report provides the homes savings, but does not provide the details of the home's baseline energy consumption. The savings calculations take place inside of the software.

could not achieve a 25% better than code efficiency using the new REM/Rate version.[36] To alleviate potential conflict between the builder and their home buyer the Program allowed these homes to achieve a "Certification Only" rating between January 1 and June 30, 2018. Because they did not meet CY 2018 efficiency requirements, these homes were ineligible for incentives and no savings was attributed to them.

As discussed above, in CY 2018 Focus on Energy introduced a new design that raised incentives based on the percentage above WUDC and increased performance requirements using a new energy savings baseline. For the impact evaluation, the Team reviewed Program tracking data in SPECTRUM.

Evaluation of Gross Savings

The Evaluation Team assessed the Program's gross savings through the tracking database review. In CY 2018, the New Homes Program based per-homes savings on a new market baseline (Seventhwave 2017) rather than the WUDC requirements, as it had done in previous years. The Program Administrator, Program Implementer, and Seventhwave worked with Noresco, the developer of the REM/Rate software (used by BPCs to calculate per home energy savings) to create the Wisconsin-specific market baseline for version 15.5 of REM/Rate.

The Evaluation Team compared CY 2018 average per-home savings in each of the efficiency tiers to average per-home savings in CY 2017 to understand how the new market baseline impacted savings.[37] As expected, the introduction of the new baseline resulted in significantly lower per-homes savings that varied by kilowatt-hour, kilowatt, and therm as well as by home efficiency level. The percentage decrease ranged between 19% and 65%, as shown in Table 81.

Table 81. Change in Per-Home Savings from CY 2017 to CY 2018

Percentage Better than Code	% Change from CY 2017 to CY 2018			CY 2018 *Ex Ante* Unit Savings				CY 2017 *Ex Ante* Unit Savings[a]			
	kWh	kW	Therm	kWh	kW	Therm	n	kWh	kW	Therm	n
25% to 29.9% (Electric)	-59%	-61%	n/a	775	0.2	-	22	1,889	0.6	-	20
30% to 34.9% (Electric)	-64%	-58%	n/a	789	0.3	-	33	2,215	0.7	-	25
35% to 99.9% (Electric)	-19%	-44%	n/a	2,558[b]	0.5	-	46	3,185	0.8	-	29
25% to 29.9% (Gas)	-65%	-65%	-58%	550	0.2	162	674	1,551	0.5	386	841
30% to 34.9% (Gas)	-61%	-62%	-55%	796	0.2	209	1,136	2,051	0.7	463	1,013
35% to 99.9% (Gas)	-62%	-62%	-56%	983	0.3	282	397	2,594	0.9	641	300

[a] Matched to CY 2018 performance tiers based on "Percent Better than Code" field in SPECTRUM.

[b] The estimate includes three outlier homes, which are reported to save between 11,836 kWh and 26,172 kWh per year. These homes are reported to be between 52% and 94% more efficient than WDUC. The Evaluation Team reviewed the REM/Rate models for these three homes and made savings adjustments to one of the homes.

[36] REM/Rate v. 15.5 allows users to model per-home savings according to Wisconsin's market baseline, whereas this modeling is not possible with earlier versions of the software.

[37] The Evaluation Team matched CY 2017 Program participation to the CY 2018 Program tiers using SPECTRUM's "Site Percent Above Code" field.

Tracking Database Review

The Evaluation Team reviewed the census of the CY 2018 New Homes Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings. The Evaluation Team identified three homes that were estimated to save over 10,000 kWh per year, which was approximately four to ten times higher than the average 2,558 kWh savings in their efficiency tier. Due to the substantial outlier savings, the Team flagged these homes for further review to confirm the reasonableness of their savings.

REM/Rate Model Review

The Evaluation Team reviewed the REM/Rate models for the three homes with kilowatt-hour savings greater than 10,000 kWh per year. Two of these homes, with annual savings of 11,836 kWh and 14,075 kWh, are heated by ASHPs and did not have natural gas service. The other home, with 26,172 kWh annual savings, is heated by a GSHP and has natural gas service. The Evaluation Team found that the REM/Rate files for all three homes were correctly modeled using the as--built home information.

According to the Program Implementer, the homes' baseline heating systems are determined by whether a home has gas or electric service. Homes with only electric service use an 8.2 HSPF ASHP baseline and homes with access to natural gas service use a 90% AFUE gas furnace baseline. To calculate heating savings for homes with access to natural gas, REM/Rate converts the assumed gas consumption of the furnace to electric consumption and bases the savings attributed to home's electric heating savings on that conversion. With this conversion the home's GSHP is not shown to save gas, even though the baseline equipment is a gas furnace.

To determine what effect the conversion had on savings, the Evaluation Team calculated savings for the GSHP home under a comparison scenario: using a market-baseline gas furnace and central air conditioner, as well as market-baseline insulation and lighting efficiency levels.[38] The Team then subtracted the energy consumption of the market-baseline home from the energy consumption of the originally modeled Program home to calculate verified savings. [39] Adjusting for the market baseline furnace and air conditioner allows verified savings to more accurately capture the complete energy impact of the GSHP home, including the gas savings and additional electric load. The Team also re-classified this home as a "Gas" home because homes in the "Electric" measure category currently do not receive any therms savings.

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[38] The Evaluation Team used the baseline metrics provided by Slipstream. The baseline gas furnace efficiency was 90% AFUE and the baseline central air conditioner efficiency was 13 SEER.

[39] The Evaluation Team cannot adjust the baseline within the REM/Rate model. Instead, the Team ran the home's model twice—once with the original GSHP equipment and once with adjusted baseline values. The Team determined the negative kilowatt-hour and positive therms savings estimates by calculating the kilowatt-hour and therms difference between the two homes' modeled electric consumption.

Table 82 shows the savings of the originally modeled GSHP home and verified savings using the two models (Program home consumption minus market-baseline home consumption).

Table 82. Original and Verified Annual Savings for Ground-Source Heat Pump Home with Access to Natural Gas

Savings Source	kWh	kW	therms[a]	MMBtu
Originally Modeled Savings	26,172	0.7	0	91
Verified Savings	-5,792	0.5	968	77

[a] SPECTRUM did not originally show gas savings for this home, even though the REM/Rate model showed 18 therms savings from the home's efficient water heater. The home was classified as an "Electric" home and did not show gas savings.

CY 2018 Verified Gross Savings Results

After rounding, the overall New Homes Program achieved an evaluated annual MMBtu realization rate of 100% (Table 83), despite the savings adjustment made to the GSHP-heated home with gas service. The adjustment to this home yielded a slight decrease in the electric realization rate and an increase in the gas realization rate.[40]

Table 83. CY 2018 New Homes Program Annual and Lifecycle Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Certification (Electric) - Level 1-25 to 29.9% Better Than Code	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Certification (Electric) - Level 2-30 to 34.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Electric) - Level 3-35 to 99.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Gas) - Level 1-25 to 29.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Gas) - Level 2-30 to 34.9% Better Than Code	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Certification (Gas) - Level 3-35 to 99.9% Better Than Code	92%	100%	101%	100%	92%	100%	101%	100%
Total Annual	98%	100%	100%	100%	98%	100%	100%	100%

Table 84 lists the *ex ante* and verified annual gross savings for the New Homes Program in CY 2018.

[40] The Evaluation Team calculated realization rates by dividing verified gross savings by *ex ante* savings.

Table 84. CY 2018 New Homes Program Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Certification (Electric) - Level 1-25 to 29.9% Better Than Code	17,054	5	0	17,054	5	0
Certification (Electric) - Level 2-30 to 34.9% Better Than Code	26,029	10	0	26,029	10	0
Certification (Electric) - Level 3-35 to 99.9% Better Than Code	92,897	21	0	92,897	21	0
Certification (Gas) - Level 1-25 to 29.9% Better Than Code	370,433	121	109,405	370,433	121	109,405
Certification (Gas) - Level 2-30 to 34.9% Better Than Code	904,521	284	237,253	904,521	284	237,253
Certification (Gas) - Level 3-35 to 99.9% Better Than Code	416,432	131	111,989	384,468	131	112,957
Total Annual	**1,827,366**	**571**	**458,647**	**1,795,402**	**571**	**459,615**

Table 85 lists the *ex ante* and verified gross lifecycle savings by measure type for the New Homes Program in CY 2018.

Table 85. CY 2017 New Homes Program Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Certification (Electric) - Level 1-25 to 29.9% Better Than Code	511,620	5	0	511,620	5	0
Certification (Electric) - Level 2-30 to 34.9% Better Than Code	780,870	10	0	780,870	10	0
Certification (Electric) - Level 3-35 to 99.9% Better Than Code	2,786,910	21	0	2,786,910	21	0
Certification (Gas) - Level 1-25 to 29.9% Better Than Code	11,112,990	121	3,282,150	11,112,990	121	3,282,150
Certification (Gas) - Level 2-30 to 34.9% Better Than Code	27,135,630	284	7,117,590	27,135,630	284	7,117,590
Certification (Gas) - Level 3-35 to 99.9% Better Than Code	12,492,960	131	3,359,670	11,534,040	131	3,388,710
Total Lifecycle	**54,820,980**	**571**	**13,759,410**	**53,862,060**	**571**	**13,788,450**

Impact of Mechanical Ventilation

Because the Program promotes the construction of air-tight, energy-efficient homes, it requires that builders include a whole-house ventilation system in every Program-certified home to ensure homes maintain healthy indoor air quality. The Program allows various approaches to meeting the whole-house ventilation requirement, including mechanical ventilation or dual-function bathroom fans.

Standard REM/Rate models cannot easily isolate the savings impact of the required mechanical ventilation because the software's reporting tools are not designed for this level of reporting. Therefore, the Program Implementer has not reported these impacts separately in the past. At the request of the PSC, the Program Implementer used specialized REM/Rate software to conduct a separate analysis of

the impact of mechanical ventilation in CY 2018. The analysis compared the energy consumption of homes with mechanical ventilation and the same homes with no mechanical ventilation, keeping all other building variables constant. Using a sample of 100 homes, the Program Implementer calculated that the mechanical ventilation requirement increases annual consumption by 32 therms per home.

Table 86 shows the total energy impacts of mechanical ventilation in CY 2018 Program homes.

Table 86. Annual Consumption of Mechanical Ventilation for CY 2018 Program Homes

CY 2018 Program Homes	Annual therms Impact	Lifetime therms Impact	Lifetime MMBtu Impact
2,403	76,896	2,306,880	230,688

Although REM/Rate models used by the Program continue to prevent isolating the impact of mechanical ventilation, the Evaluation Team is reporting these impacts here to clarify that Program savings are reduced by the mechanical ventilation requirement. Without this requirement, Program savings (reported in Table 84 and Table 85) could be higher by the amount shown in Table 86; however, it is possible that Program builders would have installed mechanical ventilation even without this requirement. Although mechanical ventilation increases a home's consumption, the PSC, the Program Administrator, and Program Implementer have agreed that it is a necessary requirement for indoor air quality benefits.

Evaluation of Net Savings

The market baseline that the Program introduced in CY 2018 incorporates net savings into the modeled ex ante savings calculation. Because standard building practices are used as the baseline for estimating gross savings, an additional net adjustment would double-discount achieved savings, unless the market baseline has shifted from the metrics used in the gross savings calculation. The Evaluation Team did not have sufficient data to estimate a shift in standard market practice since the *2017 Baseline and Market Characterization Study* and believes that any shift in market practices would have been relatively minor, given that the study was conducted two years ago. Therefore, the Evaluation Team applied a NTG ratio of 100% to gross savings.

Table 87 shows the annual net energy impacts (kilowatt-hour, kilowatt, and therms) by measure type for the Program.

Table 87. CY 2018 New Homes Program Annual Net Savings by Measure Type

Measure	Annual Net		
	kWh	kW	therms
Certification (Electric) - Level 1-25 to 29.9% Better Than Code	17,054	5	0
Certification (Electric) - Level 2-30 to 34.9% Better Than Code	26,029	10	0
Certification (Electric) - Level 3-35 to 99.9% Better Than Code	92,897	21	0
Certification (Gas) - Level 1-25 to 29.9% Better Than Code	370,433	121	109,405
Certification (Gas) - Level 2-30 to 34.9% Better Than Code	904,521	284	237,253
Certification (Gas) - Level 3-35 to 99.9% Better Than Code	384,468	131	112,957
Total Annual	**1,795,402**	**571**	**459,615**

Table 88 shows the lifecycle net energy impacts (kilowatt-hour, kilowatt, and therms) by measure type for the Program.

Table 88. CY 2018 New Homes Program Lifecycle Net Savings by Measure Type

Measure	Lifecycle Net		
	kWh	kW	therms
Certification (Electric) - Level 1-25 to 29.9% Better Than Code	511,620	5	0
Certification (Electric) - Level 2-30 to 34.9% Better Than Code	780,870	10	0
Certification (Electric) - Level 3-35 to 99.9% Better Than Code	2,786,910	21	0
Certification (Gas) - Level 1-25 to 29.9% Better Than Code	11,112,990	121	3,282,150
Certification (Gas) - Level 2-30 to 34.9% Better Than Code	27,135,630	284	7,117,590
Certification (Gas) - Level 3-35 to 99.9% Better Than Code	11,534,040	131	3,388,710
Total Lifecycle	**53,862,060**	**571**	**13,788,450**

Process Evaluation

For the CY 2018 process evaluation of the New Homes Program, the Evaluation Team focused on three key topics:

- The new CY 2018 Program design and its effects on Program participation
- Program goals and KPIs
- Program tracking processes and coordination among the Program Administrator, Program Implementer, and Trade Allies

To assess these topics, the Evaluation Team completed two process evaluation activities:

- Interviewed the Program Administrator and the Program Implementer
- Reviewed CY 2018 Program materials

Program Design, Delivery, and Goals

Through the CY 2018 New Homes Program, Focus on Energy offered incentives to participating builders for constructing homes that are at least 30% more efficient than WUDC requirements. The incentives offset both the cost of constructing an energy-efficient home and the cost of hiring a BPC to certify the home. Under a tiered incentive structure, builders were rewarded for building more efficient homes, with the highest incentive level offered for homes that were energy neutral. Builders could also receive Program certification for homes that were between 25% and 29.9% more efficient than WUDC, although they did not receive incentives at this participation level. To receive incentives, builders were required to work with an accredited BPC.[41] In addition, Focus on Energy offered Program training on advanced building practices to builders both inside and outside the Program.

[41] BPCs must possess RESNET (Residential Energy Services Network) certification or an equivalent and approved certification.

Program Management and Delivery Structure

Focus on Energy delivers the Program to eligible homeowners throughout Wisconsin through the Program Administrator, the Program Implementer, BPCs, and participating home builders.

Home builders hire a BPC affiliated with the Program to conduct at least two site visits during home construction to inspect construction and verify the home's energy performance. The BPC first visits the site at the framing stage and checks the insulation, then visits again when the home is 100% complete to conduct a blower door test, ventilation capacity testing, and other verification of Program standards.

The Program Implementer maintains communication with BPCs via a newsletter—released three times per year—Program bulletins, and one-one-one communication. In CY 2018, there were 30 BPCs who participated in the Program.

After each site visit, the BPC submits a report of findings from the visit to the home builder. The BPC may recommend corrections that the builder needs to make prior to submitting final paperwork to the Program Implementer. After reviewing the paperwork, the Program Implementer forwards it to the Program Administrator for final approval and payment of the incentive to the builder.

Program Goals

The Program Implementer tracked three KPIs in CY 2018, shown in Table 89 along with the results and the source of the results for each indicator. The Program Implementer reported accomplishing two of its KPIs: number of trainings held and number of builders trained on building science, and the average number of days incentives were outstanding. The Program Implementer partially accomplished its KPI regarding the builder sales staff training and reported exceeding the number of individual trainings but not meeting the goal in terms of the number of staff trained (because some builders did not send their entire staff to the trainings).

Table 89. CY 2017 New Homes Program Key Performance Indicators

KPI	CY 2018 Goal	CY 2018 Result	CY 2018 Result Source
Train builder sales staff on marketing specific to the Focus on Energy Program	One seminar per quarter / 80 individual attendants	**Partially Accomplished**: Six seminars / 53 total individuals	Reported by Program Administrator
Provide technical trainings for builders on building science and zero net energy homes in collaboration with municipal/cooperative utility providers	One training per quarter / 100 individual attendants	**Accomplished**: 31 trainings / 651 total individuals	
Have few average days of incentives outstanding	Less than 25 days of incentives being outstanding	**Accomplished**: 24.9 average days	

Data Management and Reporting

The Program Administrator and the Program Implementer reported that SPECTRUM, the data tracking system, was functional and running smoothly in CY 2018 and that no changes were planned.

Marketing and Outreach

Focus on Energy has typically marketed the New Homes Program primarily through the BPCs and home builders. However, in CY 2018, Focus on Energy conducted additional Program marketing geared toward home buyers, using tactics that included highlighting Program homes in the Wisconsin Parade of Homes as well as social media and magazine advertisements geared toward home buyers. The Program Administrator and Program Implementer were unsure how many new home buyers the CY 2018 marketing tactics had brought into the Program.

CY 2018 Program Design

Focus on Energy introduced a new Program design in CY 2018 because during a billing analysis conducted in CY 2015, the Evaluation Team found that Program homes consumed, on average, nearly as much energy as other new homes constructed in Wisconsin. Following this finding, Focus on Energy commissioned a new home construction baseline study and began to redesign the Program to differentiate Program homes from the wider new construction market by raising the threshold for receiving Program incentives and raising incentive levels.

Focus on Energy sensitized builders and BPCs to the CY 2018 Program design in late CY 2017 through written Program updates and one-on-one communication. The Program implemented the design at the start of CY 2018. The new Program design includes two new key elements (while other elements, such as relying on BPCs to model homes and provide advice to builders, remained unchanged):

- More stringent Program requirements based on the percentage more efficient than code, as well as the introduction of incentives for energy-neutral homes
- Builder training on advanced construction techniques

The four tiers of the new Program are illustrated in Table 90.

Table 90. CY 2018 Incentive Structure

Certification Level	Incentive	
	Electric Only Homes	Electric and Natural Gas Homes
Level 1: 25%–29.9% more efficient than code	$0	$0
Level 2: 30%–34.9% more efficient than code	$350	$1,000
Level 3: 35%–99.9% more efficient than code	$550	$2,000
Level 4: Energy Neutral (or 100% more efficient than code)	$1,000	$5,000

Program Rollout

The Program Administrator and Program Implementer reported that the CY 2018 Program rollout went smoothly due to the early engagement with builders. The only significant issues in rolling out the CY 2018 design was a delay of approximately two and a half months in developing the REM/Rate market baseline needed to calculate energy savings in CY 2018. This delay caused an initial backlog in processing Program homes at the beginning of the year. The Program Administrator and Program Implementer reported that they were able to resolve this backlog and bring application processing up to date.

Builder Training

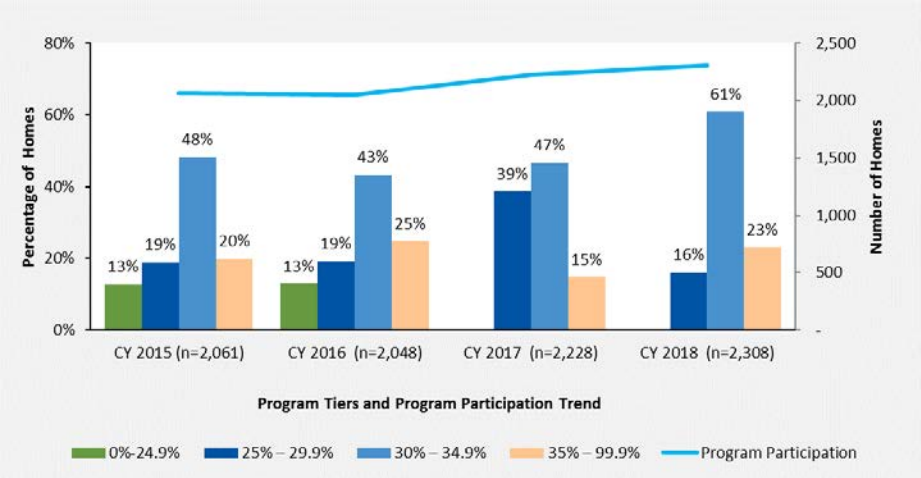
In CY 2018, the Program Implementer provided training for New Homes Program builders on new home construction techniques and on how to market Program homes to prospective home buyers. According to the Program Implementer, construction technique sessions were focused on mechanical ventilation, building science, code compliance, and advanced building techniques (including continuous exterior insulation, insulated concrete forms, and structurally insulated panels). These trainings were open to both participating and nonparticipating builders and were held in coordination with Wisconsin utilities.

Program Participation

The Evaluation Team compared participation in previous years to participation in CY 2018 by matching homes in CY 2015, CY 2016, and CY 2017 to the CY 2018 Program tiers using the SPECTRUM "Site Percent Above Code" field, which records the performance of Program homes vis-à-vis the WUDC.

Figure 36 shows the percentage of homes in each Program tier.[42] In line with the evolution of more stringent Program requirements, the percentage of homes in the higher-savings tiers has increased in CY 2018 since CY 2015. The Evaluation Team also analyzed whether CY 2018 participation in the efficiency tiers changed in each quarter and found that in each quarter participation in the four tiers was similarly distributed. In CY 2018 there was no participation in the Program's Level 4 Tier, energy neutral homes.

Figure 36. Program Participation since CY 2015



Note: CY 2018 Program participation does not include 95 homes that received the "Certification Only" rating.

Table 91 shows that the Program maintained its baseline of builder participation from CY 2017 to CY 2018, despite the more stringent Program requirements. While CY 2018 had the lowest number of individual builder participants since CY 2015, the Program lost only one builder from CY 2017 to CY 2018. The biggest drop in participation occurred from CY 2016 to CY 2017, when 60 builders no

[42] In CY 2015 and CY 2016, homes that were respectively 10% and 15% more efficient than code were eligible to participate in the Program.

longer participated. In CY 2018, 166 builders certified homes through the Program, constructing between one and 548 homes each and with an average of 14 homes.

Table 91. Builder Participation since CY 2015

	CY 2015	CY 2016	CY 2017	CY 2018
Count of home builder participants	198	227	167	166
Minimum number of homes per builder	1	1	1	1
Maximum number of homes per builder	298	427	463	548
Average number of homes per builder	10	11	13	14

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 92 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the New Homes Program.

Table 92. New Homes Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$1,966,850	$696,950	$1,170,050	$1,605,000

The Evaluation Team found that the CY 2018 New Homes Program was not cost-effective (0.99). Table 93 lists the evaluated costs and benefits.

Table 93. New Homes Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$157,571	$200,203	$224,605	$243,045
Delivery Costs	$774,396	$456,553	$512,199	$554,252
Incremental Measure Costs	$15,836,482	$1,550,502	$306,382	$369,797
Total Non-Incentive Costs	**$16,768,448**	**$2,207,258**	**$1,043,185**	**$1,167,094**
Benefits				
Electric Benefits	$4,326,010	$1,147,693	$0	$0
Gas Benefits	$10,768,049	$1,639,098	$1,738,214	$1,455,814
Emissions Benefits	$1,466,460	$286,822	$154,636	$132,587
Total TRC Benefits	**$16,560,519**	**$3,073,613**	**$1,892,850**	**$1,588,401**
Net TRC Benefits	**($207,929)**	**$866,355**	**$849,664**	**$421,307**
TRC B/C Ratio	**0.99**	**1.39**	**1.81**	**1.36**

Evaluation Outcomes and Recommendations

The Evaluation Team identified several outcomes for its evaluation of the New Homes Program.

Outcome 1. In CY 2018, Focus on Energy successfully rolled out a major New Homes Program redesign. The new design, which includes more stringent participation requirements, appears to have shifted builder participation toward more efficient home tiers, without experiencing a significant loss in builder participation.

Outcome 2. In CY 2018, the Program Implementer focused New Homes Program marketing messages on potential home buyers to encourage them to consider Focus on Energy-certified homes. The Program Implementer conducted marketing toward potential home buyers via social media and the Wisconsin Parade of Homes.

Recommendation 1. Consider conducting a survey of participant home buyers to gauge the effectiveness of Program marketing tactics and to inform future marketing campaigns. A survey with home buyers could provide valuable information on their motivations and the effectiveness of Program marketing. Results from this survey could help inform future marketing directed toward home buyers.

Outcome 3. In CY 2018, the New Homes Program introduced a new market baseline to calculate per-home savings. The new market baseline was introduced in response to a CY 2015 billing analysis that found Program homes did not, on average, consume less electricity than non-Program homes. Seventhwave's research on the Wisconsin new home market provided the basis for the new baseline. Using the new baseline to calculate per-home savings, CY 2018 *ex ante* per-home savings decreased between 19% and 65%.

Recommendation 2. Future Program evaluators should consider conducting a billing analysis of CY 2018 Program homes in CY 2019. A billing analysis of CY 2018 homes would help to validate the home savings estimates and provide information on market changes that would allow a net-savings adjustment.

Outcome 4. In CY 2018, the New Homes Program used different heating baseline assumptions for homes, depending on their access to natural gas. Homes with access to gas service were assigned a 90% AFUE gas furnace baseline and homes without gas service were assigned an 8.2 HSPF ASHP baseline. When a home installs electric heating equipment, such as a GSHP as heating equipment, the REM/Rate model converts the assumed gas consumption to electricity to calculate the electric heating equipment's electric savings.

Recommendation 3. Calculate actual fuel specific-impacts, rather than converting fuel impacts for reported savings. Converting assumed gas consumption to electricity in order to calculate electric savings masks the total energy impacts of installed heating equipment. Recording specific fuel impacts provides a more transparent accounting of energy savings.

Simple Energy Efficiency Program

For the Simple Energy Efficiency Program, Focus on Energy mails no-cost energy-saving packs[43] containing various combinations and quantities of LEDs, faucet aerators, showerheads, advanced power strips (APS), and other energy-saving measures directly to residential customers in single-family homes (one to three units) and multifamily homes (four or more units). APTIM is the Program Administrator and Energy Federation Inc. is the Program Implementer.

As part of the PSC initiative to enhance Focus on Energy services to rural customers, Focus on Energy continued to offer the Connected Devices Kits Program in CY 2018. The Program operated similarly to but independently of the Simple Energy Efficiency Program, offering kits that contained smart and Wi-Fi thermostats, APS, and connected LED light bulbs to customers of participating utilities who live in designated rural zip codes.[44]

The Simple Energy Efficiency Program delivered 89,367 packs in CY 2018 and had a benefit/cost ratio of 6.27. Table 94 shows spending, savings, participation, and cost-effectiveness for CY 2018, CY 2017, and the quadrennial from CY 2015 through CY 2018.

Table 94. Simple Energy Efficiency Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$1,991,876	$1,477,862	$5,174,775
Participation	Number of Participants	89,367	69,886	245,957
Verified Gross Lifecycle Savings	kWh	230,255,500	171,534,543	614,198,241
	kW	1,557	1,154	4,244
	therms	7,261,922	5,755,601	24,287,526
Verified Gross Lifecycle Realization Rate	% (MMBtu)	99%	98%	95%
Net Annual Savings	kWh	16,718,646	12,471,032	46,889,210
	kW	1,557	1,154	4,242
	therms	585,484	508,691	2,147,913
Annual Net-to-Gross	% (MMBtu)	100%	100%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	6.27	5.68	6.01

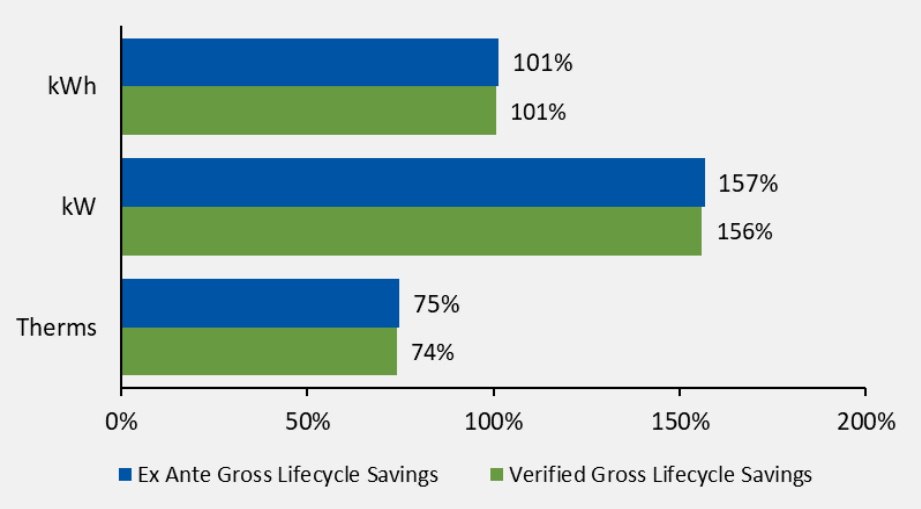
Figure 37 shows the percentage of gross lifecycle savings goals achieved by the Simple Energy Efficiency Program in CY 2018. The Program exceeded its CY 2018 *ex ante* and verified gross lifecycle savings goals for kilowatt-hours and kilowatts but fell short of its *ex ante* and verified gross lifecycle savings goals for

[43] Focus on Energy uses the term *pack* to distinguish the Simple Energy Efficiency Program from other Wisconsin utility programs that offer energy-saving *kits.*

[44] Focus on Energy designated rural zip codes according to U.S. Census Bureau data. See Appendix M for a complete list of designated rural zip codes.

therms. The excess kilowatt savings and shortfall of therm savings can be attributed to differences between planned pack distribution and actual distribution.

Figure 37. Simple Energy Efficiency Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

The Connected Devices Kits Program delivered 54,847 kits in CY 2018 and had a benefit/cost ratio of 1.25. Table 95 shows spending, savings, participation, and cost-effectiveness for CY 2018. CY 2018 was the first year the Program claimed savings.

Table 95. Connected Devices Kits Program Summary

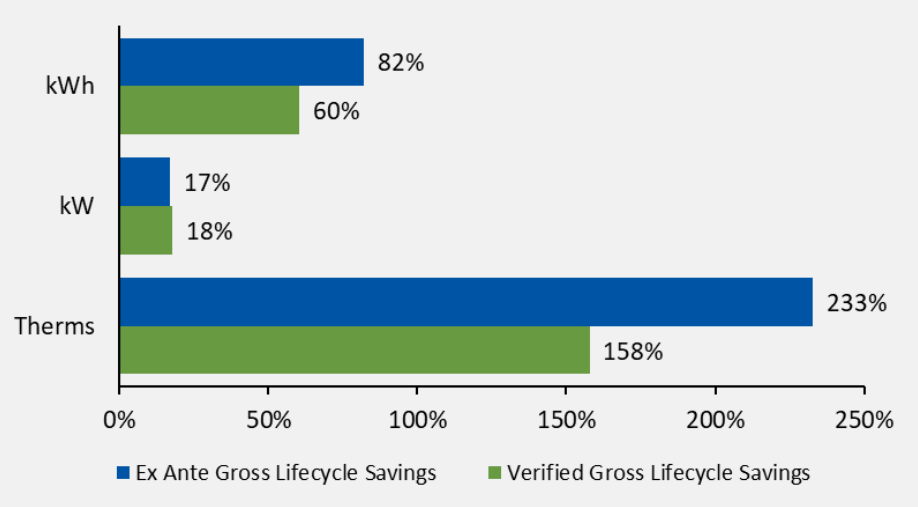
Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$6,541,280	$0	$6,541,280
Participation	Number of Participants	54,847	0	54,847
Verified Gross Lifecycle Savings	kWh	90,613,549	0	90,613,549
	kW	381	0	381
	therms	5,083,734	0	5,083,734
Verified Gross Lifecycle Realization Rate	% (MMBtu)	70%	0%	70%
Net Annual Savings	kWh	9,516,825	0	9,516,825
	kW	381	0	381
	therms	506,608	0	506,608
Annual Net-to-Gross	% (MMBtu)	100%	0%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.25	n/a	1.25

Figure 38 shows the percentage of two-year (CY 2017-CY 2018) gross lifecycle savings goals achieved by the Connected Devices Kits Program in CY 2018. The Program exceeded its two-year *ex ante* and verified gross lifecycle savings goals for therms but fell short of its CY 2017 and CY 2018 *ex ante* and verified

gross lifecycle savings goals for kilowatt-hours and kilowatts. Like Simple Energy Efficiency, these variations can be tied to a difference between predicted kit distribution and actual distribution.

As noted above, CY 2018 was the first year the Program claimed savings; therefore, all achievement against the two-year goals occurred in CY 2018.

Figure 38. Connected Devices Kits Program Achievement of CY 2017-CY 2018 Gross Lifecycle Savings Goal



Note: For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2017 and CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals. This figure shows achievement against a two-year goal; however, the Program did not claim savings in CY 2017.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the CY 2018 Simple Energy Efficiency and Connected Devices Kits programs. The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 96 lists the specific data collection activities and sample sizes the Team used for the evaluations.

Table 96. CY 2018 Simple Energy Efficiency Program and Connected Devices Kits Program Data Collection Activities and Sample Sizes

Activity	Simple Energy Efficiency Sample Size (n)	Connected Devices Kits Sample Size (n)
Program Actor Interviews		2
Tracking Database Review	Census	Census
Participant Surveys	361	2,111
Ongoing Customer Satisfaction Surveys	11,187	5,780

Program Actor Interviews

In August 2018, the Evaluation Team interviewed the Program Administrator and the Program Implementer to assess the status of the Simple Energy Efficiency and Connected Devices Kits programs

and to discuss topics such as the programs' design and goals, marketing strategies, and data tracking to gain a better understanding of high-level processes, successes, and any concerns with either program.

Tracking Database Review

The Evaluation Team reviewed a census of SPECTRUM tracking data, which entailed three tasks for both programs:

- Thoroughly reviewing the data to ensure that SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to appropriate measure categories
- Checking for complete and consistent application of data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Participant Surveys

The Evaluation Team conducted online surveys with 361 multifamily customers who participated in the Simple Energy Efficiency Program and 2,111 customers who participated in the Connected Devices Kits Program during CY 2018. Survey topics included Program awareness, measure installation or removal, cross-program participation, energy-saving actions, spillover, and demographics.

The Team attempted to survey a minimum of 70 participants for each program's pack configuration, which is generally sufficient to achieve 90% confidence at ±10% precision. The Evaluation Team used a census sample of participants with email addresses provided in the tracking data to enable the best chance to achieve 70 completes for packs and kits with low distribution numbers. Table 97 shows the participant population when the survey was fielded in September 2018 and the number of completed surveys by pack and kit type.

Table 97. Simple Energy Efficiency and Connected Devices Kits Program Surveys by Pack Type

Pack Type	Participation as of September 2018	Survey Invitations Sent	Surveys Completed
Simple Energy Efficiency			
Pack with APS	1,694	289	93
Light Bulb Pack	2,650	377	81
Hand Showerhead Pack	1,434	226	79
Fixed Showerhead Pack	1,303	166	69
Flood Light Pack	387	65	21
Decorative Light Pack	215	37	18
Simple Energy Efficiency Total	**7,683**	**1,160**	**361**
Connected Devices Kits			
Free Kit #1 (LEDs and APS)	16,751	3,248	454
Free Kit #2 (Emerson Sensi)	10,136	3,542	568
Free Kit #3 (Nest E)	9,258	5,430	918
Co-Pay Kit #1 (Nest Learning)	521	282	94
Co-Pay Kit #2 (ecobee4)	397	228	77
Connected Devices Kits Total	**37,063**	**12,730**	**2,111**
Overall Total	**44,746**	**13,890**	**2,472**

All pack types but two (the Flood Light and Decorative Light packs) received enough responses to achieve the targeted levels of confidence and precision, the implications of which are discussed in the *In-Service Rates* section.

Ongoing Customer Satisfaction Surveys

The PSC requested that the Evaluation Team conduct ongoing customer satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. The goals of these surveys are to provide a quick and easy opportunity for recent Program participants to provide feedback, ensure that feedback is close to the participation experience, enable problem identification at any time of year, and identify opportunities for delivering follow-up energy efficiency information to interested participants. The Program Implementer used data collected during ongoing customer satisfaction surveys to assess performance and help meet contractual obligations related to satisfaction KPIs.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2018 Simple Energy Efficiency and Connected Devices Kits participants with an email address within two weeks of when they completed participating in the Program. The Evaluation Team gathered online survey results via SPECTRUM and sent, received, and scanned mail survey responses for participants without an email address, which were combined with the online results for quarterly and annual reporting.

In CY 2018, 11,187 Simple Energy Efficiency Program participants and 5,780 Connected Devices Kits Program participants responded to the ongoing customer satisfaction survey (after the Evaluation Team removed duplicates). The Evaluation Team selected random samples of 10%, or 1,081 Simple Energy Efficiency respondents and 18%, or 1,027 Connected Devices Kits respondents, for reporting purposes.

Impact Evaluation

The Team's impact evaluation findings for the Simple Energy Efficiency and Connected Devices Kits programs are outlined below, based on the tracking database review and participant surveys.

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data and ISRs from participant surveys and applied the results to the gross savings.

Tracking Database Review

The Evaluation Team reviewed the census of CY 2018 Simple Energy Efficiency Program and Connected Devices Kits Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EUL values in adherence with the TRM or other deemed savings sources.

The Evaluation Team identified several anomalies in the tracking data:

- Fifty-nine customers across both programs appeared to receive multiple packs or kits
- Three Simple Energy Efficiency Program customers requested a Light Bulb Pack and appeared to receive only one or two of the pack's three measures
- One Connected Devices Kits Program customer appeared to receive an APS but not connected LEDs in the Program's Free Rural Kit #1

The Team forwarded the customer information to the Program Implementer to investigate the cause of the discrepancies and provide resolutions to each issue:

- All duplicate entries were true kit deliveries, not indicating an underlying database issue with SPECTRUM. These customers commonly used different naming conventions in their mailing addresses (thereby circumventing the system that prevented customers from ordering multiple packs or kits). These duplicates comprised less than one-tenth of 1% of all pack and kit orders.
- The four customers who appeared to receive partial packs had their records affected during data upload interruptions to SPECTRUM. The Evaluation Team manually adjusted each of the four records to reflect receipt of all kit measures.

In-Service Rates

The following sections present the first-year and lifetime ISRs the Team used to calculate verified Program savings.

First-Year ISRs

In CY 2018, the Evaluation Team conducted surveys with Simple Energy Efficiency multifamily participants and Connected Devices Kits participants to verify measure installation and estimate multifamily measure-level ISRs for each pack type. Because of insufficient response rates from multifamily participants who received Decorative Light Packs and Flood Light Packs, the Team applied CY 2017 single-family ISRs to CY 2018 multifamily candelabras and reflector LEDs.

For Simple Energy Efficiency single-family participants, the Team applied measure-level ISRs derived from the CY 2017 single-family participant survey to the Program's single-family pack distribution in CY 2018 to calculate updated ISRs at the pack level. The Team then calculated average Simple Energy Efficiency ISRs by weighting single-family and multifamily participation at the pack level. Because single-family participants comprised the majority of Program participation, overall ISRs strongly resemble single-family ISRs. Table 98 compares first-year ISRs for Simple Energy Efficiency Program measures, distinguished by single-family and multifamily households, to CY 2017 ISRs.[45]

[45] The first-year ISR represents the percentage of products that are still installed, in use, and operating properly within 12 months of receipt.

Table 98. Simple Energy Efficiency Program First-Year Measure-Level In-Service Rates

Measure	CY 2018			CY 2017 (Second Half)[a]
	Multifamily ISR	Single-Family ISR	Weighted ISR	Single-Family ISR
A19 LEDs (9 Watt and 11 Watt)	72.9%	77.1%	76.5%	77.7%
Bathroom Faucet Aerators	54.9%	56.1%	56.0%	56.2%
Fixed Showerhead	73.5%	64.0%	65.2%	64.0%
Hand-Wand Showerhead	65.8%	71.0%	70.3%	71.0%
APS	73.9%	78.4%	77.7%	78.4%
Specialty LEDs[b]	64.9%	72.7%	71.8%	72.7%
Pipe Wrap	24.8%	40.0%	38.0%	39.9%
Hot Water Temperature Card	16.0%	17.4%	17.2%	16.6%

[a] Focus on Energy changed pack configurations in the second half of CY 2017 and maintained the same pack configuration in CY 2018. Accordingly, the Team compared first-year ISRs in CY 2018 to those from packs distributed after July 1, 2017. Single-family ISRs in CY 2017 and CY 2018 are not identical due to differences in pack type distributions by year.

[b] Specialty LEDs include candelabra (candle), reflector (flood), and globe bulbs.

Table 99 shows first-year ISRs for all measures distributed in Connected Devices Kits Program kits, grouped by measure name in SPECTRUM.

Table 99. Connected Devices Kits Program First-Year Measure-Level In-Service Rates

Measure Name	Technology	First-Year ISR
APS	Embertec Bluetooth or TrickleStar Multi-Sensing APS	69.4%
Communicating (Wi-Fi) thermostat	Emerson Sensi Wi-Fi Thermostat	59.4%
Connected lighting	Philips Hue Connected LED	63.2%
Smart thermostat – premium	Nest Learning or ecobee4 Thermostat	90.6%
Smart thermostat – value	Nest E Thermostat	71.9%

Lifetime ISRs

The Evaluation Team also calculated lifetime ISRs for lighting measures (A19 and specialty LEDs) because first-year ISRs do not account for the future installation of bulbs stored for later use. To calculate lifetime ISRs for LEDs, the Team followed the approach documented in the UMP,[46] which was updated following the CY 2016 evaluation. The Team did not apply this approach to non-lighting measures because there is not a similar evaluation protocol for these products. The Team also did not apply this approach to connected LEDs in the Connected Devices Kits Program due to a lack of verification that connected LEDs are stored and later installed in a similar manner to standard LEDs.

The UMP imputes the trajectory of lighting installations annually for the EUL of the bulb or until a utility or program stops claiming lighting savings, whichever comes first. The Evaluation Team adopted the latter approach, following the methodology used in the Retail Lighting and Appliance Program, which

[46] 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

assumes that Focus on Energy will stop claiming lighting savings in 2022. To account for the present value of future installations, the Team discounted future savings annually at 2%. The final ISR values for each measure type are shown in Table 100.

Table 100. Simple Energy Efficiency Program Measure-Level In-Service Rates

Measure	TRM ISR	Evaluated ISR[a]	ISR Type
A19 LEDs (9 Watt and 11 Watt)	92.0%	89.8%	Lifetime (through 2022)
Bathroom Faucet Aerators	54.0%	56.0%	First year
Fixed Showerhead	65.0%	65.2%	First year
Hand-Wand Showerhead	65.0%	70.3%	First year
APS	70.0%	77.7%	First year
Specialty LEDs	92.0%	91.5%	Lifetime (through 2022)
Pipe Wrap	39.9%	38.0%	First year
Hot Water Temperature Card	16.6%	17.2%	First year

[a] This column reflects Program-level ISRs (weighted average of multifamily and single-family pack distribution).

Table 101 compares verified first-year ISRs to TRM ISRs. As noted above, the Team did not calculate trajectory ISRs for the connected LEDs distributed through the Connected Devices Kits Program.

Table 101. Connected Devices Kits Program Measure-Level In-Service Rates

Measure	TRM ISR	Evaluated ISR	ISR Type
APS	55.0%	69.4%	First year
Communicating (Wi-Fi) thermostat	100.0%	59.4%	First year
Connected lighting	90.0%	63.2%	First year, LED only[a]
Smart thermostat – premium	100.0%	90.6%	First year
Smart thermostat – value	100.0%	71.9%	First year

[a] The TRM algorithm for connected lighting includes three separate ISRs specific to the measure for the LEDs (90%), the hub (75%), and the smart device app (75%). The Evaluation Team's CY 2018 participant survey only collected ISR information the LEDs (63%). Accordingly, in calculating verified savings, the Team calculated the proportion of the verified LED ISR to the TRM LED ISR (63% ÷ 90% = 70%) and applied it to the TRM default ISRs for the hub and app (75% * 70% = 53% for both).

Verified Unit Energy Savings

The Evaluation Team produced verified per-UES by replacing TRM ISRs with evaluated ISRs in each measure's energy savings TRM algorithm. Realization rates were calculating as the ratio of verified savings to *ex ante* savings.

Among Simple Energy Efficiency Program measures, evaluated ISRs exceeded TRM (*ex ante*) ISRs for 11-watt LEDs, bathroom faucet aerators, fixed and hand-wand showerheads, APSs, and water heater temperature turn-down cards, leading to realization rates greater than 100%. Conversely, evaluated ISRs fell short of TRM ISRs for 9-watt LEDs, globe LEDs, candelabra LEDs, reflector LEDs, and pipe wrap, resulting in realization rates less than 100%. As shown in Table 104, evaluated ISRs closely resembled TRM ISRs for all measures, with evaluated ISRs falling between two and eight percentage points of TRM ISRs.

Among Connected Devices Kits Program measures, the TRM sets the *ex ante* ISRs for smart and Wi-Fi thermostats at 100%; therefore, any verified ISR adjustments would cause thermostat realization rates to be less than 100%. For other kit measures, the verified ISR for APS exceeded the TRM ISR by 14 percentage points and the verified ISR for the connected LEDs fell short of the TRM ISR by 27 percentage points.

Table 102 and Table 103 shows the *ex ante* unit savings (using the TRM ISR), verified gross unit savings (using the verified ISR), and realization rates by measure for the Simple Energy Efficiency and Connected Devices Kits programs, respectively.

Table 102. CY 2018 Simple Energy Efficiency Program Unit Savings

Measure	*Ex Ante* Unit Savings			Verified Unit Savings			Realization Rates		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
A19 LEDs, 9 Watt	25.3	0.0022	0.0	25.1	0.0022	0.0	99%	99%	n/a
A19 LEDs, 11 Watt	31.2	0.0028	0.0	31.3	0.0028	0.0	100%	100%	n/a
Bathroom Faucet Aerators	9.2	0.0007	1.4	9.5	0.0007	1.4	104%	104%	104%
Fixed Showerhead	48.1	0.0020	7.8	48.3	0.0021	7.8	100%	100%	100%
Hand-Wand Showerhead	47.9	0.0020	7.8	51.8	0.0022	8.4	108%	108%	108%
APS	48.9	0.0065	0.0	54.3	0.0072	0.0	111%	111%	n/a
Globe LEDs	14.9	0.0013	0.0	14.4	0.0013	0.0	97%	97%	n/a
Candelabra LEDs	26.3	0.0024	0.0	25.3	0.0023	0.0	96%	96%	n/a
Reflector LEDs	42.2	0.0038	0.0	42.0	0.0038	0.0	100%	100%	n/a
Pipe Wrap	29.8	0.0043	3.4	28.4	0.0041	3.3	95%	95%	95%
Hot Water Temperature Card	1.5	0.0002	0.6	1.5	0.0002	0.7	104%	104%	104%
Water-Related Energy Savings	61,061.7	0.0000	0.0	61,061.7	0.0000	0.0	100%	n/a	n/a

Table 103. CY 2018 Connected Devices Kits Program Unit Savings

Measure	*Ex Ante* Unit Savings			Verified Unit Savings			Realization Rates		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
APS	67.2	0.0089	0.0	84.8	0.0112	0.0	126%	126%	n/a
Communicating thermostat	219.5	0.0000	19.8	130.3	0.0000	11.7	59%	n/a	59%
Connected lighting	40.5	0.0062	0.0	28.5	0.0044	0.0	70%	70%	n/a
Smart thermostat – premium	430.5	0.0000	29.7	390.0	0.0000	26.9	91%	n/a	91%
Smart thermostat – value	428.4	0.0000	29.5	307.8	0.0000	21.2	72%	n/a	72%

Verified Gross Savings Results

After applying verified unit savings to all measures, the Simple Energy Efficiency and Connected Devices Kits programs achieved evaluated realization rates of 99% (Table 104) and 71% (Table 105), respectively, weighted by MMBtu.[47]

[47] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 104. CY 2018 Simple Energy Efficiency Program Annual and Lifecycle Realization Rates

Measure	Annual Realization Rates				Lifecycle Realization Rates			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
A19 LEDs, 9 Watt	99%	99%	n/a	99%	99%	99%	n/a	99%
A19 LEDs, 11 Watt	100%	100%	n/a	100%	100%	100%	n/a	100%
Bathroom Faucet Aerators	104%	104%	104%	104%	104%	104%	104%	104%
Fixed Showerhead	100%	100%	100%	100%	100%	100%	100%	100%
Hand-Wand Showerhead	108%	108%	108%	108%	108%	108%	108%	108%
APS	111%	111%	n/a	111%	111%	111%	n/a	111%
Globe LEDs	97%	97%	n/a	97%	97%	97%	n/a	97%
Candelabra LEDs	96%	96%	n/a	96%	96%	96%	n/a	96%
Reflector LEDs	100%	100%	n/a	100%	100%	100%	n/a	100%
Pipe Wrap	95%	95%	95%	95%	95%	95%	95%	95%
Hot Water Temperature Card	104%	104%	104%	104%	104%	104%	104%	104%
Water-Related Energy Savings	100%	n/a	n/a	100%	100%	n/a	n/a	100%
Total	**100%**	**100%**	**99%**	**99%**	**100%**	**100%**	**99%**	**99%**

Table 105. CY 2018 Connected Devices Kits Program Annual and Lifecycle Realization Rates

Measure	Annual Realization Rates				Lifecycle Realization Rates			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
APS	126%	126%	n/a	126%	126%	126%	n/a	126%
Communicating thermostat	59%	n/a	59%	59%	59%	n/a	59%	59%
Connected lighting	70%	70%	n/a	70%	70%	70%	n/a	70%
Smart thermostat – premium	91%	n/a	91%	91%	91%	n/a	91%	91%
Smart thermostat – value	72%	n/a	72%	72%	72%	n/a	72%	72%
Total	**76%**	**103%**	**68%**	**71%**	**76%**	**103%**	**68%**	**71%**

Table 106 and Table 107 lists the *ex ante* and verified annual gross savings for the Simple Energy Efficiency and Connect Devices Kits programs, respectively, for CY 2018.

Table 106. CY 2018 Simple Energy Efficiency Program Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
A19 LEDs, 9 Watt	5,414,412	477	0	5,371,463	473	0
A19 LEDs, 11 Watt	1,902,733	172	0	1,911,331	172	0
Bathroom Faucet Aerators	506,194	38	77,328	524,571	39	80,136
Fixed Showerhead	651,491	28	104,911	653,913	28	105,301
Hand-Wand Showerhead	675,280	29	109,754	729,897	31	118,631
APS	916,446	121	0	1,016,847	134	0
Globe LEDs	1,231,737	111	0	1,194,394	108	0
Candelabra LEDs	708,174	63	0	680,584	61	0
Reflector LEDs	2,023,752	184	0	2,016,183	183	0
Pipe Wrap	2,292,493	334	263,178	2,182,031	318	250,497
Hot Water Temperature Card	68,457	9	29,784	71,063	9	30,919
Water-Related Energy Savings[a]	366,370	0	0	366,370	0	0
Total Annual	**16,757,539**	**1,566**	**584,957**	**16,718,646**	**1,557**	**585,484**

[a] Differences with SPECTRUM in savings are due to water adjustment measures amounting to 2.2% of annual savings.

Table 107. CY 2018 Connected Devices Kits Program Annual Gross Savings Summary by Measure

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
APS	1,642,540	217	0	2,072,587	274	0
Communicating thermostat	3,334,719	0	300,249	1,979,489	0	178,228
Connected lighting	990,420	151	0	695,883	106	0
Smart thermostat – premium	565,702	0	38,972	512,459	0	35,304
Smart thermostat – value	5,958,850	0	410,300	4,282,030	0	294,842
Total Annual	**12,492,231**	**369**	**749,521**	**9,542,448**	**381**	**508,373**

Table 108 and Table 109 list the *ex ante* and verified gross lifecycle savings by measure for the Simple Energy Efficiency and Connected Devices Kits programs in CY 2018.

Table 108. CY 2018 Simple Energy Efficiency Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
A19 LEDs, 9 Watt	81,216,414	477	0	80,572,182	473	0
A19 LEDs, 11 Watt	28,541,185	172	0	28,670,147	172	0
Bathroom Faucet Aerators	5,061,945	38	773,282	5,245,714	39	801,355
Fixed Showerhead	6,514,911	28	1,049,114	6,539,130	28	1,053,014
Hand-Wand Showerhead	6,752,805	29	1,097,544	7,298,972	31	1,186,313
APS	5,498,673	121	0	6,101,082	134	0
Globe LEDs	18,476,055	111	0	17,915,904	108	0
Candelabra LEDs	10,623,399	63	0	10,209,517	61	0
Reflector LEDs	30,356,280	184	0	30,242,739	183	0
Pipe Wrap	34,387,392	334	3,947,677	32,730,466	318	3,757,462
Hot Water Temperature Card	1,026,849	9	446,767	1,065,946	9	463,778
Water-Related Energy Savings[a]	3,663,700	0	0	3,663,700	0	0
Total Lifecycle	**232,119,608**	**1,566**	**7,314,384**	**230,255,500**	**1,557**	**7,261,922**

[a] Differences with SPECTRUM in savings are due to water adjustment measures amounting to 1.6% of lifecycle savings.

Table 109. CY 2018 Connected Devices Kits Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
APS	9,855,240	217	0	12,435,521	274	0
Communicating thermostat	33,347,190	0	3,002,490	19,794,892	0	1,782,278
Connected lighting	14,856,293	151	0	10,438,245	106	0
Smart thermostat – premium	5,657,020	0	389,720	5,124,595	0	353,040
Smart thermostat – value	59,588,500	0	4,103,000	42,820,296	0	2,948,416
Total Lifecycle	**123,304,243**	**369**	**7,495,210**	**90,613,549**	**381**	**5,083,734**

Evaluation of Net Savings

The Evaluation Team calculated net energy savings and demand reduction by measuring and applying freeridership and spillover to verified savings values. The NTG calculations and net savings for each Program are outlined below.

Simple Energy Efficiency Program

Consistent with past analyses, the Evaluation Team applied a NTG ratio of 1.0 to all measures provided in packs through the Simple Energy Efficiency Program.

The Evaluation Team has assumed no participant spillover for the Program. The Team surveyed respondents about spillover actions they may have taken unrelated to the Program as a result of participating in the Program, discussed in the *Energy-Saving Actions* section.

Connected Devices Kits Program

Similar to the Simple Energy Efficiency Program, the Evaluation Team applied a NTG ratio of 1.0 to all measures provided in free kits through the Connected Devices Kits Program.

For measures within co-pay kits offered through the Program (that is, for premium smart thermostats), the Evaluation Team used participant surveys to assess net savings. The survey's self-report NTG battery included questions that allowed the Team to calculate freeridership (measures that would have been purchased without the Program's influence) and spillover (Program-induced energy-saving actions).

To calculate the measures' final NTG percentages, the Evaluation Team then combined self-reported freeridership and spillover results using the following equation. Appendix I provides a complete review of the Team's self-report NTG analysis and findings.

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

Table 110 shows freeridership and spillover results for premium smart thermostats and the measure's final NTG. Because premium smart thermostats comprise a small portion of the Program, their impact on overall NTG is similarly small. Survey respondents who received free kits were not asked questions related to freeridership and spillover.

Table 110. CY 2018 Connected Devices Kits Program Net-to-Gross

Measure	Freeridership	Spillover	NTG (1 – Freeridership + Spillover)	Sample Size
APS	0%	0%	100%	n/a
Communicating Thermostat	0%	0%	100%	n/a
Connected Lighting	0%	0%	100%	n/a
Smart Thermostat – Premium	9%	4%	95%	123
Smart Thermostat – Value	0%	0%	100%	n/a
Program Total			**99.7%**	**123**

CY 2018 Verified Net Savings Results

Table 111 and Table 112 show the annual and lifecycle net energy impacts (kilowatt-hour, kilowatt, and therms) for the Simple Energy Efficiency Program. As noted above, these savings reflect a NTG ratio of 1.0.

Table 111. CY 2018 Simple Energy Efficiency Program Annual Net Savings

Program	Annual Net		
	kWh	kW	therms
Simple Energy Efficiency	16,718,646	1,557	585,484

Table 112. CY 2018 Simple Energy Efficiency Program Lifecycle Net Savings

Program	Lifecycle Net		
	kWh	kW	therms
Simple Energy Efficiency	230,255,500	1,557	7,261,922

Table 113 and Table 114 show the annual and lifecycle net savings for the Connected Devices Kits Program. As noted above, these savings reflect a Program-level NTG ratio of 0.997.

Table 113. CY 2018 Connected Devices Kits Program Annual Net Savings

Program	Annual Net		
	kWh	kW	therms
Connected Devices Kits	9,516,825	381	506,608

Table 114. CY 2018 Connected Devices Kits Program Lifecycle Net Savings

Program	Lifecycle Net		
	kWh	kW	therms
Connected Devices Kits	90,357,319	381	5,066,082

Process Evaluation

In CY 2018, the Evaluation Team conducted Program actor interviews and participant surveys as part of the process evaluation activities for the Simple Energy Efficiency and Connected Devices Kits programs. The Team focused on five key process topics:

- Customer satisfaction with measures and other Program components
- Customer cross-participation in other Focus on Energy programs
- Effective marketing and outreach methods
- Customers' energy-saving actions after participating in the Program
- Program tracking processes and coordination between the Program Administrator and Program Implementer

The Evaluation Team used information from the Program Administrator and the Program Implementer interviews, participant surveys, tracking data, and Program information provided by the Program Implementer to inform the process evaluation.

Program Design, Delivery, and Goals

The Evaluation Team drew from interviews, surveys, and Program materials to document the Program design and implementation process in CY 2018.

Program Design

Through the CY 2018 Simple Energy Efficiency Program, Focus on Energy offered customers of participating Wisconsin utilities no-cost packs containing energy-efficient products. All residential customers were eligible for the Program if they moved to a new address or had not participated in the Simple Energy Efficiency or Express Energy Efficiency programs in the last three years. The Program required customer information, including utility account number, to verify that customers were eligible to receive a pack (through the Simple Energy Efficiency Program).

Focus on Energy reconfigured Simple Energy Efficiency Program offerings for the second half of CY 2017, based on PSC feedback and customer satisfaction responses. For continuity, Focus on Energy offered the same Program pack configurations in CY 2018. Table 115 lists the quantity of each measure provided in each energy-saving pack offered to Program participants. To address customer feedback and requests, the Program Implementer included pamphlets with technical information and installation instructions for the measures in each pack and created videos on its website. Each pack was valued at roughly $40.

Table 115. CY 2018 Simple Energy Efficiency Program Pack Configurations

Measure	Quantity per Pack					
	Light Bulb Pack	Fixed Showerhead Pack	Hand Showerhead Pack	Flood Light Pack	Decorative Light Pack	Pack with APS
9-watt A19 LED	4	2	-	-	2	3
11-watt A19 LED	2	-	-	-	-	-
Reflector LED	-	-	-	6	-	-
Globe LED	-	3	3	-	-	-
Candelabra LED	-	-	-	-	6	-
Pipe Wrap (15-foot roll)	1	1	1	-	-	1
Showerhead	-	1	1	-	-	-
Bathroom Faucet Aerator	-	2	2	-	-	-
Water Heater Temperature Card	-	1	1	-	-	1
APS	-	-	-	-	-	1

The PSC directed the Program Administrator to create the Connected Devices Kits Program in CY 2017 as part of a package of programs to serve rural customers and support the use of broadband internet in energy efficiency programs. Through the Connected Devices Kits Program, Focus on Energy offered kits containing Wi-Fi–connected household items: smart thermostats, wi-fi thermostats, LEDs, and APSs. Although similar to Simple Energy Efficiency, Connected Devices Kits operated independently of the statewide Program.

The Connected Devices Kits Program targeted customers through two channels:

1. ***Internet service providers (ISPs):*** Customers who received internet service from any ISP that operates in a PSC–designated rural zip code[48] can request a kit. Customers must also have received electric or natural gas service from a participating (Focus on Energy–eligible) utility and have access to internet service with a minimum speed of 10 MBps (megabytes per second) to qualify for a kit. Customers who added or upgraded the internet service while ordering a kit were also eligible to receive a $50 bill credit from their ISP. Focus on Energy offered the bill credit to support the expansion of broadband internet services and reimbursed ISPs for customer bill credits on a quarterly basis.
2. ***Utilities:*** Beginning in CY 2018, Focus on Energy instituted a utility-based channel for the Program. Customers who received electric or natural gas service from participating utilities could request a kit without meeting the internet service requirement of the ISP channel. Utility channel participants were not eligible to receive the $50 bill credit offered through the ISP channel.

Customers must have lived in a rural zip code to participate in the Connected Devices Kits Program, whereas any customer can participate in the Simple Energy Efficiency Program. Accordingly, all Connected Devices Kits participants qualified to participate in Simple Energy Efficiency, but not all Simple Energy Efficiency participants could qualify to participate in Connected Devices Kits. Similar to the Simple Energy Efficiency Program, the Connected Devices Kits Program required customer information, including utility account number and zip code, to verify that customers were eligible to receive a kit (through the Connected Devices Kits Program).

Table 116 lists the measures provided in the Connected Devices Kits Program's five kit types offered to participants, two of which required a $120 co-pay. Kits contain one of each measure listed.

Table 116. CY 2018 Connected Devices Kits Program Kit Configurations

Measure	Free Rural Kit #1	Free Rural Kit #2	Free Rural Kit #3	Co-Pay Rural Kit #1	Co-Pay Rural Kit #2
Co-pay	**$0**	**$0**	**$0**	**$120**	**$120**
Embertec Bluetooth or TrickleStar Multi-Sensing APS	✓	-	-	-	-
Philips Hue Connected LED	✓	-	-	-	-
Emerson Sensi Wi-Fi Thermostat	-	✓	-	-	-
Nest E Thermostat	-	-	✓	-	-
Nest Learning Thermostat	-	-	-	✓	-
ecobee4 Smart Thermostat	-	-	-	-	✓

[48] The PSC classified zip codes as rural according to the U.S. Census Bureau, then expanded the list of eligible zip codes to include those with a significant percentage of customers eligible for CAF-II and ACAM support.

Program Management and Delivery Structure

The Program Administrator oversees the Program Implementer and Program activity. The Program Implementer contributes to Program design and tracking, assists in Program marketing activities, processes and fulfills customer orders, and manages the customer call center.

The Program Administrator and Program Implementer noted that, overall, both the Simple Energy Efficiency and Connected Devices Kits Programs ran smoothly in CY 2018. Both organizations reported that their communication was successful, with frequent contact.

The Program Administrator and Program Implementer have additional implementation responsibilities for the Connected Devices Kits Program. The Program Administrator recruits ISPs and utilities to market the Program to eligible customers, and the Program Implementer processes orders, distributes kits, and maintains the Program tracking database. ISPs interface directly with customers to support them when ordering kits.

Like the Simple Energy Efficiency Program, the Connected Devices Kits Program hosted an exclusive Focus on Energy online store, through which customers could browse and request (or purchase) kits. Through the ISP channel, the Program Administrator provided to each ISP codes that enabled customers to access the online store. Customers who accessed the store were asked to provide additional information to confirm their eligibility to participate in the Program. Because ISPs could not confirm a customer's eligibility, the access codes provided an additional layer of verification for Focus on Energy.

Through the utility channel, participating utilities marketed the Program directly to rural customers who had been confirmed by Focus on Energy as qualified to participate. Accordingly, when the utility referred customers to the online store, they did not need an access code.

Program Goals

As shown in Figure 37, the Simple Energy Efficiency Program met its goals for all *ex ante* and verified savings (lifecycle and annual) for kilowatt-hours and kilowatts but not for therms. All water-saving measures except for pipe wrap insulation achieved realization rates greater than 100%, which suggests that the shortage in therms savings is tied directly to fewer kits with water-saving measures being distributed to participants than expected.

The Program Administrator tracked Program performance metrics (such as total spending, energy savings, and spending per MMBtu) on a weekly basis using Tableau data visualization software. At the time of the interview, the Program Administrator expected to achieve every goal and KPI for the Program except its goal of processing pack orders within 30 days of request. The Program Implementer was delayed in processing and uploading Program data to SPECTRUM pending the completion of workpapers that detailed savings algorithms for some measures offered in Program packs.

The Program Implementer reported meeting the fulfillment pack request period KPI for both Simple Energy Efficiency and Connected Devices Kits; however, the Evaluation Team was unable to verify the result using SPECTRUM data due to inconsistencies in the "pack ordered" and "pack delivery" dates.

Table 117 lists the CY 2018 KPIs and results for the Simple Energy Efficiency Program. Table 118 lists the Connected Devices Kits Program KPIs and results, which span CY 2017 and CY 2018 in accordance with the Program design.

Table 117. Simple Energy Efficiency Program CY 2018 Key Performance Indicators

KPI	Results	Result Source
Maintain or improve customer satisfaction score above the CY 2017 Program baseline of 8.8	**Accomplished**: 9.1	Ongoing surveys
Achieve a NPS above the CY 2017 Program baseline of +74	**Accomplished**: +85	Ongoing surveys
Fulfill pack requests in two to four weeks	**Accomplished**: 24 days	Program Implementer
Upload data (bulk upload) to SPECTRUM within 30 days of pack shipment	**Not Accomplished**	Program Administrator/ Program Implementer
Deliver packs to all 72 counties in Wisconsin	**Accomplished**	Program Administrator/ Program Implementer
Achieve demographic distribution of packs by housing type	**Accomplished**	Program Administrator/ Program Implementer

Table 118. Connected Devices Kits Program CY 2017 and CY 2018 Key Performance Indicators

KPI	Results	Result Source
Maintain or improve customer satisfaction score above the CY 2017 Program baseline of 8.8	**Accomplished**: 9.1	Ongoing surveys
Achieve a NPS score above CY 2017 Program baseline of +74	**Accomplished**: +82	Ongoing surveys
Fulfill kit requests in two to four weeks	**Accomplished**: 25 days	Program Implementer
Deliver ISP codes within four business days of request	**Accomplished**	Program Administrator/ Program Implementer
Deliver updated kit order report weekly	**Accomplished**	Program Administrator/ Program Implementer

Data Management and Reporting

The Program Administrator and Program Implementer collect participant data through an enrollment process and report back to SPECTRUM through a bulk uploading process after batch orders are shipped. Per the Program Administrator, the Program experienced difficulty with its bulk upload process related to processing measure updates specific to multifamily customers and to the overall volume of pack requests the Program Implementer receives. These difficulties were also reported in CY 2017. SPECTRUM's bulk upload functionality was upgraded during CY 2018.

Marketing and Outreach

In CY 2018, the Simple Energy Efficiency Program was marketed mostly through bill inserts, press releases, social media, word of mouth, and local media advertising through television, print media, and radio. Most marketing collateral originated with the Program Administrator and was supplemented in collaboration with the Program Implementer and coordination with participating utilities. The Program Implementer had its own limited marketing budget and produced some collateral independently, including designing and distributing a coupon mailer.

Program marketing referred customers to an online store or a phone number to order a pack or kit. Based on Program participant survey results, 93% of Simple Energy Efficiency Program survey respondents (n=352) and 95% of Connected Devices Kits Program survey respondents (n=2,085) requested or purchased a pack or kit online in CY 2018.

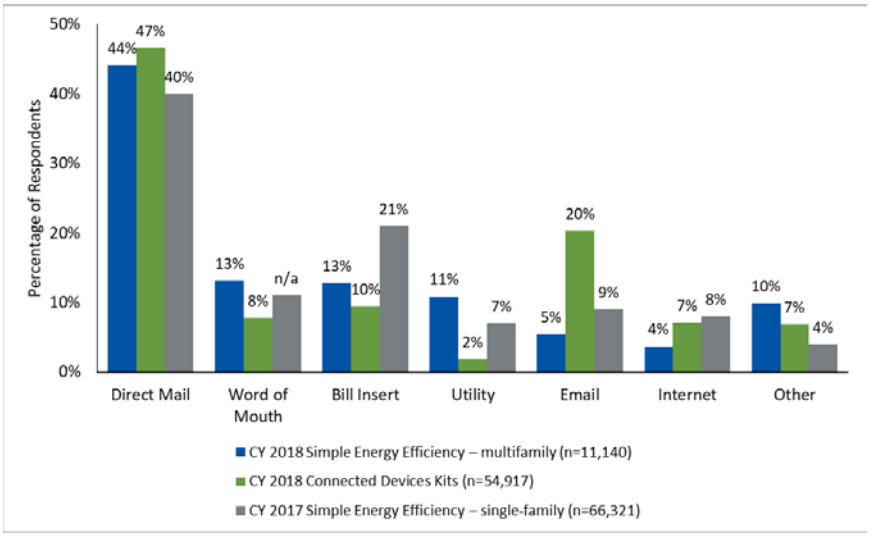
The Program Administrator marketed the Connected Devices Kits Program similarly to how it marketed the Simple Energy Efficiency Program: by coordinating with participating utilities and local ISPs to design and customize marketing collateral, and having each utility and ISP use the marketing materials to directly target customers in the designated rural zip codes within their service territories.

As discussed in the *Program Management and Delivery Structure* section, Customers who responded to marketing from ISPs received an access code that directed them to an exclusive Focus on Energy online store where they could request or purchase a kit; customers who were referred via their utility could access the online store directly, without an access code. The access code enabled ISPs to award bill credits to eligible customers and provided an additional layer of eligibility verification for Focus on Energy because ISPs could not verify eligibility on their own.

Customer Awareness

The Program Implementer tracked how Program participants heard about Focus on Energy. As shown in Figure 39, both Simple Energy Efficiency multifamily customers and Connected Devices Kits customers heard about Focus on Energy most frequently via direct mail (44% and 47%, respectively), similar to CY 2017 Simple Energy Efficiency single-family results (40%). Connected Devices Kits participants heard about Focus on Energy via email (20%) four times more often than Simple Energy Efficiency multifamily participants (5%); conversely, Simple Energy Efficiency multifamily participants heard about Focus on Energy directly from their utility (11%) over five times more often than Connected Devices Kits participants (2%).

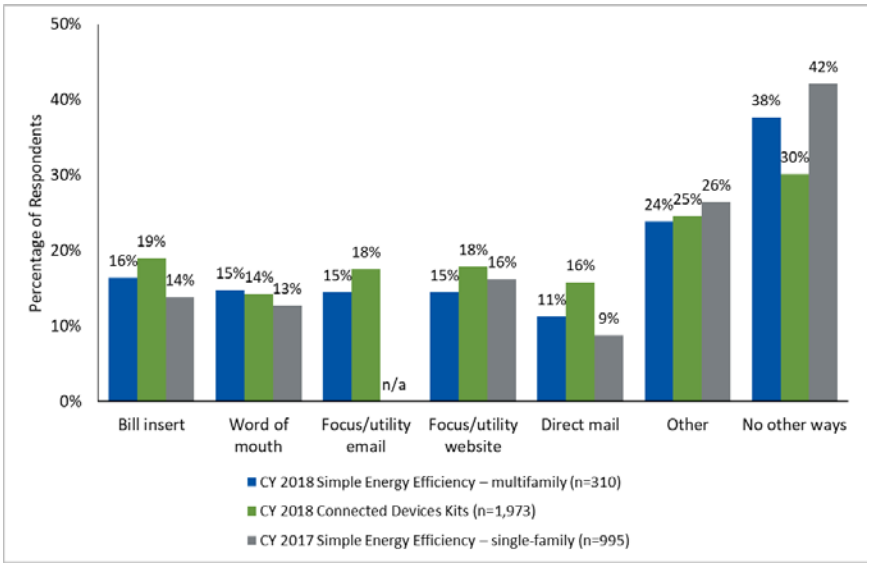
Figure 39. Program Awareness, by Program and Year



Source: SPECTRUM data field "How did Customer Hear about Focus."

In a multiple-response follow-up question, 62% of CY 2018 Simple Energy Efficiency multifamily respondents and 70% of Connected Devices Kits respondents heard about their Program from at least one other source (see Figure 40). Consistent with CY 2017 single-family results, multifamily and rural respondents in CY 2018 commonly heard about both programs via bill inserts (16% to 19%), word of mouth (14% to 15%), and Focus on Energy or utility websites (15% to 18%). Respondents also frequently heard about the programs via Focus on Energy or utility emails (15% to 18%).

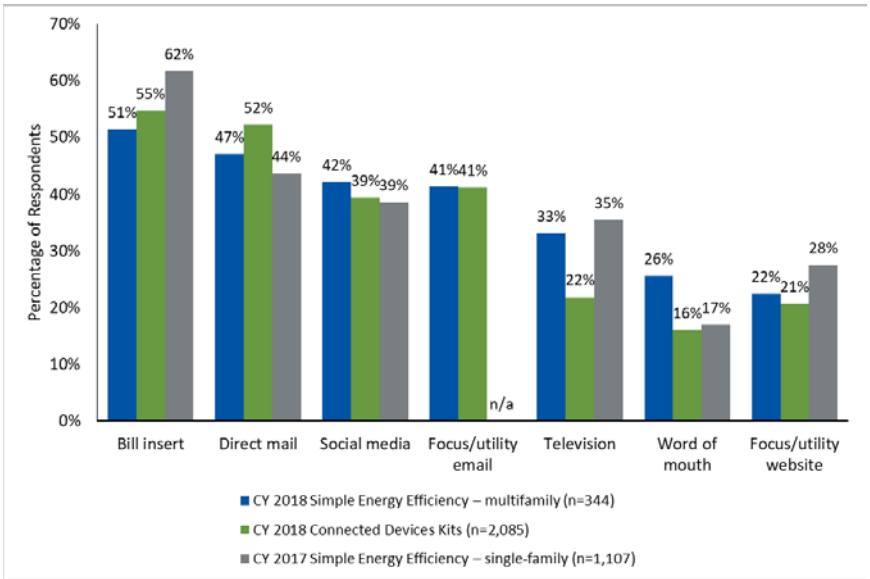
Figure 40. Secondary Channels of Program Awareness, by Program and Year



Source: Participant Survey Question B2. "Are there any other ways you heard about the Program?" Multiple responses allowed.

Similar to how they learned about the Simple Energy Efficiency and Connected Devices Kits programs, CY 2018 respondents prefer to learn about energy efficiency programs via bill inserts (51% to 55%) and through other direct mail such as brochures or postcards (47% to 52%). However, CY 2018 respondents also have a strong preference for learning about programs via social media (42% to 39%), a channel through which Focus on Energy reached respondents relatively infrequently in CY 2018. Figure 41 shows respondents' seven most-preferred channels for outreach.

Figure 41. Preferred Channels of Program Awareness, by Program and Year



Source: Participant Survey Question B3. "What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs?" Multiple responses allowed.

Cross-Program Promotion and Participation

The Program Administrator coordinates with Focus on Energy residential Program Implementers to determine the best ways to use existing marketing resources for cross-promotion. Each pack and kit distributed through the Simple Energy Efficiency and Connected Devices Kits programs includes an insert promoting other Focus on Energy residential programs and listing other ways customers can save energy, from small changes like washing laundry in cold water to large changes that customers can supplement with other Focus on Energy rebates and services.

To assess the effectiveness of the cross-promotion strategy, the Evaluation Team asked survey respondents to share their awareness of and participation in other Focus on Energy programs; the results are shown in Table 119. Overall, 51% (1,031 of 2,010) of Connected Devices Kits respondents had heard of other programs, compared to only 29% (98 of 342) of Simple Energy Efficiency multifamily respondents. In CY 2017, 50% of Simple Energy Efficiency single-family survey respondents had heard of other programs, which suggests that multifamily customers are much less likely to be aware of Focus on Energy programming in general—except for those in the Multifamily Program, in which multifamily survey respondents had more frequently heard of other programs than single-family survey respondents.

Table 119. Respondent Awareness of and Participation in Other Focus on Energy Programs

Program	Simple Energy Efficiency Program (Multifamily Customers)		Connected Devices Kits Program	
	Aware of Other Programs[a]	Participated in Other Programs[b]	Aware of Other Programs[a]	Participated in Other Programs[b]
Simple Energy Efficiency	n/a	n/a	76%	24%
Appliance Recycling	65%	8%	56%	11%
Home Performance with ENERGY STAR	64%	11%	54%	10%
Retail Lighting and Appliance	58%	13%	52%	29%
Renewable Energy Competitive Incentive	24%	0%	20%	3%
New Homes	18%	0%	10%	1%
Multifamily	17%	0%	5%	1%

Note: Reported percentages are based on the number of respondents who were aware of other Focus on Energy programs, not on total survey respondents.

[a] Source: Participant Survey Question K2/L2. "Which programs or rebates are you aware of?" Multiple responses allowed.

[b] Source: Participant Survey Question K4/L4. "Which programs, rebates, or projects have you participated in?" Multiple responses allowed.

Customer Experience

The Evaluation Team used the participant surveys and ongoing customer satisfaction surveys, supported by the Program actor interviews, to assess customers' experience with several Program components:

- Overall Program satisfaction
- Satisfaction with Program processes
- Measure satisfaction
- Reasons for removing or not installing measures
- Measure installation practices
- Energy-saving actions
- Barriers to participation

Annual Results from Ongoing Customer Satisfaction Surveys

The Team assessed separate findings for the Simple Energy Efficiency and Connected Devices Kits programs, as outlined below.

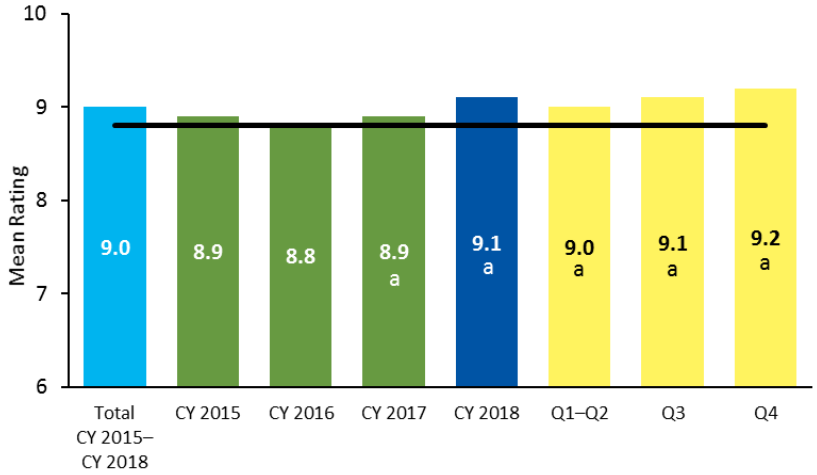
Simple Energy Efficiency

Throughout CY 2018, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Simple Energy Efficiency Program. Respondents answered satisfaction and

likelihood questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 indicated the lowest satisfaction or likelihood.[49]

Figure 42 shows the average overall Program satisfaction rating of 9.1 among CY 2018 participants, which was statistically significantly higher than the portfolio baseline of 8.8.[50]

Figure 42. CY 2018 Satisfaction Ratings for the Simple Energy Efficiency Program



Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Focus on Energy Program?" (CY 2015 n=1,374, CY 2016 n=881, CY 2017 n=921, CY 2018 n=1,050, Q1-Q2 n=398, Q3 n=197, Q4 n=455). Total CY 2015–CY 2018 is the participation-weighted average of four annual results (Express Energy Efficiency Program for CY 2015, Simple Energy Efficiency for CY 2016–CY 2018).

[a] This result is statistically significantly different from the portfolio baseline ($p<0.10$ or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 120 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial that the Simple Energy Efficiency was active. In CY 2018, two ratings were significantly higher than in the previous year: satisfaction with upgrades (9.2, up from 8.9 in CY 2017) and likelihood of recommending the Program (9.5, up from 9.2 in CY 2017).

[49] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[50] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial.
Q1 and Q2 of CY 2018 are combined in the figure because the Evaluation Team used the survey completion date as a proxy for participation date. The CY 2018 survey began during Q2 and included all participants through that time, preventing the Team from distinguishing between Q1 and Q2 participants.

Table 120. CY 2018 Average Ratings for Simple Energy Efficiency Program

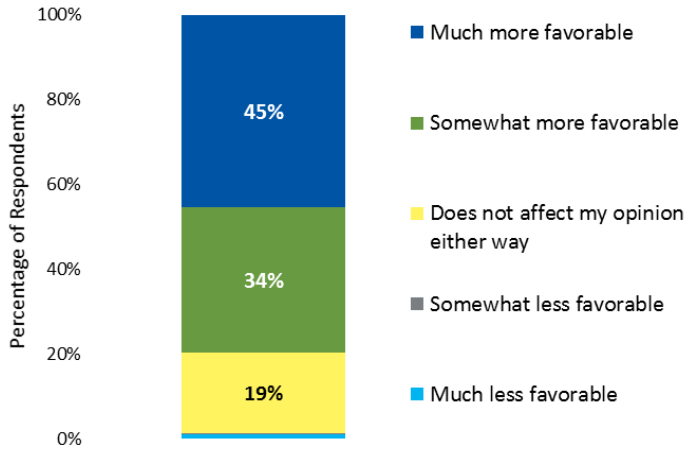
Item	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	8.8	8.9	9.2[a]
Likelihood of making more improvements	8.5	8.5	8.6
Likelihood of recommending the Program	9.2	9.2	9.5[a]

[a] This result is statistically significantly different from the result for CY 2017 ($p<0.05$ using a binomial t-test).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 the percentage of detractors (respondents giving a rating of 0 to 6). The NPS for CY 2018 participants was +85, an increase from +75 in CY 2017.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 45% gave the highest rating that it made them feel *much more favorable* (Figure 43). Just 19% said that their opinion was not affected and only 1% of survey respondents (13 out of 1,025) reported that their opinion of their utility had become *somewhat less favorable* or *much less favorable*.

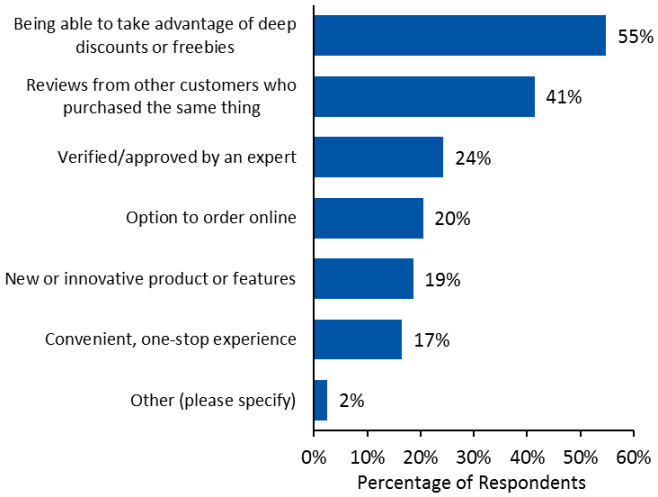
Figure 43. CY 2018 Effect of Focus on Energy Offerings on Simple Energy Efficiency Program Participants' Opinion of Utilities



Source: Simple Energy Efficiency Program Customer Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (CY 2018 n=1,025)

Program participants were asked to identify the two factors they value most in making purchase decisions (Figure 44). The most frequent response was deep discounts and freebies (55%), followed by reviews from other customers (41%).

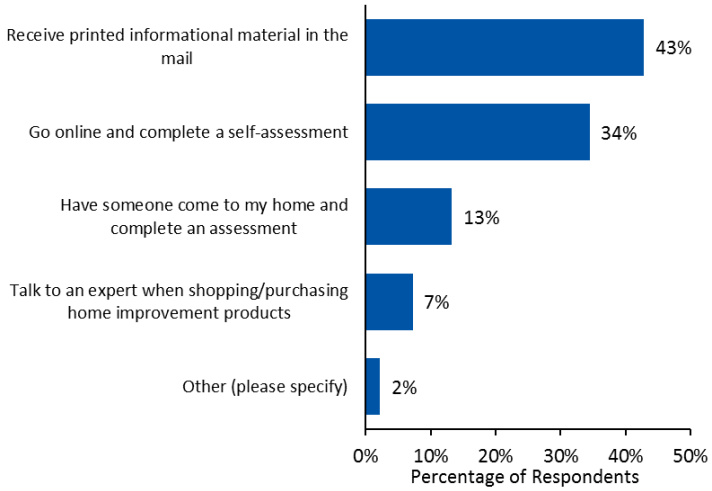
Figure 44. CY 2018 Most Valued Factors for Simple Energy Efficiency Program Participants in Purchase Decision Making



Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=1,045)

Program participants were asked how they most preferred to learn about opportunities to improve the energy efficiency of their home. The two top responses were printed material in the mail (43%) and online self-assessments (34%; Figure 45).

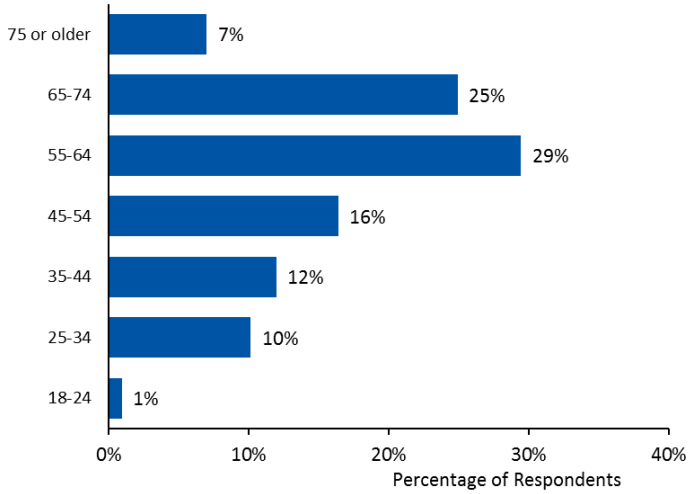
Figure 45. CY 2018 Preferred Methods for Simple Energy Efficiency Program Participants to Learn about Energy Efficiency Opportunities



Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (CY 2018 n=957)

Survey respondents were asked their age, and the median response was 55 to 64 years (Figure 46).

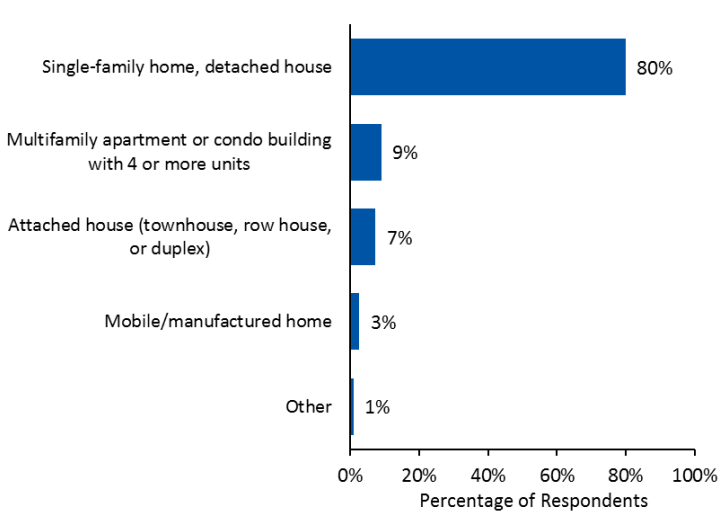
Figure 46. CY 2018 Age of Simple Energy Efficiency Program Participants



Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question. "Which of the following categories best represents your age?" (CY 2018 n=1,052)

The Evaluation Team asked respondents what type of home they lived in, and 80% reported living in a detached, single-family home while another 9% lived in a multifamily apartment building (Figure 47). This distribution aligns closely with the statewide averages, with 71% of Wisconsin residents living in detached, single-family homes and 7% living in multifamily buildings (three or more units) according to U. S. Census American Community Survey data from CY 2017.

Figure 47. CY 2018 Housing Type for Simple Energy Efficiency Program Participants

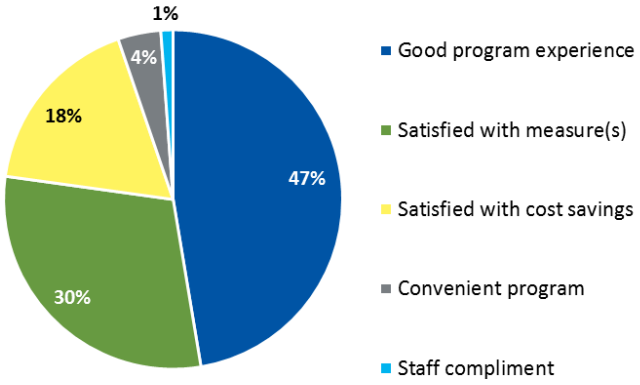


Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question. "What type of home do you live in?" (CY 2018 n=1,070)

Ongoing customer satisfaction survey respondents answered whether they had any comments or suggestions for improving the Program. Of the 1,081 participants selected for reporting, 246 provided open-ended feedback, which the Evaluation Team coded into 285 mentions. Of these, 171 were positive or complimentary comments (60%) and 114 were suggestions for improvement (40%).

The positive responses are shown in Figure 48, with general satisfaction and satisfaction with measures dominating (at 47% and 30%, respectively).

Figure 48. CY 2018 Positive Comments about the Simple Energy Efficiency Program

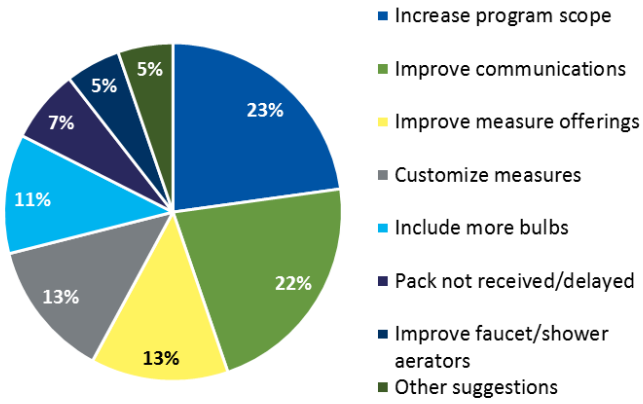


Source: Simple Energy Efficiency Program Ongoing Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total positive mentions CY 2018 n=171)

Suggestions for improving the Program are shown in Figure 49. The most common suggestions involved increasing the Program scope (23%), followed by improving communications (22%), improving measure offerings (13%), and customizing kit measures (13%). In CY 2017, the most common suggestion was to improve faucet and shower aerators (25%), which was mentioned much less frequently in CY 2018 (5%).

Most of the respondents who suggested increasing the Program scope commented on increasing the number of options and the frequency of offerings; some also mentioned wanting rebates for appliances and renewable energy. Among comments regarding improving Program measures, most mentioned improving lighting or APS. Respondent comments about improving communications included issues with accessing or navigating the website and requests for more information about other Program offerings.

Figure 49. CY 2018 Suggestions for Improving the Simple Energy Efficiency Program



Source: Simple Energy Efficiency Program Ongoing Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement mentions CY 2018 n=114)

Connected Devices Kits

Throughout CY 2018, the Evaluation Team also surveyed participants to measure their satisfaction with various aspects of the Connected Devices Kits Program.

Table 121 shows the average satisfaction and likelihood ratings for CY 2018, the first year in which the Connected Devices Kits Program claimed savings.[51] The average overall Program satisfaction rating was 9.1 among CY 2018 participants, which was the same as for the Simple Energy Efficiency Program overall satisfaction rating (also 9.1) and statistically higher than the portfolio baseline of 8.8. Compared to CY 2018 Simple Energy Efficiency participants, Connected Devices Kits participants gave lower ratings for their satisfaction with the upgrades they received (8.8 compared to 9.2); however, this rating for Connected Devices Kits in CY 2018 was in line with Simple Energy Efficiency ratings in its first years of operation from CY 2016 (8.8) and CY 2017 (8.9).

Table 121. CY 2018 Average Ratings for Connected Devices Kits Program

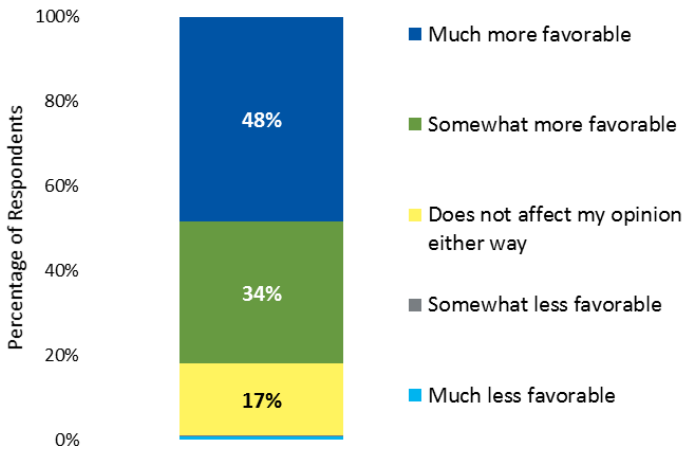
Item	CY 2018
Overall satisfaction with the Program	9.1
Satisfaction with upgrade(s)	8.8
Likelihood of making more improvements	8.7
Likelihood of recommending the Program	9.4

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. The NPS for CY 2018 participants was +82, comparable to the CY 2018 NPS of +85 for Simple Energy Efficiency.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 48% gave the highest rating that it made them feel *much more favorable* (Figure 50). Just 17% said that their opinion was not affected and only 1% of survey respondents (nine out of 942) reported that their opinion of their utility had become *somewhat less favorable* or *much less favorable*.

[51] The Connected Devices Kits Program was active but did not claim savings in CY 2017. Any savings generated in CY 2017 have been attributed to CY 2018.

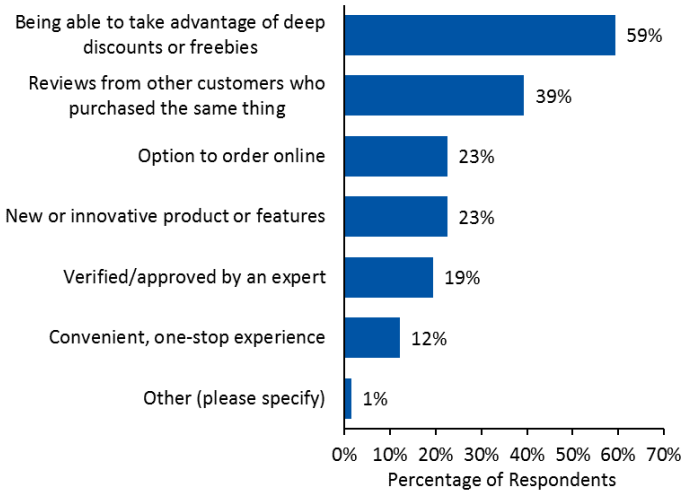
Figure 50. CY 2018 Effect of Focus on Energy Offerings on Connected Devices Kits Program Participants' Opinion of Utilities



Source: Connected Devices Kits Program Customer Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (CY 2018 n=942)

Program participants were asked to identify the two factors they value most in making purchase decisions (Figure 51). The most frequent responses were deep discounts and freebies (59%), followed by reviews from other customers (39%), which were very similar percentages to the responses from Simple Energy Efficiency Program participants (of 55% and 41%, respectively; see Figure 44).

Figure 51. CY 2018 Most Valued Factors for Connected Devices Kits Program Participants in Purchase Decision Making

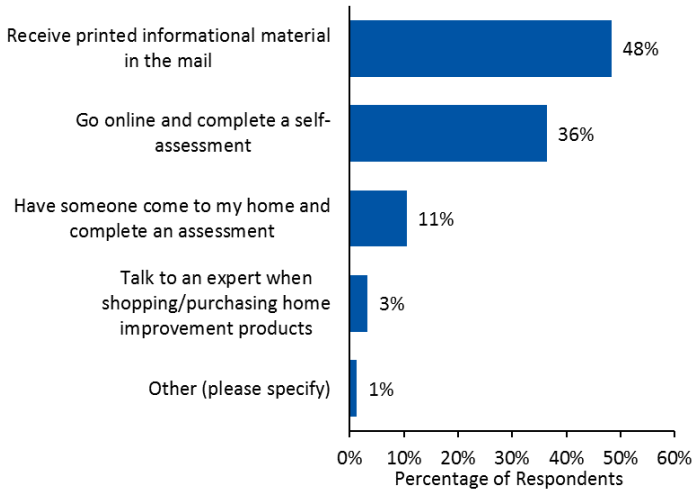


Source: Connected Devices Kits Program Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=994)

Program participants were asked how they most preferred to learn about opportunities to improve the energy efficiency of their home. The two top responses were printed material in the mail (48%) and

online self-assessments (36%; Figure 52). These were very similar percentages to the top responses from Simple Energy Efficiency participants (of 43% and 34%, respectively; see Figure 45).

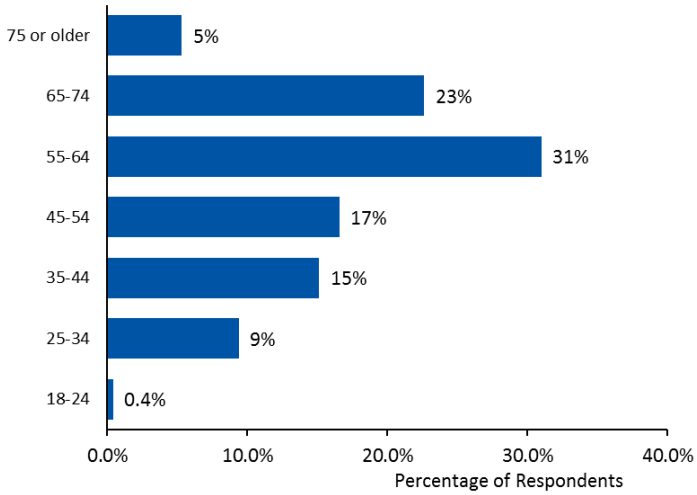
Figure 52. CY 2018 Preferred Methods for Connected Devices Kits Program Participants to Learn about Energy Efficiency Opportunities



Source: Connected Devices Kits Program Ongoing Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (CY 2018 n=903)

Survey respondents were asked their age, and the median response was 55 to 64 years old (Figure 53), the same median age as for Simple Energy Efficiency participants (see Figure 46).

Figure 53. CY 2018 Age of Connected Devices Kits Program Participants



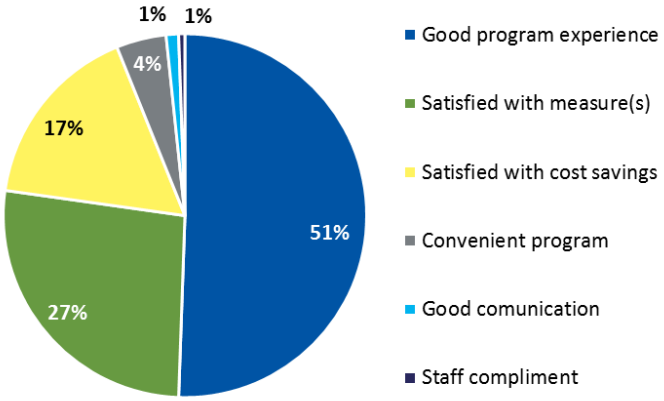
Source: Connected Devices Kits Program Ongoing Participant Satisfaction Survey Question. "Which of the following categories best represents your age?" (CY 2018 n=963)

Ongoing customer satisfaction survey respondents answered whether they had any comments or suggestions for improving the Program. Of the 1,027 participants selected for reporting, 240 provided

open-ended feedback, which the Evaluation Team coded into 275 mentions. Of these, 180 were positive or complimentary comments (65%) and 95 were suggestions for improvement (35%).

The positive responses are shown in Figure 54, with general satisfaction and satisfaction with measures dominating (at 51% and 27%, respectively). These results closely mirrored responses from Simple Energy Efficiency Program respondents (of 47% and 30%, respectively; see Figure 48).

Figure 54. CY 2018 Positive Comments about the Connected Devices Kits Program

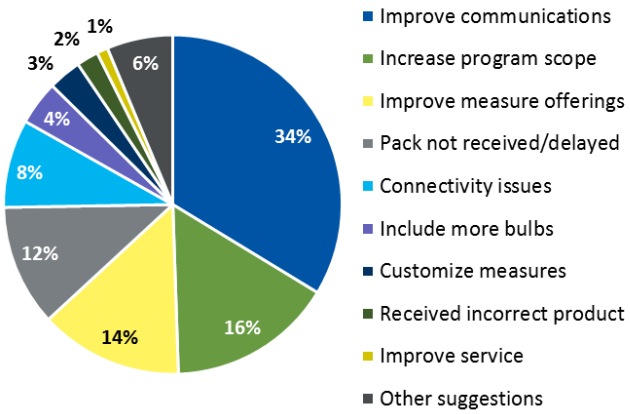


Source: Connected Devices Kits Program Ongoing Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total positive mentions CY 2018 n=180)

Suggestions for improving the Program are shown in Figure 55. The most common suggestions involved improving communications (34%), followed by increasing the Program scope (16%), improving measure offerings (14%), and packs being delayed or not received (12%).

Respondent comments about improving communications included issues with accessing or navigating the website and requests for more information about Program measures, their installation, and use. Many of the responses that suggested increasing the Program scope requested a greater frequency of kit offerings; some also mentioned wanting rebates for appliances and renewable energy. Comments regarding improving Program measures focused on APS, showerheads, and thermostats, though these responses may be less related to the inherent features and performance of the measures and more related to participants not knowing how to install and use these measures properly to achieve the intended results.

Figure 55. CY 2018 Suggestions for Improving the Connected Devices Kits Program



Source: Connected Devices Kits Program Ongoing Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement mentions CY 2018 n=95)

Satisfaction with Program Processes

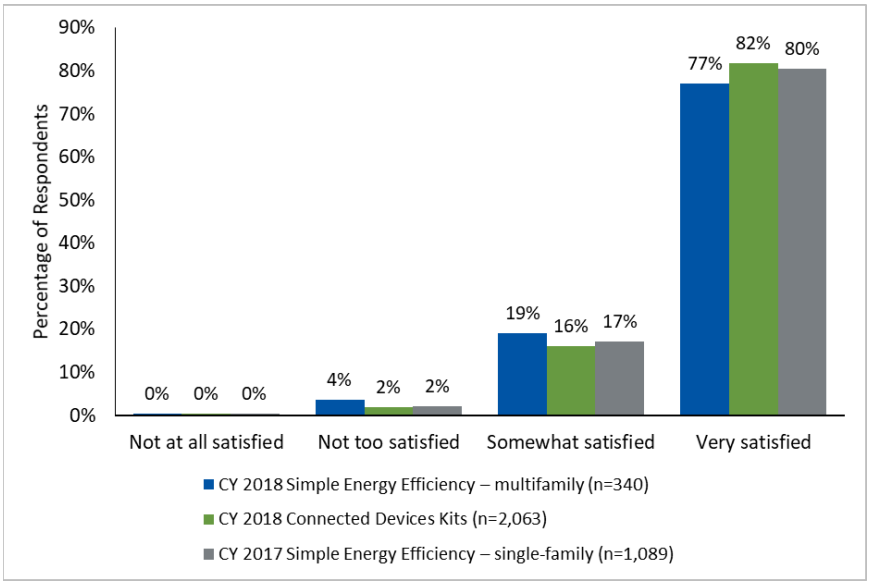
More than 99% of Simple Energy Efficiency Program multifamily survey respondents and roughly 98% of Connected Devices Kits Program survey respondents who used the website to sign up for the Program said it was either *very easy* or *somewhat easy* to fill out the online request form, consistent with CY 2017 results.

The Program Administrator and Program Implementer aimed to mail free packs and kits within four weeks of receiving a request. When asked how long it took to receive their packs, 72% of Simple Energy Efficiency multifamily respondents (n=292) and 90% of Connected Devices Kits respondents (n=1,760) said it took less than four weeks, up from 69% of Simple Energy Efficiency single-family respondents in CY 2017. For co-pay kits (n=155), the Program Implementer processed individual orders in real time (rather than grouping requests and processing them in batches, as was done for free packs and kits). Accordingly, 38% of respondents who ordered a co-pay kit said they received their kit in less than a week, and another 53% said it took between one and two weeks to receive their co-pay kit.

Ninety-six percent to 98% of multifamily and rural respondents said they were *very satisfied* or *somewhat satisfied* with how long it took to receive their free packs and kits, consistent with CY 2017 single-family results (97%). Connected Devices Kits participants were slightly more likely[52] to be *very satisfied* (82%) than CY 2018 Simple Energy Efficiency multifamily participants (77%), as shown in Figure 56. This increase in satisfaction parallels the slightly increased speed with which Connected Devices Kits participants received their free kits compared to Simple Energy Efficiency multifamily participants.

[52] This was statistically significant at the 95% confidence level.

Figure 56. Respondent Satisfaction with Time to Receive Packs/Kits, by Program and Year



Source: Participant Survey Question I5/J6. "How satisfied were you with how long it took to receive the pack/kit?"

Among Connected Devices Kits respondents, co-pay kit customers were more frequently *very satisfied* (88%; n=168) than free kit customers (81%; n=1,895) with the time it took to receive their kits.

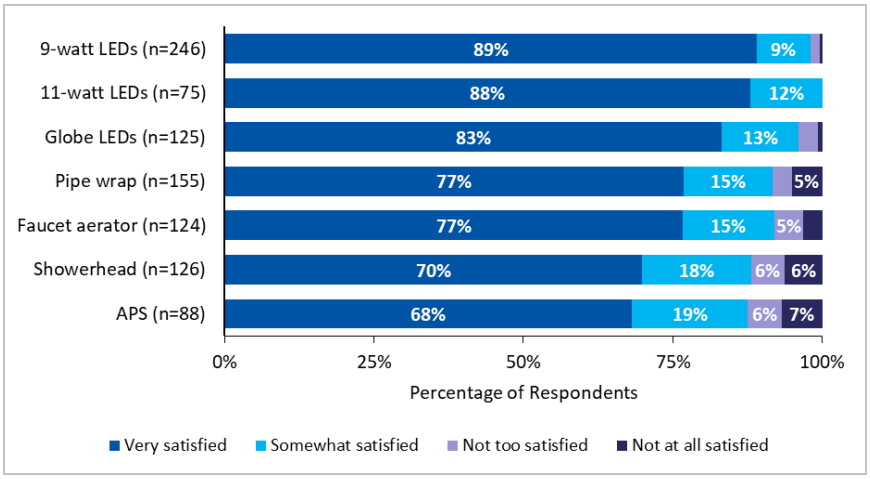
Measure Satisfaction

The Evaluation Team asked survey respondents to rate their satisfaction with each measure they received in their pack or kit, regardless of whether the measure was installed.

Simple Energy Efficiency Program

Simple Energy Efficiency multifamily survey respondents reported high levels of satisfaction with all measures, as shown in Figure 57. Total satisfaction (measured by the total percentage of participants who were either *very satisfied* or *somewhat satisfied*) ranged from 88% (APSs and efficient showerheads) to 100% (11-watt LEDs). Satisfaction ratings by multifamily respondents for CY 2018 measures generally aligned with those by single-family respondents for CY 2017 measures.

Figure 57. Simple Energy Efficiency Program Respondent Satisfaction with Measures



Note: This figure excludes candelabra and reflector LEDs because of small sample sizes.
Source: Participant Survey Question C7/C15/C23/C31/C39/D8/E7/F7/G7. "How satisfied are you with the [measure] you received?"

The survey asked multifamily customers who were less than *very satisfied* with any measures what their reason(s) were for providing their low satisfaction rating. The following subsections discuss their reasons for dissatisfaction by measure type. High overall levels of satisfaction resulted in small numbers of respondents who were dissatisfied. Due to small sample sizes, the Evaluation Team recommends interpreting the following details anecdotally.

LEDs

The Evaluation Team compiled 34 responses from 30 Simple Energy Efficiency multifamily customers who reported being less than *very satisfied* with the general purpose (A-lamp) LEDs for various reasons:

- Not bright enough (n=18)
- Did not like the color (n=4)
- Delay in light turning on (n=4)
- Broke, burned out, or stopped working (n=2)
- Other (n=6)

Multifamily respondents who were less than *very satisfied* with their globe LEDs (26 responses from 20 customers) also commonly did not like the color (n=6) or thought they were not bright enough (n=6), but most frequently said the bulbs did not fit their existing sockets (n=7). Two respondents said they had difficulty installing the globe LEDs.

Advanced Power Strips

Multifamily respondents who were less than *very satisfied* with the APS (33 responses from 27 customers) cited the following reasons for their satisfaction rating.

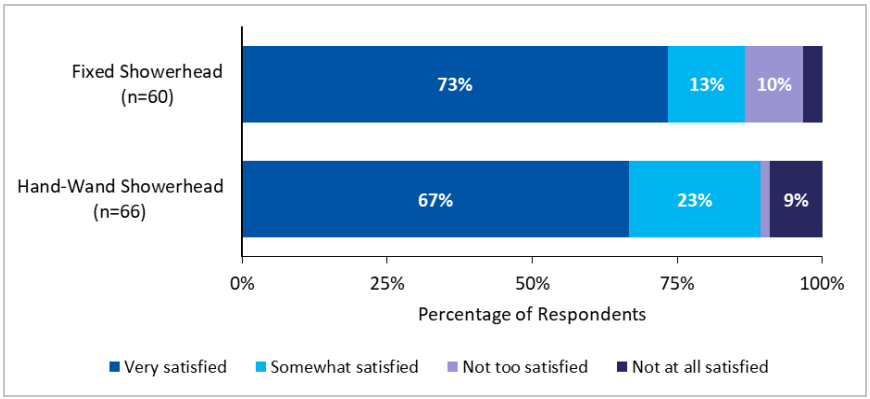
- Did not like how the attached equipment works when plugged in (n=9)
- Did not have enough regular outlets (n=7)

- Difficult or unable to set up (n=7)
- Broken or did not work (n=6)
- Other (n=4)

Showerheads

Multifamily respondents were more satisfied with fixed showerheads (73% *very satisfied*, 3% *not at all satisfied*) than hand-wand showerheads (67% *very satisfied*, 9% *not at all satisfied*), as shown in Figure 58. However, this difference in satisfaction is not statistically significant.[53]

Figure 58. Simple Energy Efficiency Program Respondent Satisfaction: Showerhead Types



Source: Participant Survey Question E7. "How satisfied are you with the showerhead you received?"

Of 34 responses about why multifamily respondents did not like their showerheads, 25 related to disliking the water pressure. Respondents provided additional open-ended feedback[54] regarding hand-wand showerheads (eight total):

- Hose is too short (n=3)
- Cannot hang showerhead when not in use (n=1)
- Showerhead leaks while changing settings (n=1)
- Not as many functions as previous showerhead (n=1)
- No filter (n=1)
- Missing parts (n=1)

Bathroom Faucet Aerators

Multifamily respondents who were dissatisfied with their bathroom faucet aerator primarily said they did not fit properly (11 of 15 responses). Other respondents said they did not know how the aerator

[53] The Evaluation Team tested this at 90% confidence.

[54] Three respondents provided open-ended feedback for fixed showerheads, but the Evaluation Team categorized their feedback into existing survey response options (such as the issue regarding water pressure).

worked (n=2), did not like how the aerator looked (n=1), and did not like how long it took for water to get hot (n=1).

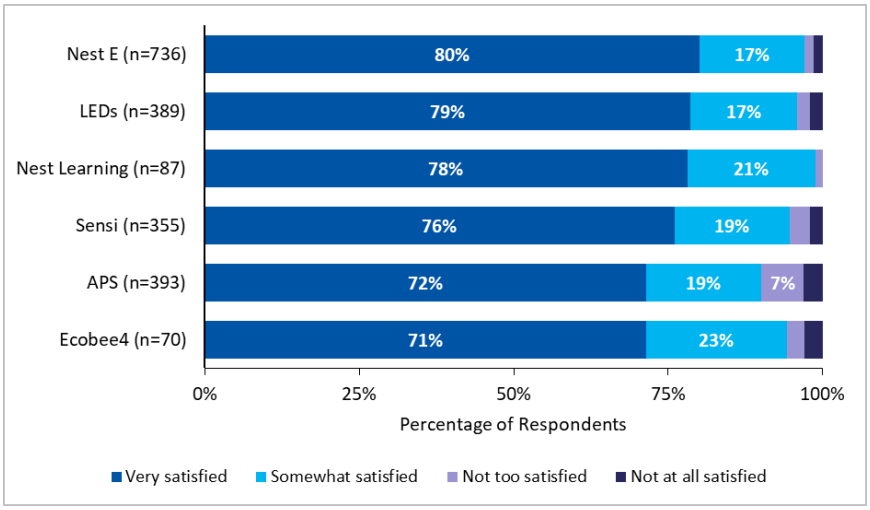
Pipe Wrap

Of 33 multifamily respondents who were less than *very satisfied* with their pipe wrap, 21 cited reasons related to not installing or having difficulty installing the pipe wrap. Other responses included that the pipe wrap was the wrong size (n=3), they did not like how it looked (n=3), and they were uncertainty if the pipe wrap was generating energy savings or lowering their energy bills (n=2).

Connected Devices Kits Program

Connected Devices Kits survey respondents reported high levels of satisfaction for all measures, as shown in Figure 59. Total satisfaction ranged from 90% (APS) to 97% (Nest E thermostat).

Figure 59. Connected Devices Kits Program Respondent Satisfaction with Measures



Source: Participant Survey Question C10/C19/D17/E14/F14/G14. "How satisfied are you with the [measure]?"

Smart Thermostats

Respondents who requested a free thermostat were more likely to be *very satisfied* with the Nest E thermostat (80%, n=736) than with the Emerson Sensi Wi-Fi thermostat (76%, n=355), and respondents who purchased a co-pay thermostat were more likely to be *very satisfied* with the Nest learning thermostat (78%, n=87) than with the ecobee4 smart thermostat (71%, n=70), although both differences are not statistically significant.[55]

[55] Tested at the 90% confidence level.

Of the 183 respondents who provided feedback as to why they were less than *very satisfied* with their free or co-pay thermostats, the most frequent feedback included:

- Difficult to Program using smart device (20%)
- Difficult/unable to set up (16%)
- Monthly bills have not changed or are higher (15%)
- Just recently or not yet installed (15%)
- Unable to connected smart device (7%)
- Home is less comfortable (6%)

Connected LEDs

Respondents who received free connected LEDs (n=389) were highly satisfied with their measures (79% *very satisfied*), although were less satisfied than customers who received typical general purpose (non-connected) LEDs through the Simple Energy Efficiency Program (83% to 89%). Respondents who were less than *very satisfied* with their connected LEDs (n=47) did not like how the connected LEDs worked or said the LEDs did not work with their smart device app (42%). Other respondents said they had difficulty installing the LEDs (21%), did not need connected LEDs in lieu of non-connected LEDs (11%), or did not have a smart device to connect to the LEDs (11%).

Advanced Power Strips

Respondents who received an APS through the Connected Devices Kits Program were highly satisfied with their APS (n=393) and were slightly more satisfied (90% *very satisfied* or *somewhat satisfied*) than customers who received an APS through the Simple Energy Efficiency Program (86%).[56] Similar to Simple Energy Efficiency, Connected Devices Kits respondents who were less than *very satisfied* with their APS (n=76) cited various reasons for their satisfaction score:

- Did not like how their equipment plugged into the APS (59%)
- APS did not have enough regular outlets (33%)
- APS was difficult to set up (24%)

Reasons for Removing or Not Installing Measures

The Evaluation Team assessed the percentage of survey respondents who removed or did not install measures, as well as their reasons why. The following sections outline survey results for the Simple Energy Efficiency and Connected Devices Kits programs.

Simple Energy Efficiency Program

Table 122 shows that 0% to 12% of multifamily respondents removed measures they had previously installed, and 10% to 61% never installed certain measures.[57] Removal and non-install rates in CY 2018

[56] Connected Devices Kits included a Tier 2 APS, whereas Simple Energy Efficiency packs included a Tier 1 APS.

[57] The in-service, removal, and non-installation rates for each measure sum to 100%.

among multifamily respondents were similar to those in CY 2017 among single-family respondents. For example, both participant groups had low removal rates for general purpose LEDs and high non-install rates for pipe wrap.

Table 122. Simple Energy Efficiency Program Multifamily Participant Measure Removal or Non-Install Rates

Measure	Percentage of Measures Removed[a]	Percentage of Measures Not Installed[b]	First-Year ISR	
			CY 2018 (Multifamily)	CY 2017 (Single Family)
A19 LEDs	<1%	23%	77%[c]	84%[c]
Bathroom Faucet Aerators	2%	42%	56%	53%
Fixed Showerheads	6%	31%	65%	58%
Hand-Wand Showerheads	5%	25%	70%	71%
APSs	12%	10%	78%	80%
Specialty LEDs[d]	3%	25%	72%[c]	73%[c]
Pipe Wrap	0%	62%	38%	40%

[a] Source: Participant Survey Question C2/C10/C18/C26/C34/C42/C50/E2/F2/G2. "Was the [measure] ever installed in your home and later removed?"

[b] Source: Participant Survey Question C1/C8/C17/C25/C33/C41/C49/D1/E1/F1/G1. "How many of the [measure] are currently installed in your home?" or "Is the [measure] you received currently installed in your home?"

[c] The first-year ISRs presented for A19 LEDs and specialty LEDs do not account for the future installation of lamps placed in storage. Lifetime ISRs for these measures, which the Team used in the verified savings calculations, are provided in Table 100.

[d] This row reflects globe LEDs only.

Most multifamily respondents who did not install general purpose LEDs (n=70) said they were waiting for other bulbs to burn out (84%) and had stored the LEDs they received for future use (98%). The same results generally applied to globe LEDs (n=82): 76% of respondents were waiting for other bulbs to burn out and 96% had stored the bulbs for future use. Unlike general purpose LEDs, globe LEDs had more instances of respondents not installing them because they did not need all of them at once or the bulbs did not fit existing sockets.

Storage rates for other measures ranged from 69% (pipe wrap; n=230) to 92% (bathroom faucet aerators; n=84) among measures not installed. In almost all other instances, respondents gave away measures they did not store or use. Less than 1% of all respondents (three of 382) said they threw away a non-lighting measure they did not store or use.

Connected Devices Kits Program

Table 123 shows that 0% to 6% of Connected Devices Kits respondents removed measures they had previously installed, and 6% to 39% never installed certain measures.[58] Removal and non-install rates among Connected Devices Kits respondents were generally lower than those of Simple Energy Efficiency respondents. This can likely be attributed to the fact that each Connected Devices Kits kit had one or

[58] The in-service, removal, and non-installation rates for each measure sum to 100%.

two measures (including a thermostat), making the request for a kit a deliberate decision. Nest learning and ecobee4 thermostats require a co-pay, which likely explains why their removal and non-install rates are lowest among all measures.

Table 123. Connected Devices Kits Program Measure Removal or Non-Install Rates

Measure	Percentage of Measures Removed[a]	Percentage of Measures Not Installed[b]	First-Year ISR
Embertec Bluetooth or TrickleStar Multi-Sensing APS	6%	25%	69%
Philips Hue Connected LEDs	4%	33%	63%
Emerson Sensi Wi-Fi Thermostats	2%	39%	59%
Nest Learning Thermostats	0%	6%	94%
ecobee4 Smart Thermostats	1%	12%	87%
Nest E Thermostats	2%	26%	72%

[a] Source: Participant Survey Question C2/C13/D2/E2/F2/G2. "Did you install any of the [measure] you received but later remove them?"

[b] Source: Participant Survey Questions C1 and C12/D1/E1/F1/G1. "How many of the smart LEDs from the kit are currently installed in your home?" and "Is the smart power strip you received currently being used in your home?"

Most respondents who did not install the connected LEDs (n=203) said they were waiting for other bulbs to burn out or simply had not gotten around to installing the bulbs yet (78%) and that they stored the LEDs they received for future use (94%). Respondents frequently removed or did not install connected LEDs for reasons unique to connected lighting: a small percentage of respondents were unable to connect their smart devices or had no smart device to connect, while others expressed a lack of confidence in using the technology.

Like respondents who removed or did not install connected LEDs, many respondents who removed or did not install APSs (n=138) frequently had not gotten around to installing or did not immediately need their APS (40%). Fifteen percent said the APS was difficult to set up, 9% did not like how electronic equipment worked when plugged into the APS, 8% said the APS did not have enough regular outlets, and 3% said they never planned to use their APS.

Among respondents who requested a free smart thermostat kit, storage rates for thermostats reported as not installed ranged from 80% (Nest E; n=258) to 83% (Emerson Sensi Wi-Fi; n=230).[59] Almost all respondents who did not install their thermostats said they had not gotten around to it or were unable to install it without assistance, such as from a contractor. A very small percentage of respondents gave away the thermostat to someone else, and four respondents said they threw away their thermostat (three Emerson Sensi Wi-Fi thermostats and one Nest E thermostat).

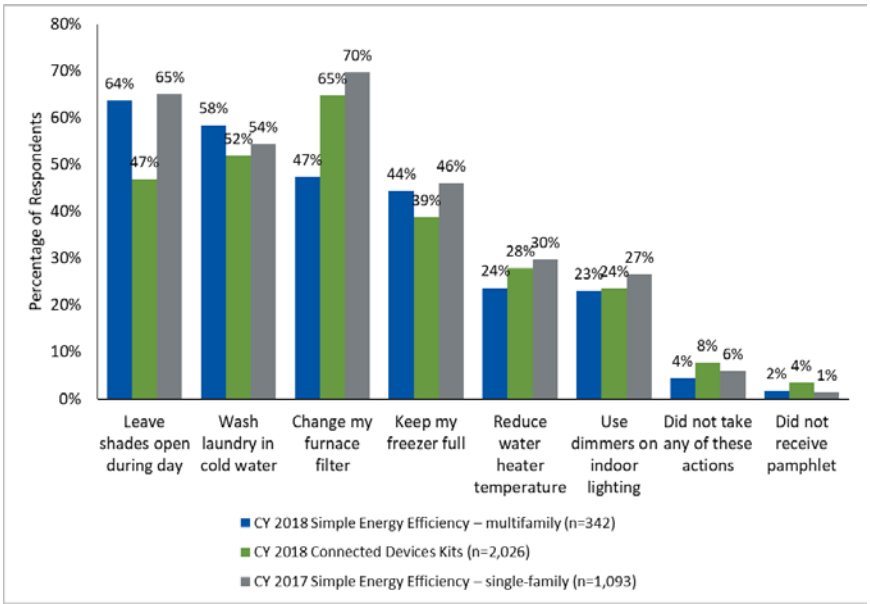
[59] The Evaluation Team assumed that customers who purchased a co-pay smart thermostat kit would install their thermostat immediately and not store it for later use.

Energy-Saving Actions

Each Simple Energy Efficiency Program pack and Connected Devices Kits Program kit includes an insert that lists other ways customers can save energy, such as by washing laundry in cold water or changing their furnace filter, as shown in Figure 60. Ninety-four percent of Simple Energy Efficiency multifamily survey respondents and 89% of Connected Devices Kits respondents took at least one of the listed energy-saving actions, in line with 93% of single-family respondents in CY 2017. Only 4% of CY 2018 Simple Energy Efficiency multifamily respondents and 8% of Connected Devices Kits respondents did not take any energy-saving actions, and 2% of CY 2018 Simple Energy Efficiency multifamily respondents and 4% of Connected Devices Kits respondents did not recall receiving the pamphlet.

The average multifamily and rural respondent took two to three of the energy-saving actions recommended in the pamphlet (roughly 2.6 on average).[60] The three actions most commonly taken by multifamily and rural respondents were leaving window shades open during the day, washing laundry in cold water, and changing the furnace filter. However, CY 2018 Simple Energy Efficiency multifamily respondents were less likely to change their furnace filter than CY 2018 Connected Devices Kits or CY 2017 Simple Energy Efficiency single-family respondents, possibly because they did not have a furnace or have access to their furnace.

Figure 60. Recommended Energy-Saving Actions Taken, by Program and Year

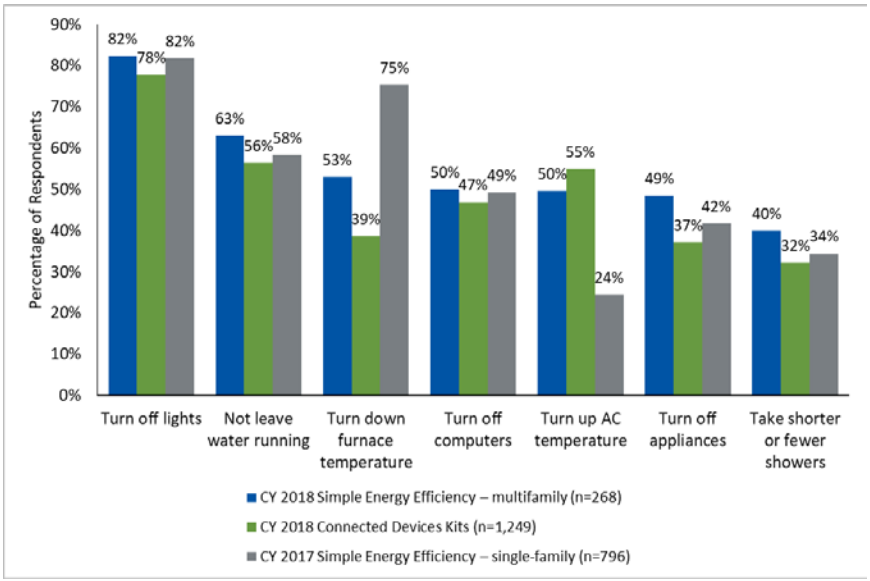


Source: Participant Survey Question J1/K1. "You should have received in your pack a pamphlet with information on actions you can take to save energy. Which of these actions have you taken? Select all that apply." Multiple responses allowed.

[60] The Evaluation Team is not claiming savings for additional energy-saving actions reported and shown in Figure 55 and Figure 56.

Survey respondents also answered whether they had taken any other energy-saving actions not listed in the pamphlet since participating in the Program and, if so, which actions they took. Eighty percent of Simple Energy Efficiency multifamily respondents and 68% of Connected Devices Kits respondents took additional energy-saving actions. As shown in Figure 61, the most- and least-common actions, respectively, for both programs were turning off lights and taking shorter or fewer showers. All CY 2018 multifamily and rural respondents were significantly less likely to turn down their furnace temperature and significantly more likely to turn up their air conditioner temperature than CY 2017 respondents. This might be attributable to the differing times of year in which the surveys were fielded (CY 2017 surveys began fielding in January 2018, whereas CY 2018 surveys began fielding in September 2018).

Figure 61. Non-Recommended Energy-Saving Actions Taken, by Program and Year



Source: Participant Survey Question J3/K3. "Specifically, what actions have you taken? Select all that apply." Multiple responses allowed.

Barriers to Participation

The Evaluation Team asked the Program Administrator and Program Implementer to discuss possible barriers to participating in the Simple Energy Efficiency and Connected Devices Kits programs; their responses are outlined below.

Simple Energy Efficiency Program

The Program Administrator and Program Implementer suggested that some Program design elements might serve as barriers to participation for customers. Because the Simple Energy Efficiency Program was opened to multifamily customers this year, customers might encounter issues related to acquiring permission from their landlords to install new energy-efficient measures or to access equipment (such as a furnace or water heater) in order to install the measures they receive in their pack. Indeed, in open-ended responses some multifamily survey respondents said they were unable to install certain measures because they are renters. Additionally, as with other similar free-to-participate programs, multifamily customers might approach the Program with skepticism and question the authenticity of the Program offer.

Connected Devices Kits Program

The Program Administrator's decision to add a utility channel (in addition to the ISP channel) to the Connected Devices Kits Program helped circumvent notable barriers to participation mentioned in CY 2017, including specific data collection and customer eligibility requirements. Despite the utility channel adding flexibility to the Program, it was still only available to rural customers. Accordingly, the Program Implementer took care to directly target customers in rural zip codes to effectively prevent or limit the exposure of the Program to non-rural customers. The Program Administrator and Program Implementer said they did not encounter any issues with non-rural customers trying to request or purchase Connected Devices Kits Program kits.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 124 lists the CY 2016, CY 2017, and CY 2018 incentive costs for the Simple Energy Efficiency Program.

Table 124. Simple Energy Efficiency Program Incentive Costs

	CY 2018	CY 2017	CY 2016
Incentive Costs	$1,991,876	$1,536,983	$1,096,464

The Evaluation Team found that the CY 2018 Simple Energy Efficiency Program was cost-effective (6.27). Table 125 lists the evaluated costs and benefits.

Table 125. Simple Energy Efficiency Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016
Costs			
Administration Costs	$0	$440,222	$458,265
Delivery Costs	$1,742,849	$1,003,902	$1,045,049
Incremental Measure Costs	$1,991,876	$1,477,862	$1,154,398
Total Non-Incentive Costs	**$3,734,725**	**$2,921,986**	**$2,656,054**
Benefits			
Electric Benefits	$14,638,169	$10,124,460	$8,697,039
Gas Benefits	$5,526,764	$4,156,455	$4,950,201
Emissions Benefits	$3,261,229	$2,330,372	$2,306,966
Total TRC Benefits	**$23,426,162**	**$16,611,288**	**$15,954,206**
Net TRC Benefits	**$19,691,437**	**$13,689,301**	**$13,298,152**
TRC B/C Ratio	**6.27**	**5.68**	**6.01**

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 126 lists the CY 2018 incentive costs for the Connected Devices Kits Program.

Table 126. Connected Devices Kits Program Incentive Costs

	CY 2018
Incentive Costs	$6,541,280

The Evaluation Team found that the CY 2018 Connected Devices Kits Program was cost-effective (1.25). Table 127 lists the evaluated costs and benefits.

Table 127. Connected Devices Kits Program Costs and Benefits

Cost and Benefit Category	CY 2018
Costs	
Administration Costs	$0
Delivery Costs	$1,621,695
Incremental Measure Costs	$6,700,169
Total Non-Incentive Costs	**$8,321,864**
Benefits	
Electric Benefits	$5,095,837
Gas Benefits	$3,823,034
Emissions Benefits	$1,507,675
Total TRC Benefits	**$10,426,546**
Net TRC Benefits	**$2,104,682**
TRC B/C Ratio	**1.25**

Evaluation Outcomes and Recommendations

The Evaluation Team identified several outcomes and recommendations to improve the Program.

Outcome 1. The CY 2018 verified ISRs differed from *ex ante* ISRs. On average, Simple Energy Efficiency Program verified multifamily ISRs were slightly lower than single-family ISRs calculated in CY 2017. Within the Connected Devices Kits Program, thermostat verified ISRs were slightly to significantly lower than ISRs in the TRM, depending on the model. Many Connected Devices Kits participant who had not installed their device indicated that they were waiting for someone to help them install it.

Recommendation 1a. Add multifamily sector ISRs to the TRM where appropriate. The Evaluation Team collected enough survey responses from multifamily Simple Energy Efficiency Program participants to establish statistically significant multifamily ISRs for all but two pack measures (candelabra and reflector LEDs). Using ISRs specific to multifamily customers can provide more accurate *ex ante* energy savings and demand reduction estimates for the multifamily sector.

Recommendation 1b. Update TRM ISRs for smart and communicating thermostats. The TRM assumes 100% ISRs for smart and communicating thermostats. The Evaluation Team derived verified ISRs that were slightly lower for premium (co-pay) smart thermostats and significantly lower for value (free) smart thermostats and communicating thermostats. The discrepancies were caused primarily by customers who intended to install the measure but were unable to do so.

Recommendation 1c. Provide additional resources to help participants install thermostats, such as online instructional videos or offering discounted installations by Focus on Energy representatives or contractors. Because a large percentage of Connected Devices Kits Program survey respondents intended to install but had not installed their thermostat, Focus on Energy would benefit from catalyzing the installation process for customers to drive higher first-year ISRs.

Recommendation 1d. Consider conducting additional research about longer-term thermostats installation rates. More information about future installations of thermostats would allow for calculating a Program trajectory ISR that accounts for delayed installations, similar to LEDs.

Outcome 2. Participation in the Simple Energy Efficiency Program by multifamily customers was successful, comprising almost 17% of all participation. By comparison, 7% of all occupied housing units in Wisconsin are multifamily residences (3+ attached units), according to the U.S. Census Bureau's 2017 American Community Survey one-year estimates.

Recommendation 2. Consider targeted marketing toward multifamily customers to maintain their strong Program participation. Such marketing might include outreach directly to multifamily building owners/managers or community events in which Focus on Energy representatives interact face-to-face with owners/managers and their tenants. Having in-person representatives onsite might help boost ISRs, especially for pack measures that are more difficult to install, like pipe wrap insulation and low-flow showerheads. Also, survey respondents indicated minimal Program awareness through social media (Figure 39) but strongly preferred social media as an outreach channel (Figure 41), indicating that increased social media efforts might be successful with these customers.

Outcome 3. The Evaluation Team encountered a small number of issues with SPECTRUM data, including 31 customers with duplicate entries and an inability to verify the fulfillment pack request period KPI due to data inconsistencies.

Recommendation 3a. While rare data issues are inevitable, the Team recommends minimizing them by introducing additional layers of quality control that:

- Confirm recorded dates are accurate, especially dates that help verify the fulfillment pack request period KPI, such as pack order and pack delivery dates, and
- Compare all mailing addresses for existing orders under that customer's name. While some names are common and may appear on several orders, all orders should be associated with a distinct address. This approach will help catch differences in address naming conventions that has allowed some customers to order multiple packs.

Recommendation 3b. Prior to finalizing Program SPECTRUM data, review the data for true duplicate entries (customers who ordered only one pack but appear two or more times in the tracking data).

Outcome 4. Interest in Decorative Light Packs and Flood Light Packs remains tepid compared to other pack types.

Recommendation 4. Diversify the Decorative and Flood Light Pack contents to make them more appealing to customers. Candelabra and reflector LEDs are typically less desired than general purpose LEDs. However, Focus on Energy might achieve greater savings from these measures simply by including one (or more) additional energy-efficient measure(s), such as an APS or low-flow showerhead, to increase the appeal of the pack, even if that requires removing LEDs so the pack maintains its approximate retail value (roughly $40, per CY 2017 interviews with Program stakeholders).

Retail Lighting and Appliance Program

Through its Retail Lighting and Appliance Program, Focus on Energy partners with retailers and manufacturers to provide instant discounts on qualified lighting and consumer products. In CY 2018, eligible Program measures included LEDs, connected lighting products, smart thermostats, APSs, and low-E storm windows for residential customers throughout Wisconsin. Focus on Energy also offers a wide range of retail support such as training to retail staff, in-store display materials, and marketing activities. In CY 2018, APTIM was the Program Administrator and ICF was the Program Implementer.

In addition to providing evaluation results for the Retail Lighting and Appliance Program, this chapter includes summary process and impact evaluation results for the ENERGY STAR Retail Products Platform (RPP). The RPP involved many of the same stakeholders and targeted similar markets and products as the Retail Lighting and Appliance Program but was formally a separate pilot. The RPP is a collaborative initiative facilitated by the U.S. Environmental Protection Agency (EPA). It is a market transformation initiative that was designed to increase sales of ENERGY STAR products by offering incentives to participating retailers. Focus on Energy discontinued participation in the RPP at the end of CY 2018 due to budget limitations and uncertainty about the Program's long-term savings potential. The *Retail Products Platform* section includes a more thorough description of the midstream Program design and findings from interviews with the Program Administrator and the Program Implementer.

Table 128 lists the actual spending, savings, participation, and cost-effectiveness of the Retail Lighting and Appliance Program.

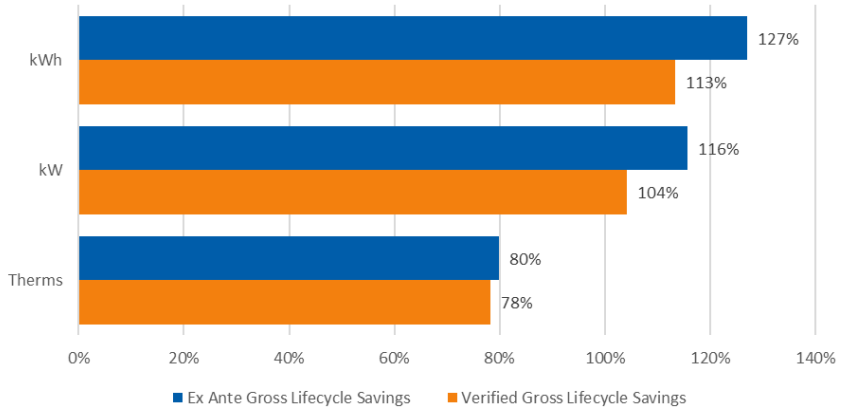
Table 128. Retail Lighting and Appliance Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$10,543,539	$9,184,298	$36,481,059
Participation	Number of Participants	920,738	881,427	3,347,033
	Quantity of Units	6,189,795	5,076,261	21,095,835
Verified Gross Lifecycle Savings	kWh	3,563,832,255	3,379,582,904	10,588,104,878
	kW	23,817	19,527	80,647
	therms	3,541,862	2,262,347	5,804,210
Verified Gross Lifecycle Realization Rate	% (MMBtu)	90%	92%	93%
Net Annual Savings	kWh	107,748,877	80,560,957	568,992,025[a]
	kW	12,144	9,126	65,345 [a]
	therms	260,069	162,889	422,958 [a]
Annual Net-to-Gross Ratio	% (MMBtu)	53%	48%	81% [a]
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	5.26	5.83	5.61

[a] The quadrennial net annual savings and annual NTG ratio include LED market effects savings, which are not reported in the yearly values. These additional savings account for the Program's historical, long-term impact on the Wisconsin residential lighting market. See the *Quadrennial Market Effects* section for additional details.

Figure 62 shows the percentage of gross lifecycle savings goals achieved by the Retail Lighting and Appliance Program in CY 2018. The Program exceeded CY 2018 goals for *ex ante* and verified kilowatt and kilowatt-hour goals, but did not meet its *ex ante* or verified therms goals due to lower participation than expected for low-E storm windows and smart thermostats.[61]

Figure 62. Retail Lighting and Appliance Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: In CY 2018, the Program Implementer's contract goal for *ex ante* gross lifecycle savings was 100%. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

The Evaluation Team verified the achievement of 113% of the electric energy and 104% of the electric demand goals. The verified gross electric energy savings and demand reduction were lower than *ex ante* savings because of the Evaluation Team's application of ISR adjustments and assignment of commercial bulbs, described in the *Impact Evaluation* section.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted process and impact evaluations of the Retail Lighting and Appliance Program and RPP in CY 2018. The Evaluation Team designed its EM&V approach to primarily evaluate Program savings from the Retail Lighting and Appliance Program.

Table 129 lists the specific data collection activities and sample sizes used in the evaluations.

[61] CY 2018 Program goals were adjusted in late CY 2017 to include additional savings from CY 2016 carryover budget.

Table 129. Retail Lighting and Appliance Program and Retail Products Platform Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)	Applicable Program(s)
Program Actor Interviews	2	Retail Lighting and RPP
Participant Surveys (Smart Thermostats and APSs)	1,481	Retail Lighting
Tracking Database Review	Census	Retail Lighting and RPP
Ongoing Participant Satisfaction Surveys	1,859	Retail Lighting
Lumen Equivalence Analysis	Census	Retail Lighting

Tracking Database Review

The Evaluation Team reviewed the census of the Retail Lighting and Appliance Program and the RPP SPECTRUM tracking data, which involved three activities:

- Thoroughly reviewing data to ensure that totals in SPECTRUM matched totals reported by the Program Administrator
- Reassigning adjustment measures to appropriate measure names
- Checking for the complete and consistent application of data fields (such as measure names, first-year savings, and effective useful lives)

Sales Data Review

The Team also reviewed participating retailers' sales data for products rebated through the RPP. Data included Wisconsin sales of qualified and non-qualified RPP products from participating retailers and one year of sale data prior to Focus on Energy joining as an RPP sponsor. The Team used these data to determine market UES trends by product category

Point-of-Sale Data Analysis

The Evaluation Team developed a national lighting sales model to determine Program attribution for the Wisconsin efficient lighting market. The model quantified the relationship between Program intensity (such as Program spending per household) and efficient lighting sales (the percentage of light bulb purchases that are efficient), which was used to calculate the Program's NTG ratio.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in the fall of CY 2018. The interviews were focused on high-level changes in CY 2018 and the outcomes of those changes, general performance including areas of success and potential concerns, and potential changes for CY 2019. Interviews addressed both the Retail Lighting and Appliance Program and RPP offers.

Participant Surveys (Smart Thermostats and Advanced Power Strips)

The Evaluation Team conducted online surveys in September 2018 with CY 2018 smart thermostat and APS participants who had received a rebate as of August 2018. The Team used the surveys to collect data to inform both the impact evaluation (installation rates, smart thermostat baselines, freeridership,

and spillover) and the process evaluation (awareness, motivation to participate, and satisfaction with the measure and with the Program interaction).

LED Market Assessment

The Evaluation Team collected data from retailer websites to assess current lighting prices and provide an understanding of the lighting market to inform the process evaluation. The Team used a web-based search tool to monitor Program and non-Program lamp inventory and pricing at participating and nonparticipating big-box stores in Wisconsin.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the CY 2015 to CY 2018 quadrennial. The goal of these surveys was to provide a quick and easy feedback opportunity for recent Program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow-up information to interested participants.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2018 participants with an email address within two weeks of their participation in the Program. Unlike the in-depth Participant Surveys (see above), these brief Satisfaction Surveys targeted all retail and Nest smart thermostat and pop-up retail participants with a goal of collecting as many completed surveys as possible. The smart thermostat customer satisfaction surveys were fielded regularly throughout CY 2018, while the pop-up retail customer satisfaction surveys were fielded following each associated sale event. The Evaluation Team gathered online survey results via SPECTRUM for annual reporting.

In CY 2018, 1,859 Retail Lighting and Appliance Program participants (1,407 retail smart thermostat, 308 Nest smart thermostat, and 144 pop-up retail) responded to customer satisfaction surveys.

Lumen Equivalence Analysis

Consistent with the previous years' evaluations and the CY 2018 plan, the Evaluation Team employed the lumen equivalence method to determine the appropriate baseline wattages for each Program bulb. This method, which adheres to the best practices prescribed by the UMP,[62] entails mapping each efficient wattage to a corresponding baseline wattage by using the lumen output of the efficient bulb to determine the least efficient wattage allowed by federal standards.

[62] 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

Impact Evaluation

This section provides impact evaluation findings for the Retail Lighting and Appliance Program based on several methods:

- Gross savings methods
  - Tracking database review
  - Engineering reviews
- Net savings methods
  - National sales data modeling

The Evaluation Team calculated gross savings for each individual bulb sold through the Program using the bulb's model information and inputs calculated from the gross savings methods (database reviews and engineering reviews). The Team calculated gross savings for smart thermostats and APSs using algorithms and inputs listed in the TRM.

To determine an overall Program NTG ratio, the Evaluation Team used results from national LED sales data modeling and the CY 2016 Smart Thermostat Pilot survey results.

Evaluation of Gross Savings

The Evaluation Team reviewed the tracking database and applied the most recent research to determine estimated verified gross savings for each Program measure.

Tracking Database Review

The Evaluation Team reviewed the census of CY 2018 Retail Lighting and Appliance Program data in SPECTRUM for appropriate and consistent application of unit-level savings and EUL values in adherence with the TRM or other deemed savings sources. All inputs used in the SPECTRUM database were consistent with the deemed values in the TRM.

The Evaluation Team also reviewed the CY 2018 sales data for information required to calculate savings and found complete data for all the inputs used in the gross savings analysis (such as model number, measure description, quantity, and wattage).

To verify the lighting dataset, the Team used the model number and description of each bulb to gather data on lumens, wattage, and bulb type from the ENERGY STAR lighting database. The Evaluation Team was able to match 95% of the total bulbs listed in the Program. For bulbs that were not matched in the ENERGY STAR database, the Team deferred to the values listed in the tracking database. The Team applied other inputs for the savings analysis, such as hours of use, from the TRM, and made no adjustments to the tracking data. A comprehensive list of *ex ante* and verified inputs are provided in Appendix I.

Verified Unit Energy Savings

The following sections describe the Evaluation Team's steps to calculate verified UES for all Retail Lighting and Appliance Program measures:

- Conducting an engineering review to verify all measures' savings calculations
- Calculating and applying verified ISRs to all measures
- Calculating delta watts for all lighting measures (lumens equivalence method)
- Applying a cross-sector sales adjustment to lighting measures

Engineering Review

The Evaluation Team calculated verified, gross UES and demand reduction for all measures following algorithms and inputs in the TRM. Exceptions to this include the ISR and the delta watts, which are both described below. Appendix H provides additional details about algorithms, inputs, and data sources for all verified savings calculations.

In-Service Rates

This section describes sources and descriptions of ISRs that the Team applied to Program measures.

Lighting

The Evaluation Team applied first-year and lifetime ISRs to CY 2018 LEDs; both ISRs were calculated in CY 2017.

- The first-year ISR represents the percentage of bulbs that were installed within 12 months of the bulbs' purchase. During the CY 2017 in-home audits, the Evaluation Team inventoried LED bulbs and estimated a first-year ISR of 56%.
- Lifetime ISRs account for the installation of bulbs that are initially put into storage and installed in future years. Following UMP guidance, in CY 2017 the Evaluation Team relied on customer survey results and Energy Independence and Security Act of 2007 (EISA) backstop provisions to calculate an installation trajectory over six years. The resulting net present value ISR, or lifetime ISR, was 87%.

Table 130 shows the two LED ISRs the Team calculated in CY 2017 and applied in CY 2018.

Table 130. CY 2017 LED In-Service Rates Applied to CY 2018 LEDs

Bulb Type	First-Year ISR	Lifetime ISR
LED	56%	87%

Low-E Storm Windows

The TRM does not specify an ISR for low-E storm windows and the Evaluation Team was unable to benchmark a value from other jurisdictions. Given the measure's small impact on the Program and lack of more accurate data, the Evaluation Team applied an ISR of 100% to low-E storm windows measures.

Advanced Power Strips and Smart Thermostats

The Evaluation Team applied first-year ISRs to APSs and smart thermostats based on participant surveys conducted in CY 2018. Table 131 shows the survey sample size and first-year ISR for both measures.

Table 131. Advanced Power Strip and Smart Thermostat First-Year ISRs

Measure	Survey Sample Size	First-Year ISR
Advanced Power Strips	52	81%
Smart Thermostats	1,429	98%

Delta Watts Analysis

The Evaluation Team employed the lumen equivalence methodology to determine the baseline wattage for each Program bulb. Calculating the difference between the baseline and efficient wattages provided the delta watts input.

The Evaluation Team matched individual bulbs from the Program Implementer's tracking database, using its model number, to its corresponding listing in the ENERGY STAR–qualified product list 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 Evaluation Team used the database values for lumens, efficient wattage, or both from the Program Implementer's database, or conducted internet searches based on product make and model numbers.

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 EISA-exempt lamps. For example, the bins and associated baseline halogen watts for standard bulbs are shown in Table 132.

Table 132. EISA (Phase 1) Lumen Bins and Baseline Watts for Standard Bulbs

Lumen Bin	CY 2018 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 2016, the DOE issued two final rules: one proposing to keep the existing EISA Phase 2 backstop provision set to take effect on January 1, 2020, and one expanding the definition of EISA general service lamps (and thus the types of lamps impacted by the backstop provision) to include several previously exempted lamps, including globes, candelabras, reflectors, and lamps up to 3,300 lumens. The effective date of these rules remains uncertain and they do not immediately impact the first-year savings for lighting however, they could impact the measure lifetimes for a wider assortment of bulbs than were previously impacted. See: U.S. Department of Energy, 10 CFR Part 430, Docket Number EERE–2013–BT–STD–0051, RIN 1904-AD09.

EISA only affects bulbs in the 310 lumen 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 UMP defers to federal requirements and does not list lumen bins explicitly. Based on federal requirements, the Mid-Atlantic TRM[63] defines lumen bins for six categories of reflector types and diameters.

The average delta watts for each category compared to the *ex ante* delta watts are shown in Table 133. The *ex ante* delta watts are based 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 causes the variation shown between the *ex ante* delta watts and the evaluated delta watts. Similar to CY 2017, the comparison in Table 133 shows strong agreement between the verified and *ex ante* delta watts values.

Table 133. CY 2018 Ex Ante and Verified Gross Delta Watts

Measure	*Ex Ante* Delta Watts	Average Verified Gross Delta Watts
LED, Reflector	53	47
LED, Omnidirectional, 310–749 Lumens	22	26
LED, Omnidirectional, 750–1,049 Lumens	32	34
LED, Omnidirectional, 1,050–1,489 Lumens	40	41
LED, Omnidirectional, 1,490–2,600 Lumens	55	57

Cross-Sector Sales

In CY 2015, the Evaluation Team conducted a residential general population survey and surveyed a subset of Focus on Energy small business customers to estimate the percentage of customers (from each population) who purchased CFLs, LEDs, or both from a participating retailer during the previous 12 months. Because store intercept studies and the phone surveys have inherent biases specific to the populations they target and the methods they employ, the Evaluation Team combined the results from the CY 2015 phone surveys (6.0%) with those from the CY 2014 intercept study (7.1%), for an average cross-sector sales proportion of 6.6%.

Because there had been no large changes to the Program design or population from CY 2015 to CY 2018, the Evaluation Team applied the 6.6% cross-sector sales proportion to CY 2018 bulbs. Appendix I of the *Focus on Energy CY 2015 Evaluation Report*[64] describes the full methodology and findings of the cross-sector sales analysis. The verified gross unit savings separated by residential and nonresidential savings are outlined in Appendix H. Table 134 provides the *ex ante* gross unit savings and the verified gross unit savings with associated realization rates.

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[63] Northeast Energy Efficiency Partnership. May 2015. *Mid-Atlantic Technical Reference Manual*. Version 5.0. http://www.neep.org/mid-atlantic-technical-reference-manual-v5

[64] Cadmus. May 20, 2016. *Focus on Energy CY 2015 Evaluation Report.* https://www.focusonenergy.com/sites/default/files/WI%20FOE%20CY%202015%20Appendices.pdf

Table 134. CY 2018 Retail Lighting and Appliance Program Unit Savings by Measure

Measure	MMID	Quantity	*Ex Ante* Unit Savings			Verified Gross Unit Savings			Realization Rate		
			kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms
Adjustment Measure	2849	1	(878)	-	(60)	(857)	-	(59)	98%	0%	98%
Advanced Power Strip, Retail, APS Tier 1	4275	1,991	75	0.010	-	61	0.0080	-	81%	81%	-
LED, Omnidirectional, 1,050-1,489 Lumens, Long Lifetime, Retail Store Markdown	4311	209,869	39	0.005	-	36	0.0042	-	92%	93%	-
LED, Omnidirectional, 1,050-1,489 Lumens, Retail Store Markdown	4310	79,595	39	0.004	-	36	0.0042	-	92%	93%	-
LED, Omnidirectional, 1,490-2,600 Lumens, Long Lifetime, Retail Store Markdown	4313	266,939	55	0.006	-	49	0.0057	-	89%	89%	-
LED, Omnidirectional, 1,490-2,600 Lumens, Retail Store Markdown	4312	268,219	55	0.006	-	49	0.0057	-	89%	89%	-
LED, Omnidirectional, 310-749 Lumens, Long Lifetime, Retail Store Markdown	4307	149,630	23	0.003	-	23	0.0027	-	99%	98%	-
LED, Omnidirectional, 310-749 Lumens, Retail Store Markdown	3553	280,691	23	0.003	-	23	0.0027	-	99%	98%	-
LED, Omnidirectional, 750-1,049 Lumens, Long Lifetime, Retail Store Markdown	4309	1,021,637	32	0.004	-	29	0.0034	-	92%	92%	-
LED, Omnidirectional, 750-1,049 Lumens, Retail Store Markdown	4308	2,790,675	32	0.004	-	29	0.0034	-	92%	93%	-
LED, Reflector, 12 Watt, Retail Store Markdown	3557	192,603	50	0.006	-	41	0.0048	-	82%	83%	-
LED, Reflector, 12 Watt, Retail Store Markdown, Long Lifetime	4306	913,228	50	0.006	-	41	0.0048	-	82%	83%	-
Low-E Storm Window, Single Family, Retail Channel	4681	3,643	7.3	0.008	4	7	0.0077	4	100%	100%	100%
Smart Thermostat, Existing Air-Source Heat Pump	4303	249	411	-	-	401	-	-	98%	-	-
Smart Thermostat, Existing Natural Gas Boiler	4301	410	324	-	53	317	-	53	98%	-	98%
Smart Thermostat, Existing Natural Gas Furnace	4302	10,414	435	-	30	425	-	30	98%	-	98%
Smart Thermostat, Existing Natural Gas Furnace	3610	1	76	0.127	92	75	0.127	92	98%	-	98%

CY 2018 Verified Gross Savings Results

Overall, the Retail Lighting and Appliance Program achieved an annual evaluated realization rate of 90% for electric energy savings and 90% for demand savings (Table 135).[65]

Table 135. CY 2018 Retail Lighting and Appliance Program Annual and Lifecycle Realization Rates by Measure Type

Measure	MMID	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	Therms	MMBtu	kWh	kW	Therms	MMBtu
Adjustment Measure	2849	98%	n/a	98%	98%	98%	n/a	98%	98%
Advanced Power Strip, Retail, APS Tier 1	4275	81%	81%	n/a	81%	81%	81%	n/a	81%
LED, Omnidirectional, 1,050-1,489 Lumens, Long Lifetime, Retail Store Markdown	4311	92%	93%	n/a	92%	92%	93%	n/a	92%
LED, Omnidirectional, 1,050-1,489 Lumens, Retail Store Markdown	4310	92%	93%	n/a	92%	92%	93%	n/a	92%
LED, Omnidirectional, 1,490-2,600 Lumens, Long Lifetime, Retail Store Markdown	4313	89%	89%	n/a	89%	89%	89%	n/a	89%
LED, Omnidirectional, 1,490-2,600 Lumens, Retail Store Markdown	4312	89%	89%	n/a	89%	89%	89%	n/a	89%
LED, Omnidirectional, 310-749 Lumens, Long Lifetime, Retail Store Markdown	4307	99%	98%	n/a	99%	99%	98%	n/a	99%
LED, Omnidirectional, 310-749 Lumens, Retail Store Markdown	3553	99%	98%	n/a	99%	99%	98%	n/a	99%
LED, Omnidirectional, 750-1,049 Lumens, Long Lifetime, Retail Store Markdown	4309	92%	92%	n/a	92%	92%	92%	n/a	92%
LED, Omnidirectional, 750-1,049 Lumens, Retail Store Markdown	4308	92%	93%	n/a	92%	92%	93%	n/a	92%
LED, Reflector, 12 watt, Retail Store Markdown	3557	82%	83%	n/a	82%	82%	83%	n/a	82%
LED, Reflector, 12 Watt, Retail Store Markdown, Long Lifetime	4306	82%	83%	n/a	82%	82%	83%	n/a	82%
Low-E Storm Window, Single Family, Retail Channel	4681	100%	100%	100%	100%	100%	100%	100%	100%
Smart Thermostat, Existing Air-Source Heat Pump	4303	98%	n/a	n/a	98%	98%	n/a	n/a	98%
Smart Thermostat, Existing Natural Gas Boiler	4301	98%	n/a	98%	98%	98%	n/a	98%	98%
Smart Thermostat, Existing Natural Gas Furnace	4302	98%	n/a	98%	98%	98%	n/a	98%	98%
Smart Thermostat, Existing Natural Gas Furnace	3610	98%	98%	98%	98%	98%	98%	98%	98%
Average	--	**90%**	**90%**	**98%**	**90%**	**89%**	**90%**	**98%**	**90%**

[65] The Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

The largest factor causing some measure-level realization rates to be lower than 100% was the ISR. For non-lighting measures, the Evaluation Team applied ISRs derived from the CY 2018 participant surveys. For LEDs, the Evaluation Team applied an ISR of 87% to the verified savings, while the ex ante savings did not include an ISR. Another factor effecting the realization rates was the difference in delta watts between verified and *ex ante* savings. Most notably, EISA-exempt lamps had a larger verified delta watts value in the lowest lumen bin (310–749 lumens) due to a larger number of specialty type bulbs with higher baseline wattages in this category. The Evaluation Team also found a lower verified delta watts for reflectors, which led to a lower realization rate for this measure type.

Table 136 lists realization rates for the annual and lifecycle gross savings for the CY 2018 Retail Lighting and Appliance Program.

Table 136. CY 2018 Retail Lighting and Appliance Program
Annual and Lifecycle Realization Rate Summary by Measure Type

Measure	Annual Realization Rate			Lifecycle Realization Rate		
	kWh	kW	Therms	kWh	kW	Therms
Lighting	89%	90%	n/a	89%	90%	n/a
Appliances[a]	97%	92%	98%	97%	92%	98%
Average	**90%**	**90%**	**98%**	**89%**	**90%**	**98%**

[a] Appliance realization rates include adjustment measures.

Table 137 lists the *ex ante* and verified annual gross savings for the CY 2018 Retail Lighting and Appliance Program.

Table 137. CY 2018 Retail Lighting and Appliance Program
Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	Therms	kWh	kW	Therms
Lighting	227,938,535	26,413	-	203,872,300	23,773	-
Appliances[a]	4,941,269	48	346,327	4,804,739	44	338,886
Total	**232,879,804**	**26,461**	**346,327**	**208,677,039**	**23,817**	**338,886**

[a] Appliance savings include adjustment measures.

Table 138 lists the *ex ante* and verified lifecycle gross savings for the CY 2018 Retail Lighting and Appliance Program.

Table 138. CY 2018 Retail Lighting and Appliance Program
Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	Therms	kWh	kW	Therms
Lighting	3,942,656,735	26,413	-	3,516,001,362	23,773	-
Appliances[a]	49,081,331	48	3,616,279	47,830,893	44	3,541,862
Total	**3,991,738,066**	**26,461**	**3,616,279**	**3,563,832,255**	**23,817**	**3,541,862**

[a] Appliance savings include adjustment measures.

Evaluation of Net Savings

This section details the Evaluation Team's methods for estimating the net Program savings.

Lighting

Following the lighting NTG approach from CY 2016 and CY 2017, the Evaluation Team used a national lighting sales model to determine Program attribution for the Wisconsin efficient lighting market. The model quantified the relationship between Program intensity (Program spending per household) and efficient lighting sales (the percentage of light bulb purchases that are efficient). 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 I.

Data Sources

The Evaluation Team relied on a variety of data sources to develop the model, but primarily relied on CY 2017 sales data prepared by the Consortium for Retail Energy Efficiency Data (CREED) LightTracker initiative.[66] Most of these sales data were generated from two sources—state point-of-sale data (representing one group of retail channels) and National Consumer Panel state sales data (representing a different group of retail channels)—that collectively represent the majority of bulb sales across the United States. The model also included inputs from a combination of Program data and household and demographic data from various publicly available websites, all collected by the Evaluation Team.

There were several primary model input data sources:

- National bulb sales
  - Point-of-sale data (grocery, drug, dollar, discount, mass merchandiser, and selected club stores)
  - Panel data (home improvement, hardware, online, and selected club stores)
- ENERGY STAR shipment data (imports and ENERGY STAR market share)
- North American Electrical Manufacturers Association shipment data
- American Community Survey data (household characteristics and demographic data)

[66] CREED is a consortium of program administrators, retailers, and manufacturers that collect the necessary data to better plan and evaluate energy efficiency programs. LightTracker, 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 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. More details are available online: https://www.creedlighttracker.com. Note that CY 2017 data was the most recent year available at the time of this study.
The information contained herein is based in part on data reported by IRI through its Advantage service, interpreted solely by LightTracker. Any opinions expressed herein reflect the judgement of LightTracker, Inc. and are subject to change. IRI disclaims liability of any kind arising from the use of this information.

- Retailer square footage per state (based on the two primary retailer channel data sources)
- General population surveys, lighting saturation studies, and other primary data collection made publicly available through evaluation reports

Modeling Methods

The primary goal of the model was to quantify the impact of state-level Program activity on the sales of efficient lighting. Several factors influence the sales of efficient lighting and, as noted above, the Evaluation Team considered a number of demographic and household characteristics, as well as retail channel variables, to capture and control for the unique characteristics of each state that could affect the uptake of efficient lighting products.

Using the regression model results, efficient bulb sales data, and Program tracking databases, the Evaluation Team estimated NTG ratios for all LEDs in CY 2018. The Team derived a NTG ratio 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 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 Team multiplied the change in share by the total number of bulbs—for all bulb types—sold in CY 2017. This value represents the net Program impact (that is, the total lift in the number of efficient bulbs sold), which the Team then divided by the total number of Program bulbs sold (the gross number of bulbs) to determine NTG:

$$NTG = \frac{(\#\ bulbs\ sold\ with\ Program - \#\ bulbs\ sold\ with\ no\ Program)}{\#\ of\ Program\ bulbs\ sold}$$

Results

As shown in Table 139, the estimated CY 2018 NTG modeled ratio for CFLs and LEDs combined is 51%. This estimate considers current Program spending and current Program age; it does not include market effects. The Team also calculated a NTG ratio of 71.6% that includes market effects (the Program's current and past influence on the market), and is comparable to the Program's CY 2016 NTG ratio of 68%, which the Team determined using previous NTG methods.

The Evaluation Team applied the NTG ratio that does not account for market effects (51%) to CY 2018 and applied the NTG ratio that accounts for market effects (71.6%) to quadrennial results. This will result in a final quadrennial NTG ratio that is higher than the CY 2018 ratio.

Table 139. LED Net-to-Gross Calculations

Calculation Term	Value
Total Wisconsin Bulbs CY 2017 (A)	26,629,056
Program Spending per Household Actual (B)	$4.23
Program Spending per Household Counterfactual (C)	$0.00
Program Age Actual (D)	15
Program Age Counterfactual (E)	14
LED Market Share Counterfactual (F)	32.6%
LED Market Share Modeled (G)	41.7%
LED Quantity Modeled (H = A * G)	11,093,649
LED Quantity Counterfactual (I = A * F)	8,681,139
Net LEDs Modeled (J = H - I)	2,412,510
Program Bulbs CY 2017 (K)	4,732,792
NTG Ratio Modeled (L = J / K)	**51.0%**

Advanced Power Strips and Smart Thermostats

The Evaluation Team used participant surveys to assess net savings for APSs and smart thermostats. The survey's self-report NTG battery included questions that allowed the Evaluation Team to calculate freeridership (measures that would have been purchased without the Program's influence) and spillover (Program-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 I provides a complete review of the Team's self-report NTG analysis and findings.

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

Table 140 shows freeridership and spillover results for APSs and smart thermostats, as well as the measures' final NTGs.

Table 140. Advanced Power Strip and Smart Thermostat Freeridership and Spillover Results

Measure	Freeridership	Spillover	NTG (1 – Freeridership + Spillover)
Advanced Power Strip	30%	2%	72%
Smart Thermostats	32%	11%	79%

The Team also evaluated freeridership for smart thermostats by price range. As shown in Table 141, as price increases, freeridership also increases, up to the $150 price point. From $150 to $249, freeridership is relatively stable at 34%-35%. That price range includes the majority of respondents, making this freeridership level only slightly higher than the overall free ridership of 32%. (Given the low sample size of the *$250 or more* price band, the 24% freeridership estimated for that band should be considered anecdotal.)

Table 141. Smart Thermostat Freeridership by Price Range

Price Range	n	Weighted Freeridership
Less than $100	87	19%
$100 to $149	136	25%
$150 to $199	428	34%
$200 to $249	398	35%
$250 or more	12	24%
Overall	**1,061**	**32%**

Low-E Storm Windows

To estimate net savings for low-E storm windows, the Team applied results from the CY 2018 net-of-freeridership analysis of the CY 2017 Low-E Storm Window Pilot. For this analysis, described in detail in the *Low-E Storm Windows Pilot* section, the Evaluation Team used historical sales data to predict what sales would have been during the Pilot period in absence of the Pilot. The Team then compared the projected sales to Pilot activity to calculate a net-of-freeridership savings value.

Since no significant changes were made to the low-E storm windows effort between the pilot phase and integration into the Retail Lighting and Appliance Program, the Evaluation Team applied the Pilot's 71% net-of-freeridership percentage to low-E storm windows.

CY 2018 Verified Net Savings Results

Table 142 shows the annual net energy impacts by measure type for the CY 2018 Retail Lighting and Appliance Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 142. CY 2018 Retail Lighting and Appliance Program Annual Net Savings

Measure	Annual Net		
	kWh	kW	therms
Lighting	103,974,873	12,124	-
Appliances[a]	3,774,004	20	260,069
Total Annual	**107,748,877**	**12,144**	**260,069**

[a] Appliance savings include adjustment measures.

Table 143 shows the lifecycle net energy impacts by measure for the CY 2018 Retail Lighting and Appliance Program.

Table 143. CY 2018 Retail Lighting and Appliance Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
Lighting	1,793,160,695	12,124	-
Appliances[a]	37,469,811	20	2,645,065
Total	**1,830,630,505**	**12,144**	**2,645,065**

[a] Appliance savings include adjustment measures.

Quadrennial Market Effects

In CY 2017, the Evaluation Team began calculating longer-term market effects for the Program using the same national sales data model it used to calculate annual NTG. By adjusting Program age in the NTG model, the Team was able to calculate the Program impact on the market considering current and past Program influence.

Focus on Energy uses Program 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 144 shows the CY 2018 NTG using current Program spending and setting the Program age counterfactual to zero.

Table 144. LED Net-to-Gross Calculations with Past Influence

Calculation Term	Current and Past Influence (With Market Effects)	Current Program Spending and Age Influence (Without Market Effects)
Total Wisconsin Bulbs CY 2017 (A)	26,629,056	26,629,056
Program Spending per Household Actual (B)	$4.23	$4.23
Program Spending per Household Counterfactual (C)	$0.00	$0.00
Program Age Actual (D)	15	15
Program Age Counterfactual (E)	0	14
LED Market Share Counterfactual (F)	28.9%	32.6%
LED Market Share Modeled (G)	41.7%	41.7%
LED Quantity Modeled (H = A * G)	11,093,649	11,093,649
LED Quantity Counterfactual (I = A * F)	7,703,104	8,681,139
Net LEDs Modeled (J = H - I)	3,390,545	2,412,510
Program Bulbs CY 2017 (K)	4,732,792	4,732,792
NTG Ratio Modeled (L = J / K)	**71.6%**	**51.0%**

Market effects is the difference between NTG with past Program influence (71.6%) and NTG with current Program influence (51.0%), or 20.7%.

These savings should be considered new savings realized in CY 2017, the year of sales data that was analyzed in the sales model. The change in market share due to prior Program activities was realized in CY 2017 (as prior Program activities increased the current market share). This represents increased sales of LEDs in CY 2017 that were not counted in prior years and, if not claimed in the current year, they are Program-induced impacts that are never credited at any time to Program spending (past or present).

The Evaluation Working Group agreed that market effects should not be reported annually throughout the quadrennial, but should be cumulatively applied to quadrennial results. To calculate market effects, the Evaluation Team first determined the number of market lamps that were sold each year as a result of the Program. Table 145 shows market effects lamps for CY 2016–CY 2018. The Team did not begin calculating market effects until CY 2017 (using CY 2016 sales data), so no market effects were applied to CY 2015. The Team was not able to procure CY 2018 data with sufficient lead time to calculate CY 2018

market effects for this report. Given the absence of available data, the Evaluation Working Group decided to estimate CY 2018 market effects using the market effects findings from CY 2017.

Table 145. Lighting Market Effects by Year

Calendar Year	Total Program LEDs	Market Effects[a]	Market Effects LEDs[b]
CY 2015	511,182	n/a	-
CY 2016	3,405,692	24.3%	827,583
CY 2017	5,067,229	20.7%	1,048,916
CY 2018	6,173,086	20.7%	1,277,829
Quadrennial	**15,157,189**	**-**	**3,154,328**

[a] Market effects represents the difference of annual NTG and NTG that includes past participation.

[b] Market effects LEDs are calculated by multiplying total Program LEDs by the market effect percentage.

Next, the Team applied average annual and lifecycle savings per lamp to each market effects LED. Table 146 shows market effects savings for LEDs.

Table 146. Annual and Lifecycle Market Effects Savings for LEDs

Calendar Year	Annual Market Effects				Lifecycle Market Effects			
	kWh	kW	Therms	MMBtu	kWh	kW	Therms	MMBtu
CY 2015	-	-	-	-	-	-	-	-
CY 2016	30,525,835	3,559	-	104,154	512,587,849	3,559	-	1,748,950
CY 2017	34,637,861	4,039	-	118,184	692,757,219	4,039	-	2,363,688
CY 2018	42,201,566	4,921	-	143,992	727,812,282	4,921	-	2,483,296
Quadrennial	**107,365,262**	**12,519**	**-**	**366,330**	**1,933,157,350**	**12,519**	**-**	**6,595,933**

Finally, the Team added market effects savings to annual verified net savings that have been reported throughout the quadrennial. Table 147 shows total verified net and market effects savings for LEDs (and only LEDs) in the Retail Lighting and Appliance Program.

Table 147. Market Effects Savings and Verified Net Savings for LEDs

Calendar Year	Annual Verified Net Savings and Market Effects				Lifecycle Verified Net Savings and Market Effects			
	kWh	kW	Therms	MMBtu	kWh	kW	Therms	MMBtu
CY 2015	15,082,266	1,754	-	51,461	192,068,894	1,754	-	655,339
CY 2016	115,855,725	13,509	-	395,300	1,945,441,866	13,509	-	6,637,848
CY 2017	112,782,214	13,151	-	384,813	2,255,644,279	13,151	-	7,696,258
CY 2018	146,176,439	17,045	-	498,754	2,520,972,976	17,045	-	8,601,560
Quadrennial	**389,896,645**	**45,460**	**-**	**1,330,327**	**6,914,128,015**	**45,460**	**-**	**23,591,005**

Table 148 shows verified gross savings, verified net and market effects savings, and final NTG ratios for the total Retail Lighting and Appliance Program, including *all* Program measures.

Table 148. Verified Gross and Net Annual Savings, Market Effects, and Net-to-Gross Ratios for All Program Measures

Calendar Year	Verified Gross Savings (Annual MMBtu)	Total Verified Net Savings and Market Effects (Annual MMBtu)	NTG Ratio
CY 2015	599,737	571,233	95%
CY 2016	501,368	465,479	93%
CY 2017	604,908	409,347	68%
CY 2018	745,895	537,638	72%
Quadrennial	**2,451,907**	**1,983,697**	**81%**

Process Evaluation

For the Retail Lighting and Appliance Program process evaluation, the Team focused on three key topics:

- General performance and implementation success
- Outcome of updates to the Program initiated in CY 2017
- Challenges and potential changes for CY 2019

The Evaluation Team used information from the Program Administrator and the Program Implementer interviews, the smart thermostat and APS participant surveys, tracking data and Program information provided by the Program Implementer to inform the process evaluation.

Program Design, Delivery, and Goals

The goal of the Retail Lighting and Appliance Program is to overcome customers' barriers related to product cost and lack of information about energy efficiency in order to increase the awareness and sales of energy-efficient products. To achieve this goal, Focus on Energy offers point of sale discounts and downstream (after purchase) rebates for select energy-efficient products through the Retail Lighting and Appliance Program.

In addition, the Program Implementer conducts various marketing activities, including in-store promotions, and provides training and support to retail staff. The Program Implementer also works with Focus on Energy to offer discounted products through the Focus on Energy appliance marketplace. This ensures access to Retail Lighting and Appliance Program discounts across the state. The appliance marketplace also provides general information about a wider variety of efficient products, many of which are provided through the RPP.

Focus on Energy partners with manufacturers to select qualified measures, establish target retail prices, and set promotional timelines. The Retail Lighting and Appliance Program and RPP partnerships are managed under memorandums of understanding (MOUs), which set product-specific incentive amounts, catalogue stock-keeping unit numbers for incented products, and list agreed-upon base retail prices for lighting products and APSs. Manufacturers send invoices to the Program Implementer on a weekly, bi-weekly, or monthly basis (depending on the MOU), then the Program Implementer processes the incentives. The invoices include the number of products sold and the retailer that sold the product and are supported by retailer point of sale data.

Table 149 shows the products discounted through the Retail Lighting and Appliance Program in CY 2018, by retail channel and type of discount.

Table 149. Retail Lighting and Appliance Program Products by Incentive Type and Retail Channel

Product	Incentive Type / Retail Channel		
	Point of Sale Discount / Brick and Mortar Stores	Instant Discount / Online Retailer Sites	Point of Sale Discount / Pop-Up Retail Events
LEDs	✓	✓	✓
Smart thermostats	--	✓	--
Advanced power strips	--	--	✓
Connected LED lighting	✓	✓	--
Low-E storm windows	✓	--	--

Program Changes

The Program Implementer did not introduce any major changes to the measures offered through the Retail Lighting and Appliance Program or the RPP in CY 2018. However, the Program Implementer shifted low-E storm windows from a pilot measure to a standard Program measure in September 2018 and expanded the discount availability to one additional retailer. The Program Implementer also continued to refine its approach to delivering new measures introduced in CY 2017, including for smart thermostats, APSs, and connected lighting.

- For smart thermostats, CY 2018 was the first full year when only ENERGY STAR–certified models were eligible (older models that had been grandfathered in were discontinued in September 2017), but the continued expansion of ENERGY STAR–certified models allowed the number of eligible models to grow.
- APSs were offered exclusively through pop-up retail events, where the Program Implementer could ensure customers also received more information about how to use the strips. This approach was an attempt to counter low installation rates experienced through the Simple Energy Efficiency and Connected Devices Kits programs. Despite a small sample size, CY 2018 participant surveys revealed that the APS ISR through Retail Lighting and Appliance Program pop-up retail events was statistically significantly higher than the Connected Devices Kits Program ISR, but differences between the Retail Lighting and Appliance Program and Simple Energy Efficiency ISRs were not statistically significant (Table 150).

Table 150. Advanced Power Strip ISR by Program Path

Advanced Power Strip Program Path	Advanced Power Strip ISR
Retail Lighting Pop-Up Retail Events	81%
Connected Devices Kits	69%
Simple Energy Efficiency (multifamily, CY 2018)	74%
Simple Energy Efficiency (single family, CY 2017)	78%

- For connected lighting, the Program Implementer added one model and worked with the participating manufacturer to resolve stocking issues that had impacted CY 2017 sales.

The Program Implementer added several new retailer partners in CY 2018. While some chains dropped out of the Program, the Program Implementer was able to meet its CY 2018 KPI to operate out of 1,000 locations.

Program Management and Delivery Structure

Program roles in CY 2018 were consistent with those in CY 2017. In CY 2018, the Program Administrator was responsible for managing the Program budget and overseeing the Program Implementer. Over CY 2018, 1,012 physical locations sold discounted LEDs through the Program, in addition to online sales available through three retailers.

The Program Implementer was responsible for several activities:

- Overseeing contracts and MOUs
- Conducting Program planning
- Tracking Program data
- Identifying and coordinating with retail partners
- Conducting marketing activities at retail locations
- Conducting digital and traditional appliance marketing campaigns
- Processing manufacturer and customer incentives and payments
- Representing Focus on Energy regarding the RPP

Program Goals

The overall goal of the Retail Lighting and Appliance Program was to increase awareness and sales of energy-efficient products sold through retail outlets. The CY 2018 Program energy-savings goals and achievements are shown in Table 151.

Table 151. CY 2018 Retail Lighting and Appliance Program Goals and Achievements

Performance Metric	CY 2018 Goal	CY 2018 Actual (*Ex Ante*)
Lifecycle electric savings (kWh)	3,141,968,735	3,991,738,066
Demand reduction (kW)	22,857	26,461
Natural gas savings (Therms)	4,525,583	3,616,279
Lifecycle energy savings (MMBtu)	10,363,805	13,981,438

The Program achieved 135% of its CY 2018 *ex ante* MMBtu goal.

The Program Implementer tracked additional KPIs to measure Retail Lighting and Appliance Program performance. Table 152 shows these KPIs, the CY 2018 results, and the source of the results information. The Program Implementer accomplished all eight of its annual KPI goals, as well as three additional KPIs specific to low-E storm windows that were established when the Program Implementer changed the status of the Low-E Storm Window Pilot to be a full Program.

Table 152. Retail Lighting and Appliance Program CY 2018 Key Performance Indicators

KPI	Measurement	Results	Source
Continue to maintain over 1,000 retail locations for lighting	Measured by retail locations reporting point of sale data	**Accomplished:** 1,012 retail locations	Program Administrator and Program Implementer
Expand online LED sales by 25% in CY 2018 versus CY 2017	Measured by units sold by partnerships designated as online	**Accomplished:** 29% increase: 280,966 units in CY 2017 vs. 362,984 units in CY 2018	Program Administrator and Program Implementer
Add at least one measure in CY 2018 beyond APSs, lighting, and thermostats	Measured by new measures offered	**Accomplished:** Added Low-E storm windows	SPECTRUM
At least three online MOUs	Measured by online MOUs	**Accomplished:** Executed three online MOUs focused on lighting: (1) The Home Depot, (2) Cree/1000bulbs.com, (3) TechniArt/Focus on Energy online store	Program Administrator and Program Implementer
Expand thermostat coupon in CY 2018 beyond initial retailer and model	Measured by partnerships with brands and retailers	**Accomplished:** Partnership with Ecobee in CY 2018 (sales claimed in CY 2019)	Program Administrator and Program Implementer
Achieve a customer satisfaction score of at least 8.6 out of 10 by the end of CY 2018	Measured quarterly by the Evaluation Team	**Accomplished:** Retail smart thermostats 9.2, Nest smart thermostats 9.0, pop-up retail events 9.1	Evaluation Team analysis
Provide at least 46 employer-based lighting events through pop-up retail	Measured by number of pop-up retail event	**Accomplished:** Hosted 85 events in CY 2018	Program Administrator and Program Implementer
Program Implementer and Program Administrator shall coordinate to send out at least two promotional emails using utility partner lists	Measured by utility customer list emails sent out in CY 2018	**Accomplished:** Sent three emails: (1) Memorial Day email, (2) Father's Day email, (3) online store email	Program Administrator and Program Implementer
Low-E Storm Window KPIs			
Increase low-E storm window sales	Measured by year-over-year low-E storm window unit sales by manufacturer	**Accomplished:** 22% increase in CY 2018 sales compared to CY 2017 sales	Program Administrator and Program Implementer
Experience general product category market growth	Measured by year-over-year increase in low-E storm window market share unit sales in participating stores	**Accomplished:** 12.3% increase in CY 2018 market share compared to CY 2017 market share	Program Administrator and Program Implementer
Increase low-E storm window market share	Measured by overall percentage increase in low-E storm window market share in Wisconsin stores versus control stores (Minnesota)	**Accomplished:** 11% increase in market share for Wisconsin compared to -2% for Minnesota	Program Administrator and Program Implementer

Data Management and Reporting

The Program data management system did not change in CY 2018 from the previous year. Focus on Energy used SPECTRUM to track Program data and to send incentive checks to participating manufacturers and retailers. The Program Implementer also used SPECTRUM to process customers' smart thermostat rebates after receiving online applications via the VisionDSM platform.

For measures other than smart thermostats, the Program Implementer's data processing team reconciled manufacturer invoices with a summary of point of sale data provided by the manufacturer.

Marketing and Outreach

The Program Implementer is primarily responsible for developing and executing Program marketing and reported that the majority of marketing activities in CY 2018 were similar to those in the prior year. According to the Program Implementer, in-store signage was the most important marketing technique used in CY 2018. The Program Implementer said its field representatives conducted approximately 1,000 retail store visits per month, during which they verify that products are sold at the prices agreed to in MOUs, place point of sale advertisements, help store personnel find prime locations for efficient light bulbs, and provide stores with in-store signage.

The Program Implementer also conducted a digital marketing campaign for all products (except APSs) that included social media and search engine advertisements. Focus on Energy supported Program outreach by providing an appliance marketplace where customers could shop for and compare products offered through the Retail Lighting and Appliance Program and the RPP.[67]

The Program Implementer said CY 2018 was the first year it was able to work with utilities to leverage customer lists to promote the smart thermostat incentive. The Program Implementer cited this change as a significant driver of increased smart thermostat participation relative to previous years (total units increased from 7,840 in CY 2017 to 11,074 in CY 2018). The Evaluation Team's participant survey indicated that the majority of participants learned about the Program on the Focus on Energy website, via word of mouth, or through direct Focus on Energy or utility communication. Since participants were likely driven to the website by direct communication or told of the incentives by someone who learned about them through direct communication, the survey findings support the Program Implementer's assessment that utility customers lists were a valuable marketing resource. (These results are discussed in more detail in the *Annual Results from Customer Satisfaction Surveys* section.)

The APS was the only product not broadly promoted through standard media and outreach channels. Instead, the Program Implementer delivered APSs through 85 pop-up retail events conducted in CY 2018. A pop-up retail event consisted of a portable retail outlet (such as a trailer) being set up in the parking lot of a building or complex with a large number of employees. The trailer would offer a limited number of LED models and a single APS model for sale, discounted through the Program. The Program

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[67] Focus on Energy. 2018. "Find Energy Saving Products Online." www.focusonsaving.com
The appliance marketplace was discontinued at the end of CY 2018 with the conclusion of RPP.

Implementer worked with the employer or building operator to promote the event within the building (for example, through posted flyers, an employee newsletter, or a general email) in advance of a scheduled short-term sales event.

LED Market Assessment

In CY 2017 the Evaluation Team began collecting data from retailer websites to assess current lighting prices, inform the process evaluation, and provide an understanding of the lighting market. The Team continued collecting data in CY 2018 using a web-based search tool to monitor Program and non-Program lamp inventory and pricing at participating and non-participating big box stores in Wisconsin to determine:

- Availability (number of models stocked) of Program and non-Program lamps at participating and non-participating retailers including incandescent, halogen, CFL, and LED in both standard and specialty forms.
- Regular and sales prices offered by retailers for both Program and non-Program lamps.

In CY 2017, the Team compared Program and non-Program LEDs within a participating retailer. In CY 2018, the Team compared LED prices and availability between a participating large, national-scale do-it-yourself (DIY) retailer and a similar nonparticipating competitor.

The Team did not compare Mass-Market retailers as in CY 2017 due to changes in the website layouts and presentation of the data on the websites. Product specifications and descriptions were difficult to extract from the data collected, particularly for the participating retailer. Poor data availability made it very difficult to compare like products between stores.

Data Collection

In CY 2018, the Team continued collecting data from stores that were included in the CY 2017 sample. – 20 stores from the participating DIY retailer and 14 stores from the nonparticipating DIY retailer. The Team collected all data on a bi-monthly basis. While this approach does not allow for quantification of sales, the Team has found that sales and the number of unique products available (unique model numbers) are highly correlated—that is, products with higher demand typically have more products to choose from as producers compete for customers. Models vary not only between brands and style or bulb type, but also by pack size, color temperature, and product features (dimmability, lifetime hours).

The Team reviewed the data for completeness. The key factors necessary for a successful analysis were:

- Prices (original and sale price)
- Availability for same day pick up
- Date of data collection
- Pack size
- Product identifier (store stock-keeping unit number, model number)

- Brand or manufacturer
- Bulb characteristics (base code, shape code, lumens, specialty type, ENERGY STAR certification, rated watts, color temperature, color rendering index, technology, average life hours)

The Team discarded data for products that were not comparable to Program bulb types (for example, linear tubes, appliance bulbs, colored bulbs, and holiday lights).

LED Market Characterization

The retailer data showed similar patterns in CY 2018 as in CY 2017. LEDs continue to have a strong presence in the market even without Program incentives. Table 153 compares the share of available products by technology, across all sampled stores, between the participating DIY retailer (DIY 1) and the nonparticipating competitor DIY retailer (DIY 2). This analysis averages product share and prices across Program-discounted and non-Program LEDs within each retailer.

Table 153. Share of Unique Products Between Participating and Nonparticipating DIY Retailers

Bulb Style	Technology	Share of Available Products – CY 2018	
		DIY 1	DIY 2
A-Line	CFL	9%	8%
	Halogen	15%	14%
	Incandescent	9%	13%
	LED	**66%**	**65%**
Decorative Candle	Halogen	17%	5%
	Incandescent	17%	45%
	LED	**66%**	**49%**
Globe	CFL	16%	0%
	Halogen	32%	14%
	Incandescent	5%	4%
	LED	**47%**	**82%**
Reflector	CFL	3%	1%
	Halogen	26%	24%
	Incandescent	14%	8%
	LED	**57%**	**66%**

The share of A-Line LEDs available is essentially the same between DIY 1 and DIY 2 retailers. This suggests that demand for A-Line LEDs remains high regardless of the presence of Program incentives.

DIY 2 retailer stores had higher shares of reflector and globe LEDs than DIY 1 stores, though DIY 1 stores had a larger share of decorative candle LEDs available. In both retailers, LEDs accounted for 47% or more of available products across bulb types. In CY 2017, LEDs represented 55% of available products at DIY 1 stores and only 23% at DIY 2 stores.

In addition to product availability, the Team compared the average price per bulb between DIY 1 and DIY 2 stores. The Team did not match model numbers from the Program tracking data to the data collected from the website and therefore did not account for Program incentives, except in cases when the price

on the website included Program incentives. Table 154 compares prices per bulb for A-line bulbs between DIY 1 stores and DIY 2 stores.

Table 154. Average A-Line Price per Bulb by Technology and Retailer

Retailer	Technology	February 2018		June 2018	
		Mean Price per Bulb	Median Price per Bulb	Mean Price per Bulb	Median Price per Bulb
DIY 1	CFL	$4.70	$3.67	$5.45	$5.37
DIY 2	CFL	$2.78	$1.80	$2.53	$2.74
DIY 1	Halogen	$4.92	$3.71	$2.25	$1.00
DIY 2	Halogen	$1.87	$1.69	$2.52	$2.82
DIY 1	Incandescent	$3.14	$1.99	$1.95	$1.25
DIY 2	Incandescent	$1.94	$1.38	$2.91	$2.99
DIY 1	LED	$7.29	$5.97	$4.94	$4.16
DIY 2	LED	$4.87	$3.52	$4.78	$3.18

The mean price-per-bulb of incandescent and halogen A-line bulbs was generally similar at both DIY 1 and DIY2 stores, ranging from almost $2 to almost $3 per bulb except in February at DIY1 stores.[68]

However, for A-line LEDs (including Program and non-Program bulbs), the mean and median price-per-bulb is consistently higher at participating DIY 1 stores than nonparticipating DIY 2 stores. The LED prices at DIY 1 stores are also higher than those the Team found in CY 2017, which ranged from $3.61 to $3.85 per bulb through CY 2017. In contrast, the mean prices observed at DIY 2 stores in CY 2018 were lower than those observed in CY 2017, which ranged from $5.82 to $6.70 per bulb.

Table 155 compares the prices of reflector bulbs. Again, prices for DIY 1 store did not explicitly account for Program incentives.

Table 155. Average Reflector Price-per-Bulb by Technology and Retailer

Retailer	Technology	February 2018		June 2018	
		Mean Price per Bulb	Median Price per Bulb	Mean Price per Bulb	Median Price per Bulb
DIY 1	CFL	$7.18	$6.49	$5.25	$5.25
DIY 2	CFL	$4.29	$4.29	$1.15	$1.15
DIY 1	Halogen	$7.61	$7.73	$6.71	$6.59
DIY 2	Halogen	$5.28	$5.26	$3.36	$2.24
DIY 1	Incandescent	$6.01	$5.49	$7.46	$7.97
DIY 2	Incandescent	$3.27	$2.93	$4.37	$4.48
DIY 1	LED	$7.95	$7.78	$5.76	$4.34
DIY 2	LED	$7.48	$7.08	$4.75	$4.00

[68] These data represent a snapshot of products on one day and product mix can fluctuate. Any one observation is not necessarily representative.

In CY 2018, CFL, halogen, and incandescent reflectors prices were considerably lower at DIY 2 stores than prices of equivalent technology reflectors at DIY 1 stores. On the other hand, there was little difference in LED prices between DIY 1 and DIY 2 stores (including program and non-Program bulbs).

While prices for LED reflectors were similar at both retailers, the CY 2018 prices represented a much sharper decrease for DIY 2 stores than for DIY 1 stores. In CY 2017, mean LED reflector prices at DIY 1 stores ranged from $6.58 to $8.66, which is about a dollar higher than prices in CY 2018. The CY 2017 mean LED reflector price at DIY 2 stores ranged from $10.15 to $11.43, three to five dollars higher than in CY 2018.

Annual Results from Customer Satisfaction Surveys

The Evaluation Team surveyed Retail Lighting and Appliance Program participants in CY 2018 to measure their satisfaction with three Program components:

- Retail smart thermostats
- Nest smart thermostats
- Pop-up retail

Respondents answered questions related to satisfaction and likelihood on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 indicated the lowest.

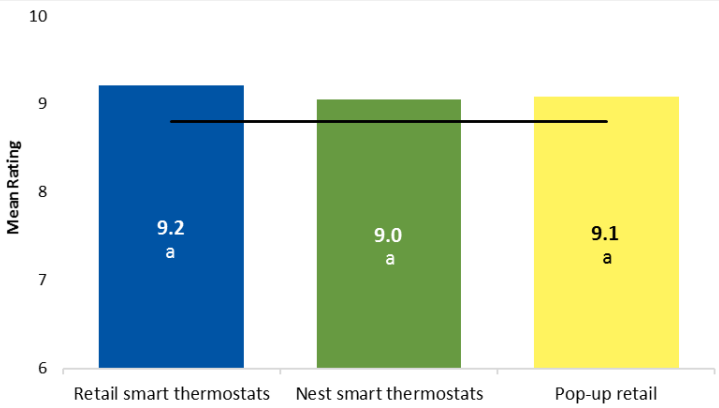
Customer Satisfaction with Program Components

Figure 63 shows the overall satisfaction ratings from Retail Lighting and Appliance Program participants for the three Program components. The CY 2018 average satisfaction ratings for all three components were statistically higher than the portfolio baseline of 8.8.[69] Satisfaction ratings for two of the Program components increased significantly from the CY 2017 surveys: retail smart thermostat ratings increased from 9.1 to 9.2 and pop-up retail ratings increased from 8.8 to 9.1.[70]

[69] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (specifically to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

[70] $p<0.10$ using binomial *t*-tests.

Figure 63. CY 2018 Overall Satisfaction with Retail Lighting and Appliance Program Components



Source: Smart Thermostat Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Focus on Energy Program?" (CY 2018 retail smart thermostats n=1,389, Nest smart thermostats n=299) and Pop-Up Retail Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Focus on Energy sale that you participated in?" (n=143)

[a] This result is statistically significantly different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 156 shows the average satisfaction and likelihood ratings for the retail and Nest smart thermostat Program components. In CY 2018, retail smart thermostat participants gave statistically higher ratings than they had in CY 2017 for all questions: satisfaction with upgrades (9.2 up from 9.1), incentives (8.8 up from 8.6), likelihood of recommending the Program (9.6 up from 9.4), and making more improvements (8.0 up from 7.7). CY 2018 was the first year Nest smart thermostat participants were surveyed, and their average ratings were within 0.1 of retail smart thermostat participants on all rated items except the incentive (8.5 for Nest, 8.8 for retail). Nest participants also rated their satisfaction with the process of obtaining and redeeming the coupon incentive highly (both 9.5).

Table 156. CY 2018 Average Ratings for Retail and Nest Smart Thermostats

Item	CY 2017 Retail Smart Thermostats	CY 2018 Retail Smart Thermostats	CY 2018 Nest Smart Thermostats
Satisfaction with upgrade	9.1	9.2[a]	9.2
Satisfaction with incentive	8.6	8.8[a]	8.5
Satisfaction with obtaining coupon	Not applicable		9.5
Satisfaction with redeeming coupon			9.5
Likelihood of making more improvements	7.7	8.0[a]	8.1
Likelihood of recommending the Program	9.4	9.6[a]	9.5

[a] This result is statistically significantly different from the result for CY 2017 (p<0.05 using a binomial t-test).

Table 157 shows the average satisfaction and likelihood ratings for the pop-up retail component of the Program. In CY 2018, there were statistically significant improvements in ratings for the event purchase experience (9.0, up from 8.3) and likelihood of recommending the Program (9.2, up from 8.7).

Table 157. CY 2018 Average Ratings for Pop-Up Retail Events

Item	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.0	9.1
Satisfaction with event purchase experience	8.3	9.0[a]
Likelihood of making more improvements	7.0	7.2
Likelihood of recommending the Program	8.7	9.2[a]

[a] This result is statistically significantly different from the result for CY 2017 ($p<0.05$ using a binomial t-test).

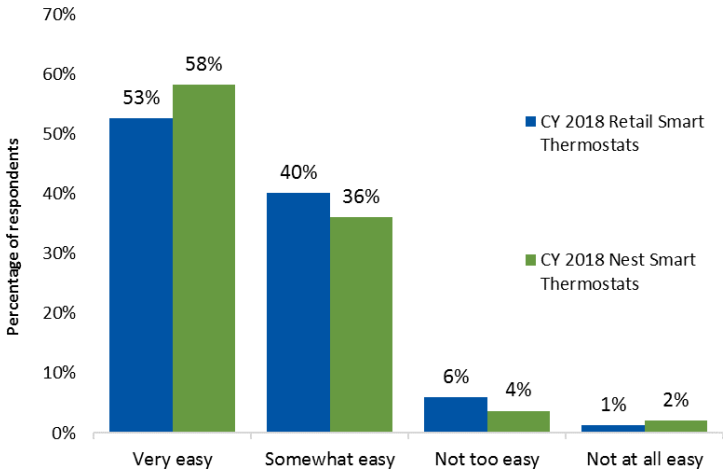
Net Promoter Scores

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 the percentage of detractors (respondents giving a rating of 0 to 6). The retail smart thermostats NPS was +87 in CY 2018, similar to +82 in CY 2017, while the NPS for Nest smart thermostats was +85 in CY 2018. The pop-up retail NPS was +70 in CY 2018, increasing from +58 in CY 2017.

Measure Installation: Smart Thermostats and Advanced Power Strips

Smart thermostat survey respondents were asked how easy it was to install their smart thermostat. Figure 64 indicates that more than half of participants in both smart thermostat Program components rated their smart thermostat as *very easy* to install, and only 6% (Nest) or 7% (retail) reported that it was either *not too easy* or *not at all easy*. These results were very similar to CY 2017 results from retail smart thermostat participants.

Figure 64. CY 2018 Retail and Nest Smart Thermostat Customers' Ease of Installing Thermostat

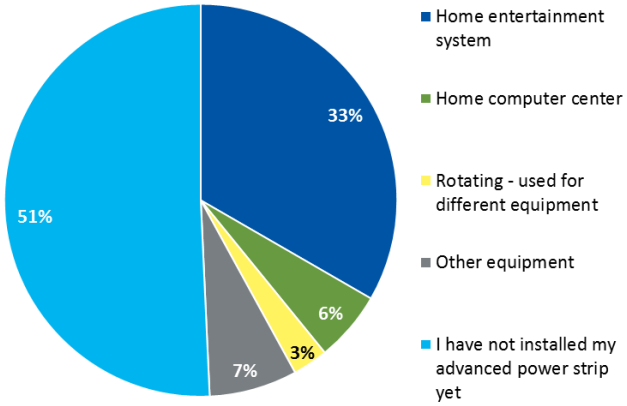


Source: Smart Thermostat Ongoing Participant Satisfaction Survey Question. "How easy was it to install your smart thermostat?" (CY 2018 retail smart thermostats n=1,337, Nest smart thermostats n=297)

Pop-up retail customers who purchased APSs were asked what equipment they had plugged into the strip (Figure 65). Half (51%) had not started using their power strip by the time they were surveyed, which was similar to the CY 2017 results (50% not installed). Home entertainment systems were by far the most common type of equipment plugged into power strips purchased through the Program (33%),

to an even greater extent than in CY 2017, when this was the most commonly cited equipment but was only mentioned by 19%.

Figure 65. CY 2018 Pop-Up Retail Customers' Advanced Power Strip Installation



Source: Pop-Up Retail Ongoing Participant Satisfaction Survey Question. "If you purchased an advanced power strip, what equipment is it plugged into?" (CY 2018 n=69)

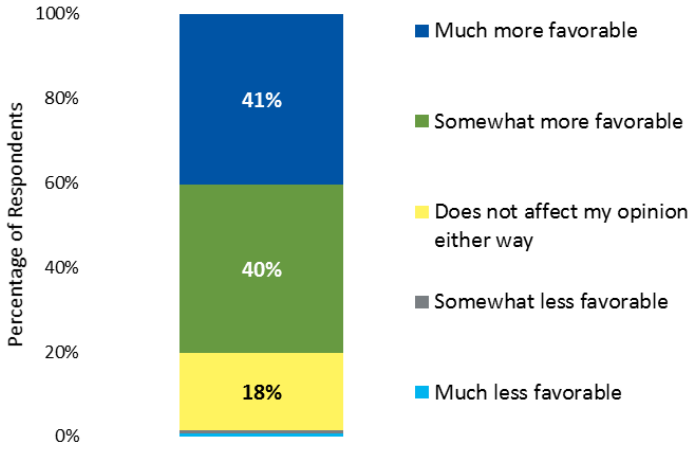
Pop Up Retail: Awareness of Lighting Discounts

The Evaluation Team asked pop-up retail survey respondents if they were aware that Focus on Energy offered instant discounts on lighting from participating retailers, and only 21% (n=139) of CY 2018 respondents were aware of the discounts, similar to 24% who were aware in CY 2017. Pop-up retail participants were also asked about their previous efficient lighting purchases, and 11% of CY 2018 respondents (n=139) had previously purchased lighting online. In CY 2017, a similar 10% had previously purchased lighting online.

Retail Smart Thermostats: Effect of Program on Opinion of Utilities, Purchase Decisions, Preferred Communications

CY 2018 retail smart thermostat participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 41% gave the highest rating of *much more favorable* (Figure 66). Just 18% said that their opinion was not affected, and only 2% of survey respondents (20 of 1,332) reported that their opinion of their utility had become *somewhat less favorable* or *much less favorable*.

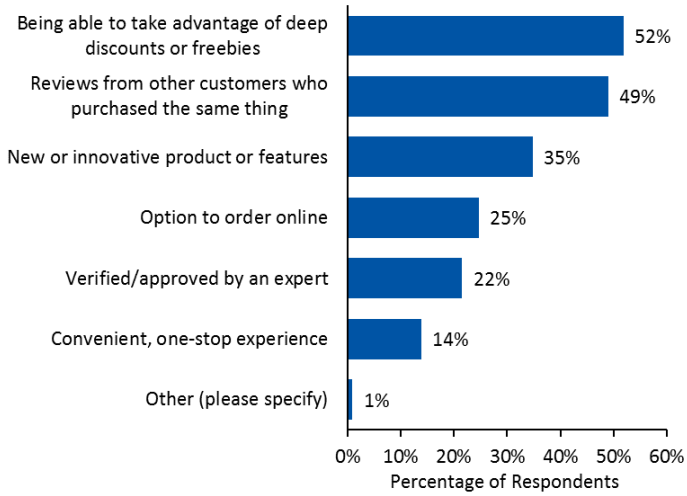
Figure 66. CY 2018 Effect of Focus on Energy Offerings on Retail Smart Thermostat Participants' Opinion of Utilities



Source: Retail Smart Thermostat Ongoing Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (CY 2018 n=1,322)

Retail smart thermostat participants identified the two factors they value most in making purchase decisions (Figure 67). The most frequent response was deep discounts and freebies (52%), followed closely by reviews from other customers (49%).

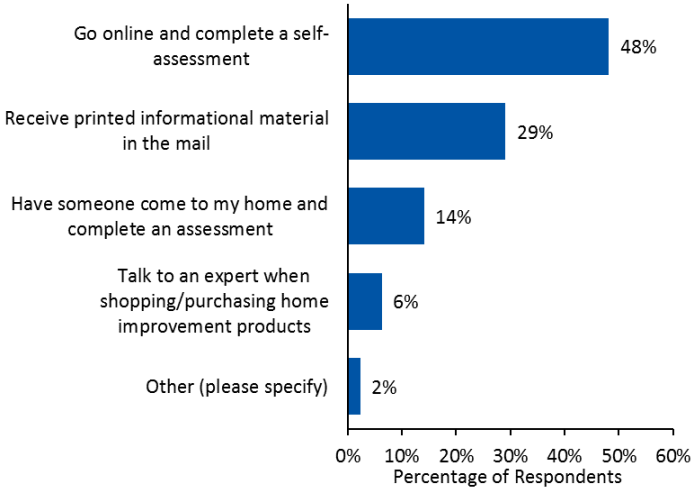
Figure 67. CY 2018 Retail Smart Thermostat Participants' Most Valued Factors in Purchase Decisions



Source: Retail Smart Thermostat Ongoing Participant Satisfaction Survey Question. "What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below." (CY 2018 n=1,361)

Retail smart thermostat participants also answered how they most preferred to learn about opportunities to improve the energy efficiency of their homes (Figure 68). The two top responses were online self-assessments (48%) and printed material in the mail (29%).

Figure 68. CY 2018 Retail Smart Thermostat Participants' Preferred Methods for Learning about Energy Efficiency Opportunities



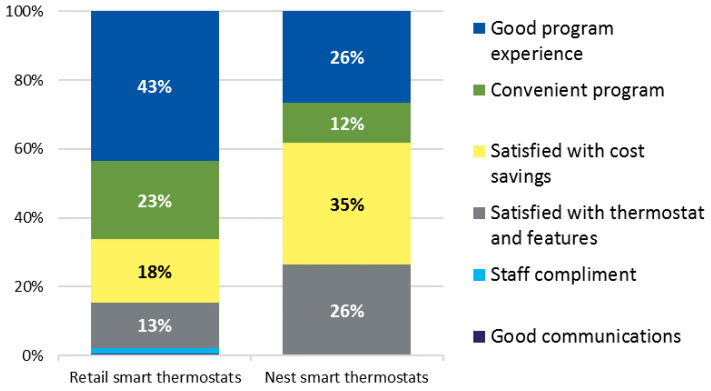
Source: Smart Thermostat Ongoing Participant Satisfaction Survey Question. "How would you most prefer to identify opportunities to improve the energy efficiency of your home?" (CY 2018 n=1,253)

Customer Suggestions for Improvement

During the ongoing participant satisfaction surveys, the Evaluation Team asked respondents if they had any comments or suggestions for improving the Program. Of the 1,407 participants who responded to the retail smart thermostat survey, 331 (24%) provided open-ended feedback, which the Evaluation Team coded into a total of 346 mentions. Of these mentions, 175 (51%) were positive or complimentary comments, and 171 (49%) were suggestions for improvement. Of the 308 participants who responded to the Nest smart thermostat survey, 58 (19%) provided open-ended feedback, which the Evaluation Team coded into a total of 66 mentions. Of these mentions, 34 (52%) were positive or complimentary comments, and 32 (48%) were suggestions for improvement.

Positive comments about smart thermostats are shown in Figure 69. For retail smart thermostat participants, the most common comments were about a generally positive experience (43%), followed by convenience (23%) and cost savings (18%). In contrast, Nest smart thermostat participants were more likely to mention cost savings (35%) and the features of the thermostat (26%).

Figure 69. Positive Comments about CY 2018 Retail and Nest Smart Thermostat Components

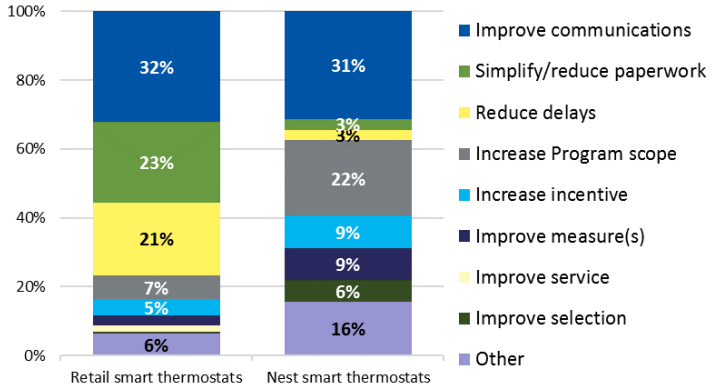


Source: Smart Thermostat Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any additional suggestions for improvement." (Retail smart thermostats CY 2018 n=175, Nest smart thermostats CY 2018 n=34)

Suggestions for improving the smart thermostat components of the Retail Lighting and Appliance Program are shown in Figure 70. Improving communications about the Program was the most common suggestion from both retail smart thermostat (32%) and Nest smart thermostat (31%) participants. Among retail smart thermostat participants, the second and third most frequent suggestions were to reduce or simplify the rebate paperwork (23%) and to reduce delays in approval and payment of rebates (21%), issues which were rarely mentioned by Nest smart thermostat participants (each 3%). In contrast, Nest smart thermostat participants were more likely to suggest increasing the Program scope (22%) compared to retail smart thermostat participants (7%).

Suggestions for improving communications included increasing awareness by marketing the rebate more widely, improving the navigability of the website, and providing more and better follow up on applications and customer inquiries. Some Nest smart thermostat participants also specifically mentioned confusion over the Program's Google Home Mini offer. Similar to CY 2017, retail smart thermostat participants' suggestions about simplifying the rebate documentation frequently referred to difficulties uploading receipts to the website and to the Program's acceptance of electronic proofs of purchase. Nest smart thermostat participants who wanted the Program scope increased generally suggested to provide rebate coupons for additional equipment such as lighting and smart devices, and for more brands of smart thermostat than just Nest.

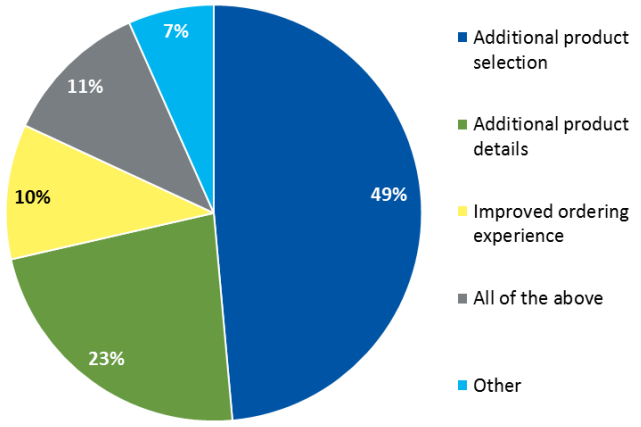
Figure 70. CY 2018 Suggestions for Improving Retail and Nest Smart Thermostat Components



Source: Smart Thermostat Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any additional suggestions for improvement." (Retail smart thermostats CY 2018 n=171, Nest smart thermostats CY 2018 n=32)

The Evaluation Team asked pop-up retail respondents how their online experience could have been improved. More than one-third (39%; n=144) selected the response option *nothing needed improvement* (compared to 29% giving this response in CY 2017). The remaining 88 respondents made 105 suggestions, shown in Figure 71. As in CY 2017 (35%), but mentioned more frequently, offering additional product selection was the most frequent suggestion in CY 2018 (49%). Providing more detailed information about products was the second-most frequently mentioned suggestion in both years, with the proportion of these suggestions increasing from 14% in CY 2017 to 23% in CY 2018. Meanwhile, only 10% in CY 2018 suggested to improve the ordering experience, a decline from 25% in CY 2017.

Figure 71. CY 2018 Pop-Up Retail Customers' Suggestions for Improving the Event Experience

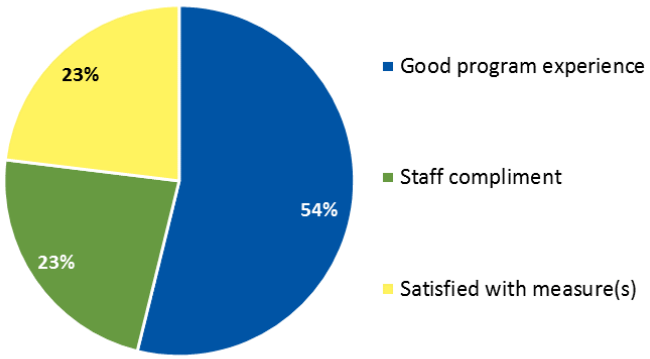


Source: Pop-Up Retail Ongoing Participant Satisfaction Survey Question. "How could the event experience have been improved for you?" (n=105 mentions)

Of the 144 participants who responded to the pop-up retail survey, 36 (25%) provided open-ended feedback, which the Evaluation Team coded into 34 total mentions. Of these mentions, 13 (38%) were positive or complimentary comments, and 21 (62%) were suggestions for improvement.

Positive comments about the pop-up retail event are shown in Figure 72, with most comments reflecting a generally positive Program experience (54%), followed by satisfaction with the measures purchased (23%) and with event staff (23%). These CY 2018 results were very similar to results in CY 2017.

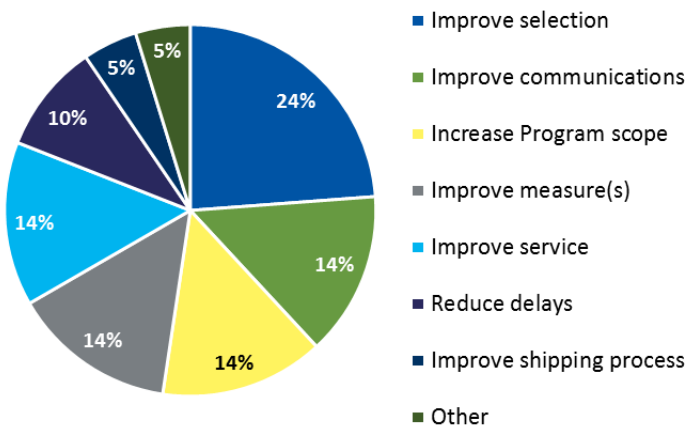
Figure 72. CY 2018 Positive Comments about Pop-Up Retail Event



Source: Pop-Up Retail Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience or any additional suggestions for improvement." (CY 2018 n=13 positive mentions)

Suggestions for improving pop-up retail events are shown in Figure 73; the most frequent suggestion was to improve the product selection (24%), which was mentioned more frequently in CY 2018 than in CY 2017 (4% of 46 suggestions for improvement). In CY 2017, 50% of these suggestions had involved reducing delays in placing and picking up orders, which was only cited in 10% of CY 2018 suggestions. Secondary suggestions in CY 2018 included improving communications, increasing the Program scope, improving the products offered, and improving service (each mentioned by three respondents; 14%).

Figure 73. CY 2018 Suggestions for Improving Pop-Up Retail Event



Source: Pop-Up Retail Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience or any additional suggestions for improvement." (CY 2018 n=21 suggestions for improvement)

Smart Thermostat and Advanced Power Strip Participant Surveys

The Evaluation Team surveyed participants who received a Program rebate for a smart thermostat or who purchased a discounted APS through a Program pop-up retail event in CY 2018. The Team used the survey to collect data on three topics related to the process evaluation:

- Awareness and motivation for purchase
- Product experience and practices
- Satisfaction with different aspects of the measure and the Program experience

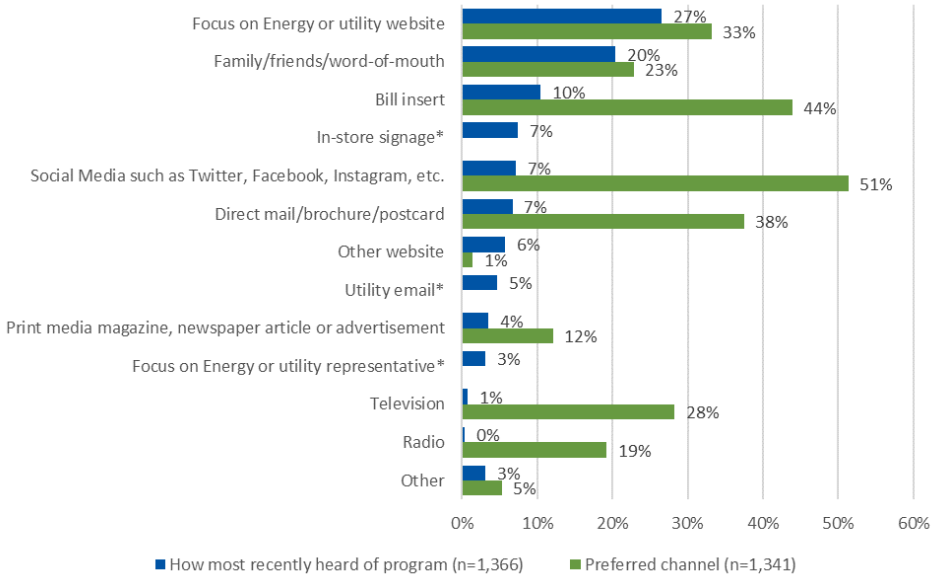
Smart Thermostats

The Evaluation Team collected responses from 1,429 smart thermostat participants, representing 20% of the 7,048 participants through August 2018.

Awareness and Motivation

Respondents mentioned a variety of sources as the most recent way they learned about the Program, with no single channel being mentioned by more than 27% of respondents. As shown in Figure 74, Focus on Energy or a utility website was mentioned the most frequently, followed by word of mouth or a utility bill insert. Figure 74 also shows how respondents would prefer to learn about energy efficiency programs. Respondents most frequently chose social media, followed by a bill insert or direct mail from the utility.

Figure 74. Awareness Channels for Smart Thermostat Rebates

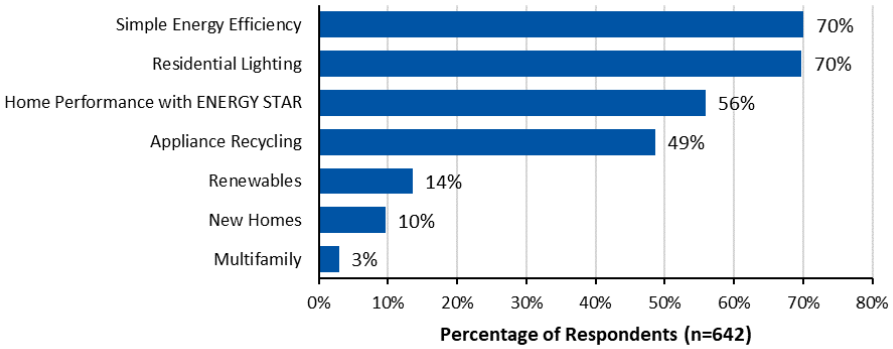


Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question I1. "Where did you most recently hear about Focus on Energy's smart thermostat rebates?" and Question I3. "What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs?" Multiple responses allowed.

* These response options were not listed in Question I3.

Survey respondents also indicated their awareness of other Focus on Energy programs. Of 664 respondents that answered the question, 642 (97%) were aware of at least one program. As shown in Figure 75, those respondents who were aware of another Focus on Energy program were most likely to be aware of Simple Energy Efficiency and Retail Lighting (70% each) and least likely to be aware of the Renewable Rewards Program (14%), the New Homes Program (10%), and the Multifamily Program (3%).

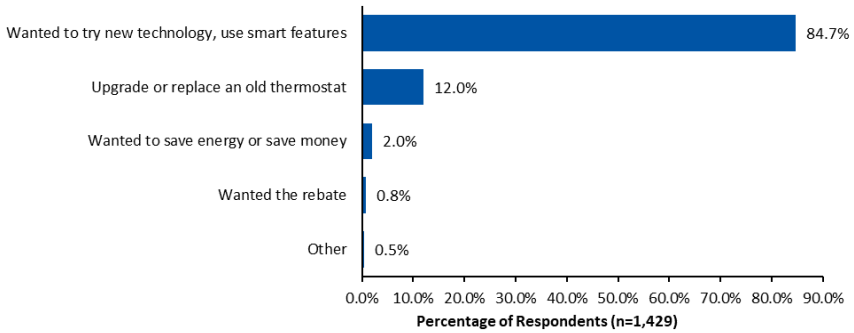
Figure 75. Smart Thermostat Participants' Awareness of Focus on Energy Programs



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question H2. "Which [Focus on Energy] programs or rebates are you aware of?"
Note: Reported percentages are based on the number of respondents who were aware of other Focus on Energy programs, not on total survey respondents.

The great majority of respondents (85%) purchased a smart thermostat because they were interested in the smart features, such as being able to control the thermostat when they were away from home. As shown in Figure 76, another 12% of respondents wanted to replace a broken or older thermostat, 2% wanted to save energy or save money, and just over 1 % were motivated by the rebate or listed some other reason.

Figure 76. Motivation for Purchasing a Smart Thermostat

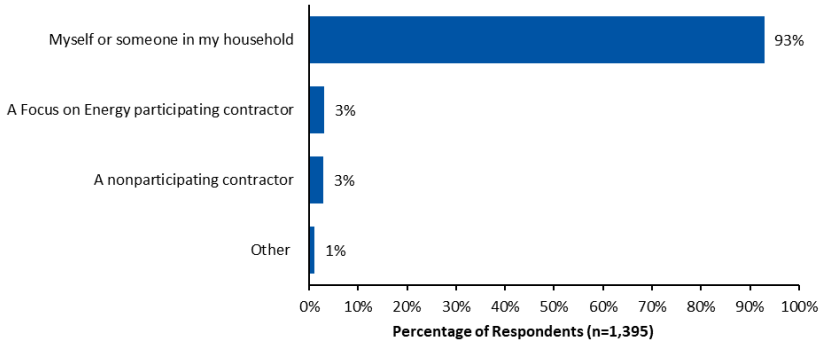


Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question D1. "What was the main reason you purchased a new smart thermostat?"

Product Experience

Overall, respondents reported few difficulties installing or using their smart thermostat. As shown in Figure 77, the great majority of respondents installed the smart thermostat themselves.

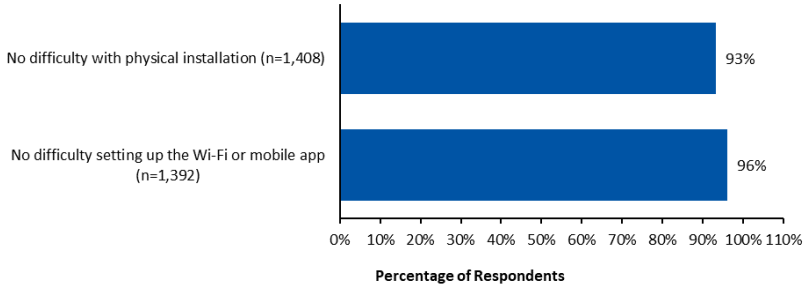
Figure 77. Smart Thermostat Installer



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question D7. "Who installed the new thermostat(s)?"

As shown in Figure 78, over 90% of respondents had no difficulty with either the physical installation or with setting up the Wi-Fi or mobile app. The rate of difficulty was slightly higher among those who worked with a third party to install their thermostat: 15% of respondents with third-party installs, compared to 5% of those who self-installed, had trouble with physical installation and 9% of those with third-party installs, compared to 4% of those who self-installed, had difficulty setting up the Wi-Fi or mobile app. Comments indicated that respondents often used a third-party if they had a particularly difficult installation scenario (such as need new wiring) or as an attempt to resolve a problem they experienced trying to install the unit themselves. As one respondent reported, "After installation the device worked with AC but not heat. I contacted [the manufacturer] for resolution—but received none. I also paid an HVAC company and they worked with [the manufacturer] and were unable to resolve the issue."

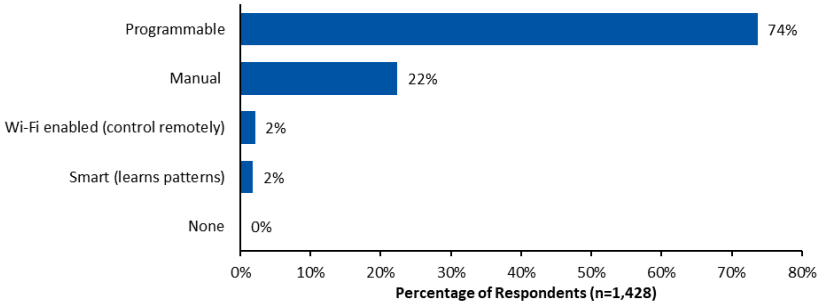
Figure 78. Difficulty with Installation and Set-Up



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question D12 "Did you have any difficulty physically installing your new thermostat?" and Question D15. "Have you had any difficulty setting up or using an electronic device to control your thermostat?"

Figure 79 shows that 78% of respondents used their smart thermostat to replace some kind of programmable thermostat (traditional programmable, Wi-Fi enabled, or smart). Just under one-quarter of respondents (22%) replaced a manual thermostat.

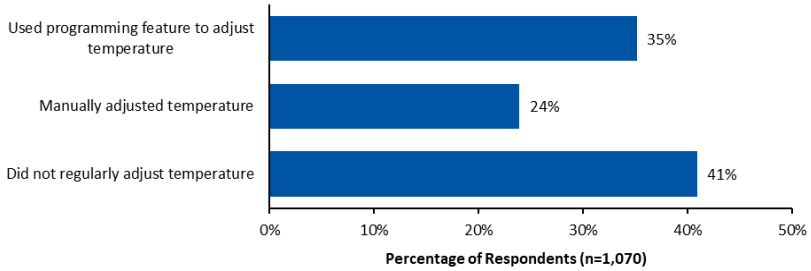
Figure 79. Type of Thermostat Replaced



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question D9. "What kind of thermostat did you use before?"

Although most respondents had programming capability in their previous thermostat, only 35% of respondents reported using those programming features to control temperature adjustments. Another 24% adjusted their thermostat manually, while 41% did not regularly adjust their temperature at all (Figure 80).

Figure 80. Temperature Adjustment Practices Used with Previous Thermostat

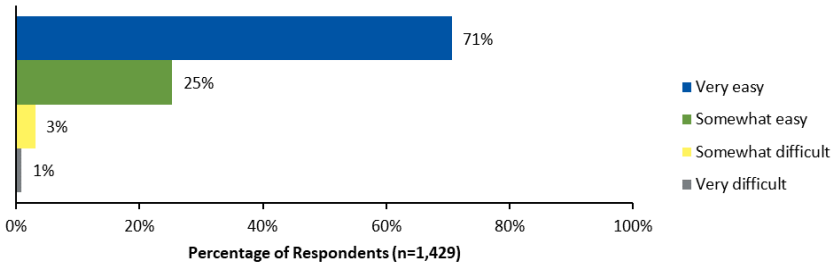


Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question D10. "With your previous thermostat, did you regularly adjust your home's temperature based on your daily schedule? (For example, did you regularly change the temperature when you were at work or asleep?)" and Question D11. "Did you manually adjust your previous thermostat or did you use the thermostat programming features to control the temperature?"

Program Experience and Satisfaction

Respondents generally reported having an easy and satisfying experience with the Program. As shown in Figure 81, 96% of respondents reported that the rebate process was either *very easy* or *somewhat easy*.

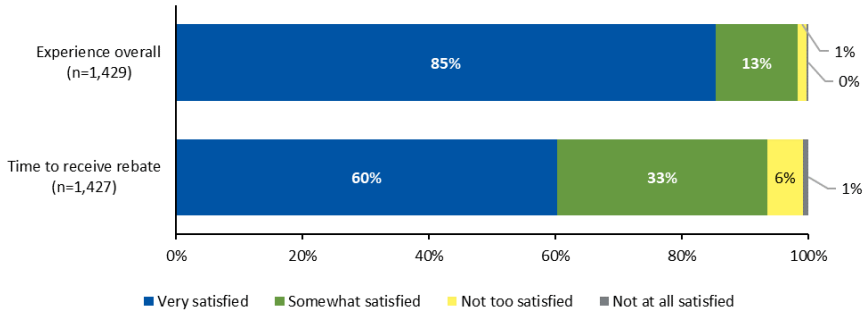
Figure 81. Ease of Rebate Application Process



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question G1. "How easy was it to fill out the application for your smart thermostat rebate?"

Figure 82 shows respondent satisfaction with each of four key Program components. While over 93% of respondents were either *very satisfied* or *somewhat satisfied* with each component, the time to receive the rebate was the least likely to receive a rating of *very satisfied* and the most likely to receive a rating of *not too satisfied* or *not at all satisfied*. However, the tracking data shows that 78% of respondents received the rebate within the 10-week window listed on the rebate application form, and the average time to submit payment was 55 days after receiving the application.

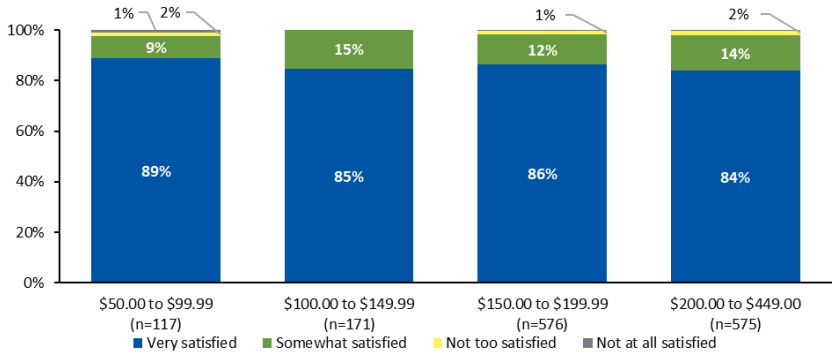
Figure 82. Satisfaction with Program Components



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question G4. "How satisfied were you with how long it took to receive your rebate?" and Question G6. "How satisfied are you overall with your experience to purchase and use a smart thermostat and receive a rebate?"

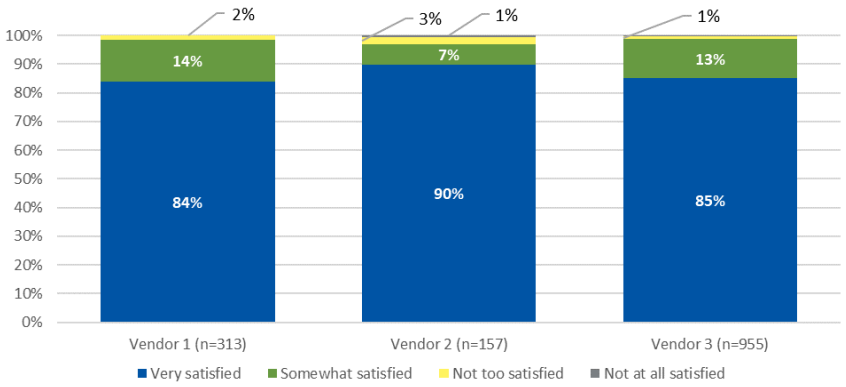
The Evaluation Team analyzed overall satisfaction by price point (Figure 83) and by brand (Figure 84) and found that satisfaction levels had virtually no variation across either of these factors.

Figure 83. Satisfaction by Retail Price Point



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question G6. "Overall, how satisfied are you with the smart thermostat you purchased?"

Figure 84. Overall Satisfaction by Brand



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question G6. "Overall, how satisfied are you with the smart thermostat you purchased?"

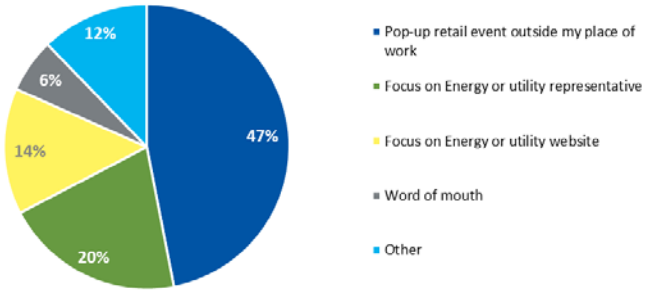
Advanced Power Strips

The Evaluation Team surveyed 52 APS respondents, representing 6% of the 835 participants through August 2018.

Awareness and Motivation

Figure 85 shows that nearly half (47%) of respondents learned about the APS offering through a pop-up retail event at their employer location. Respondents who learned about the Program from a Focus on Energy or utility representative may also be referring to retail staff at the event at their place of work. Respondents did not mention traditional marketing channels such as television, radio, or social media, which conforms to the marketing strategy for APSs: the Program Implementer did not use traditional mass market channels since the APS discounts were not broadly available.

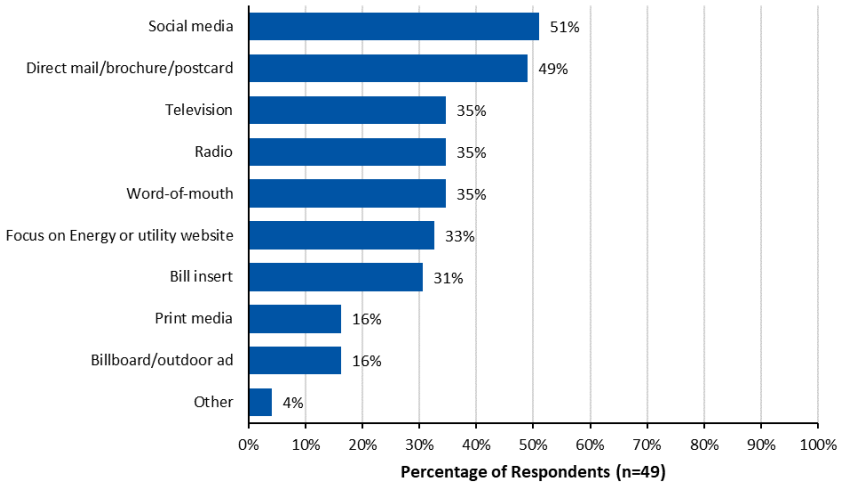
Figure 85. Awareness Channels for Advanced Power Strips



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question I1. "Where did you most recently hear about Focus on Energy's advanced power strip rebates?" (n=49)

When asked how they would prefer to receive notices and information from Focus on Energy, respondents most commonly indicated social media or direct mail. Most of the most-commonly selected options are not suitable for a pop-up retail event that is not open to the general public. Figure 86 shows all channels mentioned by respondents, and the percentage of respondents who mentioned them.

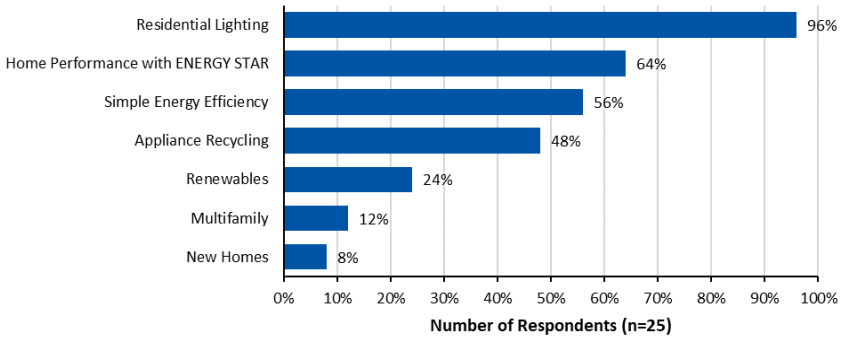
Figure 86. Preferred Communication Channels



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question I3. "What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs?" Multiple responses allowed.

Survey respondents indicated their familiarity with other Focus on Energy programs. Of 29 respondents that answered the question, 25 (86%) were aware of at least one program. As shown in Figure 87, respondents were most likely to be aware of Retail Lighting (96%) and least likely to be aware of the Multifamily Program (12%) and the New Homes Program (8%).

Figure 87. Participants Awareness of Focus on Energy Programs



Note: Reported percentages are based on the number of respondents who were aware of other Focus on Energy programs, not on total survey respondents.

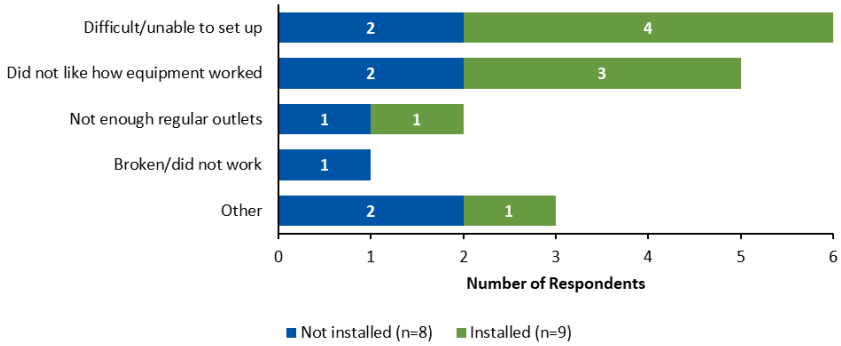
Product Experience

According to survey results, most respondents used their APS and had no difficulty. However, of those currently using their APS, 21% reported some difficulty using it. In addition, 19% of respondents said their APS was not installed: either they had never installed it or they had uninstalled it.

As shown in Figure 88, two respondents who did not currently have the APS installed and four who were using the APS reported having difficulty setting it up. Another five respondents (two who were not using the APS and three who were using the APS) said they did not like how the equipment worked when

connected to the APS. Others said the APS did not have enough regular outlets, did not work, or that they had some other difficulty. These results parallel survey results from participants who received an APS through the Simple Energy Efficiency Program or Connected Devices Kits Program (see the *Advanced Power Strips* section).

Figure 88. Difficulties Using the Advanced Power Strips



Source: CY 2018 Smart Thermostat and Advanced Power Strip Participant Survey Question B3. "Why did you not use the advanced power strip you received?" and Question B7. "Have you had any difficulty using the smart strip to operate your electronics?"

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 158 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for Retail Lighting and Appliance Program.

Table 158. Retail Lighting and Appliance Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$10,543,539	$9,197,123	$8,439,351	$8,299,005

The Evaluation Team found that the CY 2018 Retail Lighting and Appliance Program was cost-effective (5.26). Table 159 lists the evaluated costs and benefits.

Table 159. Retail Lighting and Appliance Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$314,326	$1,042,219	$982,240	$772,876
Delivery Costs	$3,808,798	$2,376,723	$2,239,945	$1,762,503
Incremental Measure Costs	$22,928,942	$16,425,723	$27,050,675	$7,799,306
Total Non-Incentive Costs	**$27,052,066**	**$19,844,664**	**$30,272,860**	**$10,334,685**
Benefits				
Electric Benefits	$119,237,465	$97,771,265	$115,493,355	$80,312,783
Gas Benefits	$1,998,382	$1,171,688	$0	$0
Emissions Benefits	$20,997,527	$16,756,088	$20,972,436	$16,566,153
Total TRC Benefits	**$142,233,373**	**$115,699,041**	**$136,465,790**	**$96,878,936**
Net TRC Benefits	**$115,181,307**	**$95,854,377**	**$106,192,931**	**$86,544,251**
TRC B/C Ratio	**5.26**	**5.83**	**4.51**	**9.37**

Retail Products Platform

The Program Administrator joined the RPP as a pilot in the summer of CY 2016 and continued to operate the RPP through CY 2018. The RPP is a nationwide, midstream collaboration between energy efficiency Program sponsors—such as Focus on Energy—participating retailers, and the EPA. As a market transformation initiative, the RPP's ultimate goal is to encourage retailers to promote energy-efficient products on their own by encouraging increased supply and demonstrating consumer demand for energy efficiency in the market place. The Pilot operates under short- and long-term programmatic goals:

- The immediate goal of the RPP is to increase sales of ENERGY STAR products.
- Longer-term, the RPP is intended to allow energy efficiency Program sponsors to capture energy savings from the increased sales, and to find Program and incentive delivery efficiencies by collaborating nationwide on data management, product specification, marketing and outreach, and EM&V.

The Retail Lighting and Appliance Program Implementer managed Focus on Energy's RPP activities.

Retail Products Platform Design

The RPP is a nationally coordinated Program led by the EPA. Program sponsors jointly decide on eligible measures and coordinate with retailers to source and sell those models. Program sponsors each implement the agreed-upon Program in their own territory, including marketing and providing incentives to retailers to stock the eligible products. Unlike the Retail Lighting and Appliance Program, the RRP has a midstream structure in that incentives are given to retailers to encourage them to stock a wider variety of ENERGY STAR–certified models (and are not intended as a per-unit discount for the customer).

The RPP accelerates and expands stocking of energy-efficient appliances by engaging directly with key, national-level retailer decision makers. In the long term, the RPP is intended to transform the market such that the purchase of efficient appliances becomes standard practice.

In Wisconsin, efficient products were sold at 149 stores in CY 2018, including the following outlets:

- Best Buy (22)
- Home Depot (27)
- Lowes (8)
- Kmart (13)
- Sears (10)
- Independent retailers (69)

Program Changes

ENERGY STAR made few changes to the RPP Program delivery or design during CY 2018, and instead continued to integrate a retail partner and several new products added in CY 2017. The Program did add additional Program sponsors in CY 2018, with five additional utility sponsors in Maryland and two in Connecticut.

While the national RPP initiative selects measures that can be offered through the Program, individual sponsors select which of those measures they will offer within their jurisdiction. In Wisconsin, the Program Implementer added a dehumidifier as a new measure in CY 2018. Table 160 shows the products incented through the RPP in CY 2018.

Table 160. Retail Products Platform Qualifying Products and Specifications in CY 2018

Qualifying Product	Tier	Specification
Soundbar	Basic	ENERGY STAR v3 + 15%
	Advanced	ENERGY STAR v3 + 50%
Air Cleaner	Basic	ENERGY STAR v1.2 + 30%
	Advanced	ENERGY STAR v1.2 + 50%
Dehumidifier	Basic	ENERGY STAR level
	Advanced	2018 Most Efficient Level
Freezer	Basic	ENERGY STAR v5
	Advanced	ENERGY STAR v5 + 5%
Electric Dryer	Basic	ENERGY STAR v1
	Advanced	ENERGY STAR Most Efficient 2017
Room Air Conditioner	Basic	ENERGY STAR v4
	Advanced	ENERGY STAR V4 + connectivity
Clothes Washer	Basic	ENERGY STAR Most Efficient 2017
	Advanced	ENERGY STAR Most Efficient 2017 + 5%
Refrigerator	Basic	ENERGY STAR v5
	Advanced	ENERGY STAR Most Efficient 2017

Program Management and Delivery Structure

There were no changes to the RPP management or delivery structure in CY 2018. Program partners meet in a regular workgroup to decide about measure offerings and incentive levels and to receive updates from participating retailers. The EPA initiated and facilitates the RPP, and the consultant Navitas

manages the day-to-day activities of the workgroup, including communication with retailers. The Program Implementer represents Focus on Energy at these workgroup meetings.

Program Goals

Although the RPP Pilot has no formal savings goal, the Program Implementer tracked eight KPIs in CY 2018. As shown in Table 161, the Program Implementer accomplished seven of these goals, including continuing participation in the pilot, adding one product (a dehumidifier), adding a major retailer, conducting shelf surveys, cross-promoting the Program, and increasing traffic to the appliance marketplace. However, the Program Implementer was not able to reduce the bounce rate from the appliance marketplace by 5%; instead, the bounce rate increased by nearly 4%.

Table 161. CY 2018 Retail Products Platform Key Performance Indicators

KPI	Measurement	Results	Info Source
Continue to participate in the nationally coordinated ENERGY STAR RPP	Measured by continued participation	**Accomplished:** Maintained participation through December 31, 2018 on all task forces representing Focus on Energy and led action items for each sponsor during task force call	Program Administrator and Program Implementer
Add one product to the RPP	Measured by products added	**Accomplished:** Added dehumidifiers on April 1, 2018 and included updates to website, an appliance brochure, and final portal configuration	Program Administrator and Program Implementer
Add one retail partner and review budget to determine if second optional retail partner can be added	Measured by new retail partners	**Accomplished:** Lowe's was added as a participating retailer and provided final store list for portal configuration. Received site visits by Program representatives. Discussion was initiated with the Program Administrator in July 2018 regarding an additional retailer	Program Administrator and Program Implementer
Conduct shelf surveys across products being promoted through the RPP to recommend Program adjustments based on market conditions	Measured as reporting to Program Administrator and Program Evaluator when shelf surveys have been completed; being available for questions on shelf data and requests for additional data collection	**Accomplished:** Surveys completed in Q2 2018.	Program Administrator and Program Implementer
Provide year-end reporting by percentages to key Trade Ally partners to highlight their contribution to Program energy savings	Measured as report being provided by December 31, 2018 that includes total qualified units rebated and incentives paid for the year	**Accomplished:** Reporting completed via portal Q4 2018.	Program Administrator and Program Implementer

KPI	Measurement	Results	Info Source
Increase traffic to the Focus on Energy Appliance Marketplace online tool by 10% in CY 2018	Measured by increased traffic to Appliance Marketplace	**Accomplished:** There was a 49% increase in page views from 12,832 in CY 2017 to 19,119 in CY 2018, and an average increase in the Facebook click-through rate from 0.8% in CY 2017 to 1.04% in CY 2018 (and different ad formats were included)	Program Administrator and Program Implementer
Through enhancements to the Appliance Marketplace, reduce the bounce rate by at least 5% for CY 2018	Measured by bounce rate	**Not Accomplished:** The bounce rate was 64.3% in CY 2017 and increased to 68.11% in CY 2018	Program Administrator and Program Implementer
Promote the RPP and other Focus on Energy programs through cross-promotion and utility coordination by deploying two promotions in CY 2018	Measured by promotions	**Accomplished:** Partnered with utilities for Memorial Day and Father's Day campaigns and updated the RPP brochure to include Appliance Recycling Program	Program Administrator and Program Implementer

Data Management and Reporting

RPP unit-level sales data are tracked in SPECTRUM. Retailers upload sales data directly to a portal, from which the Program Implementer can access shipment data and review data imported by the retail partner before uploading it to SPECTRUM. In CY 2018, the Program sponsors adopted a nationwide change to data collection. In response to retailer data security concerns, the retailer brand name is no longer included in Program tracking data for sales of products not incented through the Program.

Marketing and Outreach

The Program Implementer conducts marketing and outreach for the RPP using a combination of digital and in-store methods and in coordination with the Retail Lighting and Appliance Program marketing. The RPP in-store materials include signage and a comprehensive RPP brochure, which cross-promotes other Focus on Energy programs, including the Retail Lighting and Appliance Program product discounts and the Appliance Recycling Program. The RPP sales materials have the same branding as the Retail Lighting and Appliance Program sales materials. When Retail Lighting and Appliance Program field representatives visit RPP participating stores, they also install RPP signage and discuss RPP products with retail staff and customers.

The Program Implementer also conducts digital and social media advertising for ENERGY STAR–certified products generally, and for specific products offered through the Program. Additionally, Focus on Energy marketed the RPP through the appliance marketplace, as described above. In CY 2018, the Program Implementer changed the marketing strategy by eliminating all direct mail and bill insert ads and focusing on digital and in-store ads.

Savings Analysis

The Program theory holds that by increasing the sales of energy-efficient models over less efficient models, RPP will generate energy and demand savings for utility customers in the short-, mid-, and long-terms, while also transforming the overall market toward higher efficiency in the long-term.

The Team developed a forecast model to measure Program impact using pre-Program sales and market shares to forecast baseline efficient unit savings. Because the RPP operates as a market transformation program rather than a resource acquisition program, the Evaluation Team did not evaluate gross and net savings in the traditional sense for resource acquisition programs. Instead, the Team credited savings only when the actual UES exceeded the expected baseline.

Evaluation of RPP savings included:

- Verification of reported unit quantities
- Review of UEC and UES assumptions and calculations
- Estimating net lift in average UES during Program period

In addition to the savings analysis, the Evaluation Team conducted a review of market characterization data looking at stocking patterns within participating and nonparticipating retailers to assess market trends that may account for savings independent of the RPP.

Tracking Database Review

The Evaluation Team reviewed the tracking database and the per-model UEC and UES calculations applied by the Program Administrator. The Administrator used the manufacturer's reported annual consumption for all measures but clothes dryers and room air conditioners. Clothes dryer savings were determined using the New York state TRM and room air conditioner savings were determined through an ENERGY STAR product analysis. UES was calculated as the difference between baseline efficiency UECs and Program-qualified UECs. Product specific formulas for UES and UEC values are included in Appendix I.

The Evaluation Team reviewed the census of CY 2018 RPP data in SPECTRUM for appropriate and consistent application of EUL values in adherence with the TRM or other deemed savings sources.

Although the tracking data contained sufficient information for the Team to estimate savings lift for the Program in CY 2018 using a baseline modeling approach, the Team was notified in November 2018 that changes to the data portal would remove data that would be necessary for conducting the same baseline modeling in the future. A Portal Enhancement memo explained that retailer name will be removed for items categorized as "qualified" and only be provided for items categorized as "qualified incentive." In the CY 2018 baseline modeling approach, having the retailer name for qualified units allowed the Evaluation Team to allocate sales of historically qualified units to specific retailers. Without this level of detail in the future, the Team will not be able to capture each retailer's savings accrued from historically qualified units. Instead, these savings would only be available at the Program level. Removing the retailer name from qualified units will reduce the Team's ability to measure savings with sufficient precision in future RPP evaluations using the baseline modeling approach.

Market Lift Estimates

The Evaluation Team used a pre-post baseline comparison to measure the net lift of the Program. Other RPP evaluators have modeled sales or market share of qualified products over time. However, these approaches presented challenges in the CY 2018 evaluation because some products changed status from being qualified to being non-qualified.

Each of the five participating retailers provided full category sales data by model number for each product category. The retailer data included sales of each model number by month and the qualified status of each model number in that month. This included monthly sales during the Program period as well as 12 months of sales prior to participating in the Program.

Table 162 shows the Program start dates for each product category and retailer. Best Buy, Home Depot, and Sears have been participating in RPP since Focus on Energy began the pilot in April 2016. Nationwide joined the Program in CY 2017 and Lowe's joined in CY 2018. Washers and dehumidifiers were not initially included in the Program: washers were added in CY 2017 and dehumidifiers were added in CY 2018. The status for the same product could change over time based on the Program budget (in which case the status could alternate between qualified and qualified-incentive) or changes in standards for qualified products.

Table 162. Program Start Dates by Retailer and Product Category

Retailer	Air Cleaner	Air Conditioner	Dehumidifier	Dryer	Freezer	Refrigerator	Sound Bar	Washer
Best Buy	1-Apr-17	1-Apr-16	1-Apr-18	1-Apr-16	1-Apr-16	1-Apr-17	1-Apr-16	1-Apr-17
Home Depot	1-Apr-17	1-Jul-16	1-Apr-18	1-Apr-16	1-Apr-16	1-Apr-17	-	1-Apr-17
Lowe's	1-Apr-18	1-Apr-18	1-Apr-18	1-Apr-18	1-Apr-18	1-Apr-18	-	1-Apr-18
Nationwide	1-Apr-17	1-Apr-17	-	1-Apr-17	1-Apr-17	1-Apr-17	1-Apr-18	1-Apr-17
Sears	1-Apr-17	1-Apr-16	1-Apr-18	1-Apr-16	1-Apr-16	1-Apr-17	1-Apr-16	1-Apr-17

Program theory suggests that efficient products promoted through the Program would continue to sell at higher levels even if a particular product is no longer eligible for incentives. To the degree that sales of less efficient products are displaced, this generates market lift. The Program Implementer calculates the UEC for each model and the UES for each unit that qualifies for the Program. The UES is the difference between the qualified UEC and the baseline efficiency UEC.

In order to measure this persistent sales increase—and resulting savings increase—of products that received Program support at any point in time, the Evaluation Team used the pre-participation data from each participating retailer to establish baseline models of average monthly UES for each retailer and product. Average monthly UES was calculated as:

$$\frac{\sum_{it}(EffQuantity_{it} * UES_i) + \sum_{it}(BaseQuantity_{it} * 0)}{BaseQuantity_t + EffQuantity_t}$$

Where:

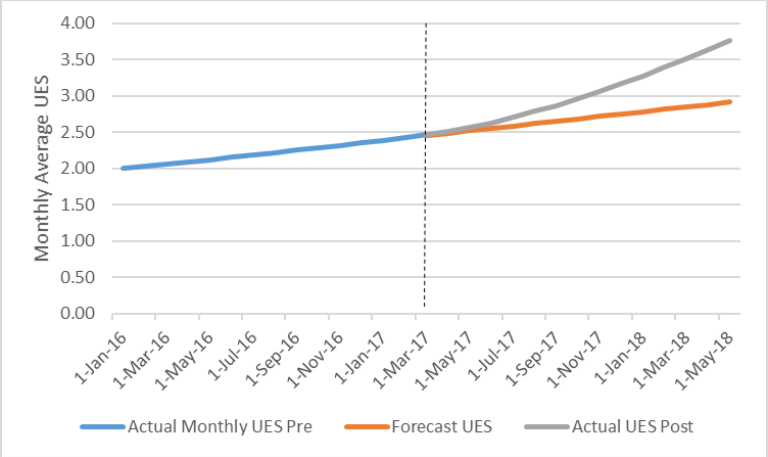
Eff Quantity	=	Number of units sold in month *t* for products that are currently incented through the Program or had been in previous months.
UES	=	Energy savings per unit for product *i*.
BaseQuantity	=	Number of all baseline[71] efficiency units sold in month *t*.

As the share of efficient products increases, the total number of products sold (the denominator in the equation) remains constant while the numerator increases. Conversely, if the share of baseline efficiency products increases the result is a smaller numerator because there are greater quantities of units sold generating zero savings.[72]

Figure 89 provides an illustration of the approach, showing pre-period average monthly UES from January 2016 to March 2017 (the blue line). There is a slight upward trend in the average monthly UES in the pre-period, suggesting that the share of efficient units is increasing naturally over time.

In this illustration, the Program period begins in March 2017. The orange line is an extrapolation of the trend observed in the pre-period. The gray line represents actual monthly UES during the Program period; this is above the orange line, meaning the Program increased the share of efficient units at a greater rate than expected without the Program. The difference between the gray and orange lines is the average per-unit savings attributable to the Program.

Figure 89. Simplified Illustration of Baseline Modeling Approach



[71] Baseline efficiency units are defined as those that have never qualified for Program support at any point in time.

[72] Any changes in baseline efficiency over time are ignored with this calculation. However, increasing standards of baseline or efficient products will be captured if current efficient products become the new baseline and the current mix of baseline products exit the market.

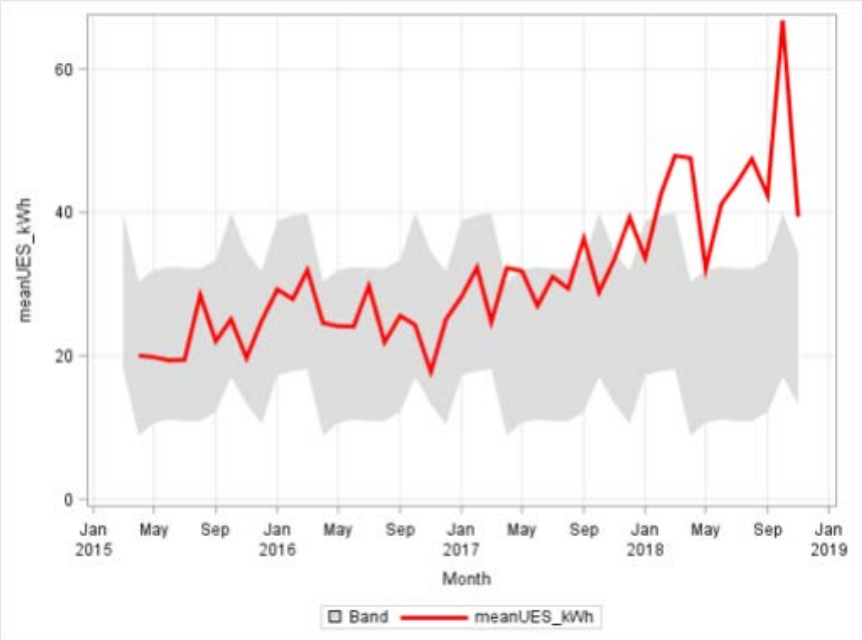
The baseline UES models included seasonal effects, time trends, and retailer-specific interactions as potential variables to explain variation in average monthly UES. Model specification was selected using leave-one-out cross validation with only the pre-period observations used to train the model.[73] Variables with the greatest predictive power when predicting out of sample were selected for the final model specification for each retailer and product category.

The Team then used these baseline models to forecast the average monthly UES for each retailer and product into the Program period. Because the model controls for pre-existing trends in the baseline period, differences between the forecast and actual observed average monthly UES are assumed to be driven by the Program.

When the difference between actual and forecasted monthly UES is significant at 90% confidence, net savings are equal to the difference in average monthly UES multiplied by the number of efficient units in that month.

Figure 90 shows the forecast vs actual UES derived from dryer sales at one of the participating retailer's stores. The shaded gray area represents the confidence interval around the model predictions. The red line is the actual monthly UES.

Figure 90. Forecast vs Actual Monthly UES of Dryers at Retailer 4 Stores



[73] Leave-one-out cross validation is a statistical procedure that randomly selects observations to hold out of the data that the model is fit to. The model is then used to predict for the observations that are withheld and the prediction error is measured. The procedure iterates over a number of samples that are withheld and the model with the smallest overall prediction error is selected.

Retailer 4's pre-period extends from March 2015 through March 2016 with the Program period beginning April 2016. As expected, there is not an initial change immediately after the Program begins. Retailers typically make purchasing decisions every six to 12 months, so any changes are not visible until pre-existing inventory sells or purchasing agreements have run their course. Beginning in spring of CY 2017, the average monthly UES begins to increase and continues an upward trend through CY 2018.

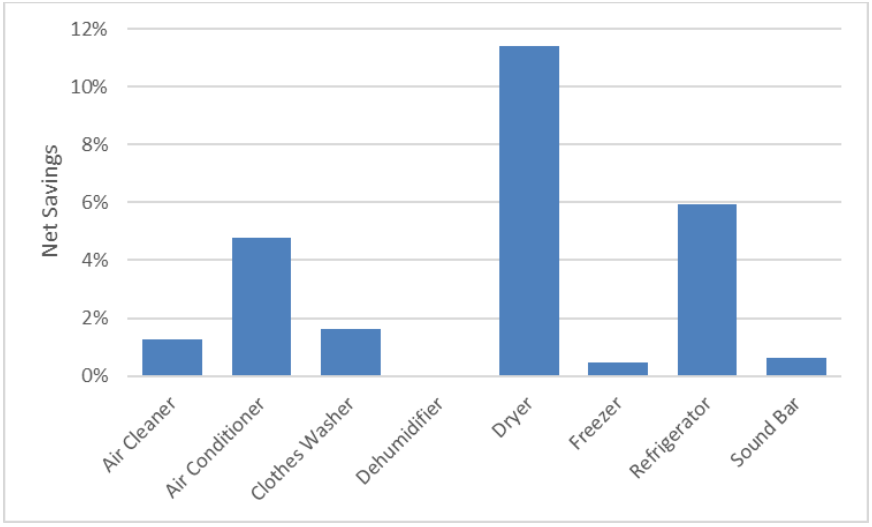
Because the efficiency tier definition for a given product can change over time (advanced to basic, basic to nonqualified) the Team did not measure net lift by tier but rather for the product as a whole. Dryers were the one exception and the Team measured kilowatt-hour and therm savings separately since the tier definitions were not related to efficiency but rather fuel type.

The Evaluation Team multiplied the difference between expected monthly UES and actual monthly UES by the number of qualified products sold in each month to calculate net savings for the Program. For example, in September 2017, the average monthly UES for electric dryers at one participating retailer was 48.44 kWh. The forecast UES for September was 30.09 kWh, which means the Program increased the average UES for electric dryers by an average of 18.35 kWh per dryer. The Program incented 388 electric dryers in that month, producing a total of 7,120 kWh net savings (18.35 * 388). Total savings generated by sales of efficient units was 18,796 kWh (48.44 kWh average UES per-unit multiplied by 388 units). The Program accounted for roughly 38% of sales that occurred in that month.

The forecast and actual monthly UES values were not significantly different in every month, nor at every participating retailer. Therefore, total overall Program net savings were lower relative to savings generated by sales of all efficient units than relative to savings generated in any single month at a given retailer.

Figure 91 shows the share of total savings attributable to the Program by product category for the RPP Pilot.

Figure 91. Net Savings Lift by Product



The savings generated by the Program varied considerably by product category, with dryers showing the greatest savings lift, followed by refrigerators. Dehumidifiers showed no savings, potentially because they were added to the Program in spring of CY 2018 and the Program did not have sufficient time to influence the market.

Verified Savings Results

Given the market transformation design of the RPP Pilot, where savings may not occur immediately following Program activity and may continue to accrue once direct Program intervention ends, Focus on Energy did not claim any *ex ante* savings for the Pilot. Therefore, the Evaluation Team did not calculate realization rates or NTG ratios for the Pilot.

Additionally, although the Pilot launched in CY 2016, savings were not evaluated until CY 2018. Therefore, all CY 2016–CY 2018 savings are being credited to the Pilot in CY 2018.

Table 163 provides the verified net annual savings for the RPP Pilot in CY 2018, totaling savings across all years the Pilot was active (CY 2016–CY 2018).

Table 163. CY 2018 RPP Pilot Verified Net Annual Savings by Measure

Measure	Verified Net Annual			
	kWh	kW	Therms	MMBtu
Clothes Dryer, Electric, ENERGY STAR	554,753	59	0	1,893
Clothes Dryer, Natural Gas, ENERGY STAR	5,658	0	2,745	294
Clothes Washer, Advanced Tier, ENERGY STAR	40,739	5	0	139
Dehumidifier, ENERGY STAR	0	0	0	0
Electric Clothes Dryer, Advanced Tier, ENERGY STAR	550	0	0	2
Freezer, Chest, ENERGY STAR	14,582	1	-348	15
Freezer, Upright, ENERGY STAR	1,637	0	0	6
Refrigerator, Advanced Tier, ENERGY STAR	41,237	5	-1,115	29
Refrigerator, ENERGY STAR	0	0	0	0
Room Air Cleaner, Advanced Tier, ENERGY STAR	4,108	0	0	14
Room Air Cleaner, ENERGY STAR	11,401	1	0	39
Room Air Conditioner, ENERGY STAR	31,172	17	0	106
Room Air Conditioner, Advanced Tier, ENERGY STAR	17	0	0	0
Soundbar, Advanced Tier, ENERGY STAR	0	0	0	0
Soundbar, ENERGY STAR	2,606	0	0	9
Total Annual	**708,459**	**89**	**1,282**	**2,545**

In CY 2018, the RPP Pilot net savings across all measures were 708,459 kWh, 89 kW, and 2,545 therms. Clothes dryers were by far the largest contributor to Program savings, both in terms of kilowatt-hours and therms. Dehumidifiers generated no savings as there was no net lift in the average monthly UES attributable to the Program.

Lifecycle *ex ante* gross and verified net savings for CY 2018 are presented in Table 164, totaling all savings from all three years of the Pilot (CY 2016–CY 2018).

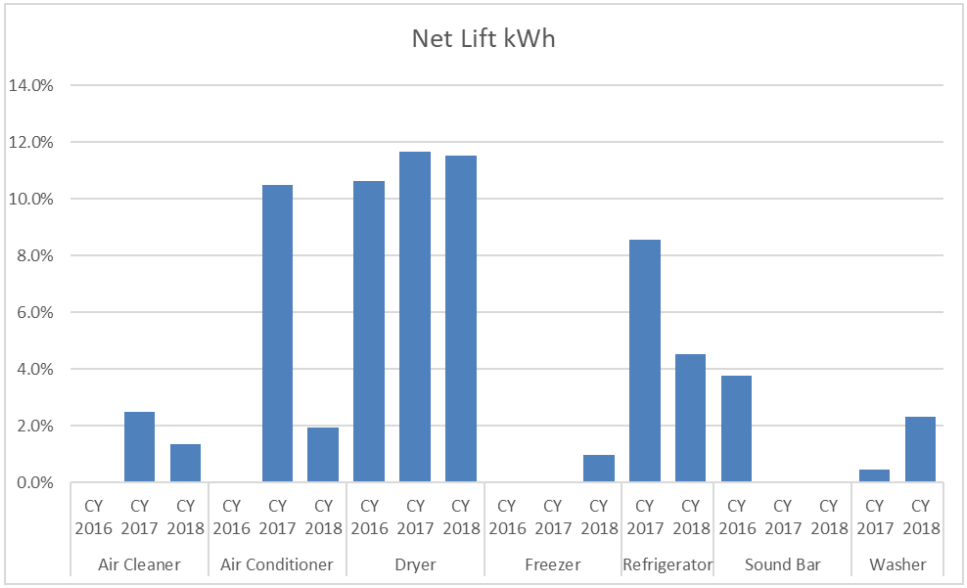
Table 164. CY 2018 RPP Pilot Verified Net Lifecycle Savings by Measure

Measure	Verified Net Lifecycle			
	kWh	kW	Therms	MMBtu
Clothes Dryer, Electric, ENERGY STAR	6,657,034	59	0	22,714
Clothes Dryer, Natural Gas, ENERGY STAR	67,893	0	32,938	3,525
Clothes Washer, Advanced Tier, ENERGY STAR	448,127	5	0	1,529
Dehumidifier, ENERGY STAR	0	0	0	0
Electric Clothes Dryer, Advanced Tier, ENERGY STAR	6,597	0	0	23
Freezer, Chest, ENERGY STAR	160,401	1	-3,826	165
Freezer, Upright, ENERGY STAR	18,003	0	0	61
Refrigerator, Advanced Tier, ENERGY STAR	453,605	5	-12,270	321
Room Air Cleaner, Advanced Tier, ENERGY STAR	0	0	0	0
Room Air Cleaner, ENERGY STAR	36,972	0	0	126
Room Air Conditioner, ENERGY STAR	102,607	1	0	350
Room Air Conditioner, Advanced Tier, ENERGY STAR	280,552	17	0	957
Soundbar, Advanced Tier, ENERGY STAR	151	0	0	1
Soundbar, ENERGY STAR	0	0	0	0
Total Annual	**8,250,189**	**89**	**16,842**	**29,834**

Program Effects by Year

Though all Pilot savings are claimed in CY 2018, the annual trends are useful for observing how the Program effects savings over time. Figure 92 shows the net electric savings lift for each product category by Program year. Nearly all the product lines showed some net savings, but results varied by product type and by year.

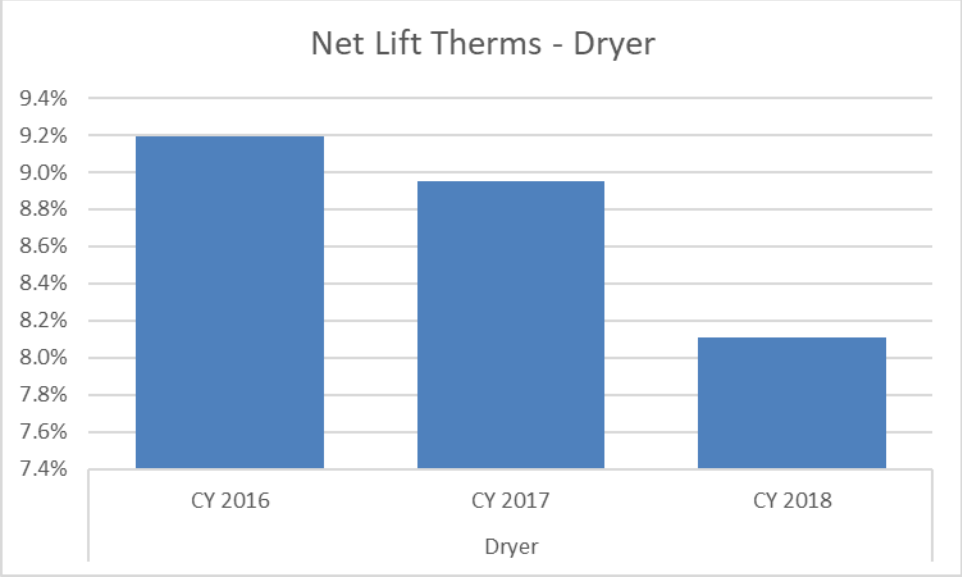
Figure 92. Net Electric Savings Lift Results by Product and Program Year



The figure shows some interesting details:

- Freezers only showed savings in CY 2018, suggesting that the Program had some impact but took time to exert influence on the market and has potential for continued growth.
- Sound bars showed savings in CY 2016 but no savings in subsequent years. Sound bars were scheduled to be removed from the national Program in early CY 2019.
- Dryers showed consistent lift across all Program years with kilowatt-hour savings of 10% to 12% and therms savings of 8% to 9% per year (shown in Figure 93). Dryers were the only product category with natural gas appliances that generated therm savings.

Figure 93. Net Therms Savings Lift for Dryers by Year



- Dehumidifiers were added to the Program in CY 2018 and removed in early CY 2019, with no discernible Program impacts.
- Refrigerators and room air conditioners showed higher savings in CY 2017 than in CY 2018.
- Washers showed a small lift in CY 2017 and increased lift in CY 2018.
- Air cleaners showed a small lift in CY 2017 and CY 2018.

Online Stocking Assessment

In addition to the market lift analysis, the Evaluation Team conducted an online stocking assessment of participating and nonparticipating retailer locations in Wisconsin. The Team used a web-based search tool to monitor product availability at participating and non-participating stores in Wisconsin to determine:

- Availability (number of unique model numbers stocked) of products at participating and non-participating retailers.
- Key product features and specifications

The Team began collecting data in the summer of CY 2017 and continued data collection through CY 2018 on a bi-monthly basis to establish conditions as near the baseline period as possible. Changes in product assortment over time at multiple retailers can:

- Provide corroborating evidence of Program influence in changing assortment toward more efficient products
- Identify features that are positively or negatively correlated with efficiency
  - Positively correlated features could indicate factors external to the Program that could lead to increasing shares of efficient products while negatively correlated features could indicate market barriers or opportunities for the Program to target new market segments

Data Collection

The Evaluation Team collected data from two participating retailers, two nonparticipating retailers, and one retailer who began participating in RPP in CY 2018 but was not a participant in CY 2017. The Team discontinued data collection from one of the nonparticipating retailers at the end of CY 2017 because the data was ultimately determined to be unusable due to inconsistent presentation of key product specifications necessary to categorize products.

For the first round of data collection, one store was chosen at random as the origin location. The additional stores were selected from the list of stores within a 50-mile radius of the origin store. Stores were selected this way to take advantage of the websites' design. Once the user chooses a store and product, they are able to see availability within that store and search nearby locations for the same product. This process allowed for efficient, reliable data collection.

Once the first round of data collection was complete, the Team used the list of stores visited as the sample frame for all subsequent rounds of data collection so the same stores were observed over time. For each store the Team would select the product type and filter to products that were available for same day pickup to capture the product mix available.

Table 165 summarizes the Evaluation Team's findings from the online stocking assessment.

Table 165. Online Stocking Assessment Summary by Product

Product	Findings
Air cleaner	• Prices have been decreasing over time at both participating and nonparticipating retailers. • Nonparticipating retailer stores have lower prices than participating retailers. • Clean air delivery rate is positively correlated with price.
Air conditioner	• Participating retailers have a slight trend toward smaller room size for ENERGY STAR units. • Nonparticipating retailers have fewer ENERGY STAR units. • Non-ENERGY STAR units have slightly higher noise levels. • Smart devices are primarily ENERGY STAR. • Smart units show a slight upward trend in price. • Non-smart ENERGY STAR units show a slight downward trend in price. • Mechanical-control units are mostly non-ENERGY STAR and cheaper than digital-control units.
Dryers	• ENERGY STAR prices are higher than non-ENERGY STAR at both participating and nonparticipating retailers.

Product	Findings
	• Gas and electric dryers show a slight downward trend in prices at nonparticipating stores. • Electric dryers at participating stores show a slight upward trend for non-ENERGY STAR units and slight downward trend for ENERGY STAR. • ENERGY STAR Gas dryers at participating stores show stable prices, non-ENERGY STAR show a slight downward trend. • There are few non-ENERGY STAR smart gas dryers. • Electric dryers are a mix of smart/non-smart, ENERGY STAR and non-ENERGY STAR.
Freezers	• Prices of ENERGY STAR and non-ENERGY STAR units are declining over time. • Prices of ENERGY STAR units are greater than non-ENERGY STAR. • There is a wider range of prices at participating retailer stores.
Refrigerator	• ENERGY STAR units have a wider range of available capacity options. • There is a slight downward price trend for smart devices. • Prices of ENERGY STAR and non-ENERGY STAR show a downward trend at nonparticipating retailer stores. • Prices of ENERGY STAR units show a slight upward trend at participating retailer stores.
Sound bars	• Nonparticipating retailer stores have more limited product assortment than participating stores and do not carry higher-end products. • ENERGY STAR product prices are higher, but both ENERGY STAR and non-ENERGY STAR products have a wide range of prices. • There is a slight upward price trend for both ENERGY STAR and non-ENERGY STAR products.
Washers	• Prices of ENERGY STAR units are higher than non-ENERGY STAR, though they are converging over time. • Participating retailer stores show an upward trend in the availability of smart devices. • Participating and nonparticipating retailer stores have a similar mix of ENERGY STAR vs non-ENERGY STAR and available capacity options.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 166 lists the CY 2018 incentive costs for RPP.

Table 166. RPP Incentive Costs

	CY 2018
Incentive Costs	$2,690,835

The Evaluation Team found that the CY 2018 RPP was not cost-effective (0.27). Table 167 lists the evaluated costs and benefits.

Table 167. RPP Costs and Benefits

Cost and Benefit Category	CY 2018
Costs	
Administration Costs	$99,648
Delivery Costs	$1,269,447
Incremental Measure Costs	$1,085,262
Total Non-Incentive Costs	**$2,454,356**
Benefits	
Electric Benefits	$552,782
Gas Benefits	$12,785
Emissions Benefits	$99,934
Total TRC Benefits	**$665,501**
Net TRC Benefits	**($1,788,856)**
TRC B/C Ratio	**0.27**

Evaluation Outcomes and Recommendations

The Evaluation Team compiled several outcomes and recommendations to improve the Retail Lighting and Appliance Program and RPP.

Outcome 1. Among smart thermostat participants, satisfaction was very high regardless of what percentage of the sale price the rebate covered. Nearly all (98%) respondents reported being either *somewhat satisfied* or *very satisfied* with their overall experience. However, freeridership rates tended to increase when the rebate covered less of the product cost (when product price increased). Freeridership rates ranged from 19% for thermostats under $100 (for which the rebate accounted for 75% or more of the cost) to 34% for thermostats in the $150 to $199 range, and 35% for thermostats in the $200 to $249 range. Freeridership appeared to plateau at about 35%, only slightly above the overall freeridership rate of 32%.

Recommendation 1. Because survey results indicate that satisfaction is stable regardless of product price, consider lowering the per-unit incentive. A similar program in another Midwestern state recently reduced their smart thermostat incentive from $100 to $50 with no impact on satisfaction results. The decrease in incentive will likely drive an increase in overall free ridership, but the plateau in CY 2018 results indicates that an increase would be minimal.

Outcome 2. APS participants indicated relatively low satisfaction rates, with just 83% of respondents being either *somewhat satisfied* or *very satisfied* with the product. Respondents explained their response by saying they had trouble using the APS, did not like how it worked, or did not like some aspect of the design (such as the bright indicators lights or having too few regular outlets).

Recommendation 2. Consider updating the training materials to help participants identify what equipment they might connect to their APS before making the purchase.

Outcome 3. In CY 2018, realization rates for reflectors decreased approximately 10% compared to CY 2017 due to the Program rebating a larger number of lower-lumen bulbs. Reflector measures are

currently designed to include all reflector types, making it possible for shifts in bulb characteristics to impact the measures' realization rates.

Recommendation 3. Consider splitting reflector measure into lumens ranges, similar to other LED measures. This will help prevent market trends from affecting measure-level realization rates and help the Program target higher-saving bulbs.

Outcome 4. Participant surveys provided information to calculate ISRs for APSs and smart thermostats. While smart thermostat ISRs were close to the TRM estimate (98% ISR from surveys compared to 100% in the TRM), APS ISRs showed a greater variance from the TRM estimate (80% ISR from surveys compared to 100% in the TRM).

Recommendation 4. Update the APS measure in the TRM to reflect the verified ISR from participant surveys.

Outcome 5. The CY 2018 LED market assessment indicates that Program participation appeared to have little impact on the number of available models relative to other technologies at big-box DIY retailers across the state. For all major bulb types, LEDs had the largest share of unique models across all technologies regardless of whether the retailer participates in the Program. These findings for statewide big-box DIY retailers may not represent all segments of the market. According to the CY 2017 Retail Lighting and Appliance Program home audit results,[74] LED saturation is not uniform, and is lower among multifamily households and renters

Recommendation 5. For future years, the Program should consider shifting away from a market-wide delivery approach and concentrate Program activity on those groups that have the most opportunity for savings. For example, rather than offering discounts on all LED products across the state, limit discounts to a few models of specialty bulbs in most areas and concentrate Program resources in stores that market to areas with a high percentage of renters or multifamily households. This concentration may be accomplished regionally, or by allocating a greater percentage of the Program budget to stores that market to lower-income customers since renters and multifamily households are more likely to be in a lower income bracket.

[74] Cadmus and Apex Analytics. January 11, 2018. *Wisconsin Focus on Energy Retail Lighting Program Evaluation: In-Home Audit Activities – Year 3.*

Direct-Mail Home Energy Assessment Pilot

In CY 2017, Focus on Energy offered the Rural Direct-Mail Home Energy Assessment (DHEA) Pilot to provide rural homeowners with a free home energy evaluation and customized recommendations to improve their home's energy efficiency. APTIM was the Pilot Administrator and EnergySavvy was the Pilot Implementer.

The DHEA Pilot Implementer mailed rural customers a 30-question Home Energy Savings survey that was designed to assess the characteristics and energy usage of the customers' homes. In CY 2017, the Pilot Implementer mailed 100,000 surveys to rural customers: 50,000 on June 19, 2017 and 50,000 on August 10, 2017. If customers completed and returned the survey, the Pilot Implementer mailed them a customized Home Energy Savings report with information about their home's energy consumption and up to four recommendations to improve their home's efficiency through other Focus on Energy residential programs.

Evaluation Approach

The Evaluation Team conducted three DHEA participant surveys between January 2018 and July 2018 to track changes in DHEA participant satisfaction, educational effectiveness, and energy-saving actions over time. Each round of the survey targeted a different group of participants, and each group was asked the same survey questions.

The Team included preliminary findings from the January 2018 surveys in the CY 2017 Focus on Energy Evaluation Report. This report expands those findings to include results from the second and third surveys, conducted in April and July 2018.

Impact Evaluation

Although the DHEA Pilot provided education about energy-saving opportunities, the Pilot alone did not claim energy savings. Therefore, the Evaluation Team provided only a process evaluation of the Pilot.

Process Evaluation

To track changes in participant satisfaction, educational effectiveness, and energy-saving actions, the Evaluation Team conducted three longitudinal surveys between January 2018 and July 2018. This report incorporates the findings from these surveys. Table 168 lists the specific evaluation activities and sample sizes used in the process evaluation.

Table 168. DHEA Pilot Data Collection Activities and Sample Sizes

Activity	Date Fielded	Invitations Sent	Started Survey	Screened from Survey[a]	CY 2017 Sample Size (n)	Response Rate
Participant Survey Group 1	January 2018	500	44	12	32	6.4%
Participant Survey Group 2	April 2018	500	31	7	24	4.8%
Participant Survey Group 3	July 2018	500	23	5	17	3.6%
Totals		**1,500**	**98**	**24**	**73**	**4.9%**

[a] Respondents were screened from the survey if they did not remember the DHEA Pilot or if they said they did not participate in the Pilot.

Pilot Design, Delivery, and Goals

To increase rural customer participation in Focus on Energy Residential programs, the Implementer mailed the DHEA survey to 100,000 randomly selected rural customers.[75] If the customer completed and returned the Home Energy Savings Survey, the Pilot Implementer mailed a report detailing the home's energy efficiency as well as offering up to four recommendations (as applicable) to improve its efficiency.[76]

Participant Survey

The Evaluation Team surveyed CY 2017 participants over the course of seven months. Survey topics target these key evaluation areas:

- Participant satisfaction with the Pilot
- Educational effectiveness of the Pilot
- Energy-saving actions that have been taken or will be taken in the near future

The Pilot Implementer provided the Evaluation Team with a sample frame of 9,080 participants who had completed and returned a Home Energy Savings survey by December 2017. The sample frame excluded 500 participants who had already been contacted by the Pilot Implementer in a separate follow-up

[75] Focus on Energy designated rural zip codes according to U.S. Census Bureau data. See Appendix M for a complete list of designated rural zip codes. Customers were eligible to receive a Home Energy Savings Survey only if they had a participating Focus on Energy electric and/or gas utility service provider.

[76] The Pilot Implementer encountered an issue with roughly 8,000 customized home energy savings reports (in the first batch of 50,000). Because of an error in the annual energy savings algorithm, 8,000 customers received estimated annual savings that were greater than what they pay for utilities in an average year (these participants saw their three-year savings estimate). The Pilot Implementer mailed these customers a letter of apology as well as free LED nightlights. These participants were not included in the sample frame for this evaluation. To avoid a similar error in the second batch of 50,000, this estimated savings calculation was removed entirely from the Home Energy Savings report.

survey (unrelated to this evaluation). From this sample frame, the Evaluation Team invited (via postcard) 1,500 randomly selected participants (500 per survey group) to take this follow-up survey:

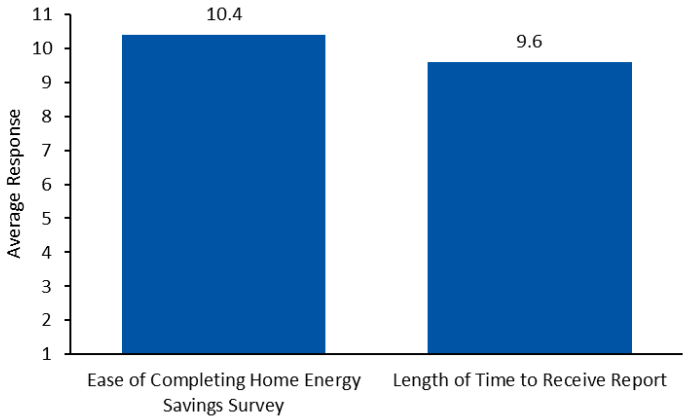
- January 2018 (three months after customers received their Home Energy Savings report)
- April 2018 (six months after customers received their Home Energy Savings report)
- July 2018 (nine months after customers received their Home Energy Savings report)

Perceptions of the Pilot

Survey respondents rated their satisfaction with various aspects of the DHEA Pilot on a scale of 1 to 11, where 11 indicated the highest satisfaction or likelihood and 1 the lowest.

As shown in Figure 94, respondents from all groups said it was *very easy* to complete the Home Energy Savings survey and they were highly satisfied with the length of time it took to receive the report after mailing in the completed survey. There were no significant differences between groups on these ratings (see Table 169 for responses by group).

Figure 94. Ease of Completing the Survey and Satisfaction with the Report Processing Time



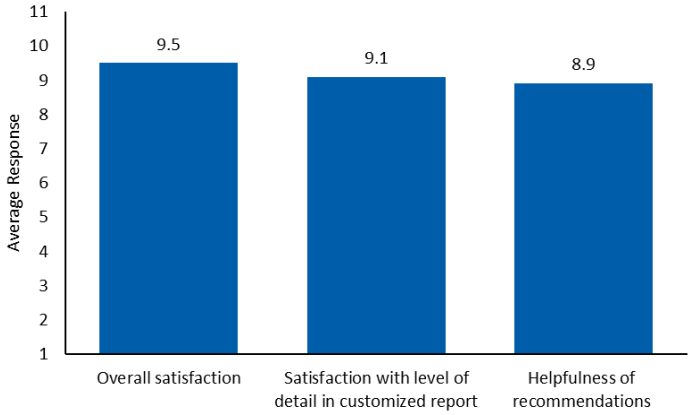
Source: Home Energy Savings Participant Survey Questions C1 and C4. "How easy was it to complete the Home Energy Savings survey?" and "Were you satisfied with the length of time it took to receive your customized Home Energy Savings report after submitting the survey?" Responses on 11-point scales ranging from 1 (*not at all easy/not at all satisfied*) to 11 (*very easy/very satisfied*). (CY 2018 ns=70 and 75, respectively)

When asked what could be done to improve the survey process, 82% of all respondents (58 of 71) said there was nothing that could be improved with the Pilot. Of the 13 respondents (five in Group 1, four in Group 2, four in Group 3) who said something could be improved, only five suggested an improvement. Two respondents requested that the survey be online (one in Group 1, one in Group 2), two said the survey should be faster to complete (one in Group 1, one in Group 2), and one suggested keeping the survey simple (Group 3).

Respondents also rated their overall satisfaction with the Pilot, their satisfaction with the level of detail in the report, and the helpfulness of the recommendations in the customized Home Energy Savings report. As shown in Figure 95, respondents were satisfied with the Pilot overall and with the level of detail in the report, although these average satisfaction scores are descriptively lower than other

programs. Respondents also thought the recommendations provided in the report were *very helpful*. There were no significant differences between groups on these ratings (see Table 169 for responses by group).

Figure 95. Participant Satisfaction and Perceived Helpfulness of the Customized Report



Source: Home Energy Savings Participant Survey Questions C7, C6, and C5. "How would you rate your overall satisfaction with the Home Energy Savings survey Program?," "How would you rate your satisfaction with the level of detail provided in your customized Home Energy Savings report?," and "How helpful was the information provided in your customized Home Energy Savings report about how you can save energy and money?" Responses on 11-point scales ranging from 1 (*not at all helpful*/*not at all satisfied*) to 11 (*very helpful*/*very satisfied*). (CY 2018 ns=69–72)

When asked if any Pilot changes could be made to improve their satisfaction, only seven respondents provided feedback (three in Group 1, three in Group 2, one in Group 3). Two respondents suggested increasing the speed from returning the survey to receiving the report (one in Group 1, one in Group 2), two respondents said some questions could be clearer (one in Group 1, one in Group 2), two respondents said they never received a customized report with recommendations (one in Group 1, one in Group 2), and one respondent suggested making it easier to remember details of the report after several months (Group 3).

Educational Effectiveness

To determine whether the DHEA Pilot was meeting the goal of educating rural customers about Focus on Energy's program offerings, the follow-up survey asked about respondents' awareness of program offerings *before* and *after* participating. Additionally, the survey asked whether respondents had investigated energy-saving opportunities after participating in the DHEA Pilot.

On average, respondents' awareness of Focus on Energy program offerings was moderate *before* participating in the DHEA Pilot (46% in Group 1, 64% in Group 2, 35% in Group 3).[77] This is comparable

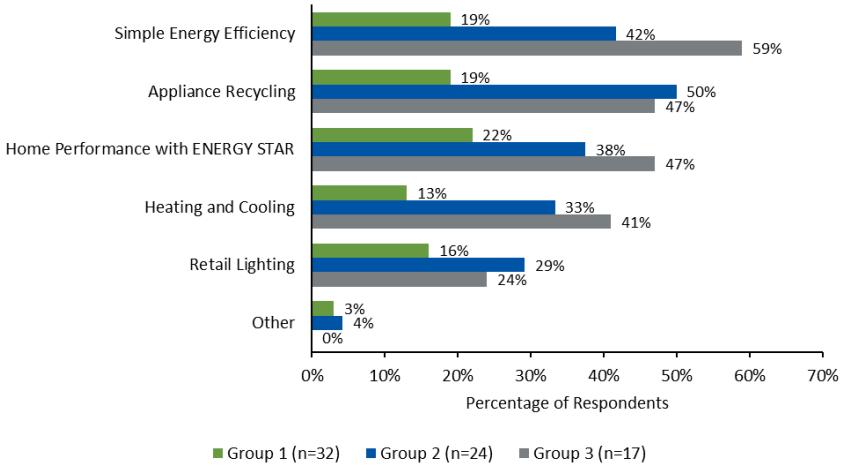
[77] There was no significant difference in awareness between groups. Overall awareness of Focus on Energy programs before participating in the DHEA Pilot was 50%.

to results of the CY 2018 General Population Survey, in which 48% of residential customers were aware of Focus on Energy (Cadmus 2016).

As shown in Figure 96, Group 1 survey respondents' awareness of specific Focus on Energy programs was relatively low *after* receiving the Home Energy Savings report. However, the percentage of respondents aware of each program significantly increased between Group 1 (three months post-report) and Group 2 (six months post-report) for the Simple Energy Efficiency, Appliance Recycling, and Heating and Cooling Programs. There were no significant differences in awareness between Groups 2 and 3.

Awareness was highest for the Simple Energy Efficiency Program, followed by the Appliance Recycling and the Home Performance with ENERGY STAR Programs.

Figure 96. Percentage of Respondents Aware of Each Program after DHEA Pilot Participation



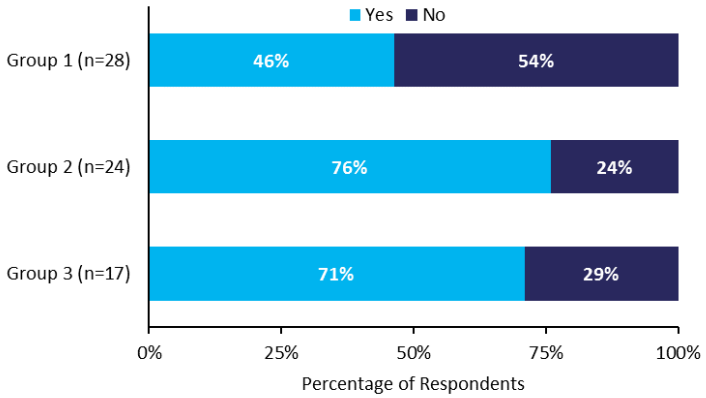
Source: Home Energy Savings Participant Survey Question E2. "Which programs are you aware of now that you have participated? Select all that apply."

Energy-Saving Actions

The Home Energy Savings survey respondents also answered questions about energy-saving actions they had taken at the time of the survey and additional actions they planned to take in the future. Notably, all but four respondents in Group 1 (86%, n=28), all but five respondents in Group 2 (80%, n=25), and all but five respondents in Group 3 (71%, n=17) reported having purchased or intending to purchase energy-saving products.

As shown in Figure 97, 46% of Group 1 respondents, 76% of Group 2 respondents, and 71% of Group 3 respondents purchased or installed energy-saving products after receiving the customized Home Energy Savings report. The increase in the percentage of respondents who purchased energy-efficient products between Group 1 and Group 2 was significant.

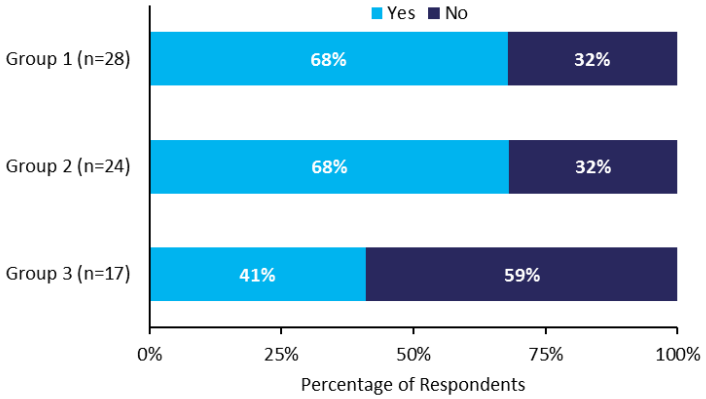
Figure 97. Percentage of Respondents Who Have Purchased Energy-Efficient Products



Source: Home Energy Savings Participant Survey Question D1. "Due to the information you received in the customized Home Energy Savings report, have you purchased or installed any energy-efficient products since you received your report?"

Additionally, as shown in Figure 98, most respondents intended to purchase or install energy-saving products in the six months following their completion of the participant survey. There was a significant decrease in the percentage of respondents who planned to purchase energy-efficient products between Group 2 and Group 3.

Figure 98. Percentage of Respondents Who Plan to Purchase or Install Energy-Efficient Products

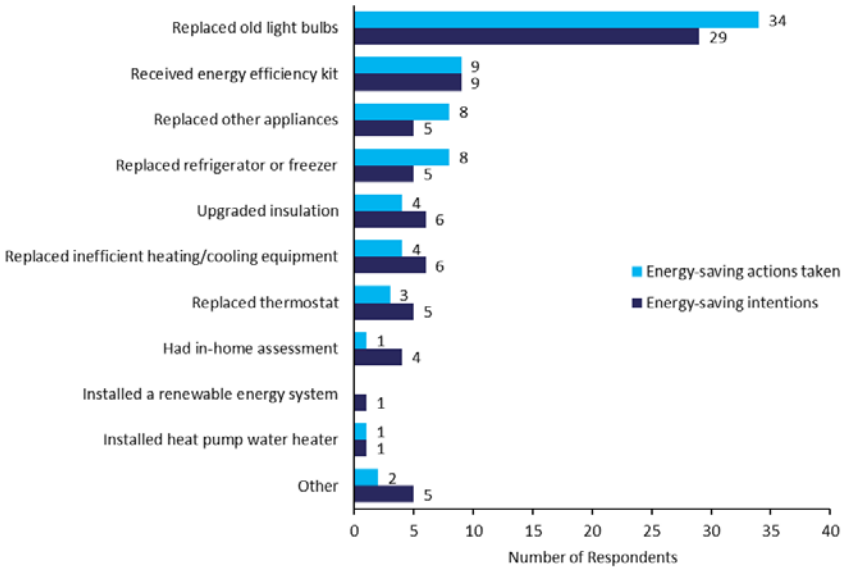


Source: Home Energy Savings Participant Survey Question D2. "Do you plan to purchase or install any energy-efficient products in the next six months?"

Of the respondents who purchased or installed an energy-saving product after participating in the DHEA Pilot, most reported replacing old light bulbs with energy-efficient LEDs, using the energy efficiency kit,

and replacing refrigerators, freezers, and other appliances with energy-efficient alternatives. These results are shown in Figure 99.[78]

Figure 99. Energy-Saving Actions Taken and Intended since Participating in DHEA Pilot



Source: Home Energy Savings Participant Survey Questions D3 and D4. "Which energy-efficient products have you purchased or installed? Select all that apply." and "Which energy-efficient products do you plan to purchase or install in the next six months? Select all that apply." (CY 2018 ns=73)

The respondents who said they intend to purchase or install energy-saving products in the next six months most frequently intend to replace old light bulbs with energy-efficient LEDs, followed by intending to get an energy efficiency kit or upgrade insulation. Notably, when respondents rated the importance of the DHEA Pilot in their decision or intention to purchase or install the energy-saving measure(s), respondents, on average, said the Pilot was moderately important (8.1 in Group 1, 7.0 in Group 2, 8.8 in Group 3).[79] There was no significant difference in ratings of importance between groups.

[78] Few respondents received rebates for these energy-saving actions. Four respondents (one in Group 1, two in Group 2, one in Group 3) received a rebate for replacing inefficient heating or cooling equipment, three respondents (one in Group 1, one in Group 2, one in Group 3) received a rebate for recycling an old refrigerator or freezer, four respondents (two in Group 2, two in Group 3) received a rebate for the energy efficiency kit, two respondents (one Group 2, one in Group 3) received a rebate for replacing a non-refrigerator or freezer appliance with an efficient model, and one respondent (in Group 3) received a rebate for a smart thermostat.

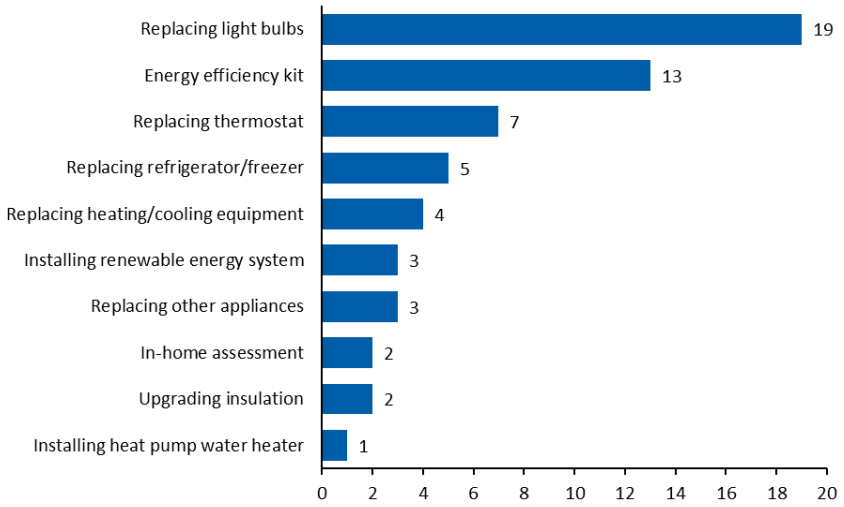
[79] Responses were on an 11-point scale ranging from 1 (*not at all important*) to 11 (*very important*).

Four respondents in Group 1, five respondents in Group 2, and five respondents in Group 3 did not take an energy-saving action *and* did not plan to purchase or install an energy-saving product in the next six months, citing the following reasons:

- Energy-saving products are too expensive (three respondents in Group 1, three respondents in Group 2, two respondents in Group 3)
- The potential savings are uncertain (one respondent in Group 1, one respondent in Group 2)
- Do not have time to make efficiency upgrades (one respondent in Group 2)
- Thinking about moving to a retirement facility (one respondent in Group 2)
- The report said the home does not need upgrades (one respondent in Group 1, two respondents in Group 3)[80]
- Will not receive money back from landlord (one respondent in Group 3)

Although many surveyed respondents took energy-saving actions, the majority did *not* investigate energy-saving opportunities after they received their Home Energy Savings report (60% in Group 1, n=25; 68% in Group 2, n=22, 59% in Group 3, n=17). All but one respondent who did inquire about energy-saving opportunities did so online (one respondent in Group 3 inquired by phone), most frequently exploring the option to replace light bulbs with more efficient LEDs, followed by receiving an energy efficiency kit (Figure 100).

Figure 100. Which Energy-Saving Opportunities Respondents Investigated



Source: Home Energy Savings Participant Survey Question E4. "Which energy-saving opportunities did you investigate? Select all that apply." (CY 2018 n=73)

[80] All reports included energy-saving recommendations. Participants who indicated that the report did not include recommendations may have misread the report or did not correctly remember the report details.

Respondent Characteristics

Home Energy Savings survey respondents answered questions about their demographic characteristics, summarized in Table 169 by group. The analysis of demographic characteristics revealed that the sample was likely not representative of the rural Wisconsin population. Across the United States (including Wisconsin), rural population members tend to have lower income and less education relative to non-rural population members. However, the sample obtained for this survey had greater income and education compared to the average Wisconsin resident. Although speculative, this may be because respondents with greater income and education tend to be the ones that participate in the DHEA Program.

Table 169. Respondent Characteristics

Survey Group	Percentage of Respondents 18 to 45 Years	Percentage of Respondents 46 to 70 Years	Percentage in Single-Family, Detached Residence	Percentage Who Own Residence	Percentage with Bachelor's Degree	Median Household Income
Group 1	25%	58%	89%	100%	67%	$90,000-$109,999
Group 2	28%	44%	92%	96%	38%	$70,000-$89,999
Group 3	21%	57%	94%	100%	41%	$90,000-$109,999
Total	**25%**	**52%**	**91%**	**100%**	**48%**	**$90,000-$109,999**
WI Average	**25%**	**52%**	**Statistic Unavailable**	**67%**	**28%**	**$55,000**

Summary of Pilot Implementer Survey Findings

In CY 2017, the Pilot Implementer mailed postcards with a three-question survey to two customer groups: a random sample of DHEA participants and a random sample of nonparticipants, drawn from a statewide list of rural customers who did not receive a home energy survey. This survey effort was separate from the Evaluation Team's participant survey described in this report.

This section summarizes the Evaluation Team's assessment of results from the three Pilot Implementer survey questions and, when possible, compares results to or highlights results from the Evaluation Team's DHEA participant survey.[81]

Survey Question 1: Are you aware that your utility provides energy efficiency incentives and resources through Focus on Energy?

Pilot Implementer survey respondents who received an energy assessment were significantly more likely to be aware of Focus on Energy incentives (75% aware) compared to respondents who did not receive an energy assessment (56% aware).

The Evaluation Team's survey similarly assessed participant awareness of Focus on Energy programs ("Which programs are you aware of now that you have participated?"). For the Team's survey, the

[81] The Evaluation Team considered $p \leq 0.05$ as statistically significant when comparing survey results.

maximum awareness level for any program was 59%, and half the respondents were aware of at least one program.

Although a smaller percentage of Evaluation Team's survey participants were aware of programs, this difference may have been due to several factors:

- Question wording. The Pilot Implementer survey asked respondents about general awareness of Focus on Energy incentives, whereas the Evaluation Team survey asked respondents to select the specific program names.
- Participant group differences. There could be unknown demographic or other differences between survey groups. For example, the Evaluation Team survey respondents were more educated and had greater incomes than the average Wisconsin resident. If Pilot Implementer survey respondents had lower income and less education than average, they might be less knowledgeable of energy efficiency opportunities.
- Timing influence. The Evaluation Team survey respondents were the most aware of Focus on Energy programs several months after receiving their DHEA report. Depending on when Pilot Implementer surveys were delivered, DHEA participants in that survey might have had additional time to investigate energy-saving opportunities, thus increasing their program awareness.

Survey Question 2: How knowledgeable do you feel today about the energy efficiency opportunities in your home?

Surprisingly, there was not a significant difference in how knowledgeable Pilot Implementer respondents felt between DHEA participants and nonparticipants. On a 10-point scale, with 10 being most knowledgeable, participants ranked their knowledge as 5.75 and nonparticipants ranked their knowledge as 5.66, suggesting that neither group felt aware of efficiency opportunities in their homes.

The Evaluation Team did not directly examine this outcome in the participant survey; however, the Team did assess and determine that most respondents did *not* investigate energy-saving opportunities after they received their Home Energy Savings report. The lack of further investigation after receiving the report could be another reason participants did not feel particularly knowledgeable of energy-saving opportunities for their home.

Survey Question 3: How would you most prefer to identify opportunities to improve the energy efficiency of your home?

Both participants and nonparticipants preferred to receive printed information, followed by having someone visit their home. As expected for a question about general preferences, there were no significant differences in preferences between participants and nonparticipants.

While the Evaluation Team survey did not assess customers preferred awareness channels, the Team's CY 2018 Residential General Population survey asked, "What's the best way for Focus on Energy to let you know about their incentives and services for energy-efficient improvements?" Of the 288 customers

who responded, the top choices were Focus on Energy mailing (38%), utility bill insert (37%), and email from Focus on Energy (24%).

Evaluation Outcomes

The Evaluation Team identified the following outcomes from its evaluation of the DHEA Pilot.

Outcome 1. Rural customers in the DHEA Pilot had moderate awareness of Focus on Energy programs, and awareness significantly increased over time for several Focus on Energy programs. Consistent with findings from the CY 2018 general population survey, roughly half of surveyed participants indicated that they were aware of current Focus on Energy residential programs. Despite low awareness of Focus on Energy programs three months after receiving the report (Group 1), awareness increased six months post-report (Group 2) for the Simple Energy Efficiency, Appliance Recycling, and Heating and Cooling Programs. In Groups 2 and 3, approximately one-third to over one-half of respondents recognized the programs listed in the survey. This finding suggests that the DHEA Pilot may be increasing awareness of Focus on Energy programs over time. However, it is important to note that awareness of Focus on Energy programs did not impact participants taking energy-saving actions. That is, there was no statistical difference in energy-saving intentions or actions between aware and unaware respondents.

Recommendation 1. A potential Program limitation is that rural customers might not have access to high-speed or reliable internet. Although the Home Energy Savings report listed a phone number for participants to call (in addition to the Focus on Energy website), participants seemed less likely to further investigate energy-saving opportunities via phone, as evidenced by the fact that all but one respondent further investigated energy-saving opportunities online.[82] To maximize success of the DHEA Program, Focus on Energy should consider additional ways to engage rural participants that do not have access to reliable, high-speed internet. For example, Focus on Energy could include a postcard with the report that participants could mail back to request additional information on specific programs.

Outcome 2. The DHEA Pilot was viewed favorably by Pilot participants. Respondents in all three survey groups reported high satisfaction with the DHEA Pilot (means equal to or greater than 9.3 on 11-point scales). In addition to reporting high satisfaction, respondents said that the Home Energy Savings survey was quick, that the customized report was detailed, and that the recommendations were helpful. Despite the high participant satisfaction, some participants recommended improving the survey process by offering an online option (in addition to the paper-based survey) and improving the report delivery time.

Recommendation 2. If the DHEA Program continues, consider including an online survey option. Electronic options may also reduce time between completing the survey and receiving the report.

Outcome 3. The DHEA Pilot facilitated energy-saving actions. Nearly half of respondents in Group 1 (three months post-Home Energy Savings report) and two-thirds of respondents in Group 2 and Group 3

[82] It is possible that this finding is because only participants with internet access were surveyed.

(six and nine months post-Home Energy Savings report, respectively) said that they had already purchased or installed an energy-saving product by the time they completed the follow-up survey. Similarly, many respondents (percentages equal to or greater than 41%) planned on purchasing or installing energy-saving products in the months following the follow-up survey. Although most of these energy-saving actions were low-cost (such as replacing light bulbs), it is notable that some respondents were investing in higher-cost measures (such as replacing appliances). Respondents also reported that the DHEA Pilot was moderately important in their decisions to purchase or install energy-saving measures (means equal to or greater than 7.0 on 11-point scales). Although it was not possible to quantify spillover findings, these results suggest that the DHEA Pilot is positively influencing energy-saving actions.

Recommendation 3. Although many surveyed participants reported taking energy-saving actions, the DHEA Pilot only had a moderate impact on these decisions. Additionally, most respondents did *not* further investigate energy-saving opportunities after receiving the Home Energy Savings report (60% in Group 1, 68% in Group 2, 59% in Group 3). If the DHEA Pilot has the goal of being a large driver of energy-saving behaviors, these findings suggest there is room for improvement. Focus on Energy should consider taking steps to increase the likelihood that respondents further investigate energy-saving opportunities after receiving the report. For example, rather than providing respondents with a single link to the Focus on Energy Residential Program website (www.focusonenergy.com/mysurvey), consider including links to specific programs related to each recommendation. In the current Home Energy Savings report, many of the recommendations do not cite what Focus on Energy offers or if an incentive exists (for example, “Get an in-home assessment” and “Upgrade insulation to modern standards”). Providing participants with concrete ways to quickly investigate energy-saving opportunities and whether financial incentives exist should increase the impact the DHEA Program has on energy-saving behaviors—this is supported by data from these surveys. Respondents who further investigated energy-saving opportunities rated the DHEA Pilot as more influential in their decisions to take energy-saving actions (mean = 9.3) compared to respondents who did not further investigate energy-saving opportunities (mean = 6.8). Focus on Energy should also consider, as one respondent suggested, sending a follow-up reminder a few months after delivering the report to remind participants about report findings.

Nonresidential Segment Programs

Small Business Programs

Through the Small Business Program, Focus on Energy encourages commercial and industrial customers to install energy-efficient products at their facilities, provided they have average monthly consumption of 40,000 kWh or less during July and August. The Program assists customers in finding trained Trade Allies that can present options for upgrading equipment and installing energy-efficient products. Additionally, the Program offers the highest incentives among Focus on Energy's business programs to reflect that this segment often faces the highest cost barriers to efficiency upgrades. To help reduce upfront cost barriers and payback periods, the customer receives the incentive directly for products installed, or Trade Allies could receive these incentives on behalf of their customers by applying instant discounts to the invoice.

As part of PSC's initiative to enhance Focus on Energy services to rural customers, Focus on Energy also provided the Community Small Business Offering in CY 2017 and CY 2018. This offering provided extensive, community-based, outreach activities and additional incentives for rural small business customers. Designed to drive engagement in specific rural Wisconsin communities, the incentives were 50% higher than those offered to non-rural customers (to help overcome cost barriers). Outreach activities targeted utilities, community organizations, Trade Allies, and customers to enhance awareness of energy efficiency opportunities. Registered Trade Allies that completed projects for eligible customers in a targeted community could receive up to $2,000 in bonus incentives. Unless otherwise stated, the Community Small Business Offering followed the same processes and procedures as those used for the Small Business Program.

Table 170 and Table 171 lists actual spending, savings, participation, and cost-effectiveness for the Small Business Program and Community Small Business Offering.

Table 170. Small Business Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$5,032,740	$2,344,213	$15,279,594
Participation	Number of Participants	2,386	1,333	7,307
Verified Gross Lifecycle Savings	kWh	664,550,261	360,410,945	1,897,644,874
	kW	5,781	2,673	19,794
	therms	3,455,027	1,026,102	4,943,690
Verified Gross Lifecycle Realization Rate	% (MMBtu)	104%	100%	103%
Annual Net-to-Gross Ratio	% (MMBtu)	91%	91%	91%
Net Annual Savings	kWh/yr	45,749,536	19,882,116	120,472,782
	kW	5,261	2,423	18,068
	therms/yr	180,723	50,225	272,422
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	4.97	3.83	3.59

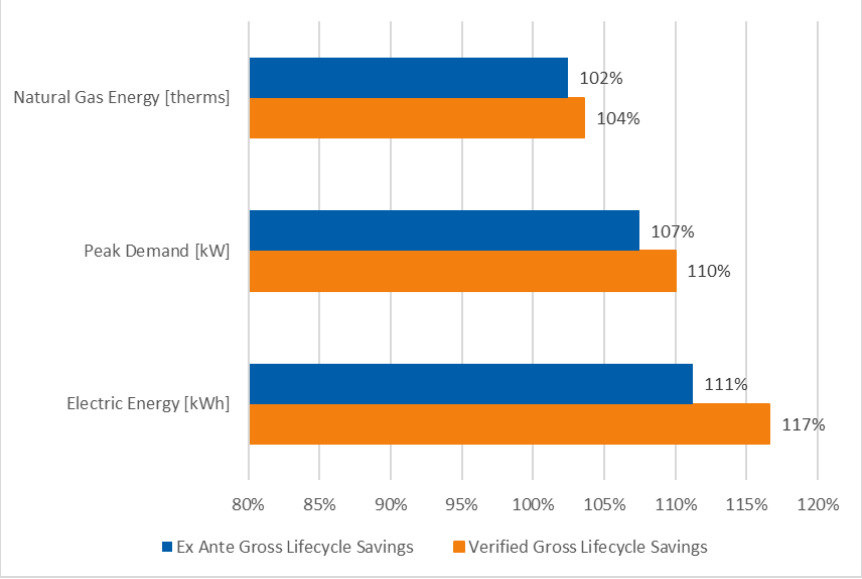
Table 171. Community Small Business Offering Summary

Item	Units	CY 2018[a]
Incentive Spending	$	$765,646
Participation	Number of Participants	502
Verified Gross Lifecycle Savings	kWh	94,421,888
	kW	944
	therms	701,132
Verified Gross Lifecycle Realization Rate	% (MMBtu)	104%
Annual Net-to-Gross Ratio	% (MMBtu)	93%
Net Annual Savings	kWh/yr	6,625,964
	kW	878
	therms/yr	39,709
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	3.03

[a] *Ex ante* energy savings for 24 CY 2017 Community Small Business Offering measures were not evaluated in CY 2017 due to low participation. These measures are included in the CY 2018 evaluation results and represent 2% of the overall Community Small Business Offering total lifecycle savings (MMBtu).

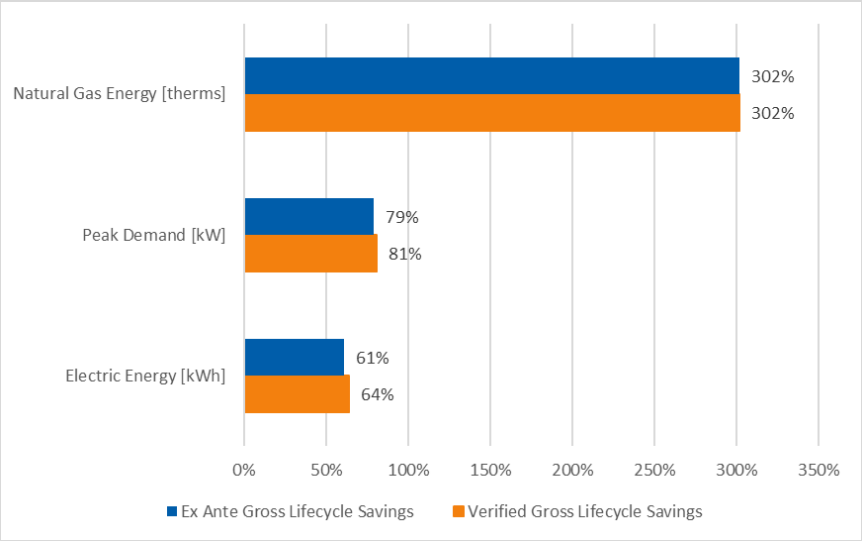
Figure 101 and Figure 102 show the percentage of gross lifecycle savings goals achieved by the Small Business Program and Community Small Business Offering in CY 2018. The Small Business Program exceeded all of its savings goals for CY 2018. The Community Small Business Offering achieved over triple the natural gas savings compared to its goal, but it did not meet its electric energy or peak demand reduction goals.

Figure 101. Small Business Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Figure 102. Community Small Business Offering Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team's impact and process evaluations of the Small Business Program and Community Small Business Offering in CY 2018 addressed the following key questions:

- What are the gross and net electric and natural gas savings?
- How can the Small Business Program and Community Small Business Offering increase energy savings and demand reduction?
- How satisfied are participants and Trade Allies with the Small Business Program and Community Small Business Offering and their energy-efficient upgrades?

The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing the Programs' performance. Table 172 lists specific data collection activities and sample sizes used in the evaluations specific to each Program.

Table 172. Small Business Program and Community Small Business Offering Data Collection Activities and Sample Sizes

Activity	Small Business Program	Community Small Business Offering	Total
Program Actor Interviews			2
Tracking Database Review			Census
Participant Surveys	70	70	140
Ongoing Participant Satisfaction Survey	469	62	531
Engineering Desk Review	29	14	43
Verification Site Visits	6	4	10

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and Program Implementer in July 2018 to learn about the Small Business Program and Community Small Business Offering's status, assess related objectives and performance, and investigate implementation challenges and solutions. The interview topics emphasized changes to the Programs' design and delivery.

Tracking Database Review

The Evaluation Team reviewed a census of projects in the Small Business Program and Community Small Business Offering's tracking database, SPECTRUM; this involved the following tasks:

- Thoroughly reviewing the data to ensure that SPECTRUM totals matched totals reported by the Program Administrator
- Reassigning savings from a number of database adjustment measures to the corresponding Program measures
- Checking for complete and consistent application of information across data fields (such as measure names, application of lifetime savings, application of EUL)

Participant Surveys

To gather feedback on Program experiences and data to inform NTG calculations (freeridership and spillover), the Evaluation Team conducted a telephone survey with participating customers. Using the CY 2018 year-to-date Program participants listed in SPECTRUM, the Team constructed the survey population frame. At the time of the surveys, the population size consisted of 1,071 participants in the Small Business Program and 183 participants in the Community Small Business Offering (as determined by unique phone numbers). Seventy Small Business Program and 70 Community Small Business Offering participants completed the survey—the identified target designed to meet 10% precision at 90% confidence.[83] Participants also received an equipment verification battery, used to calculate a Program-level ISR.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. These surveys sought to provide a quick, easy opportunity for recent Program participants to provide feedback shortly after their experiences, revealing problems at any time of year, and identifying energy efficiency opportunities for follow-up with interested participants. The Team also used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfaction KPIs.

Through SPECTRUM, the Program Administrator deployed online surveys to all CY 2018 participants with an e-mail address within two weeks of receiving their incentive check and sent paper surveys to

[83] Of 70 Community Small Business Offering respondents at the time of the survey, 32 had completed a project and 38 had not completed a project.

participants without email addresses. The Evaluation Team gathered online survey results via SPECTRUM and collected mailed survey responses, combining them with online results for quarterly and annual reporting.

In CY 2018, 469 Small Business Program participants and 62 Community Small Business Offering participants responded to the participant satisfaction survey.

Engineering Desk Review

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 43 Program measures (29 Small Business Program measures and 14 Community Small Business Offering measures). This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Team leveraged applicable Focus on Energy TRMs (2018 TRM and 2018 TRM Update) and associated workpapers to determine methodology and data for all the sampled measures. The evaluation sample for these reviews was selected using a weighted, random stratified sampling approach known as PPS (here, lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted 10 verification site visits for the Small Business Program in CY 2018 (six Small Business Program measures and four Community Small Business Offering measures). Site visits involved verifying the types and quantities of equipment installed, determining how the installed equipment was controlled, and documenting the installed equipment's operating hours. Site visits were selected as a subset of the Evaluation Team's sample of desk reviews, with selection made by the Evaluation Team, based upon measure types (more often targeting custom and hybrid measures for site visits than prescriptive), savings share for the evaluation sample and Program (very large measures were often targeted for site visits), and field logistics (not all chosen sites could support site visits at a given time). No on-site metering was performed for the Small Business Program in CY 2018.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Small Business Program and the Community Small Business Offering:

- Tracking database review
- ISR determination
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data to identify reported installations, and then the Team applied the results from engineering desk reviews (n=43) and verification site visits (n=10) to calculate verified gross savings for the combined Small Business Program and Community Small Business Offering. The Team applied the combined, gross, savings realization rates to *ex ante* savings for the individual programs.

As a part of the tracking database review, the Team evaluated the census of CY 2018 Small Business Program and Community Small Business Offering data contained in SPECTRUM. The effort sought to check for appropriate and consistent application of unit-level savings values and EUL values in alignment with the applicable TRM (2018 TRM and 2018 TRM Update). For measures not explicitly captured in the TRM, the Team referred to secondary sources (deemed savings reports, workpapers, other relevant TRMs, and published studies).

The Evaluation Team found generally accurate overall accounting of demand and energy savings in the SPECTRUM database, and it adhered to industry best practices. SPECTRUM offers the typical date fields, such as "Paid Date" and "Application Received Date," and offers several additional fields that help users track projects in greater detail. SPECTRUM also employed unique customer identifier numbers—a best practice not followed in many other jurisdictions—so account numbers and customer contact information can be used to easily classify unique customers.

The Team found no issues with 37 out of 43 projects sampled for impact activities. Issues identified for the remaining six projects, overall, had minor impacts on the Program's realization rates. The Evaluation Team identified two measure types that lacked a current, accepted workpaper in the available TRMs; therefore, they could not recreate the *ex ante* reported savings:

- For MMID 3106, the Team found that deemed energy savings in SPECTRUM do not align with the 2017 TRM or 2018 TRM. Deemed savings listed in the 2018 TRM were almost 25% higher than those in SPECTRUM.
- MMID 2307 (ECM Condenser/Condensing Unit Fan Motor) had a protocol in the 2018 TRM (not the 2017 TRM), but the 2018 TRM's deemed savings were higher than the deemed savings used in *ex ante* savings calculations.

The Team identified one misapplication of the measure ID in SPECTRUM, where MMID 4189 (LED Lamp, ENERGY STAR, Replacing Interior Directional Incandescent, 75W-99W, SBP) was used to calculate reported savings, but MMID 3944 (LED Lamp, ENERGY STAR, Replacing Interior Directional Incandescent, 55–74W) should have been used, based on the installed equipment. The project involved the installations of 8W LED lamps.

For two sampled LED fixture installation measures at the same customer site, the Team found a SPECTRUM data entry error, where *ex ante* savings were entered incorrectly (flip-flopped), causing a high verified savings realization rate for the first measure and a low rate for the second.

Site visits generally confirmed that Program measures were installed and operating as planned. The only deviations observed were minor, and these were captured in the Program's realization rates. Only one verification site visit identified one of six lighting fixtures not installed at the time of the visit, reducing the ISR for the measure to 83%.

The Team identified a number of measures in the Non-Residential portfolio which were evaluated inaccurately in CY 2017. In these cases, boiler measures which were submitted using claimed savings values based on the input capacity instead of the output (AHRI) capacity. The commercial boiler

measures in the TRM were based on a billing analysis and used a coefficient to correct for these rating issues. The Team revised the evaluated savings values for CY 2017 to back-out these adjustments. These impact changes were not applied to CY 2017, but rather applied in CY 2018 as part of the end-of-quadrennial reconciliation. In the Small Business Program, *ex post* gross and *ex post* net savings values increased because of these adjustments.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2018, the Evaluation Team conducted participant surveys to verify installed measures and to estimate ISRs at the measure level for the Small Business Program and Community Small Business Offering.

The Evaluation Team applied a combined, weighted ISR of 100.0% from these surveys to all engineering desk reviews without a completed site visit. The Team applied a site-specific ISR to all measures where verification site visits were performed.

Verified Gross Savings Results

Table 173 and Table 174 list annual and lifecycle realization rates for the Small Business Program and Community Small Business Offering. The Small Business Program achieved a first-year evaluated realization rate of 103%, weighted by total (MMBtu) energy savings.[84] The Community Small Business Offering achieved a first-year evaluated realization rate of 103%. Realization rates were generally the same for both programs.

Table 173. CY 2018 Small Business Program Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	103%	102%	101%	103%	105%	101%	104%

Note: Small Business Program realization rates include the Evaluation Team's CY 2017 boiler measure evaluation adjustment.

Table 174. CY 2018 Community Small Business Offering Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	103%	102%	100%	103%	105%	100%	104%

Table 175 and Table 176 list the total *ex ante* and verified annual gross savings for the CY 2018 Small Business Program and Community Small Business Offering by measure category.

[84] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 175. CY 2018 Small Business Program First Year Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	119,282	28	4,680	122,509	28	4,680
Air Sealing	0	0	34,070	0	0	34,070
Boiler	0	0	74,181	0	0	74,181
Controls	8,858,977	404	16,313	9,098,666	414	16,313
Delamping	762,204	155	0	782,826	159	0
Energy Recovery	-97	0	295	-100	0	295
Fluorescent, Linear	200,490	41	0	205,914	42	0
Fryer	0	0	5,032	0	0	5,032
Furnace	89,869	0	39,162	92,301	0	39,162
LED	32,083,108	4,222	0	32,951,149	4,322	0
Motor	6,170,283	713	0	6,337,226	729	0
Other	2,692	0	0	2,765	0	0
Oven	0	0	156	0	0	156
Packaged Terminal Unit (PTAC, PTHP)	108,914	0	0	111,861	0	0
Refrigerated Case Door	1,794	0	0	1,843	0	0
Refrigerator /Freezer—Commercial	2,060	0	0	2,116	0	0
Rooftop Unit /Split System Air Conditioner	42,855	38	10,168	44,014	39	10,168
Showerhead	2,692	0	8,760	2,765	0	8,760
Steam Trap	0	0	258	0	0	258
Tune-Up /Repair /Commissioning	1,722	3	78	1,768	3	78
Variable Speed Drive	106,239	39	0	109,113	40	0
Water Heater	93,730	5	3,334	96,266	5	3,334
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	2,118
Total First Year	**48,646,814**	**5,649**	**196,487**	**49,963,003**	**5,781**	**198,605**

[1] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 176. CY 2018 Community Small Business Offering First Year Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	189,644	0	4,940	195,988	0	4,940
Boiler	0	0	11,455	0	0	11,455
Controls	393,872	19	3,970	407,048	20	3,970
Delamping	193,704	40	0	200,184	41	0
Furnace	29,326	0	12,779	30,307	0	12,779
Infrared Heater	0	0	625	0	0	625
LED	5,747,280	822	0	5,939,546	841	0
Motor	218,773	25	0	226,092	26	0
Other	0	0	3,331	0	0	3,331
Packaged Terminal Unit (PTAC, PTHP)	50,645	0	0	52,339	0	0
Refrigerator /Freezer—Commercial	243	0	0	251	0	0
Rooftop Unit /Split System Air Conditioner	3,196	3	0	3,303	3	0

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Unit Heater	0	0	3,366	0	0	3,366
Water Heater	0	0	390	0	0	390
CY 2017 Community Small Business Offering[a]	67,379	13	1,841	69,633	13	1,841
Total First Year	**6,894,063**	**922**	**42,698**	**7,124,693**	**944**	**42,698**

[a] *Ex ante* energy savings for 24 CY 2017 Community Small Business Offering measures were not evaluated in CY 2017 due to low participation. These measures are included in the CY 2018 evaluation results and represent 2% of the overall Community Small Business Offering total lifecycle savings (MMBtu).

Table 177 and Table 178 list *ex ante* and verified gross lifecycle savings by measure category for the CY 2018 Small Business Program and Community Small Business Offering.

Table 177. CY 2018 Small Business Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	1,908,512	28	32,760	2,000,870	28	32,760
Air Sealing	0	0	671,660	0	0	671,663
Boiler	0	0	1,483,616	0	0	1,483,623
Controls	108,549,458	404	174,164	113,802,446	414	174,165
Delamping	7,629,632	155	0	7,998,850	159	0
Energy Recovery	-1,455	0	4,425	-1,525	0	4,425
Fluorescent, Linear	2,808,463	41	0	2,944,372	42	0
Fryer	0	0	60,384	0	0	60,384
Furnace	1,617,276	0	704,730	1,695,540	0	704,733
LED	413,462,759	4,222	0	433,471,286	4,322	0
Motor	92,992,974	713	0	97,493,143	729	0
Other	24,228	0	0	25,400	0	0
Oven	0	0	1,872	0	0	1,872
Packaged Terminal Unit (PTAC, PTHP)	1,633,710	0	0	1,712,769	0	0
Refrigerated Case Door	19,773	0	0	20,730	0	0
Refrigerator /Freezer—Commercial	24,720	0	0	25,916	0	0
Rooftop Unit /Split System Air Conditioner	642,819	38	152,520	673,927	39	152,521
Showerhead	24,230	0	78,844	25,402	0	78,844
Steam Trap	0	0	1,548	0	0	1,548
Tune-Up /Repair /Commissioning	7,415	3	105	7,774	3	105
Variable Speed Drive	1,593,585	39	0	1,670,703	40	0
Water Heater	937,300	5	48,590	982,658	5	48,590
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	39,792
Total Lifecycle	**633,875,399**	**5,649**	**3,415,218**	**664,550,261**	**5,781**	**3,455,027**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 178. CY 2018 Community Small Business Offering Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	1,880,668	0	48,067	1,971,678	0	48,067
Boiler	0	0	229,078	0	0	229,080
Controls	3,930,131	19	39,702	4,120,320	20	39,702
Delamping	1,937,040	40	0	2,030,778	41	0
Furnace	527,751	0	229,968	553,291	0	229,969
Infrared Heater	0	0	9,375	0	0	9,375
LED	76,130,001	822	0	79,814,127	841	0
Motor	3,542,368	25	0	3,713,792	26	0
Other	0	0	54,144	0	0	54,144
Packaged Terminal Unit (PTAC, PTHP)	759,675	0	0	796,438	0	0
Refrigerator /Freezer—Commercial	2,916	0	0	3,057	0	0
Rooftop Unit /Split System Air Conditioner	47,940	3	0	50,260	3	0
Unit Heater	0	0	50,493	0	0	50,494
Water Heater	0	0	5,850	0	0	5,850
CY 2017 Community Small Business Offering[a]	1,304,994	13	34,451	1,368,146	13	34,451
Total Lifecycle	**90,063,484**	**922**	**701,129**	**94,421,888**	**944**	**701,132**

[a] *Ex ante* energy savings for 24 CY 2017 Community Small Business Offering measures were not evaluated in CY 2017 due to low participation. These measures are included in the CY 2018 evaluation results and represent 2% of the overall Community Small Business Offering total lifecycle savings (MMBtu).

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Small Business Program and Community Small Business Offering. The Evaluation Team calculated a NTG percentage of 91% for the Small Business Program and a NTG percentage of 93% for the Community Small Business Offering. For a detailed description of the NTG analysis methodology and findings, refer to Appendix I.

Freeridership Findings

The Evaluation Team used a self-report survey method to determine each Program's freeridership level for CY 2018. For the Small Business Program, the Team estimated average self-reported freeridership rate of 10.1%, weighted by evaluated savings, and, for the Community Small Business Offering, average self-reported freeridership of 7.7%.

Table 179 lists the CY 2015, CY 2016, and CY 2018 Small Business Program, self-reported freeridership estimates, weighted by participant gross evaluated energy savings. The Evaluation Team did not conduct participant surveys in CY 2017.

Table 179. Summary of CY 2015, CY 2016, and CY 2018 Small Business Program Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	70	12.5%
CY 2016	70	6.0%
CY 2017	n/a	n/a
CY 2018	70	10.1%

Spillover Findings

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Small Business Program and Community Small Business Offering. The Evaluation Team applied evaluated and deemed savings values to spillover measures that customers said they installed due to their Program participation, as shown in Table 180

Table 180. Small Business Program and Community Small Business Offering Participant Spillover Measures and Savings

Program	Spillover Measure	Quantity	Total Lifecycle MMBtu Savings Estimate
Small Business Program	Window Air Conditioner	1	1.2
	Commercial Washer, ENERGY STAR	1	449.4
Community Small Business Offering	LEDs	4	186.3
	Water Heating Equipment	1	21.4

The Evaluation Team then divided the sample spillover savings by each Program's gross savings from the entire survey sample, as shown in the following equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate,[85] rounded to the nearest whole percentage point, for the Small Business Program respondents, and a 1% spillover estimate[86] for the Community Small Business Offering respondents (shown in Table 181).

[85] The actual value is 0.87%.

[86] The actual value is 0.98%.

Table 181. Small Business Program and Community Small Business Offering Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate	
	Small Business Program	Community Small Business Offering
Spillover Savings	451	208
Program Savings	51,629	21,260
Spillover Estimate	**1%**	**1%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

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

This yielded an 91% overall NTG estimate for the Small Business Program and 93% estimate for the Community Small Business Offering. Table 182 shows total, first-year, gross and net savings in MMBtu, along with the overall Program NTG.

Table 182. CY 2018 Annual Net Savings and Net-to-Gross Ratio

Program	Total First-Year Gross Verified Savings (MMBtu)	Total First-Year Net Savings (MMBtu)	Program First-Year NTG Percentage
Small Business Program	191,324	174,104	91%
Community Small Business Offering	28,613	26,610	93%

Table 183 and Table 184 show the annual Small Business Program and Community Small Business Offering net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category. The Evaluation Team attributed these savings as net of what would have occurred naturally without the Program's presence.

Table 183. CY 2018 Small Business Program First-Year Net Savings

Measure Category	First Year Net		
	kWh	kW	therms
Aeration	112,178	26	4,259
Air Sealing	0	0	31,004
Boiler	0	0	67,504
Controls	8,331,360	377	14,845
Delamping	716,809	144	0
Energy Recovery	-91	0	268
Fluorescent, Linear	188,549	38	0
Fryer	0	0	4,579
Furnace	84,517	0	35,637
LED	30,172,321	3,933	0
Motor	5,802,797	664	0
Other	2,532	0	0
Oven	0	0	142

Measure Category	First Year Net		
	kWh	kW	therms
Packaged Terminal Unit (PTAC, PTHP)	102,427	0	0
Refrigerated Case Door	1,687	0	0
Refrigerator /Freezer—Commercial	1,937	0	0
Rooftop Unit /Split System Air Conditioner	40,302	35	9,253
Showerhead	2,532	0	7,972
Steam Trap	0	0	235
Tune-Up /Repair /Commissioning	1,619	2	71
Variable Speed Drive	99,912	36	0
Water Heater	88,148	5	3,034
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	1,920
Total First Year	**45,749,536**	**5,261**	**180,723**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 184. CY 2018 Community Small Business Offering First-Year Net Savings

Measure Category	First Year Net		
	kWh	kW	therms
Aeration	182,269	0	4,594
Boiler	0	0	10,653
Controls	378,555	18	3,692
Delamping	186,171	38	0
Furnace	28,186	0	11,885
Infrared Heater	0	0	581
LED	5,523,778	782	0
Motor	210,265	24	0
Other	0	0	3,098
Packaged Terminal Unit (PTAC, PTHP)	48,676	0	0
Refrigerator /Freezer—Commercial	234	0	0
Rooftop Unit /Split System Air Conditioner	3,072	3	0
Unit Heater	0	0	3,131
Water Heater	0	0	363
CY 2017 Community Small Business Offering[a]	64,759	12	1,712
Total First Year	**6,625,964**	**878**	**39,709**

[a] *Ex ante* energy savings for 24 CY 2017 Community Small Business Offering measures were not evaluated in CY 2017 due to low participation. These measures are included in the CY 2018 evaluation results and represent 2% of the overall Community Small Business Offering total lifecycle savings (MMBtu).

Table 185 and Table 186 list the lifecycle Small Business Program and Community Small Business Offering net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category.

Table 185. CY 2018 Small Business Program Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Aeration	1,820,792	26	29,812
Air Sealing	0	0	611,214
Boiler	0	0	1,350,097
Controls	103,560,226	377	158,490
Delamping	7,278,953	144	0
Energy Recovery	-1,388	0	4,027
Fluorescent, Linear	2,679,378	38	0
Fryer	0	0	54,950
Furnace	1,542,942	0	641,307
LED	394,458,870	3,933	0
Motor	88,718,760	664	0
Other	23,114	0	0
Oven	0	0	1,704
Packaged Terminal Unit (PTAC, PTHP)	1,558,620	0	0
Refrigerated Case Door	18,864	0	0
Refrigerator /Freezer—Commercial	23,584	0	0
Rooftop Unit /Split System Air Conditioner	613,273	35	138,794
Showerhead	23,116	0	71,748
Steam Trap	0	0	1,409
Tune-Up /Repair /Commissioning	7,074	2	96
Variable Speed Drive	1,520,339	36	0
Water Heater	894,219	5	44,217
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	36,071
Total Lifecycle	**604,740,738**	**5,261**	**3,143,934**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 186. CY 2018 Community Small Business Offering Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Aeration	1,833,661	0	44,703
Boiler	0	0	213,044
Controls	3,831,898	18	36,923
Delamping	1,888,624	38	0
Furnace	514,560	0	213,871
Infrared Heater	0	0	8,719
LED	74,227,138	782	0
Motor	3,453,827	24	0
Other	0	0	50,354
Packaged Terminal Unit (PTAC, PTHP)	740,687	0	0
Refrigerator /Freezer—Commercial	2,843	0	0
Rooftop Unit /Split System Air Conditioner	46,742	3	0

Measure Category	Lifecycle Net		
	kWh	kW	therms
Unit Heater	0	0	46,959
Water Heater	0	0	5,441
CY 2017 Community Small Business Offering[a]	1,272,376	12	32,039
Total Lifecycle	**87,812,355**	**878**	**652,053**

[a] *Ex ante* energy savings for 24 CY 2017 Community Small Business Offering measures were not evaluated in CY 2017 due to low participation. These measures are included in the CY 2018 evaluation results and represent 2% of the overall Community Small Business Offering total lifecycle savings (MMBtu).

Process Evaluation

In CY 2018, the Evaluation Team conducted interviews and a participant survey, and reviewed materials. The process evaluation focused on participants' satisfaction with the Small Business Program and Community Small Business Offering's components, effectiveness of the Programs' marketing and processes, factors in making upgrades, payback and cost coverage requirements, and awareness and perceptions of Focus on Energy.

Program Design, Delivery, and Goals

Small Business Program Design

Through the CY 2018 Small Business Program, Focus on Energy offered customers the following to offset participation cost barriers and to encourage greater energy efficiency among customers:

- A variety of energy-efficient products selected by the customer
- Incentives approximately 30% or more above other Focus on Energy business programs
- Installation of products by a Trade Ally

The Program Implementer made two changes to its standard prescriptive offerings:

- Increased incentive levels for some measures
- Broadened measure selection
- Complementary products and services with additional incentives were discontinued

Community Small Business Offering Design

As part of PSC's initiative to enhance Focus on Energy services to rural customers, Focus on Energy developed and launched the Community Small Business Offering in CY 2018.

This offering provided community-based outreach activities and additional incentives for rural customers. The incentives—50% higher than those offered to non-rural small business customers—were intended to help rural customers overcome participation cost barriers. In addition to increased incentives, the Community Small Business Offering provided participants with free energy assessments and energy-saving kits (see Table 187 for descriptions of the four kit types). The customer had to complete the free energy assessment to receive an energy-saving kit.

Table 187. Community Small Business Offering Kit Measures

Kit Type	Measures
Restaurant Kit	9W LED, bathroom aerator, exit light retrofit, kitchen aerator, pre-rinse spray valve
Retail Kit	9W LED, bathroom aerator, exit light retrofit, BR30 LED
Office Kit	9W LED, bathroom aerator, exit light retrofit, kitchen aerator, APS
All Electric Kit	9W LED, BR30 LED, APS

Program Management and Delivery Structure

APTIM serves as the Program Administrator, managing the overall Program and Program design.

In CY 2018, Franklin Energy served as the Program Implementer, and its staff served as Energy Advisors. The Program Implementer executed the day-to-day Program operations, such as marketing and outreach activities, data management, and incentive processing.

Utility Partners also contributed to Program marketing and outreach activities and provided Trade Ally support. Trade Allies, providing the Program's main marketing channel, were responsible for educating and promoting the Program to customers, setting up projects, and installing products. Energy Advisors reviewed the work completed by Trade Allies for quality assurance and to provide technical support to Trade Allies and Utility Partners. Ten percent of projects were inspected for quality assurance, including all projects with incentives over $7,500 and no projects with incentives under $200.

Program Goals

The Small Business Program and Community Small Business Offering's overall objective was to encourage small business owners and managers to use more energy-efficient products. Table 188 shows the Programs' savings goals and results for CY 2018.

Table 188. Small Business Program and Community Small Business Offering CY 2018 Goals and Achievements

Performance Metric	CY 2018 Goal	CY 2018 Actual *Ex Ante*
Small Business Program		
Lifecycle electric savings (kWh)	569,773,025	653,115,780
Lifecycle natural gas savings (therms)	3,334,300	3,416,837
Demand reduction (kW)	5,255	5,721
Community Small Business Offering		
Lifecycle electric savings (kWh)	147,167,866	91,452,627
Lifecycle natural gas savings (therms)	232,175	659,226
Demand reduction (kW)	1,163	921

The Program Implementer tracked KPIs in addition to energy and participation achievements to measure Program performance. Table 189 shows the KPIs and CY 2018 results, as reported by the Program Implementer and, where possible, verified by the Evaluation Team through SPECTRUM.

Table 189. Small Business Program and Community Small Business Offering CY 2018 Key Performance Indicators

KPI	Goal	CY 2018 Result	CY 2018 Result Source
Small Business Program			
Success Story Development	Develop 6 success stories	Met goal (7 success stories)	As reported by Program Implementer
Customer Satisfaction	Achieve a customer satisfaction score of 8.8 or higher	Met goal (average satisfaction score of 9.2)	Evaluation Team Satisfaction Survey
Days Incentive Outstanding	Program Implementer shall average 32 business days for DIO on complete incentive applications	Met goal (26 days)	SPECTRUM
HVAC Trade Ally Participation	Increase the number of HVAC Trade Allies participating in the Program by 10%	Met goal (increased HVAC Trade Allies by 90%)	SPECTRUM
New Customer Participation	75% of participating customers are new to the Program	Met goal (91% of participants were new in CY 2018)	SPECTRUM
Community Small Business Offering			
Success Story Development	Develop 4 success stories	Met goal (20 success stories)	As reported by Program Implementer
Customer Satisfaction	Achieve a customer satisfaction score of 8.8 or higher	Met goal (average satisfaction score of 9.1)	Evaluation Team Satisfaction Survey
Days Incentive Outstanding	Program Implementer shall average 28 business days for DIO on complete incentive applications	Did not meet goal (30 days)	SPECTRUM
Trade Ally Participation	Achieve an average of three Trade Ally applications per campaign	Met goal (averaged 7 Trade Allies per campaign)	As reported by Program Implementer
New Customer Participation	Achieve an average of five unique customer applications per campaign (not including kits)	Met goal (averaged 15 customers per campaign)	As reported by Program Implementer

Data Management and Reporting

The Program Administrator and Program Implementer did not identify changes to the tracking system or reporting features from CY 2017 to CY 2018. The Program Implementer continued to manage data and generate reports through SPECTRUM.

Marketing and Outreach

Customer Marketing and Outreach

In CY 2018, the Small Business Program partnered with the Business Incentive Program to conduct customer marketing and outreach. The Program Implementer targeted different industries and markets in the following quarterly and year-long marketing campaigns:

- Q1 marketing to hospitality and restaurant businesses
- Q2 marketing to healthcare facilities
- Q3 marketing to taverns

Though each marketing focus used Trade Allies, direct mail, newsletters, radio, social media, associations, and events as channels for promoting the Program, the Program Implementer considered Trade Allies as the most effective means of attracting customers to the Program.

For the Community Small Business Offering, the Program Implementer launched six marketing strategies:

1. Collaborate with the Utility Partner to understand which approach worked best for the community, identifying customers for targeting, and setting up cobranding.
2. Identify and engage Trade Allies in the target area by providing special trainings and Program materials on rural customers.
3. Host meetings with the Chamber of Commerce and Rotary Club in the target area to ask for help in organizing events and displays.
4. Make customers aware of the offering through direct mail and promotion on social media.
5. Conduct door-to-door customer outreach (canvassing).
6. Promote a six-month bonus offering to rural customers (50% increase on incentives) and Trade Allies ($200 bonus per application).

Trade Ally Marketing and Outreach

Outreach generally remained the same as that from the previous year, using emailed newsletters, Energy Advisors, meetings, and training sessions to inform Trade Allies about the latest Program updates. The Small Business Program and Community Small Business Offering adopted the Trade Ally ranking system consistent with other nonresidential programs to track engagement (though the systems differed slightly due to differing incentives). Trade Allies were rated as Platinum, Gold, Silver, or Green based on:

- Applications submitted
- Savings delivered (MMBtu)
- Historical small business participation

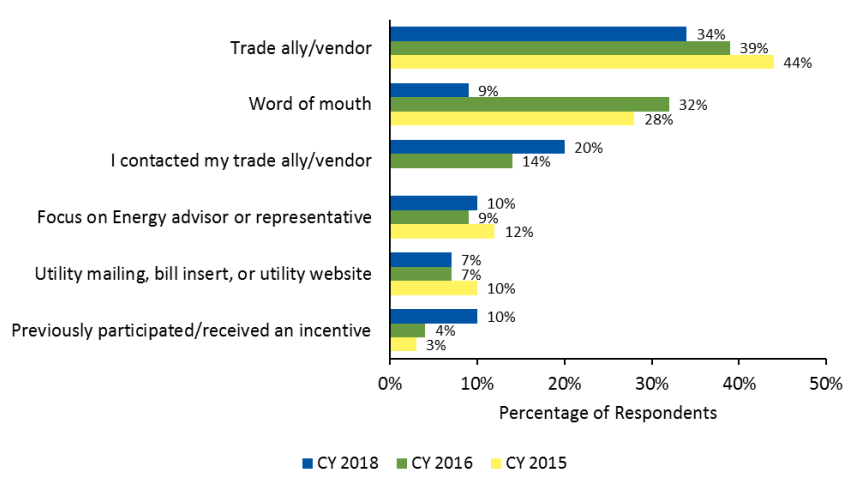
Small Business Program Participant Survey

This section summarizes the results from the Small Business Program participant survey. The following section summarizes the results from the separate Community Small Business Offering participant survey.

Customer Program Awareness

Trade Allies and vendors continued to serve as the primary means for informing small businesses about the Program. As shown in Figure 103, 34% of participant survey respondents learned about the Program from a Trade Ally or vendor, and 20% learned of it by contacting a Trade Ally or vendor. Learning about the Program through word-of-mouth significantly decreased from the 32% identified for the CY 2016 evaluation.[87] None of the other differences between CY 2016 and CY 2018 were statistically significant.

Figure 103. How Small Business Program Participants Learned about the Program

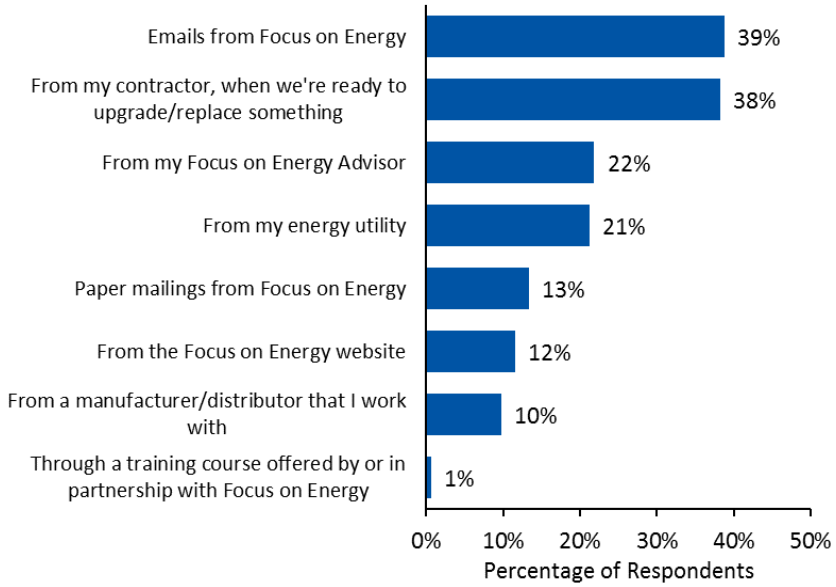


Source: Participant Survey Question D2. "How did your business learn about Focus on Energy's Small Business Program?" Multiple responses allowed (CY 2018 n=70, CY 2016 n=69, CY 2015 n=68)

When Small Business Program respondents were asked who they sought as a trusted information source regarding energy efficiency upgrades for their businesses, 61% said their Trade Ally and 13% said a utility representative (n=70). Most respondents found their Trade Allies through past work with them (31%) or through word of mouth (27%; n=70). Small Business Program participants were also asked how they most preferred to learn about energy efficiency opportunities for their organization (Figure 104). The two top responses were e-mails from Focus on Energy (mentioned by 39%) and from their contractors (38%).

[87] Statistically significant at p≤0.05.

Figure 104. Small Business Program Participants' Preferred Methods for Learning About Energy Efficiency Opportunities

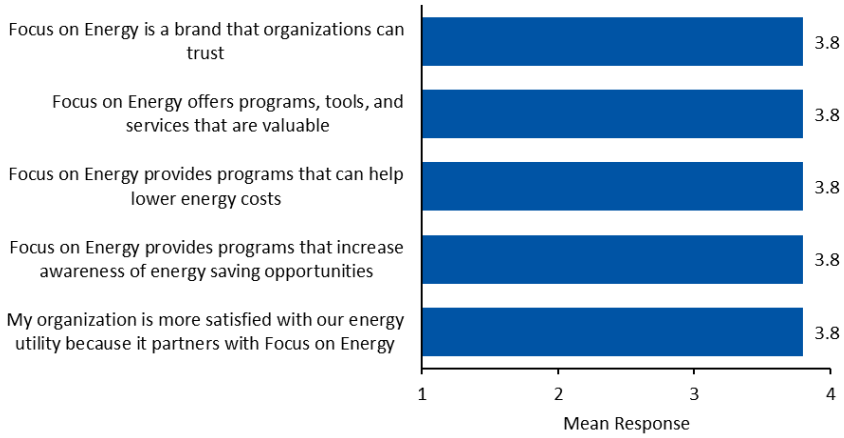


Source: Small Business Program Participant Satisfaction Survey Question. "How do you MOST prefer to learn about energy efficiency opportunities for your organization? Please choose your top two from the list below." (n=165; this question was asked in online surveys but was not included in mail surveys)

Perceptions of Focus on Energy

When Small Business Program participants were asked what came to mind when thinking of Focus on Energy, respondents (n=70) most frequently said saving energy (40%), saving money (37%), rebates/incentives (14%), good programs (14%), and lighting (6%). To assess their perceptions of the organization, respondents also were asked to rate their agreement with statements about Focus on Energy. As shown in Figure 105, respondents strongly agreed with the provided statements.

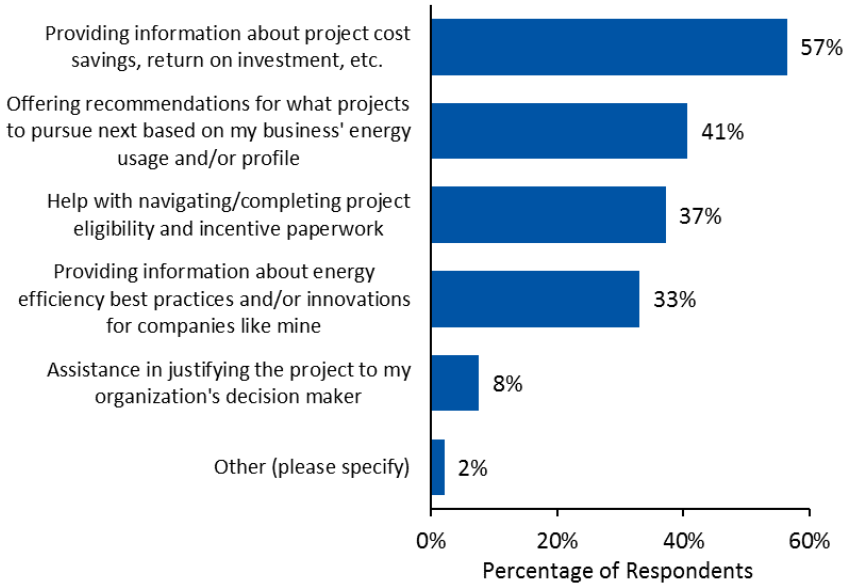
Figure 105. Small Business Program Respondents' Agreement with Statements about Focus on Energy



Source: Participant Survey Question C2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you agree or disagree with these statements." (CY 2018 n=70)

Small Business Program participants were asked how Focus on Energy could best support their organizations aside from providing incentives (Figure 106). The two top suggestions were providing information about project cost savings (mentioned by 57%) and offering recommendations for what projects to pursue based on their business' energy usage (41%).

Figure 106. Small Business Program Participants' Preferred Services from Focus on Energy



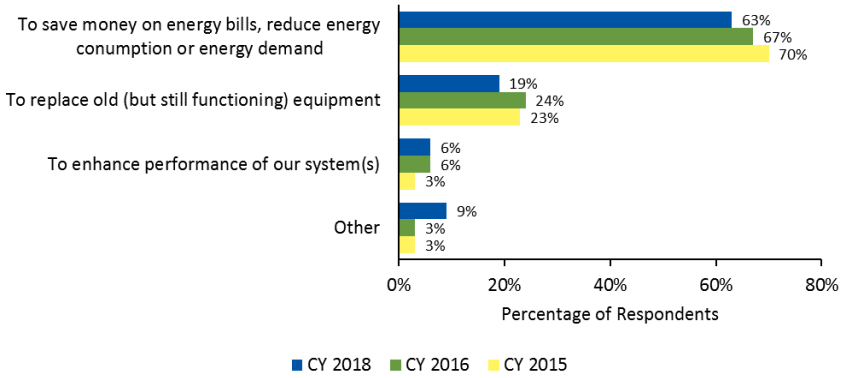
Source: Small Business Program Participant Satisfaction Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward? Choose your top two from the list below." (n=145; this question was asked in online surveys but was not included in mail surveys)

Decision-Making Process

Participants considered energy efficiency an important decision-making factor when making upgrades. When asked about the importance of energy efficiency in their decision-making, 76% of respondents said energy efficiency was *very important* and 23% said it was *somewhat important* (one respondent said *not too important*).

As shown in Figure 107, when asked to name the most important decision-making factor for making energy-efficient upgrades through the Program, saving money and energy was reported by 70%, whereas 23% cited replacing old equipment. These findings were consistent with previous survey results.

Figure 107. Most Important Factor in Making Energy-Efficient Upgrades

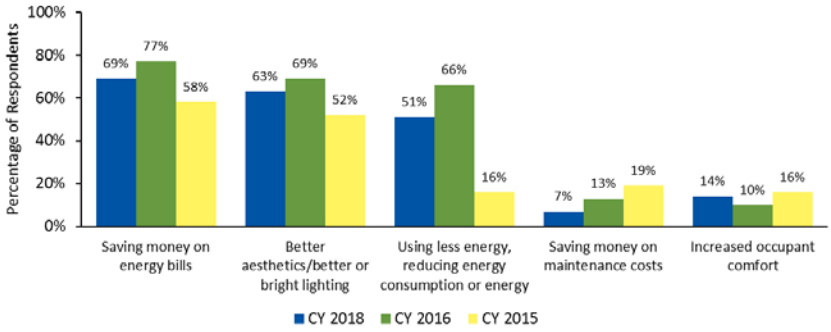


Source: Participant Survey Question E1. "What factor was most important to your business' decision to make these energy-efficient upgrades through the Small Business Program?" (CY 2018 n=70; CY 2016 n=70; CY 2015 n=70)

Program Benefits

Participants considered saving money on energy bills, better aesthetics, and using less energy as the greatest benefits from conducting the Program energy-efficient upgrades. As shown in Figure 108, 69% of respondents cited saving money on energy bills as one of the top benefits, followed by 63% who cited better aesthetics and 51% who cited using less energy. No statistically significant differences emerged between CY 2018 and CY 2016. In CY 2018, however, significantly more respondents found using less energy as a benefit (51%) compared to CY 2015 (16%), whereas significantly fewer respondents in CY 2018 listed saving money on maintenance costs as a benefit (7%) compared to CY 2015 (19%).[88]

Figure 108. Top Benefits Resulting from Energy-Efficient Upgrades



Source: Participant Survey Question F1. "What would you say are the main benefits your business has experienced as a result of the energy efficiency upgrades through the Small Business Program?" Multiple responses allowed (CY 2018 n=70; CY 2016 n=70; CY 2015 n=69)

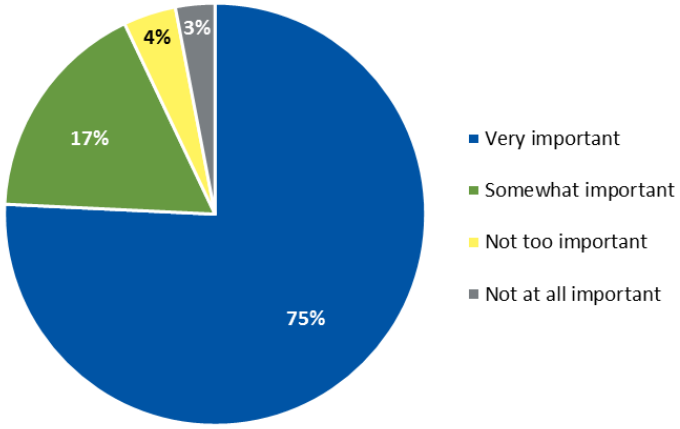
Trade Ally Impact on Product Decisions and Satisfaction

As shown in Figure 109, 75% of respondents said their Trade Ally's role was *very important* in their decisions about Program products to install. Only 7% of respondents said their Trade Ally was *not too*

[88] Statistically significant at p≤0.05.

important or *not at all important*. Similarly, most respondents were *very likely* to work with the same Trade Ally again, with 79% rating their likelihood to do so greater than or equal to an 8 on a 10-point scale (ranging from 0, *not at all likely*, to 10, *extremely likely*). Respondents not likely using their Trade Allies cited factors such as shopping for different vendors for each project (n=2), the price being too high (n=1), not seeing expected savings (n=1), the Trade Ally changing companies (n=1), and not liking their Trade Ally (n=1).

Figure 109. Trade Ally's Importance on Product Decisions



Source: Participant Survey Question E7. "How important was your Trade Ally in helping you make decisions about the Program products to install? Would you say the Trade Ally was…" (n=69)

Incentives of Interest

When respondents were asked which Small Business Program incentives and products initially interested them in participating, 79% said lighting, followed by heating systems (3%; n=70). Many respondents did not know of other incentives or products (besides LEDs) offered by the Small Business Program (47%, n=70). If respondents knew of other incentives or products, they were most familiar with refrigeration (11%) or heating systems (11%).

Barriers to Participation and Opportunities

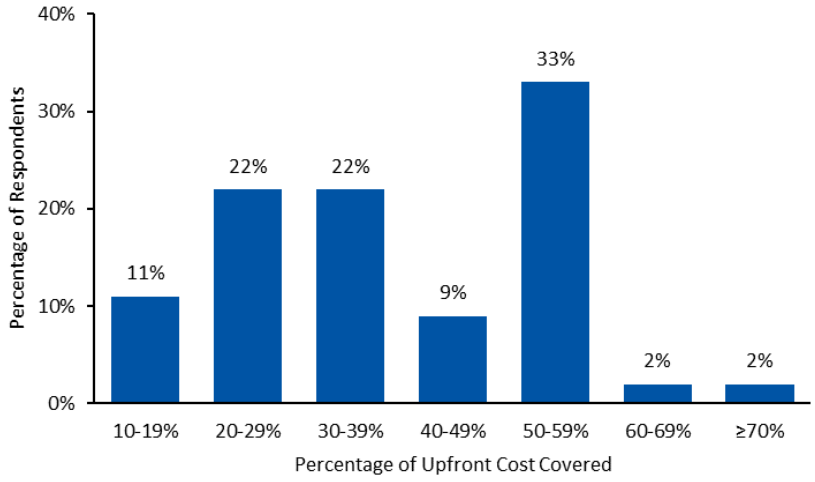
Although cost remained the greatest participation barrier to the Small Business Program, the percentage of respondents citing cost as the biggest challenge to making energy-efficient improvements significantly decreased between CY 2016 (80% of 66 respondents) and CY 2018 (53% of 70 respondents) .[89] Cost barriers between the Small Business Program and the Business Incentive Program did not significantly differ. In CY 2018, other Small Business Program barriers included replacing equipment without affecting operations (10%), lack of awareness about incentives (7%), and long payback periods (6%). Consistent with cost-barrier responses, when asked what could be done to overcome participation challenges, 41% of respondents said higher incentives and 13% said instant discounts (n=70).

[89] Statistically significant at p≤0.05.

Despite high initial costs, chain of command burdens among Small Business customers seemed less than those among other nonresidential customers: 67% of Small Business Program respondents said they did not require approval from someone else in the business to make energy-efficient upgrades (n=70), compared to a 32% from Business Incentive Program respondents (n=137).

With the considerable focus on upgrade costs, it comes as little surprise that Small Business Program participants wanted to see relatively fast paybacks on their upgrades. When asked about their businesses' preferred payback period for an energy efficiency project, participants' average response was 2.5 years (n=61). Respondents also were asked what percentage of upfront costs would Focus on Energy have to cover to persuade the business to invest in an energy efficiency project. As shown in Figure 110, 44% of respondents needed 20% to 39% of upfront costs covered to invest in an energy efficiency project, and 42% would need 40% to 59% covered to invest in an energy efficiency project.

Figure 110. Percentage of Upfront Cost Needed for Participants to Invest in an Energy Efficiency Project



Source: Participant Survey Question F5. "What percentage of the upfront cost would Focus on Energy need to cover to get you to invest in an energy efficiency project?" (n=58)

Ease of Participation and Suggestions for Improvements

When the Evaluation Team asked Small Business Program survey respondents if they understood the Program's eligibility requirements, 79% said they did and 10% said they did not (11% said *don't know*; n=70). Similarly, most respondents found it easy to understand how the Small Business Program worked (46% *very easy*, 37% *somewhat easy*, 10% *somewhat challenging*; n=70) as well as easy to complete the paperwork (44% *very easy*, 48% *somewhat easy*, 4% *somewhat challenging*; n=25). Respondents with difficulties in understanding the Program said the provided materials were challenging to understand without a contractor's help.

Community Small Business Offering Participant Survey

Of 70 Community Small Business Offering participants surveyed, 32 completed a qualifying project through the Program. The 38 remaining respondents who did not complete a project received the free

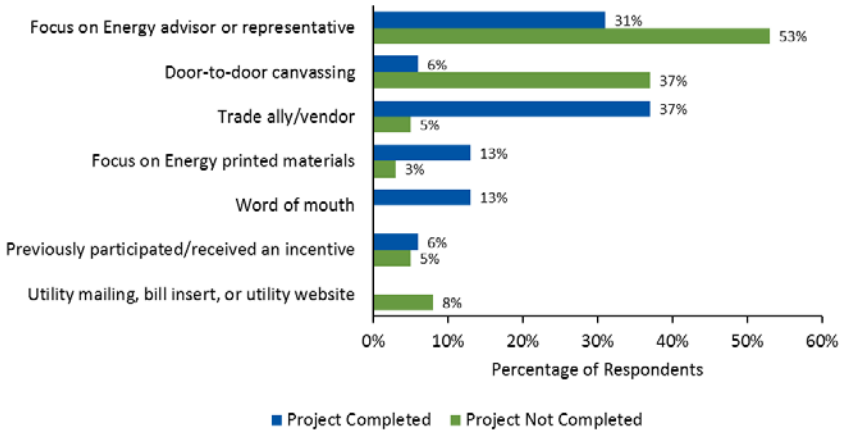
energy-saving kit.[90] When applicable, the Evaluation Team compared results between respondents who completed a project and respondents who did not.

Customer Program Awareness

In contrast with the Small Business Program, where Trade Allies served as the most common awareness channel, Energy Advisors and representatives served as the most common means informing surveyed participants about the Community Small Business Offering, although the channel was significantly less common for respondents completing a project (31%) than for those who did not (53%).

As shown in Figure 111, learning about the Program via door-to-door canvassing proved significantly less common for respondents completing a project (6%) compared to those who did not (37%). Respondents completing a project were significantly more likely to learn about the Program through a Trade Ally or vendor (37%) or via word of mouth (13%) compared to those not completing a project (5% and 0%, respectively).[91] No other significant differences appeared for awareness channels.

Figure 111. How Community Small Business Offering Participants Learned About the Program



Source: Participant Survey Question F2. "How did your business learn about Focus on Energy's Community Small Business Offering?" Multiple responses allowed (project completed n=32, project not completed n=38)

When Community Small Business Offering respondents were asked who they sought as a trusted information source regarding energy efficiency upgrades for their businesses, respondents most frequently cited Trade Allies (similar to Small Business respondents). Respondents completing a project said Trade Allies served as a trusted source significantly more often (53%) than those not completing a project (32%; n=70).[92] The second most-frequently cited trusted information sources were respondents' Focus on Energy Advisors, although no difference emerged between respondents completing a project

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[90] This survey disposition is proportional to the final year-end population. Forty-two percent of the 495 unique customers received a kit without completing a project, compared to 45% of the survey respondents.

[91] Statistically significant at p≤0.05.

[92] Statistically significant at p≤0.05.

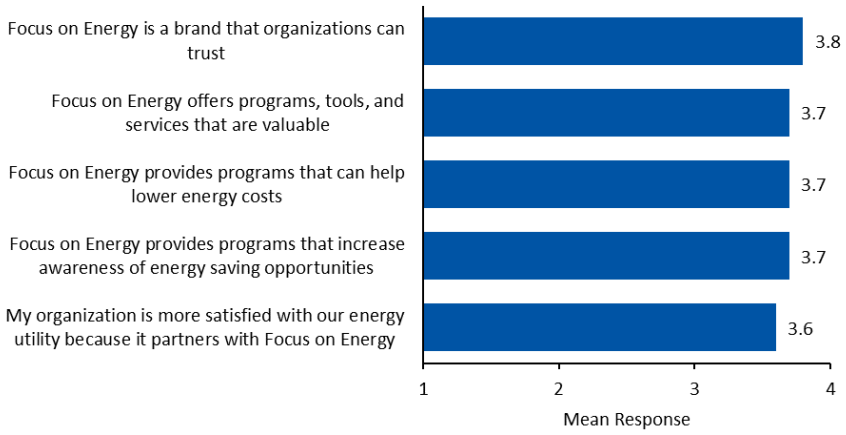
(38%) and those who did not (34%). Respondents completing a project found their Trade Allies through their previous work with them (47%) or through word-of-mouth (34%; n=32).

Perceptions of Focus on Energy

Consistent with the Small Business Program, upon asking what came to mind when thinking of Focus on Energy, Community Small Business Offering respondents (n=70) primarily said saving money (51%), followed by saving energy (47%), good programs (16%), lighting (13%), rebates/incentives (7%), and upgrades (6%).

The Evaluation Team also asked respondents to rate their agreement with statements about Focus on Energy to assess their perceptions of the organization. As shown in Figure 112, respondents *strongly agreed* with all the provided statements, particularly the statement, "Focus on Energy is a brand that organizations can trust."

Figure 112. Community Small Business Offering Respondents' Agreement with Statements about Focus on Energy



Source: Participant Survey Question E2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you agree or disagree with these statements." (CY 2018 n=70)

Free Assessment and Kit Experience

Small Business Community Offering respondents who did not complete a project were asked about the free energy assessment and kit they received through the Program. Nearly all (95%) respondents (n=38) recalled that Focus on Energy staff performed a free energy assessment of their facility (one said no, one said *don't know*). Overall, respondents thought the free energy assessment was helpful, with the average response as 8.3 on a 10-point scale ranging from 1 (*not at all helpful*) to 10 (*very helpful*).

Regarding the free-energy saving kit respondents received, most recalled ordering the kit through in-person canvassing (47%) or online (18%). Respondents were satisfied with the kit, with an average rating of 8.7 on a 10-point scale ranging from 1 (*not at all satisfied*) to 10 (*very satisfied*).

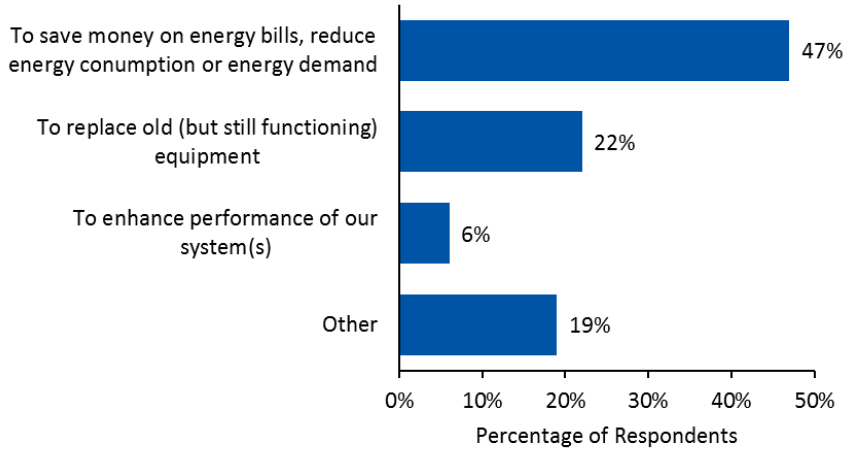
When asked why they did not complete a project, respondents (n=38) provided the following reasons:

- Only wanted to replace light bulbs (29%)
- Cost of making upgrades was too high/not enough capital (18%)
- Building was newer/already made upgrades (13%)
- Waiting to complete project (13%)
- Do not own the building (11%)
- Do not have time (11%)
- Have not received the correct rebate for the past upgrade (5%)
- Desired upgrade is not rebated (5%)

Decision-Making Process

Consistent with the Small Business Program, participants completing a project considered energy efficiency as an important decision-making factor. When asked about energy efficiency's importance in decision-making, 69% of respondents said energy efficiency was *very important,* and 31% said it was *somewhat important*. When asked to name the most important decision-making factor for making energy-efficient upgrades through the Program, 47% reported saving money and energy, whereas 22% said replacing old equipment was the biggest factor (see Figure 113).

Figure 113. Most Important Factor in Making Energy-Efficient Upgrades



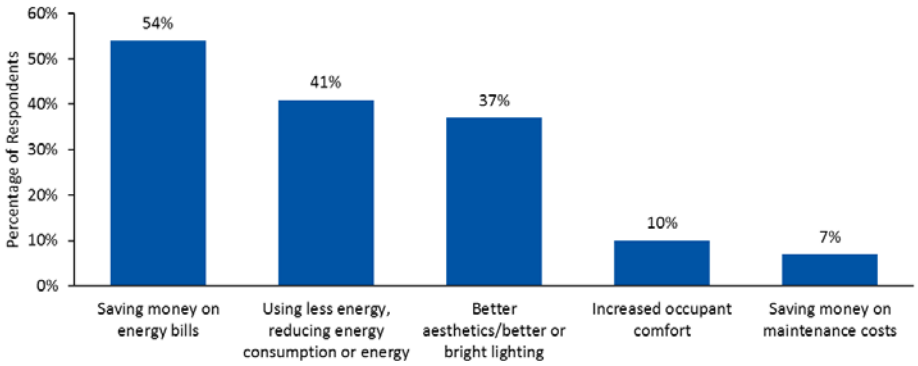
Source: Participant Survey Question G1. "What factor was most important to your business' decision to make these energy-efficient upgrades through the Community Small Business Offering Program?" (n=32)

Program Benefits

Participants consider saving money on energy bills, better aesthetics, and using less energy as the greatest benefits from making the Program's energy-efficient upgrades—reasons comparable to Small Business respondents.

As shown in Figure 114, respondents said saving money on energy bills (54%), using less energy (41%), and better aesthetics (37%) were the top benefits from making upgrades.

Figure 114. Top Benefits Resulting from Energy-Efficient Upgrades

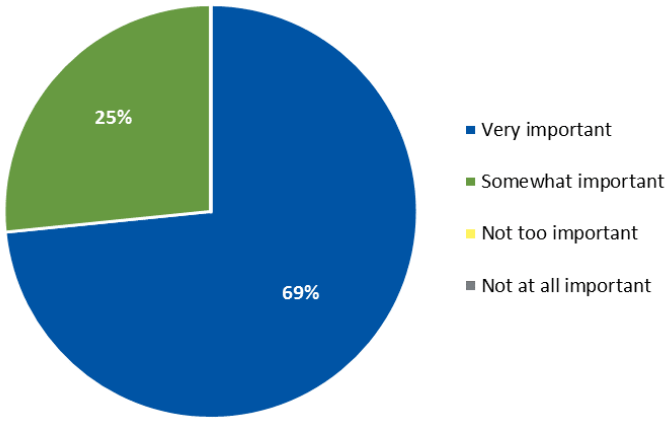


Source: Participant Survey Question H1. "What would you say are the main benefits your business has experienced as a result of the energy efficiency upgrades through the Community Small Business Offering?" (project completed n=32, project not completed n=38)

Trade Ally Impact on Product Decisions and Satisfaction

As with Small Business respondents, when Community Small Business Offering respondents (who completed a project) were asked how important their Trade Allies were in their decisions about Program products to install, 69% of respondents said their Trade Ally was *very important* (n=32, see Figure 115). No respondents said their Trade Ally was *not too important* or *not at all important* (one respondent did not answer, and one said *don't know*). Community Small Business Offering respondents also were significantly more likely to work with the same Trade Ally again (mean = 9.4) compared to Small Business Program respondents (mean = 8).[93]

Figure 115. Trade Ally's Importance on Product Decisions



Source: Participant Survey Question G8. "How important was your Trade Ally in helping you make decisions about the Program products to install? Would you say the Trade Ally was…" (n=32)

[93] Statistically significant at p≤0.05. Responses on a 10-point scale ranging from 1 (*not at all likely*) to 10 (*extremely likely*).

Incentives of Interest

Similar to Small Business respondents, when asked which Community Small Business Offering incentives and products initially interested them in participating, respondents most frequently said lighting, with respondents completing a project selecting this option (75%) significantly more frequently than respondents who did not (37%). This was followed by the free energy assessment and the free energy-saving kit, both of which were selected more frequently by respondents not completing a project (16% and 16%, respectively) compared to respondents completing a project (3% and 0%, respectively), indicating those following through with the project may have been interested in a deeper lighting upgrade from the start.[94]

When asked what programs offered the most value to small business such as theirs, respondents most frequently said lighting (project completed 44%, project not completed 50%), followed by heating systems (project completed 19%, project not completed 13%) and cooling systems (project completed 3%, project not completed 11%).

Barriers to Participation and Opportunities

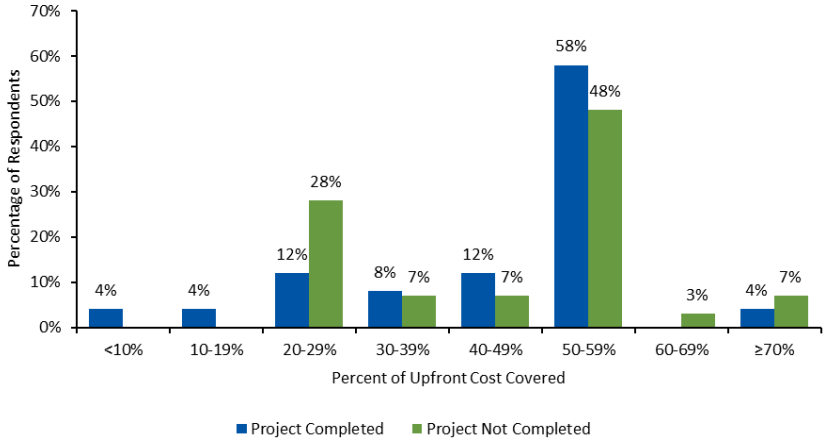
As with the Small Business Program, cost presented the biggest participation barrier: 59% of respondents completing a project (n=32) and 68% of respondents not completing a project (n=38) said high initial costs presented the biggest challenge to making energy-efficient improvements within their business. This barrier was followed by business budget limitations and long payback periods. In accordance with these findings, when asked what could be done to overcome participation challenges, respondents most frequently said offering higher incentives and instant discounts. No significant differences emerged between respondents completing a project and respondents not doing so.

Akin to Small Business respondents, the chain of command proved less of a burden for Small Business Community Offering respondents compared to other nonresidential customers: 47% of respondents completing a project said they required approval from someone else in the business for making energy-efficient upgrades (n=32), whereas 42% of respondents who did not complete a project required approval from someone else (n=38).

As with Small Business Program participants, Community Small Business Offering participants wanted to see relatively fast paybacks on their upgrades, reporting they required 2.5 years on average (n=56), the same as Small Business participants). The Evaluation Team also asked respondents what percentage of upfront costs Focus on Energy would need to cover for the business to invest in an energy efficiency project. As shown in Figure 116, a majority of respondents needed 50% or more of the upfront costs covered to invest in an energy efficiency project. These responses did not significantly differ between respondents completing a project and those not doing so, nor did significant differences emerge with Small Business participants.

[94] Statistically significant at p≤0.05.

Figure 116. Percentage of Upfront Cost for Participants to Invest in Energy Efficiency Project



Source: Participant Survey Question H5. "What percentage of the upfront cost would Focus on Energy need to cover to get you to invest in an energy efficiency project?" (project completed n=26, project not completed n=29)

Ease of Participation and Suggestions for Improvement

When Community Small Business Offering respondents were asked to rate how easy it was to understand the Program, 41% said *very easy* and 41% said *easy* (16% said *somewhat challenging*, n=32)—results comparable to those of Small Business respondents.[95] Of surveyed respondents taking a lead role in completing the application form (n=9), six respondents found the application *very easy* or *easy* to complete, and three said it was *somewhat challenging*. Respondents having difficulty said the provided materials were challenging to understand without a contractor's help (n=3), and the Program was generally confusing (n=1). Respondents saying the application was difficult to complete were not sure if they completed it correctly (n=1), found the list of refunded bulbs confusing (n=1), and the application took too long to complete (n=1).

Most respondents (projects completed 66%; projects not completed 87%) did not comment on tactics Focus on Energy could use to improve the overall Program experience. The 19 respondents offering comments requested more face-to-face interactions (n=4); better or more communications about the Program's processes (n=4); a simpler application process (n=3); a larger selection of products (n=3); an increased incentive amount (n=2); a quicker response time (n=2); and an online application option (n=1).

Small Business Programs' Satisfaction Surveys

The Evaluation Team conducted an ongoing participant satisfaction survey, administered quarterly, with the Team collecting responses from 469 Small Business Program participants and 62 Community Small Business Offering participants (property owners, managers, and building developers).

The Evaluation Team used these surveys to investigate satisfaction with the Program and its components, and the respondents' likelihood to recommend the Program.

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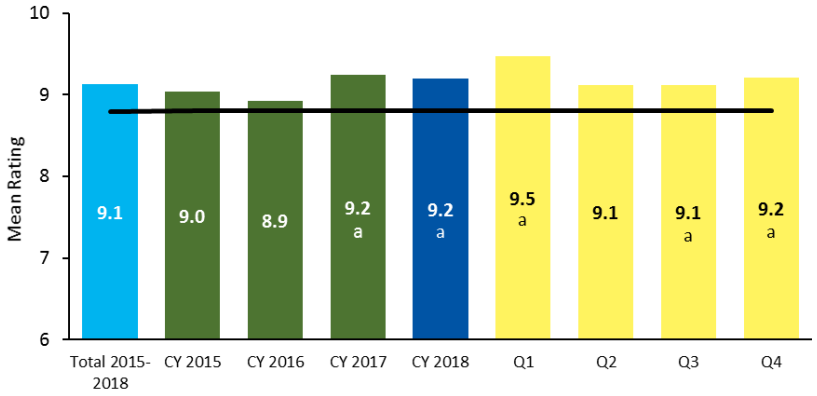
[95] Only participants who completed a project were asked this question.

Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2018, the Program Administrator and Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Small Business Program. Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.[96]

Figure 117 shows that the average overall satisfaction rating with the Program was 9.2 among CY 2018 participants, which is significantly higher than the portfolio baseline of 8.8.[97] The average ratings during Q1, Q3 and Q4 were also statistically higher than the portfolio baseline.[98] This chart does not include satisfaction ratings from Community Small Business Offering participants. Community Small Business Offerings provided an overall satisfaction rating of 9.1 in CY 2018 (see Figure 118).

Figure 117. CY 2018 Overall Satisfaction with the Small Business Program



Source: Small Business Program Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=256, CY 2016 n=198, CY 2017 n=255, CY 2018 n=461, Q1 n=57, Q2 n=52, Q3 n=143, Q4 n=188). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

[a] Denotes that the result for the year or quarter is statistically significant different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

[96] The number of participants who completed a survey does not always match the number of responses for each question because some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[97] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

[98] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to program participation dates. Survey responses without participation dates were included in the year-end total but not the quarterly breakdown.

Table 190 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. Each component was asked about on a scale of 0 to 10. For all of these items, CY 2018 average ratings were not statistically different than CY 2017.

Table 190. CY 2018 Average Ratings for Small Business Program

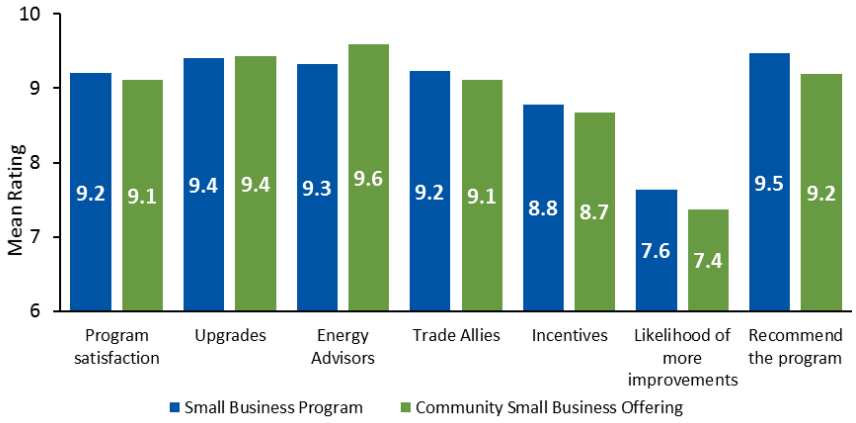
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.1	9.0	9.4	9.4
Satisfaction with Energy Advisors	*Not asked*	*Not asked*	9.4	9.3
Satisfaction with Trade Ally	9.1	9.1	9.2	9.2
Satisfaction with incentive	8.6	8.6	8.8	8.8
Likelihood of more improvements	7.2	6.7	7.6	7.6
Likelihood of recommending the Program	*Not asked*	9.1	9.5	9.5

Note: This table excludes the Community Small Business Offering.

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Small Business Program. 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 Small Business Program NPS was +83 for CY 2018, similar to +85 for the Program in CY 2017.

The Evaluation Team also surveyed Community Small Business Offering participants to measure their satisfaction with various aspects of the Program. This new rural offering was launched during CY 2018, so there are no prior periods for comparison. Figure 118 shows the average CY 2018 ratings for the Community Small Business Offering compared to Small Business Program participant ratings; none of these differences were statistically significant. The NPS for the Community Small Business Offering was +71.

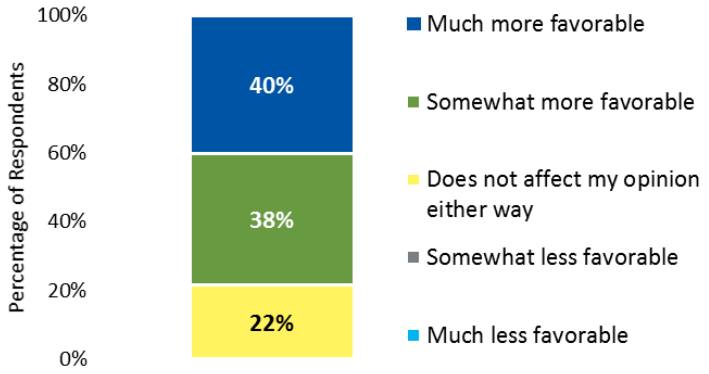
Figure 118. CY 2018 Satisfaction with the Community Small Business Offering Compared to Satisfaction with the Small Business Program



Source: Small Business Program and Community Small Business Offering Ongoing Participant Satisfaction Survey Questions. Satisfaction with each component asked on a scale of 0 to 10.The total number of CY 2018 surveys completed was 469 for Small Business Program participants and 62 for Community Small Business Offering participants; the number of valid survey responses varies for each question.

Small Business Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 40% gave the highest rating of *much more favorable* (Figure 119). Only 22% said their opinion was not affected, and no survey respondents (0%) reported that their opinion of their utility had become less favorable.

Figure 119. Effect of Focus on Energy Offerings on Small Business Program Participants' Opinion of Utilities



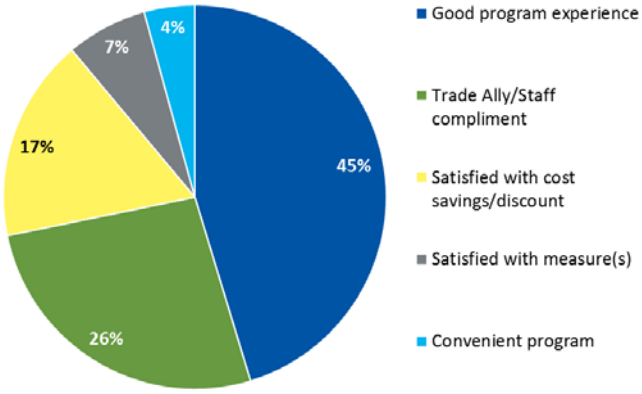
Source: Small Business Program Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (n=162; this question was asked in online surveys but was not included in mail surveys)

Suggestions for Improvement

At the conclusion of the ongoing participant satisfaction survey, respondents answered whether they had any additional comments or suggestions for improving the Program. Of the 469 Small Business Program participants who responded to the survey, 154 (or 33%) provided open-ended feedback, which the Evaluation Team coded into a total of 175 mentions. Of these mentions, 117 were positive or complimentary comments (67%), and 58 were suggestions for improvement (33%).

The positive responses are shown in Figure 120. Most of these comments reflected a generally positive Program experience (45%) or a Trade Ally or Focus on Energy staff compliment (26%), which were also the two most common categories of positive comments in previous years. Though the Community Small Business Offering responses are not included in the charts below, 21 respondents offered open-ended feedback, which was in-line with the themes reported by Small Business respondents.

Figure 120. CY 2018 Positive Comments About the Small Business Program

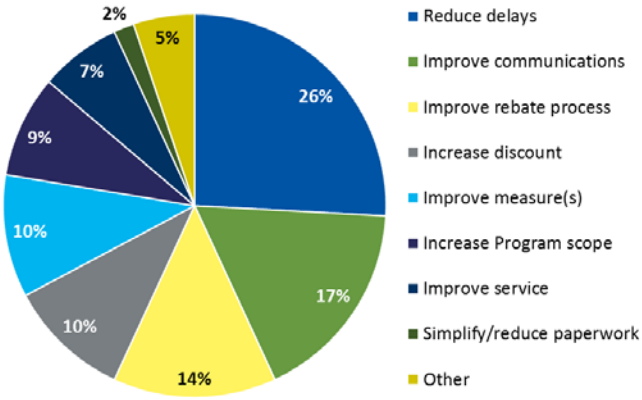


Source: Small Business Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=117)

Suggestions for improvement are shown in Figure 121. The most frequent of these suggestions were to reduce delays (26%), improve communications (17%), and improve the rebate process (14%).

Participant suggestions to improve communications focused on increasing awareness for the Program through more outreach and marketing, making information on which measures qualify for discounts more readily available, and receiving a confirmation email once an application has been submitted. Participant suggestions to improve the rebate process focused on streamlining and shortening the process, extending the rebate application deadlines, and ensuring correct rebate amounts for qualifying products are communicated to the customer.

Figure 121. CY 2018 Suggestions for Improving the Small Business Program



Source: Small Business Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=58)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 191 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Small Business Program.

Table 191. Small Business Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$5,032,740	$2,344,328	$4,142,650	$3,759,992

The Evaluation Team found that the CY 2018 Small Business Program was cost-effective (4.97). Table 192 lists the evaluated costs and benefits.

Table 192. Small Business Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$65,348	$297,595	$313,672	$337,049
Delivery Costs	$2,057,919	$1,215,203	$1,280,855	$1,376,311
Incremental Measure Costs	$7,773,173	$4,896,648	$10,818,975	$8,398,051
Total Non-Incentive Costs	**$9,896,441**	**$6,409,446**	**$12,413,501**	**$10,111,411**
Benefits				
Electric Benefits	$39,466,467	$20,301,742	$31,802,438	$24,317,163
Gas Benefits	$2,465,132	$678,361	$179,719	$162,637
Emissions Benefits	$7,274,204	$3,553,473	$5,193,825	$3,992,762
Total TRC Benefits	**$49,205,803**	**$24,533,576**	**$37,175,982**	**$28,472,561**
Net TRC Benefits	**$39,309,363**	**$18,124,130**	**$24,762,480**	**$18,361,150**
TRC B/C Ratio	**4.97**	**3.83**	**2.99**	**2.82**

Table 193 lists the CY 2018 incentive costs for the Community Small Business Program.

Table 193. Community Small Business Program Incentive Costs

	CY 2018
Incentive Costs	$1,026,994

The Evaluation Team found that the CY 2018 Community Small Business Program was cost-effective (3.03). Table 194 lists the evaluated costs and benefits.

Table 194. Community Small Business Program Costs and Benefits

Cost and Benefit Category	CY 2018
Costs	
Administration Costs	$63,472
Delivery Costs	$1,311,978
Incremental Measure Costs	$1,100,909
Total Non-Incentive Costs	**$2,476,360**
Benefits	
Electric Benefits	$5,919,095
Gas Benefits	$504,451
Emissions Benefits	$1,071,418
Total TRC Benefits	**$7,494,964**
Net TRC Benefits	**$5,018,604**
TRC B/C Ratio	**3.03**

Evaluation Outcomes and Recommendations

Overall, the Small Business Programs performed well in CY 2018, meeting their stated energy goals and achieving high customer satisfaction levels. The Evaluation Team identified the following outcomes and recommendations to improve the Small Business Programs.

Outcome 1. LEDs, though responsible for an increasingly lower share of Program savings, still dominated product installations and drove customer participation in the Small Business Program during CY 2018. Similar to CY 2016, LEDs served as the primary participation driver for small businesses. The Program Administer reported that the percentage of the Program's savings that LEDs are responsible for decreased between CY 2017 and CY 2018 as the eligible measures expanded, however, many surveyed participants (47%) in the Small Business Program did not know of other incentives or products besides LEDs.

Recommendation 1. The Program Administrator and Program Implementer should continue to work toward expanding awareness and uptake of non-lighting measures through the Program. Work with Trade Allies to develop customer opportunities and incentives that encourage installations of non-LED products. Although the Program increased incentives for products, most customers purchased LEDs through the Program.

Outcome 2. Trade Allies proved influential in participants' product installation decisions, while customers contacted by door-to-door canvassers through the Community Small Business Offering were less likely to move forward with a project. Surveyed Small Business Program and Community Small Business Offering respondents reported that Trade Allies proved *very influential* in their decisions about which Program products to install. Additionally, respondents for both programs were highly satisfied with their Trade Allies and would likely work with them again.

In the Community Small Business Offering, Trade Allies played a central role in participants' project completion decisions, given that surveyed participants completing a project most likely learned of the Program through a Trade Ally (37%) compared to those not completing a project (13%).

Recommendation 2. Continue to build relationships with Trade Allies and consider them as key outreach partners for the core Small Business Program and future kit programs. Trade Allies not only play a central role in participants' product decisions, but they provided the primary project completion mechanism in the Community Small Business Offering. In future kit programs, the Program should consider offering opportunities that provide sales training and marketing resources to its Trade Allies, so they can enhance promotion and continue to boost kit-to-project conversions.

Renewable Energy Competitive Incentive Program

Through the Renewable Energy Competitive Incentive Program (RECIP), Focus on Energy offers financial incentives to Wisconsin business customers for eligible, cost-effective renewable energy projects. The Program Administrator issues a request for proposals (RFP) and selects winning proposals through a competitive bid process. The Program Implementers (Franklin Energy, CESA, and Leidos) process the awarded projects, using an arrangement similar to the custom program path requirements of the Business Incentive, Agriculture, Schools, and Government Program and the Large Energy Users Program.

In CY 2018, Focus on Energy did not release new Program RFPs for projects to be completed as part of the CY 2015–CY 2018 quadrennial, though a portion of the funding continued to be dispersed for projects already underway and completed in CY 2018. Focus on Energy did, however, release an RFP to begin soliciting projects for CY 2019.

Table 195 lists the Program's actual spending, savings, participation, and cost-effectiveness.

Table 195. RECIP Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$2,684,552	$1,398,442	$10,247,948
Participation	Number of Participants	58	32	161
Verified Gross Lifecycle Savings	kWh	259,173,592	131,662,896	858,102,645
	kW	3,623	1,803	9,587
	therms	0	0	8,600,950
Verified Gross Lifecycle Realization Rate	% MMBtu	100%	100%	100%
Annual Net-to-Gross Ratio	% MMBtu	99%	94%	99%
Net Annual Savings	kWh/yr	10,765,908	4,624,644	41,530,138
	kW	3,587	1,695	9,443
	therms/yr	0	0	484,936
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.85	1.87	1.47

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted an impact evaluation and a limited process evaluation of the Program in CY 2018. Table 196 lists specific data collection activities and sample sizes used in the evaluations.

Table 196. RECIP Data Collection Activities and Sample Sizes

Activity	Sample Size
Program Actor Interviews	1
Tracking Database Review	Census
Engineering Desk Review	0
Verification Site Visits	0

Program Actor Interviews

In November CY 2018, the Evaluation Team interviewed the Program Administrator to achieve the following:

- Learn about the Program's status
- Document Program activities conducted in CY 2018
- Investigate challenges faced in closing out projects for the CY 2015–CY 2018 quadrennial
- Explore the Program's future direction and planned activities for the next quadrennial

Tracking Database Review

The Evaluation Team reviewed a census of RECIP records in SPECTRUM, Focus on Energy's database. The review involved the following tasks:

- Conducting a thorough data review to ensure SPECTRUM totals matched totals reported by the Program Administrator
- Reassigning savings from any database adjustment measures to the corresponding Program measures (if applicable)
- Checking for complete and consistent application of data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Verification Site Visits/Engineering Desk Reviews

The Evaluation Team did not perform site visits or engineering desk reviews in CY 2018.

Impact Evaluation

Evaluation of Gross Savings

During the tracking database review, the Evaluation Team identified two solar PV projects where the reported lifecycle kilowatt-hour savings indicated discrepancies in the EUL value that was applied to the annual kilowatt-hour savings. In one project an EUL of 30 years was incorrectly used rather than the deemed value of 25 years, so the Evaluation Team decreased the lifecycle savings for this project to equal 25 times the annual savings. In the second project, the installed PV system size had increased from the original proposal and the lifecycle savings value in the database was updated accordingly but the annual savings value was not, so the Evaluation Team increased the annual savings value to reflect the larger system size. The Evaluation Team made only these two minor updates to the SPECTRUM data.

Because the Evaluation Team did not perform engineering desk reviews or verification site visits in CY 2018, the Team applied historic weighted average realization rates derived from the CY 2015–CY 2018 evaluations to the CY 2018 Program data to arrive at the verified gross savings results.

Verified Gross Savings Results

Table 197 lists the annual and lifecycle realization rates for the CY 2018 Program. Overall, the Program achieved an annual evaluated realization rate of 100.1%, weighted by total (MMBtu) energy savings.[99]

Table 197. CY 2018 RECIP Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate		
kWh	kW	therms	MMBtu	kWh	therms	MMBtu
100.1%	108.8%	-	100.1%	100.1%	-	100.1%

Table 198 lists the *ex ante* and verified annual gross savings for the CY 2018 Program.

Table 198. CY 2018 RECIP Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Photovoltaics: Agriculture, Schools and Government	2,046,835	813	0	2,049,171	884	0
Other: Business Incentives	0	0	0	0	0	0
Photovoltaics: Business Incentives	4,755,697	1,896	0	4,761,125	2,063	0
Photovoltaics: Large Energy Users	1,520,332	331	0	1,522,067	360	0
Biogas: Large Energy Users	2,539,394	290	0	2,542,292	315	0
Total Annual	**10,862,258**	**3,330**	**0**	**10,874,655**	**3,623**	**0**

Table 199 lists the *ex ante* and verified gross lifecycle savings by measure category for the CY 2018 Program.

Table 199. CY 2018 RECIP Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Photovoltaics: Agriculture, Schools and Government	51,170,875	813	0	51,232,966	884	0
Other: Business Incentives	0	0	0	0	0	0
Photovoltaics: Business Incentives	118,892,436	1,896	0	119,036,700	2,063	0
Photovoltaics: Large Energy Users	38,008,300	331	0	38,054,419	360	0
Biogas: Large Energy Users	50,787,880	290	0	50,849,506	315	0
Total Lifecycle	**258,859,491**	**3,330**	**0**	**259,173,592**	**3,623**	**0**

[99] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Evaluation of Net Savings

The Evaluation Team did not perform any new NTG evaluation activities in CY 2018 and therefore did not calculate new freeridership or spillover estimates.

Verified Net Savings Results

The Evaluation Team applied the lifecycle MMBtu weighted historical average of the CY 2015, CY 2016, and CY 2017 NTG ratios to the 2018 verified gross savings to determine the net savings for CY 2018. Table 200 shows the weighted historical average NTG ratio, as well as the total annual gross and net savings.

Table 200. CY 2018 RECIP Annual Net Savings and Net-to-Gross Ratio

Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
37,091	36,720	99%

Table 201 shows the annual Program net demand and energy impacts (kilowatt-hours, kilowatts, and therms) by measure category. The Evaluation Team attributed these savings net of what would have occurred naturally without the presence of the Program.

Table 201. CY 2018 RECIP Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Photovoltaics: Agriculture, Schools and Government	2,028,679	876	0
Other: Business Incentives	0	0	0
Photovoltaics: Business Incentives	4,713,514	2,042	0
Photovoltaics: Large Energy Users	1,506,846	357	0
Biogas: Large Energy Users	2,516,869	312	0
Total Annual	**10,765,908**	**3,587**	**0**

Table 202 lists the lifecycle Program net demand and energy impacts (kilowatt-hours, kilowatts, and therms) by measure category.

Table 202. CY 2018 Design Assistance Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Photovoltaics: Agriculture, Schools and Government	50,720,636	876	0
Other: Business Incentives	0	0	0
Photovoltaics: Business Incentives	117,846,333	2,042	0
Photovoltaics: Large Energy Users	37,673,875	357	0
Biogas: Large Energy Users	50,341,011	312	0
Total Lifecycle	**256,581,856**	**3,587**	**0**

Process Evaluation

In CY 2018, the Evaluation Team's interview with the Program Administrator stood as the primary process evaluation activity. The Team focused the interview on the following key research topics:

- Program activities in CY 2018
- Challenges faced in closing out projects for the CY 2015–CY 2018 quadrennial
- Program changes and future directions in the upcoming CY 2019–CY 2022 quadrennial

Program Design, Delivery, and Goals

In CY 2012, Focus on Energy launched the Program to offer financial incentives to Wisconsin business customers for conducting eligible, cost-effective, renewable energy projects through a competitive bid process. Through the Program, Focus on Energy solicits proposals from eligible business customers for six renewable energy technologies: solar PV, solar thermal, wind, geothermal, biogas, and biomass.

For CY 2018, the PSC refrained from issuing guidance for further Program RFPs until policy and renewable energy funding decisions were finalized in mid-CY 2018 as part of its CY 2019–CY 2022 quadrennial planning process. As such, in CY 2018, Focus on Energy did not release new Program RFPs for projects to be completed as part of the CY 2015–CY 2018 quadrennial, though a portion of the funding continued to be dispersed for projects already underway and completed in CY 2018.

All projects awarded funds in CY 2017 had to be completed by CY 2018 due to the end of the quadrennial period. To motivate customers and Trade Allies to complete projects on time in CY 2017, the Program Administrator instituted a committed incentive reduction (a funding reduction up to 25%) for projects not completed by their proposed project completion date. Despite this requirement, the Program Administrator said a handful of CY 2017 projects would not be completed by the end of CY 2018. Though these projects will receive Program funding when completed in CY 2019, they must be paid out of the CY 2019–CY 2022 quadrennial budget, reducing the total funding available for other projects in the new quadrennial. The Program Administrator noted that, due to project delays and attrition from projects awarded funding but ultimately not proceeding, Program budgeting on an annual basis posed an ongoing challenge. While he thought that this challenge would likely continue in the new quadrennial, he noted that changes to the timing and frequency of RFPs (as detailed in the following section) could help to mitigate this challenge.

The Program Administrator set no specific energy-savings goals for CY 2018.

Future of the Program

After the PSC issued final decisions regarding renewable energy funding and programs for the new quadrennial, Focus on Energy released an RFP in September 2018, to begin building pipeline for the

CY 2019–CY 2022 quadrennial. As stipulated in the PSC's order[100] for the new CY 2019–CY 2022 quadrennial, the Program will undergo three main changes to better serve the market:

- **Release of RFPs on a regular schedule**: In the CY 2015–CY 2018 quadrennial, RFPs were released once per year, with the possibility of releasing additional RFPs when funding became available. In the new quadrennial, RFPs will be released three times per year (January, May, and September). This change is designed to provide greater certainty to customers and Trade Allies to facilitate project planning. In addition, the Program Administrator noted that more frequent RFPs may relieve some challenges regarding project attrition, as the Program can backfill with additional projects within the year if projects awarded in earlier cycles drop out of the Program.
- **Two-tiered funding approach:** Incentive funding will be awarded via two separate tracks:
  - Standard track, for all technologies and solar PV projects larger than 100 kW capacity
  - Mid-sized PV track, for smaller solar projects less than or equal to 100 kW capacity

  This change seeks to more equitably distribute funding for midsize solar projects, which historically have been awarded a lesser share of RECIP funding.
- **Streamlined application process:** To reduce the application effort and time investment required for developing and evaluating project proposals, the Program Administrator will introduce a more streamlined application process in the new quadrennial. Specifically, the Program Administrator will release a prescriptive proposal template that reduces project narrative requirements and focuses on critical quantitative data points needed for proposal scoring and evaluation.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 203 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for RECIP Program.

Table 203. RECIP Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$2,684,552	$1,398,442	$2,042,803	$4,122,150

The Evaluation Team found that the CY 2018 RECIP Program was cost-effective (1.85). Table 204 lists the evaluated costs and benefits.

[100] Public Service Commission of Wisconsin. August 28, 2018. *Quadrennial Planning Process III: Final Decision*. http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=349339

Table 204. RECIP Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$6,935	$24,635	$2,547	$36,371
Delivery Costs	$122,463	$100,595	$10,400	$148,518
Incremental Measure Costs	$13,325,634	$6,103,314	$17,797,612	$16,911,818
Total Non-Incentive Costs	**$13,455,033**	**$6,228,544**	**$17,810,559**	**$17,096,707**
Benefits				
Electric Benefits	$22,197,208	$10,417,835	$11,996,471	$19,740,127
Gas Benefits	$0	$0	$3,464,752	$2,890,415
Emissions Benefits	$2,741,194	$1,215,274	$2,292,591	$3,562,607
Total TRC Benefits	**$24,938,402**	**$11,633,109**	**$17,753,814**	**$26,193,149**
Net TRC Benefits	**$11,483,369**	**$5,404,565**	**($56,745)**	**$9,096,443**
TRC B/C Ratio	**1.85**	**1.87**	**1.00**	**1.53**

Evaluation Outcomes and Recommendations

Due to the lack of new impact and process evaluation activities performed in CY 2018, the Evaluation Team does not have any recommendations to improve the RECIP Program at this time.

Design Assistance Program

Through the Design Assistance Program, Focus on Energy provides incentives to participating customers and their design teams to design and build new energy-efficient buildings or to complete substantial renovations of existing buildings. The Program, launched in January 2013, targets new construction projects for nonresidential and multifamily buildings as well as major renovation projects of 5,000 square feet or more. The Program Implementer, The Weidt Group, with support from the Program Administrator, APTIM, conducts direct outreach to design professionals, such as architects, engineers, and design contractors.

Table 205 lists actual spending, savings, participation, and cost-effectiveness for the Design Assistance Program for CY 2017, CY 2018, and for the quadrennial from CY 2015 through CY 2018.

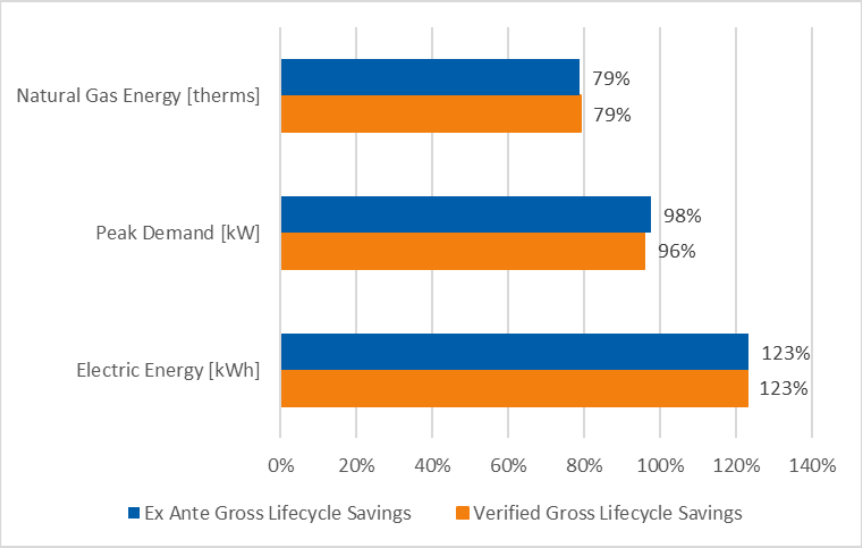
Table 205. Design Assistance Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$4,539,595	$3,940,402	$16,535,853
Participation	Number of Participants	131	63	325
Verified Gross Lifecycle Savings	kWh	742,467,464	751,682,968	2,775,754,773
	kW	5,073	5,832	20,243
	therms	32,427,389	24,882,665	114,418,720
Verified Gross Lifecycle Realization Rate	MMBtu	100%	100%	100%
Annual NTG Ratio	MMBtu	72%	53%	72%
Net Annual Savings	kWh	26,728,037	19,918,003	98,228,451
	kW	3,652	3,091	14,236
	therms	1,171,884	659,391	4,188,837
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	4.13	4.35	3.90

Note: The values in this table are inclusive of both offerings: Design Assistance and Design Assistance—Residential.

Figure 122 shows the percentage of gross lifecycle savings goals achieved by the Design Assistance Program in CY 2018. The Program exceeded the electric energy consumption savings CY 2018 goal, nearly met the peak demand reduction goal, and fell short of the natural gas consumption savings goal. The Program Implementer reported that the achievement of the therms savings goal could be negatively affected by changes to a few projects with large expected therms savings, as well as a trend of lower-than-expected lighting power densities due to the adoption of LED lighting which increases the heating load in this climate zone.

Figure 122. Design Assistance Program Achievement of CY 2018 Gross Lifecycle Savings Goals



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals. Values are inclusive of both offerings: Design Assistance and Design Assistance—Residential.

Evaluation, Measurement, and Verification Approach

In CY 2018, the Evaluation Team conducted impact and process evaluations of the Program. The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 206 lists specific data collection activities and sample sizes used in the evaluations.

Table 206. Design Assistance Program Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Engineering Desk Review	0
Verification Site Visits	0

Note: The values in this table are inclusive of both offerings: Design Assistance and Design Assistance—Residential.

Program Actor Interviews

In July 2018, the Evaluation Team interviewed the Program Administrator and the Program Implementer (defined as Program actors) to learn about the current state of the Design Assistance Program and to assess its objectives, performance, and implementation challenges and solutions. Interview topics addressed Program design and implementation, goals and KPIs, marketing and outreach, building owner and design team engagement, data tracking, and Program barriers.

Tracking Database Review

The Evaluation Team reviewed a census of Design Assistance Program records in SPECTRUM, Focus on Energy's database. The review involved several tasks:

- Conducting a thorough data review to ensure SPECTRUM totals matched totals reported by the Program Administrator
- Reassigning savings from any database adjustment measures to the corresponding Program measures (if applicable)
- Checking for complete and consistent application of data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Verification Site Visits/Desk Reviews

The Evaluation Team did not perform either site visits or engineering desk reviews in CY 2018.

Impact Evaluation

Evaluation of Gross Savings

Because the Evaluation Team did not perform any engineering desk reviews or verification site visits in CY 2018, the Team applied historical weighted average realization rates derived from the CY 2015 through CY 2017 evaluations to the CY 2018 Program data.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating properly following installation by the Program Implementer. Because each measure for the Design Assistance Program comprises multiple energy conservation strategies, the 100% ISR reflects the total number of completed projects. As the Evaluation Team did not perform site visits in CY 2018, the 100% ISR identified in the CY 2015 through CY 2017 site visits was applied to the CY 2018 Program data.

Verified Gross Savings Results

Table 207 lists the annual and lifecycle realization rates for the CY 2018 Program. Overall, the Program achieved an annual evaluated realization rate of 100%, weighted by total (MMBtu) energy savings.[101]

Table 207. CY 2018 Design Assistance Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate		
kWh	kW	therms	MMBtu	kWh	therms	MMBtu
100%	98%	101%	100%	100%	100%	100%

Note: The values in this table are inclusive of both offerings: Design Assistance and Design Assistance—Residential.

[101] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 208 lists the *ex ante* and verified annual gross savings for the CY 2018 Program. Design Assistance projects consist of two types of measures represent the initial and final phases of each project—initial Design and Modeling Assistance and final Project Savings Verification. Each project is initiated with the Design and Modeling Assistance measure, in which potential energy-saving design strategies are evaluated and a bundle of strategies is selected for inclusion in the project design. After the building construction is completed, the implementation of the energy-saving strategies is verified, and all savings are associated with the subsequent Project Savings Verification measure. Design and Modeling Assistance measures are effectively excluded from the impact evaluation because they do not have associated energy savings.

Table 208. CY 2018 Design Assistance Program Annual Gross Savings Summary

Measure Category	*Ex* Ante Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Design Assistance	31,392,554	4,404	1,307,271	31,300,475	4,325	1,317,021
Design Assistance—Residential	5,838,925	761	308,297	5,821,799	747	310,596
Total Annual	**37,231,479**	**5,165**	**1,615,568**	**37,122,274**	**5,073**	**1,627,617**

Table 209 lists the *ex ante* and verified gross lifecycle savings by measure category for the CY 2018 Program.

Table 209. CY 2018 Design Assistance Program Lifecycle Gross Savings Summary

Measure Category	*Ex* Ante Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Design Assistance	627,851,080	4,404	26,145,420	626,028,044	4,325	26,239,307
Design Assistance—Residential	116,778,500	761	6,165,940	116,439,420	747	6,188,082
Total Lifecycle	**744,629,580**	**5,165**	**32,311,360**	**742,467,464**	**5,073**	**32,427,389**

Evaluation of Net Savings

The Evaluation Team did not perform any new NTG activities in CY 2018 and therefore did not calculate new freeridership or spillover estimates.

Verified Net Savings Results

The Team applied the lifecycle MMBtu weighted historical average of the CY 2015, CY 2016, and CY 2017 NTG ratios to the CY 2018 verified gross savings to determine the net savings for CY 2018. Table 210 shows the weighted historical average NTG ratio along with the total annual gross and net savings.

Table 210. CY 2018 Design Assistance Program Annual Net Savings and Net-to-Gross Ratio

Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
289,364	208,342	72%

Table 211 shows the annual Program net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category. The Evaluation Team attributed these savings as net of what would have occurred naturally without the presence of the Program.

Table 211. CY 2018 Design Assistance Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Design Assistance	22,536,342	3,114	948,255
Design Assistance—Residential	4,191,695	538	223,629
Total Annual	**26,728,037**	**3,652**	**1,171,884**

Table 212 lists the lifecycle Program net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category.

Table 212. CY 2018 Design Assistance Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Design Assistance	450,740,191	3,114	18,892,301
Design Assistance—Residential	83,836,383	538	4,455,419
Total Lifecycle	**534,576,574**	**3,652**	**23,347,720**

Process Evaluation

In CY 2018, the Evaluation Team conducted interviews as part of the process evaluation, focused on several key topics for the Design Assistance Program:

- Program design, delivery, and goals
- Program marketing and outreach

Program Design, Delivery, and Goals

The Design Assistance Program uses a custom incentive design that relies on savings per kilowatt-hour or therm and offers two incentives—one for customers and one for design teams. The design team incentive is intended to influence these teams to design and construct high-efficiency nonresidential and residential (multifamily) buildings. In May 2018, the Wisconsin Department of Safety and Professional Services updated the rules for use with the Wisconsin Commercial Building Code to reference the 2015 International Energy Conservation Code/ASHRAE 90.1-2013, with a number of exceptions.[102]

[102] Wisconsin State Legislature. July 2018. "Energy Conservation: Subchapter II—Changes, Additions, or Omissions to the International Energy Conservation Code." *Wisconsin State Administrative Code.* Chapter SPS 363.0100. Register No. 751. https://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/361_366/363/II/0100.

On August 15, the Design Assistance Program converted to the updated commercial code for the Program baseline. Incentives increased in tandem, with the rationale that a higher baseline would make it harder to achieve the same level of savings, and higher incentives would therefore be needed to attract participants. Projects enrolled before August 15 received the same incentives as in CY 2017, and projects enrolled after that date received higher incentives, shown in Table 213.

Table 213. Design Assistance Program Incentive Structure in CY 2018

Incentive	Reward
Projects Enrolled Pre-August 15, 2018	
Design Team Incentive	$0.012/kWh if Program Implementer completes whole-building energy modeling $0.015/kWh if customer completes whole-building energy modeling
Customer/Building Owner Incentive	$0.09/kWh and $0.55/therm
Projects Enrolled Post-August 15, 2018	
Design Team Incentive	$0.016/kWh if Program Implementer completes whole-building energy modeling $0.019/kWh if customer completes whole-building energy modeling
Customer/Building Owner Incentive	$0.13/kWh and $0.75/therm

Focus on Energy requires that Program projects include whole-building energy modeling to inform and influence design teams and customers about available energy-related decisions. Customers and their design teams can opt to complete building modeling themselves and receive an incentive of $0.015 per kilowatt-hour (pre-August 15) or $0.019 per kilowatt-hour (post-August 15), or, for a slightly lower incentive, they can have the Program Implementer complete building modeling.

Using the modeling results, the Program Implementer offers several energy-efficient building design options, or bundles, with a range of forecasted savings and designs to implement, and underscores the message that more savings will lead to higher incentives. Customers select the bundle best representing their proposed design and adhering to their available budget. The Program Implementer then provides customers with a document that summarizes their selected strategies and details key design parameters that must be confirmed before the project can receive credit for the energy-saving strategies. Customers proceeding with project construction are awarded incentives based on verified (post-construction) building performance.

Program Roles

The Program Implementer, working directly with building owners and project design teams, is responsible for the Program's marketing and outreach, project verification, and incentive processing. The Program Implementer also performs whole-building energy modeling for participants opting not to perform modeling themselves.

The Program Administrator is primarily responsible for Program management, including reviewing applications, approving incentives, and tracking data as well as conducting some Program marketing and outreach.

Design teams have a substantial role in helping identify new opportunities and customers, providing energy model inputs, and working with building owners to implement building design recommendations.

Program Changes

Focus on Energy did not make changes to Program design or delivery in CY 2018, aside from updating the Program baseline based on the new energy code and increasing incentives. The Program made efforts to help improve the design teams' and building owners' ease of participation based on CY 2017 evaluation findings. The Program Implementer and Program Administrator did not anticipate the code change to impact the Program significantly. They said the design community anticipated the update, that designers knew and were educated on the changes, and that the Program's relevance would remain the same or increase due to the value of the technical assistance it provides to the design community. However, the Program Implementer reported that they did anticipate decreased savings from each project since the new baseline includes strategies that were previously under the old code. That means a larger number of projects is required for the Program savings goals to be met, and higher incentives are needed to maintain interest in participation.

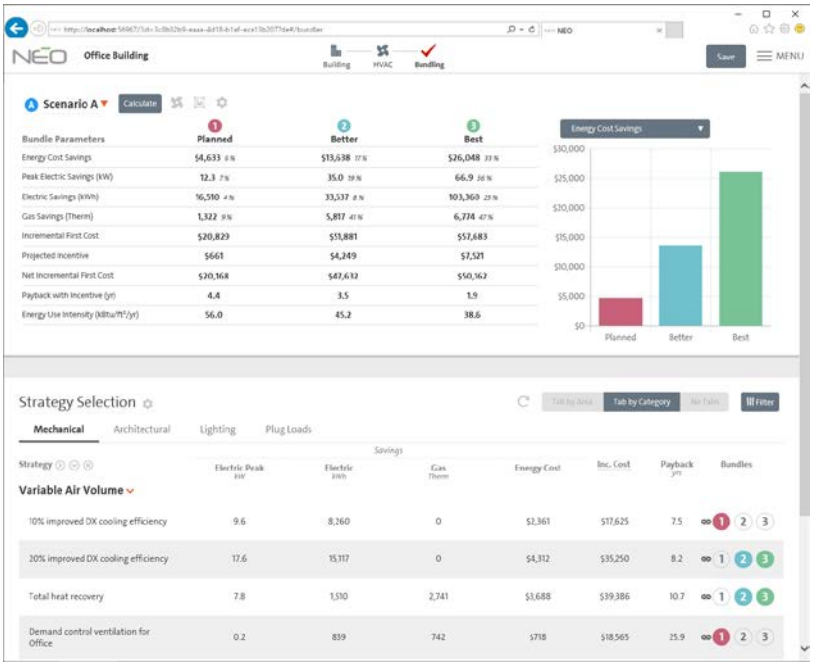
Efforts to improve participants' experience included the Program Implementer continuing to make regular updates to the net energy optimizer (NEO) energy modeling tool, which helps customers view the impacts of various efficiency upgrades. These updates included enhancements to the tool's features, capabilities, and user experience.

In response to CY 2017 evaluation feedback indicating that NEO modeling analysis results were too complicated for less technically inclined clients, the Program Implementer introduced additional results visualizations and summaries to tool output reports. The improvements made the reports more intuitive and less complex, helping customers better understand technical results:

- Increased visual flow and graphical cues to improve ease of navigating through the reports
- Updated user interface
- More summarization of results

Figure 123 shows sample results produced through NEO tool's output.

Figure 123. Example of Net Energy Optimizer Modeling Tool Output



The Program Implementer increasingly focused on communication skills during staff trainings, specifically including details of:

- Speaking conversantly with clients,
- Aiding clients in understanding complicated concepts, and
- Simplifying or clarifying technical terms and definitions.

Another CY 2017 evaluation finding indicated that some participants felt overwhelmed by the number of meetings with multiple individuals required for Program participation. The Program Implementer said, in CY 2018, they worked to reduce the number of people required to attend meetings and to clarify the attendees needed prior to meetings. They also focused on transmitting as much information as possible through email to reduce the overall number of meetings.

Program Goals

In CY 2018, the Design Assistance Program had several savings goals:

- Demand reduction of 4,908 kW (nonresidential) and 375 kW (residential)
- Lifecycle electric savings of 543,000,000 kWh (nonresidential) and 61,000,000 kWh (residential)
- Lifecycle natural gas savings of 31,783,000 therms (nonresidential) and 9,219,460 therms (residential)

The CY 2018 Program achieved 123% of its nonresidential verified electric savings goal, 96% of its nonresidential verified demand reduction goal, and 79% of its nonresidential verified therms goal.

In CY 2018, the goals increased for nonresidential and residential kilowatt-hour, nonresidential kilowatt, and nonresidential and residential therms savings due to the expected project pipeline for the year and

the resulting estimated savings. At the time of the interviews, the Program Implementer reported being unsure whether the therms goals would be met due to changes to a few projects with large expected therms savings (the projects were extended into CY 2019 or the measure mix changed, resulting in fewer therms savings). The Program Implementer also reported seeing a trend of lower-than-expected lighting power densities due to the adoption of LED lighting, which increases the heating load in this climate zone. These low lighting power densities generally result in net energy savings for the building but tend to increase gas consumption, and the energy models reflect the interactive effects between energy-savings strategies. The Program Implementer expected that the Program would meet its kilowatt-hour and kilowatt savings goals.

In CY 2018, the Program Implementer employed four KPI, intended to improve customer satisfaction and increase participation. Table 214 presents these KPIs and their results. The Program achieved the three KPIs that were measurable this year.

Table 214. Design Assistance Program CY 2018 Key Performance Indicators

KPI	Goal	CY 2018 Result	CY 2018 Result Source
Customer Satisfaction	Increase or maintain the baseline customer satisfaction score of 9.0 from CY 2017	n/a – no interviews conducted in CY 2018	n/a
Days Incentive Agreement Outstanding	Less than 30 business days between bundle selection date and the Program Administrator sending incentive agreements to owner	27 days	Reported by Program Implementer
Success Story Development	Under the guidance of the Program Administrator, identify and develop three Program success stories	Developed three success stories	Reported by Program Implementer
Program Process Effectiveness, Efficiency, and Quality	Seek to have 80% of projects served using the NEO tool	93%	Reported by Program Implementer

The Program Administrator added a new KPI in CY 2018: developing three Program success stories to use in marketing materials. A qualitative KPI, this goal was intended to identify satisfied customers who could speak highly of the Program, of new technologies used in projects, or of projects in areas important to Focus on Energy (such as those in rural areas). These success stories could be presented on the Focus on Energy website and social media pages and distributed to local media outlets, depending on the project.

In CY 2018, the Program Administrator modified the second KPI to measure the number of days between approving the bundle selection and sending the incentive agreement (rather than measuring the days between bundle selection approval and the owner signing the incentive agreement). This modification meant that the time taken by the owner to sign the agreement did not affect the KPI. Instead, the KPI assessed the Program Implementer's and Program Administrator's ability to process documentation. The Program Administrator also removed the CY 2017 KPI associated with enrolling

projects, reporting that it did not serve as a helpful performance indicator for a Program with long project timelines. Participation, however, was still tracked internally.

Data Management and Reporting

For the Design Assistance Program, like other Focus on Energy programs, the Program Implementer uses SPECTRUM. SPECTRUM contains data transferred from NEO, the comprehensive energy modeling software that helps customers view the impacts of various energy-savings strategies. The Program Implementer uploads the bundle selection and verification requirement documentation from the NEO tool to SPECTRUM.

The Program Administrator reviews and approves these documents, the Program Implementer sends an incentive agreement to the customer, and the customer signs and returns the agreement. The Program Implementer then uploads the agreement to SPECTRUM and distributes the incentive to the design team. Customers receive their incentive upon project completion. The Program Implementer verifies savings in two ways:

- By reviewing and confirming that building documentation (Construction Documents, State of Wisconsin approved COMcheck submission and the equipment submittals) align with strategies and specifications described in the bundle requirements document, and
- By conducting site visits to confirm whether measures have been installed. Ten percent of the projects are selected for on-site verification, including every project expected to save over 1,000,000 kWh at bundle selection as well as smaller projects identified based on location, project complexity, or other special factors.

The Program Administrator and Program Implementer did not report any issues in managing data and tracking processes through SPECTRUM in CY 2018, and said the database usability continues to improve.

Marketing and Outreach

The Program Administrator and Program Implementer focus primarily on building relationships through face-to-face interactions with building owners and their design teams to increase awareness of and engagement with the Program. They limit additional outreach to social media and emails to existing contacts. Implementation staff reported that the Program targets specific trade groups and professional groups (such as the Wisconsin branch of the American Institute of Architects, the Wisconsin Healthcare Engineering Association, the Wisconsin Economic Development Corporation, and the Wisconsin ASHRAE chapters). The Program Implementer also seeks to maintain engagement through lunch-and-learn sessions with design teams, when it introduces the Program and provides updates.

The Program Implementer commented that the August code change required them to use targeted messaging to inform the design community of the switch and to update marketing materials. The Implementer focused on ensuring that participants or interested customers had a venue to ask questions and understand the changes.

The Program Administrator reported that the Program faces an ongoing challenge from a marketing and outreach perspective: managing the pipeline of interested customers. Structurally, there is insufficient

capacity to accommodate all those who want to participate in the Program. The Program Administrator stressed the importance of identifying opportunities for participants to take advantage of the Design Assistance Program as early as possible in a project's timeline. This means broadening the engagement period with the design community and becoming involved early in the design process by performing high-level preliminary analyses.

In becoming involved in the process at an earlier stage, the Program Administrator could more accurately predict participation and manage Program resources. A complement to this goal is educating prospective customers about other Focus on Energy opportunities available to them later in a project's timeline to maintain their engagement with Focus on Energy.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 215 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Design Assistance Program.

Table 215. Design Assistance Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$4,539,595	$3,940,402	$4,874,177	$3,181,680

The Evaluation Team found that the CY 2018 Design Assistance Program was cost-effective (4.13). Table 216 lists the evaluated costs and benefits.

Table 216. Design Assistance Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$0	$544,066	$604,527	$514,394
Delivery Costs	$2,608,723	$1,996,405	$2,275,910	$2,100,485
Incremental Measure Costs	$12,309,069	$6,929,961	$11,987,515	$13,218,037
Total Non-Incentive Costs	**$14,917,791**	**$9,470,433**	**$14,867,952**	**$15,832,916**
Benefits				
Electric Benefits	$35,717,167	$26,300,185	$36,576,085	$27,677,925
Gas Benefits	$18,301,527	$9,771,125	$21,541,900	$12,224,875
Emissions Benefits	$7,639,878	$5,132,661	$8,393,755	$5,828,143
Total TRC Benefits	**$61,658,572**	**$41,203,970**	**$66,511,741**	**$45,730,943**
Net TRC Benefits	**$46,740,781**	**$31,733,537**	**$51,643,789**	**$29,898,026**
TRC B/C Ratio	**4.13**	**4.35**	**4.47**	**2.89**

Evaluation Outcomes and Recommendations

Due to the lack of new impact and process evaluation activities performed in CY 2018, the Evaluation Team does not have any recommendations to improve the Design Assistance Program at this time.

Business Incentive Program

Through the Business Incentive Program, launched in CY 2012, Focus on Energy offers prescriptive and custom incentives for commercial and industrial sector customers who install energy-efficient measures. Customers not eligible for the Agriculture, Schools, and Government or Large Energy Users programs may participate in the Business Incentive Program. Additionally, small business customers who are interested in a prescriptive offering not available through the Small Business Program or who have reached their annual Small Business Program incentive cap may participate in the Business Incentive Program.

APTIM serves as the Program Administrator. Franklin Energy, the Program Implementer, oversees Program management and delivery. The Program Implementer's Energy Advisors, with support from Trade Allies and the Program Administrator, promote and deliver the Program to customers.

To support the PSC's initiative to provide rural customers with energy-efficient technologies and benefits, Focus on Energy also developed and launched the Communications Providers Initiative in CY 2017. The Program is designed to drive infrastructure updates for telephone, cable, broadband, and ISPs in Wisconsin.

Outreach activities primarily target providers that are associated with the Wisconsin State Telecommunications Association and the Internet and Television Association. Through the Program, Focus on Energy strives to make connections with telephone and ISPs to identify projects that fit the general description to update infrastructure and improve system efficiency. The Program offers elevated prescriptive and custom lighting and heating and cooling measures for qualifying customers, with an emphasis on improving IT equipment such as routers, transports, and rectifiers as potential opportunities. Custom measures are provided an incentive of $0.06 to $0.09 per kilowatt-hour and $150 to $200 per kilowatt. Comparatively, the standard CY 2018 custom incentive rates for the Business Incentive Program are $0.03 per kilowatt-hour and $100 per kilowatt.

Table 217 lists actual Business Improvement Program spending, savings, participation, and cost-effectiveness from CY 2017 to CY 2018 and the overall quadrennial (CY 2015–CY 2018).

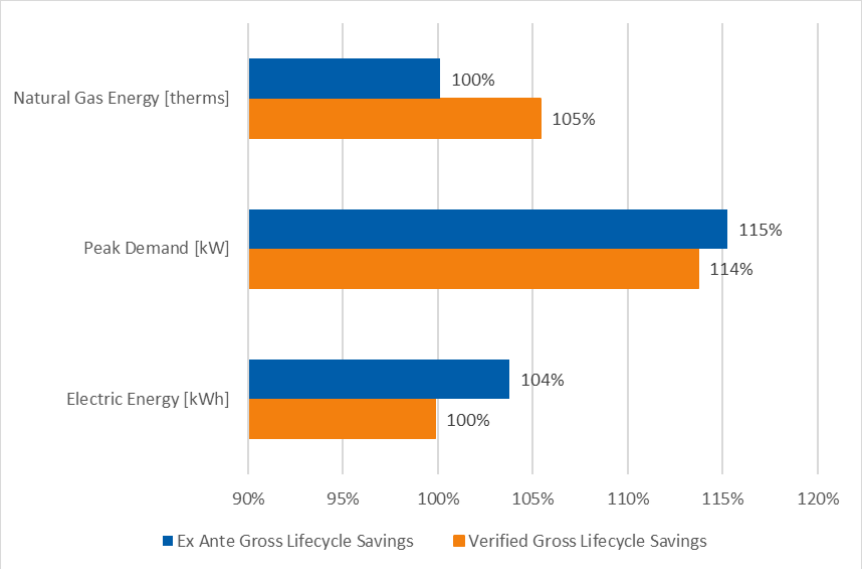
Table 217. Business Incentive Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$8,394,863	$9,461,560	$30,612,985
Participation	Number of Participants	1,519	2,097	8,515
Verified Gross Lifecycle Savings	kWh	1,998,315,278	2,525,286,083	7,193,897,531
	kW	20,346	21,397	70,178
	therms	25,264,768	20,249,065	145,080,972
Verified Gross Lifecycle Realization Rate	MMBtu	99%	92%	103%
Annual Net-to-Gross Ratio	MMBtu	57%	60%	58%
Net Annual Savings	kWh/yr	88,300,355	95,051,087	289,811,274
	kW	11,597	12,772	39,966
	therms/yr	884,138	810,763	7,831,735
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	4.45	3.81	3.54

Note: This table excludes the Communications Providers Initiatives.

The Business Incentive Program achieved 100% of its electric energy savings and 105% of its therm savings goals and 114% of its peak demand goal in CY 2018 based on verified gross lifecycle savings. Figure 124 shows the percentage of gross lifecycle savings goals achieved for the Business Incentive Program in CY 2018.

Figure 124. Business Incentive Program Achievement of CY 2018 Gross Lifecycle Savings Goals



Notes: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018.
The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.
This figure excludes the Communications Providers Initiative.

Although the Business Incentive Program successfully met its gross savings and demand goals in CY 2018, the number of participants has decreased from CY 2017 to CY 2018, and over the course of the quadrennial (Table 218). This attrition is most prominent within the commercial segment and can be partially attributed to the shift of customers from this Program into the Small Business Program, which

had an 80% increase in the number of participants from CY 2017 to CY 2018 (without considering the increases associated with the Community Small Business Offering).

The Program Implementer reported that the shift of customers from the Business Incentive Program to the Small Business Program from CY 2017 to CY 2018 is likely due to several recent changes to the Small Business Program: the Small Business Program Implementer expanded the measure mix, increased the incentive levels. It also increased accessibility of incentives; in CY 2017 eligibility changed from a monthly kilowatt maximum to an average monthly usage of 40,000 kWh or less in July and August, as customers do not readily have access to their kilowatt peak demand data. The Program Implementer also reported that another aspect of this attrition could be attributed to changes in the Program engagement strategy, which reduced Energy Advisor interactions with the commercial market segments that have declined over the years. Although the number of participants has declined, the Program is achieving more savings per participant than in previous years. To monitor Program activity, the Program Implementer has added a related goal to increase overall Program participation in CY 2019.

Table 218. Business Incentive Program Participation, CY 2015 to CY 2018

Year	Number of Participants
CY 2015	2,601
CY 2016	2,298
CY 2017	2,097
CY 2018	1,519

Table 219 lists verified Communications Providers Initiative spending, savings, participation, and cost-effectiveness from CY 2017 to CY 2018 and for the overall quadrennial (CY 2015–CY 2018).

Table 219. Communications Providers Initiative Summary

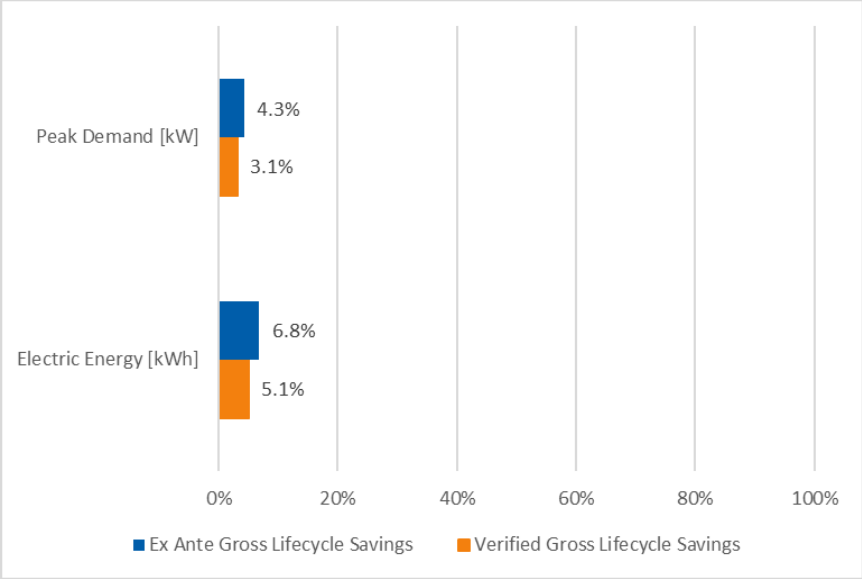
Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)[a]
Incentive Spending	$	$161,909	$15,313	$177,223
Participation	Number of Participants	20	4	24
Verified Gross Lifecycle Savings	kWh	19,318,847	1,840,690	21,159,537
	kW	138	8	146
	therms	51,740	37,155	88,895
Verified Gross Lifecycle Realization Rate	MMBtu	75%	75%	75%
Annual Net-to-Gross Ratio	MMBtu	100%	100%	100%
Net Annual Savings	kWh/yr	1,150,962	68,604	1,219,566
	kW	138	8	146
	therms/yr	2,587	1,859	4,446
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	0.79	N/A	0.79

[a] Quadrennial totals reflect CY 2017 and CY 2018 results for the Communications Providers Initiative.

The Program achieved 4.3% of its peak demand reduction goal and 6.8% of its electric energy savings goal. This is reasonable considering that the Communications Providers Initiative is a new Program offering and the Program staff built a pipeline of projects for CY 2019 during CY 2018. This Program does

not have a natural gas savings goal, but the Program implemented two projects that included a natural gas measure. Figure 125 shows the percentage of gross lifecycle savings goals achieved for the Program.

Figure 125. Communications Providers Initiative Achievement of Gross Lifecycle Savings Goals



Notes: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

In CY 2018, the Evaluation Team conducted impact and process evaluations of the Business Incentive Program and the Communications Providers Initiative, designing its evaluation approach to integrate multiple perspectives in assessing the Programs' performance. Table 220 lists specific data collection activities and sample sizes used in the Business Incentive Program evaluation.

Table 220. CY 2018 Business Incentive Program Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	140
Ongoing Participant Satisfaction Surveys	275
Engineering Desk Reviews	45
Verification Site Visits	43

Table 221 lists specific data collection activities and sample sizes used in the Communications Providers Initiative evaluation.

Table 221. CY 2018 Communications Providers Initiative Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Tracking Database Review	Census
Engineering Desk Reviews	32
Verification Site Visits	15

Program Actor Interviews

In July 2018, the Evaluation Team interviewed the Program Administrator and the Program Implementer to learn about the Business Incentive Program's current state and to assess its objectives, performance, and implementation challenges and solutions. Additionally, the Team asked interviewees (when applicable) about their marketing and outreach efforts for engaging Trade Allies and customers.

Tracking Database Review

The Evaluation Team reviewed the census of Business Incentive Program and Communications Providers Initiative records in Focus on Energy's database, SPECTRUM. The review involved four tasks:

- Conduct a thorough data review to ensure that totals in SPECTRUM matched totals reported by the Program Administrator
- Reassign savings from a number of database adjustment measures to the corresponding Program measures
- Check for complete and consistent application of information across data fields (such as measure names, application of first-year savings, and application of effective useful lives)

Participant Surveys

The Evaluation Team surveyed a random sample of 140 customers who participated in the Business Incentive Program during CY 2018 to assess their experiences with the Program and to gather data to inform NTG calculations. Of 140 respondents, four completed custom projects and 136 completed prescriptive or hybrid projects. Twenty-nine respondents operated chain stores or franchises, and the remaining 111 operated other businesses. At the time of the surveys, the Program had 778 unique survey participants (as determined by unique telephone numbers), with 25 completing custom projects and 753 completing prescriptive or hybrid projects.[103]

Based on this population size, the number of completed surveys achieved ±10% precision, with 90% confidence at the Program level. Whenever possible, the Evaluation Team compared the CY 2018 participant survey results to the CY 2016, CY 2015, and CY 2013 participant survey results to document any changes. Participants also received a verification battery, which they used to calculate a Program-level ISR.

[103] Custom participants may have received prescriptive and/or hybrid incentives for their projects.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys, beginning in CY 2015, for the CY 2015–CY 2018 quadrennial. These surveys were intended to provide recent Program participants an opportunity to offer feedback quickly and easily, ensure this feedback closely reflects the participation experience, identify problems at any time of the year, and discover opportunities for delivering follow-up information to interested participants. The Program Implementer also used data collected during ongoing participant satisfaction surveys to assess performance and help meet KPIs related to customer satisfaction.

Within two weeks of the incentive check payment, the Program Administrator deployed online surveys to all CY 2018 participants with email addresses via SPECTRUM, and the Evaluation Team sent paper surveys to participants without email addresses. The Team gathered the online survey results via SPECTRUM and received and scanned mailed survey responses. The Team combined results from both modes for conducting the analysis. In CY 2018, 275 Business Incentive Program participants responded to the ongoing customer satisfaction survey.

Engineering Desk Reviews

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 45 Business Incentive Program measures and 32 Communications Providers Initiative measures. This review included assessing the savings calculations and methodology applied by the Program Implementer. The Evaluation Team leveraged the applicable TRM versions (2017 TRM Update, dated Spring 2017, and 2018 TRM) and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency Program evaluations of applicable measures (based on geography, sector, measure application, and date of issue).

For prescriptive measures in Wisconsin, the TRM and associated workpapers were the primary sources used by the Evaluation Team to determine the savings calculation methodology and data in nearly all cases. For custom and hybrid measures, the Evaluation Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The Team selected the final evaluation sample for these reviews using a weighted, random stratified sampling approach known as PPS, here based on total lifecycle energy savings.

Verification Site Visits

The Evaluation Team conducted 43 verification site visits for the Business Incentive Program and 15 verification site visits for the Communications Providers Initiative in CY 2018. Site visits involved verifying the type, quantity, and operating hours of equipment installed, along with determining how that equipment is controlled. The Evaluation Team did not collect any project-specific metering data in CY 2018. The Team collected trend data for two sampled measures while onsite.

Business Incentive Program Impact Evaluation

The Evaluation Team used several approaches to measure the Program impact:

- Tracking database review
- ISR determination
- Engineering desk reviews
- Verification site visits

Based on the results of the impact evaluation, the Team determined gross and net savings for the Program, outlined below.

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data to determine reported installations, then applied the results from engineering desk reviews (n=45) and verification site visits (n=43) to calculate verified gross savings.

The Team found that the overall accounting of demand reduction and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. SPECTRUM offers typical date fields, such as "paid date" and "application received date," and offers several additional fields that help users track projects in greater detailed. SPECTRUM also employs unique customer identifier numbers, a best practice not followed in many other jurisdictions, so account numbers and customer contact information can be used to easily classify unique customers.

Of the measures sampled for desk reviews, the Evaluation Team identified several types where savings calculations did not align with the 2017 TRM Update or 2018 TRM:

- For prescriptive MMID 2197 (Anti-Sweat Heater Controls), the Team found an error in SPECTRUM where the deemed peak demand reduction was lower than the 2018 TRM default by a factor of 10, but the deemed electric energy savings were correct.
- MMID 2608 (Unit Heater, ≥90% Thermal Efficiency) does not have a protocol in any of the TRMs published before the reviewed project took place (2015 TRM through 2018 TRM), so the Team used the new protocol in the recently released 2019 TRM to calculate verified savings.
- For a hybrid high-efficiency natural gas water heater measure (MMID 3046), the *ex ante* reported EUL was 20 years, which matches the 2018 TRM, but the *ex ante* lifecycle savings were calculated using a 15-year measure life. The Team used a 20-year measure life, which increased the calculated verified lifecycle savings.

The Evaluation Team also reviewed the submitted custom and hybrid project calculations for accuracy. The Team made minor adjustments to the *ex ante* savings calculations for MMID 2520 (Refrigeration, Not Otherwise Specified), as the custom calculations did not properly account for defrost. According to the 2018 TRM, defrost occurs four times per day for approximately 20 minutes per cycle, and does not occur in spaces kept above freezing. The Team updated the assumed defrost hours from 1.5 hours per day to 1.33 hours per day and reduced operating hours for evaporators in rooms above freezing. Also,

the calculator did not account for variable speed operation of the evaporator fans. The Team adjusted the average fan speed from 100% to 50% based on observed fan speeds, which ranged between 24 Hz and 35 Hz during the site visit. These adjustments decreased the verified *ex post* savings from *ex ante* reported savings by 10%.

During site visits the Team generally confirmed that Program measures were installed and operating as planned, but there were deviations. For three lighting projects, the Team adjusted the ISR based on the site visit findings, which ranged from 93% to 95%.

During a site visit for a custom measure involving variable frequency drives (VFDs) on pool pumps (MMID 2493), the Team updated the submitted savings calculator based on the observed VFD speeds and issues identified in the calculator. The pump VFD speeds were maintained at a constant flow setpoint, rather than automatically varying to match load requirements. The Team corrected the assumed VFD cube-law coefficient from 3.0 to 2.5 based on the recommended 2018 TRM value for calculating power from fractional speed. The submitted calculations also used the proposed system electric energy consumption as the *ex ante* reported energy savings, instead of using the difference between baseline and proposed electric energy consumption.

For custom MMID 2498 (Process Heat Recovery, Not Otherwise Specified), the Team adjusted the savings calculator based on observed hours of use from the installed system controller, actual space temperature setpoints, actual roof-top unit cooling performance, and actual motor nameplate efficiency.

For two hybrid process fan and pump motor VFD measures (MMID 2647 and MMID 2648), the Team adjusted the motor full-load efficiency from the calculator default value to the actual motor nameplate efficiency based on the site visit findings.

At a visit for another hybrid measure involving a VFD on an HVAC fan (MMID 2643), the installed fan VFD was operated in manual mode and ran for significantly fewer hours than reported. The operator manually turns the units on and off and changes the fan speed depending on the facility's heating or cooling load.

For a hybrid high-efficiency water heater measure (MMID 3046), the installed water heater's energy factor was much higher than the calculator default energy factor. This adjustment increased savings.

Finally, for a hybrid measure involving a VFD-controlled air compressor (MMID 2196), the Team updated the savings calculator using reduced hours of use based on our site observations and the VFD compressor screen display. The site still uses its existing (baseline) load/unload air compressor as a backup and runs it one day per week to keep it active.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2018, the Evaluation Team conducted participant

surveys to verify the installed measures and estimate ISRs at the measure level. Only one participant (out of 140) reported that not all the Program equipment was installed and operating.

The Evaluation Team applied a combined, weighted ISR of 99.8% from these surveys to all engineering desk reviews without a completed site visit. The Team applied a site-specific ISR to all measures for which verification site visits were performed.

Verified Gross Savings Results

Table 222 lists the annual and lifecycle realization rates for CY 2018. Overall, the Program achieved a first-year evaluated realization rate of 98%, weighted by total (MMBtu) energy savings.[104] Realization rates represent a weighted average for the entire Program. As stated above, one natural gas hot water heater measure with an incorrect EUL increased the natural gas lifecycle savings realization rate over the first-year savings realization rate.

Table 222. CY 2018 Business Incentive Program Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	97%	99%	100%	98%	96%	105%	99%

Table 223 lists the total *ex ante* and verified annual gross savings for the CY 2018 Program by measure category.

Table 223. CY 2018 Business Incentive Program First-Year Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Air Sealing	0	0	10,329	0	0	10,327
Boiler	0	0	485,692	0	0	485,608
Chiller	3,150,663	171	0	3,051,654	169	0
Compressor	2,405,625	507	0	2,330,028	500	0
Controls	9,662,350	707	99,531	9,358,711	697	99,514
Delamping	406,752	76	0	393,970	75	0
Dishwasher, Commercial	88,108	0	1,005	85,339	0	1,005
Dryer	253,853	44	0	245,876	44	0
Energy Recovery	-146,892	126	386,154	-142,276	124	386,087
Fan	-5,521	0	2,426	-5,348	0	2,426
Filtration	32,800	6	21,134	31,769	6	21,130
Fluorescent, Linear	287,790	51	0	278,746	50	0
Fryer	80,145	16	26,581	77,626	16	26,576
Furnace	92,980	0	40,517	90,058	0	40,510
Griddle	20,880	4	0	20,224	4	0
Ice Machine	8,023	1	0	7,771	1	0

[104] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Induction	47,904	0	0	46,399	0	0
Infrared Heater	0	0	49,995	0	0	49,986
Insulation	107,038	10	40,787	103,674	10	40,780
LED	111,235,730	15,270	0	107,740,151	15,070	0
Motor	2,329,980	300	0	2,256,761	296	0
Other	7,179,481	1,041	125,648	6,953,866	1,027	125,626
Oven	0	0	23,340	0	0	23,336
Packaged Terminal Unit (PTAC, PTHP)	663,608	0	0	642,754	0	0
Process Heat	6,501	1	0	6,297	1	0
Reconfigure Equipment	1,166,301	199	0	1,129,650	196	0
Refrigerated Case Door	2,378,382	138	43,496	2,303,641	136	43,488
Refrigerator/Freezer, Commercial	78,145	9	0	75,689	9	0
Rooftop Unit/Split System Air Conditioner	548,057	442	67,576	530,835	437	67,564
Steam Trap	0	0	43,083	0	0	43,075
Steamer	8,768	4	1,230	8,492	4	1,230
Strip Curtain	63,945	7	0	61,936	7	0
Supporting Equipment	725,409	83	0	702,613	82	0
Tune-Up/Repair/Commissioning	3,820,527	16	41,037	3,700,467	16	41,030
Unit Heater	0	0	26,631	0	0	26,626
Variable Speed Drive	13,241,898	1,387	0	12,825,772	1,368	0
Water Heater	-250	0	15,198	-242	0	15,195
Total Annual	**159,938,980**	**20,616**	**1,551,390**	**154,912,903**	**20,346**	**1,551,120**

Table 224 lists the *ex ante* and verified gross lifecycle savings by measure type for the CY 2018 Program.

Table 224. CY 2018 Business Incentive Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Air Sealing	0	0	132,240	0	0	139,242
Boiler	0	0	9,713,932	0	0	10,228,243
Chiller	63,013,260	171	0	60,635,525	169	0
Compressor	36,084,382	507	0	34,722,778	500	0
Controls	95,662,017	707	1,310,144	92,052,318	697	1,379,511
Delamping	4,293,008	76	0	4,131,016	75	0
Dishwasher, Commercial	881,080	0	10,050	847,833	0	10,582
Dryer	3,807,797	44	0	3,664,114	44	0
Energy Recovery	-2,292,205	126	5,558,931	-2,205,711	124	5,853,253
Fan	-82,815	0	36,390	-79,690	0	38,317
Filtration	98,400	6	317,010	94,687	6	333,794
Fluorescent, Linear	4,038,011	51	0	3,885,641	50	0
Fryer	961,740	16	318,972	925,450	16	335,860
Furnace	1,673,256	0	729,123	1,610,117	0	767,727
Griddle	250,560	4	0	241,105	4	0
Ice Machine	80,230	1	0	77,203	1	0
Induction	718,560	0	0	691,446	0	0

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Infrared Heater	0	0	749,925	0	0	789,630
Insulation	2,675,950	10	1,019,675	2,574,976	10	1,073,662
LED	1,456,726,342	15,270	0	1,401,758,398	15,070	0
Motor	37,809,731	300	0	36,383,023	296	0
Other	94,701,106	1,041	1,101,729	91,127,665	1,027	1,160,061
Oven	0	0	280,097	0	0	294,927
Packaged Terminal Unit (PTAC, PTHP)	9,954,120	0	0	9,578,512	0	0
Process Heat	97,513	1	0	93,833	1	0
Reconfigure Equipment	15,164,261	199	0	14,592,055	196	0
Refrigerated Case Door	19,716,199	138	652,440	18,972,230	136	686,984
Refrigerator/Freezer, Commercial	937,740	9	0	902,355	9	0
Rooftop Unit/Split System Air Conditioner	8,220,550	442	1,013,640	7,910,357	437	1,067,308
Steam Trap	0	0	258,495	0	0	272,181
Steamer	105,216	4	14,760	101,246	4	15,541
Strip Curtain	255,780	7	0	246,128	7	0
Supporting Equipment	14,508,180	83	0	13,960,730	82	0
Tune-Up/Repair/Commissioning	7,989,566	16	205,187	7,688,089	16	216,051
Unit Heater	0	0	399,459	0	0	420,608
Variable Speed Drive	198,629,310	1,387	0	191,134,254	1,368	0
Water Heater	-2,500	0	172,170	-2,406	0	181,286
Total Lifecycle	**2,076,676,344**	**20,616**	**23,994,369**	**1,998,315,278**	**20,346**	**25,264,768**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the CY 2018 Business Incentive Program and calculated a NTG of 57%. For a detailed description of the NTG analysis methodology and findings, refer to Appendix I.

Freeridership Findings

The Evaluation Team used the self-report survey method to determine the Program freeridership level for CY 2018. The Team estimated an average self-reported freeridership of 44%, weighted by evaluated savings, for the CY 2018 Program.

In CY 2018, the Evaluation Team relied solely on the self-reported freeridership of 44% and applied this to all the Program measure categories. Two CY 2018 respondents with the greatest savings accounted for 39% of the total analysis sample gross savings, with an average weighted freeridership rate of 56%.

For comparison:

- In CY 2016, the three respondents with the greatest savings accounted for 48% of the total analysis sample gross savings, with an average weighted freeridership rate of 74%.
- In CY 2015, the three respondents with the greatest savings accounted for 34% of the total analysis sample gross savings, with an average weighted freeridership rate of 46%.

Table 225 lists the CY 2015, CY 2016, and CY 2018 self-reported freeridership estimates, weighted by participant gross evaluated energy savings. The Team did not conduct participant surveys in CY 2017.

Table 225. Summary of CY 2015, CY 2016, and CY 2018 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	104	36%
CY 2016	70	56%
CY 2017	n/a	n/a
CY 2018	140	44%

Spillover Findings

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Business Incentive Program. The Team applied evaluated and deemed savings values to the spillover measures customers said they had installed as a result of their Program participation, presented in Table 226.

Table 226. Business Incentive Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total Lifecycle MMBtu Savings Estimate
LEDs	3	5,470

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate,[105] rounded to the nearest whole percentage point, for the Business Incentive Program respondents (Table 227).

Table 227. Business Incentive Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	5,470
Program Savings	517,171
Spillover Estimate	**1%**

[105] The actual value is 1.06%.

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results:

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

This yielded an overall NTG estimate of 57% for the Program. Table 228 shows total net-of-freeridership, participant spillover, and total net savings in MMBtu, as well as the overall Program NTG.

Table 228. CY 2018 Business Incentive Program Annual Net Savings and Net-to-Gross Percentage

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total First-Year Gross Verified Savings (MMBtu)	Total First-Year Net Savings (MMBtu)	Program First-Year NTG
383,131	6,842	684,163	386,973	57%

Table 229 shows the annual Program net demand and energy impacts (kilowatt-hours, kilowatts, and therms) by measure category.

Table 229. CY 2018 Business Incentive Program First-Year Net Savings

Measure	First-Year Net Savings		
	kWh	kW	Therms
Air Sealing	0	0	5,887
Boiler	0	0	276,796
Chiller	1,739,443	96	0
Compressor	1,328,116	285	0
Controls	5,334,465	398	56,723
Delamping	224,563	43	0
Dishwasher, Commercial	48,643	0	573
Dryer	140,149	25	0
Energy Recovery	-81,097	71	220,069
Fan	-3,048	0	1,383
Filtration	18,108	3	12,044
Fluorescent, Linear	158,885	29	0
Fryer	44,247	9	15,149
Furnace	51,333	0	23,091
Griddle	11,528	2	0
Ice Machine	4,429	1	0
Induction	26,447	0	0
Infrared Heater	0	0	28,492
Insulation	59,094	6	23,245
LED	61,411,886	8,590	0
Motor	1,286,354	169	0
Other	3,963,704	585	71,607
Oven	0	0	13,301
Packaged Terminal Unit (PTAC, PTHP)	366,370	0	0
Process Heat	3,589	0	0
Reconfigure Equipment	643,901	112	0
Refrigerated Case Door	1,313,076	78	24,788

Measure	First-Year Net Savings		
	kWh	kW	Therms
Refrigerator/Freezer, Commercial	43,143	5	0
Rooftop Unit/Split System Air Conditioner	302,576	249	38,512
Steam Trap	0	0	24,553
Steamer	4,841	2	701
Strip Curtain	35,303	4	0
Supporting Equipment	400,489	47	0
Tune-Up/Repair/Commissioning	2,109,266	9	23,387
Unit Heater	0	0	15,177
Variable Speed Drive	7,310,690	780	0
Water Heater	-138	0	8,661
Total First Year	**88,300,355**	**11,597**	**884,138**

Table 230 lists the lifecycle Program net demand and energy impacts (kilowatt-hours, kilowatts, and therms) by measure category.

Table 230. CY 2018 Business Incentive Program Lifecycle Net Savings

Measure	Lifecycle Net Savings		
	kWh	kW	Therms
Air Sealing	0	0	79,368
Boiler	0	0	5,830,099
Chiller	34,562,249	96	0
Compressor	19,791,984	285	0
Controls	52,469,821	398	786,321
Delamping	2,354,679	43	0
Dishwasher, Commercial	483,265	0	6,032
Dryer	2,088,545	25	0
Energy Recovery	-1,257,255	71	3,336,354
Fan	-45,423	0	21,841
Filtration	53,972	3	190,263
Fluorescent, Linear	2,214,815	29	0
Fryer	527,506	9	191,440
Furnace	917,767	0	437,604
Griddle	137,430	2	0
Ice Machine	44,005	1	0
Induction	394,124	0	0
Infrared Heater	0	0	450,089
Insulation	1,467,736	6	611,988
LED	799,002,287	8,590	0
Motor	20,738,323	169	0
Other	51,942,769	585	661,235
Oven	0	0	168,108
Packaged Terminal Unit (PTAC, PTHP)	5,459,752	0	0
Process Heat	53,485	0	0
Reconfigure Equipment	8,317,471	112	0
Refrigerated Case Door	10,814,171	78	391,581

Measure	Lifecycle Net Savings		
	kWh	kW	Therms
Refrigerator/Freezer, Commercial	514,343	5	0
Rooftop Unit/Split System Air Conditioner	4,508,903	249	608,366
Steam Trap	0	0	155,143
Steamer	57,710	2	8,859
Strip Curtain	140,293	4	0
Supporting Equipment	7,957,616	47	0
Tune-Up/Repair/Commissioning	4,382,211	9	123,149
Unit Heater	0	0	239,747
Variable Speed Drive	108,946,525	780	0
Water Heater	-1,371	0	103,333
Total Lifecycle	**1,139,039,708**	**11,597**	**14,400,918**

Communications Providers Initiative Impact Evaluation

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data to determine reported installations, then applied the results from engineering desk reviews (n=32) and verification site visits (n=15) to calculate verified gross savings.

The Team found that the overall accounting of demand reduction and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. SPECTRUM offers typical date fields, such as “paid date” and “application received date,” and offers several additional fields that help users track projects in greater detail.

From the desk reviews, the Evaluation Team identified several types of measures where savings calculations did not align with evaluated findings:

- For four lighting measures, the Evaluation Team verified that lighting retrofits were installed in office buildings and revised the lighting operating hours to the TRM hours of use for commercial buildings. The Program implementer confirmed that in these four cases lighting retrofits were installed at office buildings, but in these cases applicants had misidentified the property type, therefore, the *ex ante* calculations used industrial hours of use.
- For two HVAC unit replacement measures, *ex ante* savings calculations used two different rated cooling capacities to calculate the baseline and installed cooling loads. The Evaluation Team modified the savings estimation approach to use the rated cooling capacity of the energy-efficient unit based on the TRM protocol. Also, the submitted project documentation did not provide sufficient information to support baseline unit efficiencies, and the unit efficiencies used between different measures installed at the same site were not consistent. We used the same *ex ante* baseline efficiency values for *ex post* evaluations since the baseline unit efficiencies

could not be verified. We recommend that the Program implementer document the specification of the baseline units prior to the removal of the units.

- For router replacement measures, based on the pre-installation utility data and total rectifier load provided by the facility personnel, the assumed *ex ante* baseline load values were frequently overestimated. For sites where the *ex ante* assumption for pre-installation router usage was greater than the average total facility power consumption, the Evaluation Team modified savings calculations to use the total facility power consumption in place of the *ex ante* estimated pre-installation power. For these types of custom measures, we recommend that the Program Implementer collect sufficient data (such as metering data, trend data, screenshots, and utility data) to fully support and document baseline assumptions.

From the onsite verifications, the Evaluation Team identified several types of measures where savings calculations did not align with our findings:

- For three lighting measures, the Evaluation Team verified that lighting retrofits were installed in office buildings and revised the lighting operating hours to the TRM hours of use for commercial buildings. The Program Implementer confirmed that these lighting retrofits were installed at office buildings but in these cases applicants had misidentified the property type, therefore, *ex ante* calculations used industrial hours of use.
- For 21 router replacement measures installed at 19 unique sites, the *ex ante* assumed pre-installation load values (i.e., load associated with in situ equipment before adjusting for customers planned added capacity) were overestimated based on the pre-installation utility data and total rectifier load provided by the facility personnel. The Evaluation Team obtained electric utility data for nine of 19 sites and made adjustments (utility data was not available for the remaining 10 sites; therefore, no load adjustment were made to those sites):
    - For 7 sites, *ex ante* assumptions for pre-installation router usage (in situ usage) were greater than the average total pre-installation facility power consumption. The Evaluation Team modified savings calculations to use the total facility power consumption in place of the *ex ante* estimated pre-installation power. We then used the *ex ante* baseline multiplier to estimate the baseline load to account for the added capacity. These values were used to estimate ex post savings. In one of these 7 cases, the estimated installed case usage was greater than the modified baseline usage, resulting in a 0% realization rate. For the other 6 sites, the realization rates ranged from 29% to 58%.
    - For the other 2 sites, the ex post savings calculations were based on the *ex ante* load assumptions.
- For a chiller replacement measure, the Evaluation Team verified that the existing unit was at the end of useful life and beyond repair. We adjusted the *ex post* savings to use the code baseline value listed in the TRM.
- For two HVAC unit replacement measures, ex ante savings calculations used two different rated cooling capacities to calculate the baseline and installed cooling loads. The Evaluation Team modified the savings estimation approach to use the rated cooling capacity of the energy-

efficient unit based on the TRM protocol. Also, the project documentation does not provide sufficient information to support baseline unit efficiencies and we verified that the baseline units were at the end of their useful life. The Evaluation Team revised the savings to use the code baseline value listed in the TRM.

Verified Gross Savings Results

Table 231 lists the annual and lifecycle realization rates for CY 2018. Overall, the Communications Providers Initiative achieved a first-year evaluated realization rate of 72%, weighted by total (MMBtu) energy savings.[106] Realization rates are generally the same for each savings type; these results represent weighted average realization rates for the entire Program.

Table 231. CY 2018 Communications Providers Initiative Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	72%	73%	100%	72%	75%	100%	75%

Table 232 lists the total *ex ante* and verified annual gross savings for the Communications Providers Initiative by measure category.

Table 232. Communications Providers Initiative Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Boiler	0	0	2,587	0	0	2,587
Chiller	171,013	4	0	125,253	3	0
Controls	157,308	0	0	115,216	0	0
Lighting	387,865	63	0	284,080	47	0
Others	276,242	49	0	202,325	36	0
Rooftop Unit/Split System Air Conditioner	3,092	4	0	2,265	3	0
IT Equipment	575,932	66	0	421,824	49	0
CY 2017 Reported Savings	131,072	13	1,859	68,604	8	1,859
Total Annual	**1,702,524**	**200**	**4,446**	**1,219,566**	**146**	**4,446**

Table 233 lists the *ex ante* and verified gross lifecycle savings by measure type for the Communications Providers Initiative.

[106] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 233. Communications Providers Initiative Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Boiler	0	0	51,740	0	0	51,740
Chiller	3,420,260	4	0	2,559,442	3	0
Controls	1,260,574	0	0	943,310	0	0
Lighting	5,148,881	63	0	3,853,000	47	0
Others	4,421,605	49	0	3,308,766	36	0
Rooftop Unit/Split System Air Conditioner	46,380	4	0	34,707	3	0
IT Equipment	11,518,662	66	0	8,619,621	49	0
CY 2017 Reported Savings	2,459,770	13	37,155	1,840,690	8	37,155
Total Lifecycle	**28,276,132**	**200**	**88,895**	**21,159,537**	**146**	**88,895**

Evaluation of Net Savings

The Evaluation Team did not perform a NTG analysis for this Program since participation was low in CY 2018. The Evaluation Team applied a NTG of 100% for CY 2018 to estimate the net savings associated with the Communications Providers Initiative, but recommends conducting a NTG assessment for the next round of evaluation.

Process Evaluation

In CY 2018, for the process evaluation, the Evaluation Team reviewed Program materials and conducted staff interviews and participant surveys. The Team focused this process evaluation on several key Business Incentive Program topics:

- Participant satisfaction and experience (compared to prior years in the quadrennial)
- Changes to market barriers and solutions over time
- Trade Ally and customer engagement
- Customers' perceptions of Focus on Energy and participation drivers
- Program design, delivery, and coordination among the Program Administrator, the Program Implementer, and utility partners

Program Design, Delivery, and Goals

The Evaluation Team interviewed key Program Administrator and Program Implementer staff to obtain an overview of the Program design and delivery process and any associated changes or challenges.

Program Design

Focus on Energy launched the Business Incentive Program in April 2012. Through the Program, Focus on Energy offers downstream incentives for a variety of prescriptive measures including lighting, HVAC, refrigeration, and compressed air. The Program provides custom incentives for nonstandard projects that involve more complex technologies or changes in equipment different than those for a one-for-one replacement. The Program pays for custom incentives on the basis of estimated performance for demand reduction and on first-year electric and/or natural gas savings.

Program Management and Delivery Structure

Franklin Energy has implemented the Business Incentive Program since the Program's inception. A Program Manager is supported by Energy Advisors (around 22 staff who manage customer and Trade Ally relationships across the Business Incentive and Small Business programs) and operational staff who handle marketing, incentive reviews and processing, quality assurance, and general strategies. Energy Advisors primarily conduct outreach to prospective customers and Trade Allies within specific market sectors—commercial, industrial, chain stores and franchises, and through the Communications Providers Initiative, rural broadband communications providers. Some Energy Advisors have subject matter or customer segment expertise (such as for, lighting, mechanical technologies, food processing, and refrigeration industries). Other Energy Advisors support different geographical regions and, by virtue of these regional assignments, work most closely with rural customers or mostly with urban customers.

In CY 2017, Focus on Energy transitioned its Chain Stores and Franchises Program into the Business Incentive Program, and the Program Implementer maintained field staff into the existing Business Incentive Program team to concentrate on the chain stores and franchises market segment. Per the Program Implementer, the transition had little impact on chain stores and franchises customers' account management, saying the change in organizational structure streamlined Program delivery. As shown in Table 234, Focus on Energy generated more electric energy savings from this customer segment in CY 2017 than in CY 2016, but electric savings decreased while peak demand reduction and therm savings increased from CY 2017 to CY 2018.

Table 234. CY 2016, CY 2017, and CY 2018 Chain Stores and Franchises Customer Savings Comparison

Year	Participants	Verified Gross Lifecycle Electric Energy Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Lifecycle Natural Gas Energy Savings (therms)
CY 2016	264	974,247,457	9,434	4,737,758
CY 2017	164	1,083,620,679	8,441	3,731,711
CY 2018	210	923,312,732	9,956	4,270,885

The Business Incentive and Small Business programs share customer and Trade Ally outreach efforts. Energy Advisors also coordinated with utility account representatives to streamline customer outreach.

Trade Allies provide a key component in delivering the Program to customers. To manage this large network, the Program Implementer categorizes Trade Allies with an A, B, C, or D ranking (corresponding to platinum, gold, silver, or green status at the portfolio level) based on savings and applications delivered to the Business Incentive and Small Business programs (where A and B rankings signify the most active and engaged Trade Allies). Green status (or D rankings) signify new Trade Allies. This ranking helps the Program Implementer prioritize outreach efforts and resources for managing the network.

National Rebate Administrators, a subset of the Trade Ally network, are third-party rebate aggregation and management companies that help clients calculate possible incentives and prioritize properties for energy efficiency projects by matching them with various utility incentive programs around the country. National Rebate Administrators often help national companies to complete incentive applications and navigate eligibility guidelines and advise them on Program-qualifying equipment.

Program Changes

In CY 2018, Focus on Energy made several changes to the Business Incentive Program to align with changing market conditions. This section highlights those changes, with further Program adjustments noted in the *Program Goals* section.

Midstream Lighting Initiative

In the first quarter of CY 2018, Focus on Energy launched a midstream lighting initiative through distributors in Northeastern Wisconsin; the initiative is available to any nonresidential customer. The Program Administrator said the company chose this market due to its size, its strong but stable and manageable sales level, and the presence of a mix of regional and national distributors in the area. More details about the initiative are available in the Pilots and New Programs chapter of this report.

During recruitment, the Program Implementer learned that distributors encountered several participation obstacles for the midstream lighting initiative: specifically with allocating accurate commissions for qualified sales to their sales teams, since most sales remained non-qualified LED equipment (such as linear lamps that are not Design Lights Consortium–listed) or since their point-of-sale systems could not support the initiative's data submittal requirements. In CY 2018, the Program Implementer recruited three distributors to participate in the initiative, and two of the three contributed to the initiative by submitting sales data.

Networked Lighting Controls

Focus on Energy transitioned networked lighting controls measures from a pilot to a standard offering and included the incentive in its CY 2018 lighting incentive catalog. The Program offered incentives for Design Lights Consortium–listed controls based on the number of square feet of new or existing fixtures included in the sensor network, along with a bonus for sharing system data with Focus on Energy from systems employing energy monitoring capabilities. The Program Implementer reported that while networked lighting controls measures proved relatively successful when marketed to the Pilot Program's schools and government sector, the Program did not experience a substantive uptake in business customers during CY 2018, possibly due to a need for more training among Trade Allies.

Bid for Efficiency Offering

The Program Implementer launched a reverse auction initiative, called Bid for Efficiency, which targeted customers with projects that were stalled financially (where they were unable to obtain capital funding) but could be completed by the close of CY 2018. Though any customer was eligible to participate in the auction, eligible projects had to be completed by end of the year for the bonus incentive. The Program Implementer hired a subcontractor, Overlay Consulting, to host a live auction platform and provide training and support to potential participants and Trade Allies. In July, the Program held the reverse auction where participants bid on bonus incentive levels, starting at $0.07 per kilowatt-hour and ending with winning bidders receiving $0.039 to $0.046 per kilowatt-hour in bonus incentives. The initiative ultimately captured seven reverse auction projects in CY 2018. The Program Implementer reported that the live auction format was engaging for customers and Trade Allies, but said the initiative could have achieved comparable results at a lower implementation cost with a paper-based process.

Incentive Updates

The Program Implementer made a few additional changes to its incentive offerings:

- Discontinued incentives for fluorescent lighting measures
- Discontinued incentives for programmable thermostats, replacing the offering with incentives for communicating and smart thermostats
- Introduced incentives for freezer/cooler synchronous motors, VFD vacuum pumps, and desiccant dryer dew point demand controls

Program Goals

The overall Program objective is to encourage businesses to use more energy-efficient products. Focus on Energy set Program savings goals for CY 2018:

- Demand reduction of 17,890 kW
- Lifecycle electric savings of 2,001,296,653 kWh
- Lifecycle natural gas savings of 23,965,758 therms

In addition to energy goals, the Program Administrator and Program Implementer tracked several KPIs. Table 235 shows Program KPIs and results, as reported through Program Administrator and Program Implementer interviews, which the Evaluation Team confirmed with SPECTRUM data wherever possible.

Table 235. CY 2018 Business Incentive Program Key Performance Indicators

KPI	Goal	Result	CY 2018 Result Source
Success Story Activity[a]	Develop at least 12 customer success stories in CY 2018	Reached goal (15)	Reported by Program Implementer
Days an Incentive Remains Outstanding for Complete Prescriptive Applications[b]	Thirty business days, including the Program Implementer's time to process incentive applications and the Program Administrator's time to cut incentive checks	Reached goal (28 days)	SPECTRUM, application received/received complete date compared to date of status change to paid
Repeat Customer Participation[b]	Repeat customers, defined as those who submitted and received payment for more than one project in CY 2018 or in CY 2017 and CY 2018, accounting for at least 30% of participating customer base	Did not reach goal (24.8%)	SPECTRUM ID comparison, multiple project IDs in CY 2017 and CY 2018 or within CY 2018
Networked Lighting Project Activity[a]	Complete at least five networked lighting projects	Did not reach goal (three projects)	SPECTRUM
Increase Midstream Lighting Activity	Increase the quantity of CY 2018 midstream-eligible measures in Green Bay area by a minimum of 5%, as compared to CY 2017	Reached goal (5.4%)	Reported by Program Implementer
Trade Ally Participation	Have 50% of registered Trade Allies complete at least one project in both CY 2017 and CY 2018	Reached goal (60%)	SPECTRUM
Customer Satisfaction[b]	Meet or exceed an 8.9 overall satisfaction rating based on scale of 0 to 10	Reached goal (9.0)	Evaluation Team's ongoing customer satisfaction surveys

[a] These were new KPIs in CY 2018.

[b] These KPIs were revised in CY 2018.

Data Management and Reporting

In CY 2018, the Program Implementer continued to manage project data and generate reports through SPECTRUM. According to the Program Implementer and the Program Administrator, the data management system met the Program's needs. In CY 2018, the Program Administrator and Program Implementer said staff were refining the process of tracking leads and opportunities through SPECTRUM so it can be used as an effective tool for customer outreach and tracking project progression.

The Program Administrator and Program Implementer also reported that the level and frequency of their reporting and communication works well.

Marketing and Outreach

Focus on Energy sought to increase participation in the Business Incentive Program by engaging customers, Trade Allies, and other stakeholders through its marketing and outreach efforts. The Program Administrator designed web pages summarizing Program offerings, ways to participate, success stories, and top opportunities for specific market segments. The Program Implementer generated or refreshed materials to support marketing plan objectives and web pages, including Program summary brochures and industry-specific pieces, such as digital grocery, restaurant, and lodging guides.

In CY 2018, the Program Implementer continued previous efforts to engage target segments—breweries, cheese processing, healthcare and senior care facilities, grocery, retail, and restaurants. It paused marketing activity for commercial real estate to perform a market characterization of this segment that will inform the CY 2019 marketing strategy. The Program Implementer developed an email campaign for restaurant owners, including a chain restaurant case study and updates to a restaurant guidebook, both of which showcase restaurant industry savings opportunities. For breweries and distilleries, the Program Implementer created a completion certificate for public display and a case study that presented project details from a business participating in the Business Incentive Program to illustrate the savings potential for prospective participants.

Trade Ally Marketing

Although the Program Implementer primarily focused marketing efforts on the customer, it also conducted several marketing activities for Trade Allies participating in the Business Incentive, Multifamily, or Small Business program(s).

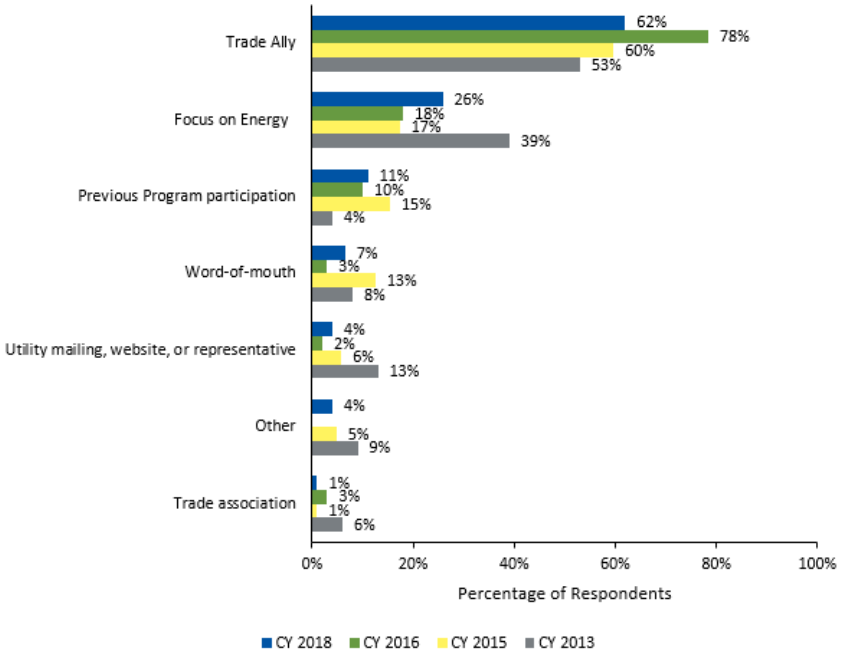
The Program Implementer conducted a quarterly Trade Ally direct mail campaigns covering topics including relationship building, application submittal deadlines, process for submitting success stories, and acknowledging CY 2019 Trade Ally contributions to the Program. In the first campaign to encourage Trade Allies to establish or build relationships with Focus on Energy and its Energy Advisors, the customized mailer listed information about Trade Ally recipients—providing the Trade Ally's contact information and identifying the company's Energy Advisor—so Trade Allies could contact their respective Energy Advisor or notify Focus on Energy about changes to their business information. The Program Implementer also continued to deliver the quarterly Trade Ally performance summary (launched in CY 2016) to advise Trade Allies of their status as platinum, gold, silver, or green (A, B, C, or D according to internal ranking by activity and engagement). Sent by mail as a customized letter, the

summary details overall savings and budget status and the contributions of individual Trade Allies to the Program budget and savings goals across the Business Programs portfolio.

Customer Program Awareness

Customers learned about the Program through many different sources. Surveyed participants (n=138) most frequently said they learned about the Program from Trade Allies (62%); though the largest awareness channel regarding the Program, this percentage represented a statistically significant decrease from CY 2016, when 78% of participants said they heard about the Program from a Trade Ally.[107] In addition, 26% of respondents said they learned about the Program directly from Focus on Energy. Figure 126 shows customer sources of awareness over time.

Figure 126. Source of Business Incentive Program Awareness



Source: CY 2018, CY 2016, and CY 2015 Participant Survey Question A5 and CY 2013 Participant Survey Question B2. "How did your organization learn about the incentives available for this project?" Multiple responses allowed (CY 2018 n=138, CY 2016 n=68, CY 2015 n=104, CY 2013 n=194)

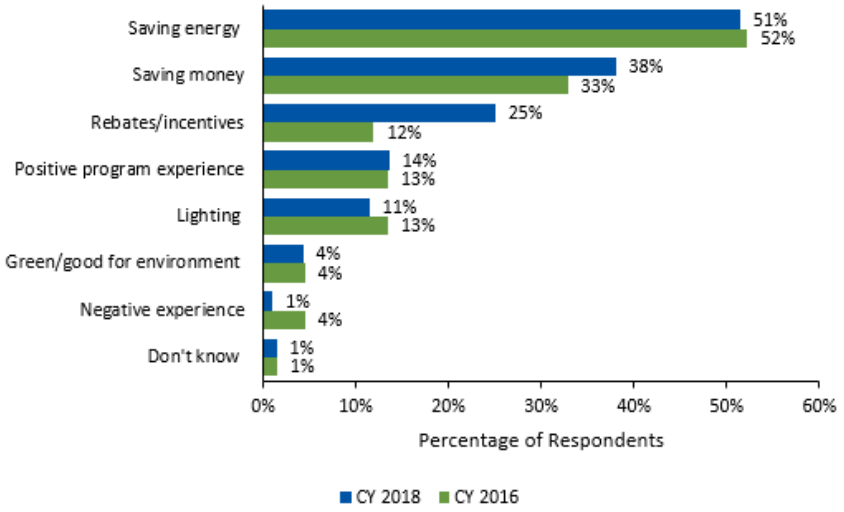
Perceptions of Focus on Energy

In CY 2016, the Evaluation Team asked several questions pertaining to brand identity to gauge the market's perception of Focus on Energy. In CY 2018, the Team reassessed these questions to investigate whether customer perceptions had changed. Business Incentive Program survey respondents reported the first three words that came to mind when they thought about Focus on Energy.

[107] $p<0.01$ using a binomial t-test.

As shown in Figure 127, the most common themes respondents associated with Focus on Energy included saving energy (51%), saving money (38%), and rebates/incentives (25%). Largely, these associations remained consistent over the two evaluation years. A significantly higher percentage of CY 2018 respondents (25%) associated Focus on Energy with rebates/incentives compared to CY 2016 respondents (12%).[108] The vast majority of customer associations were positive or neutral.

Figure 127. Respondent Word Association with "Focus on Energy"

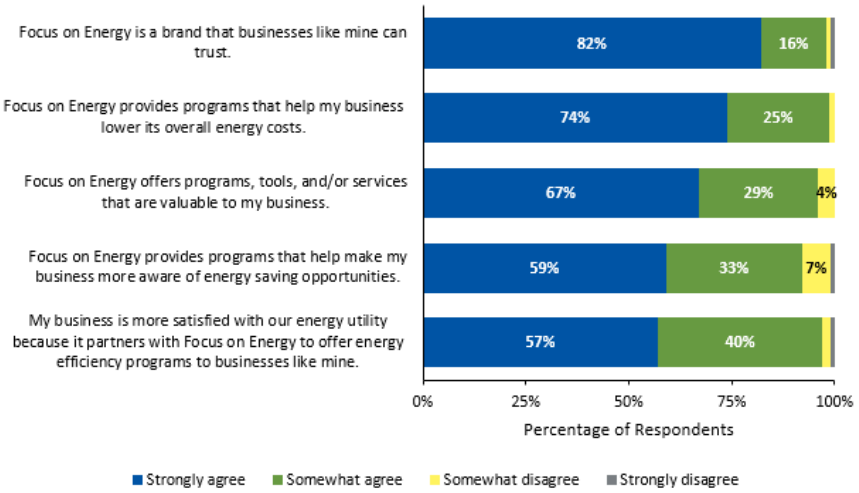


Source: CY 2018 and CY 2016 Participant Survey Question B1. "What are the first three words that come to mind when you hear 'Focus on Energy'?" Multiple responses allowed (CY 2018 n=140, CY 2016 n=67)

The Evaluation Team asked survey respondents to what extent they agreed with several statements about Focus on Energy. The vast majority of respondents agreed with all of the statements. Respondents most strongly agreed with two statements: Focus on Energy is a trustworthy brand and Focus on Energy helps businesses lower overall energy costs, as shown in Figure 128.

[108] $p<0.01$ using a binomial t-test.

Figure 128. Agreement with Focus on Energy Claims



Source: CY 2018 Participant Survey Question B2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you agree or disagree with these statements." (n=137–139)

To investigate changes in customer perceptions over time, the Evaluation Team compared the CY 2016 and CY 2018 responses to the statements shown in Figure 128. The Team computed a mean rating for each statement, where a 1 rating was *strongly agree* and 4 was *strongly disagree*, to compare differences between years. The mean was consistent for most statements across the years, though significantly more respondents agreed that Focus on Energy provided programs that made the business more aware of energy-saving opportunities in CY 2018 than in CY 2016.[109]

Marketing Messages

The Evaluation Team asked survey respondents to identify which statements shown in Table 236 would make them most interested in learning more about Focus on Energy. Respondents gravitated toward cost-oriented statements, with 43% saying reducing their energy costs and saving money resonated the most—results similar to those in CY 2016.

Table 236. Participant Reaction to Marketing Statements

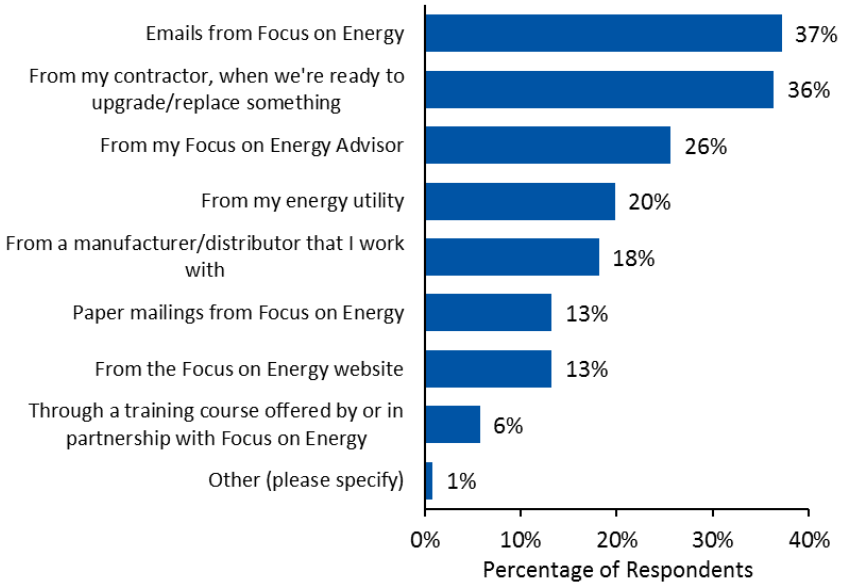
Focus on Energy helps Wisconsin businesses….	Top Statements by Percentage of Respondents	
	CY 2018	CY 2016
Reduce their energy costs and save money	43%	38%
Lower their energy costs	36%	29%
With solutions to use energy smarter and save money	15%	22%
Grow by making smarter decisions about their energy use	6%	12%

Source: CY 2018 and CY 2016 Participant Survey Question B3. "Which of the following statements would make you most interested in learning more about Focus on Energy?" (CY 2018 n=140, CY 2016 n=69)

[109] $p<0.05$ using an independent samples t-test (CY 2018 M=1.51, SD=0.69; CY 2016 M=1.30, SD=0.49).

Survey participants were asked how they most prefer to learn about energy efficiency opportunities for their organization (Figure 129). The two top responses were emails from Focus on Energy (mentioned by 37%) and communication from their contractor (36%); the least-mentioned responses were manufacturers and distributors (18%) and paper mailings from Focus on Energy (13%).

Figure 129. CY 2018 Business Incentive Program Participants' Preferred Methods for Learning about Energy Efficiency Opportunities



Source: CY 2018 Participant Survey Question. "How do you MOST prefer to learn about energy efficiency opportunities for your organization? Please choose your top two from the list below." Multiple responses allowed (n=121; this question was asked in online surveys but not included in mail surveys)

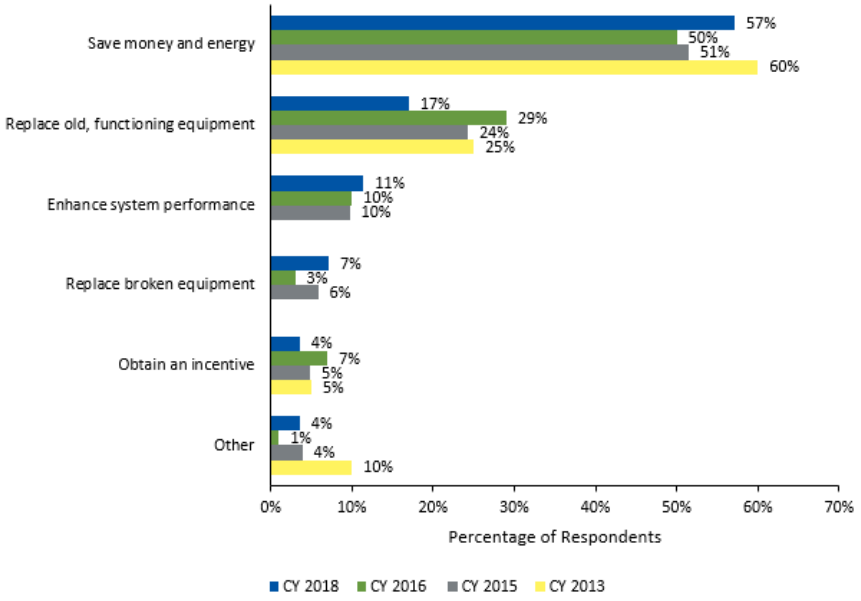
Decision-Making Process

CY 2018 Business Incentive Program participants shared their reasons for implementing an energy efficiency project through the Program. Over half the respondents (57%, n=140) said saving money and energy were the most important factors in choosing to make energy efficiency improvements, followed by replacing old, but still functioning equipment (17%), which was an answer provided by a significantly lower percentage of respondents than in CY 2016 (29%, n=70).[110]

Figure 130 shows the full breakdown of CY 2018 survey respondents' drivers for making energy efficiency upgrades, as compared to CY 2016, CY 2015, and CY 2013.

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

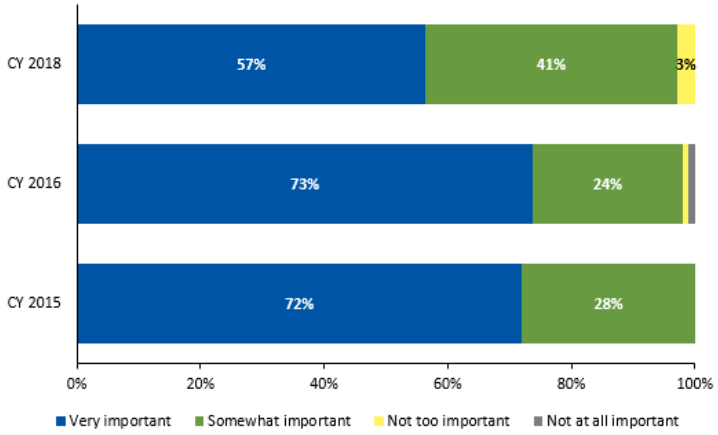
Figure 130. Business Incentive Program Drivers for Energy Efficiency Upgrades



Source: CY 2018, CY 2016, and CY 2015 Participant Survey Question C1; CY 2013 Participant Survey Question C6. "What factor was most important to your company's decision to make the energy-efficient upgrades for which you received an incentive?"

In response to a separate question, 57% of CY 2018 respondents indicated that energy efficiency was *very important* to their organization when making capital upgrades or improvements—a significantly lower proportion of respondents than in CY 2015 (72%).[111] Figure 131 shows a full breakdown of CY 2018, CY 2016, and CY 2015 respondents' importance ratings of energy efficiency.

Figure 131. Business Incentive Program Importance of Energy Efficiency



Source: CY 2018, CY 2016, and CY 2015 Participant Survey Question C2. "How important is energy efficiency to your organization when making capital upgrades or improvements?" (CY 2018 n=140, CY 2016 n=70, CY 2015 n=104)

[111] $p<0.01$ using a binomial t-test.

Contractors, Energy Advisors, and utility account managers all provide information and encourage customers to initiate a project through the Business Incentive Program. CY 2018 survey respondents (n=134–136) most often cited contractors (84%) and Energy Advisors (31%) as those who helped initiate their Program project. A significantly lower percentage of CY 2018 respondents identified Energy Advisors as those who helped initiate their Program project than did CY 2015 respondents (41%, n=104).[112] All other CY 2018 percentages were consistent with CY 2016 and CY 2015 responses.

Respondents (n=136) also identified multiple resources as trusted information sources, with Trade Allies as their most trusted source (68%), followed by Energy Advisors (35%), utility account managers (16%), other business owners (16%), and web resources (10%).

Organizational decision makers varied among business customers, and two-thirds of respondents (68%, n=137) said they required project approval from another member of their organization. Over one-half of respondents requiring project approval (62%, n=88) said they could receive approval within three weeks. Respondents most commonly said their business' owner or president (77%) was involved in building upgrade decisions, followed by facility or maintenance managers (14%) or a board of directors (13%).

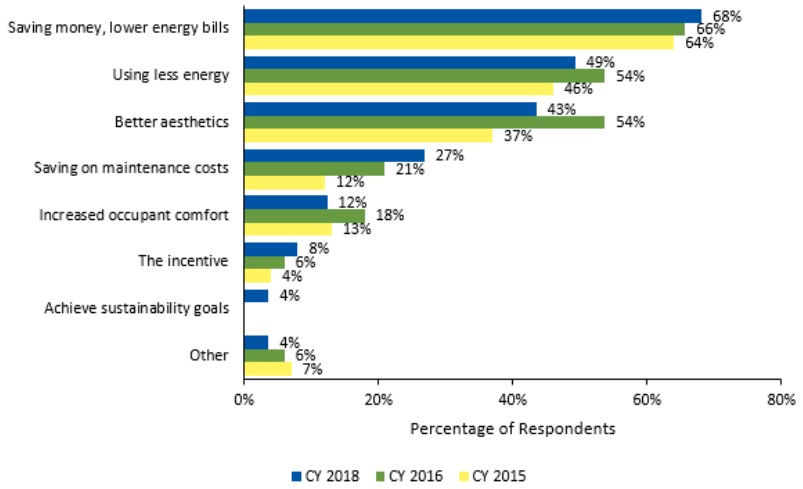
Program Benefits

Business Incentive Program participants described numerous benefits that their companies experienced due to energy efficiency upgrades they made through the Program. The majority of respondents (68%, n=138) cited saving money on utility bills as a Program participation benefit. A significantly higher percentage of CY 2018 participants (27%) identified saving money on maintenance costs as a benefit compared to CY 2015 participants (12%, n=104).[113] Most participants who answered "Other" (4%) cited lowering their environmental impacts as the main benefit. Figure 132 details benefits that participants reported from implementing energy-efficient upgrades.

[112] $p<0.01$ using a binomial t-test.

[113] $p<0.01$ using a binomial t-test.

Figure 132. Business Incentive Program Participation Benefits

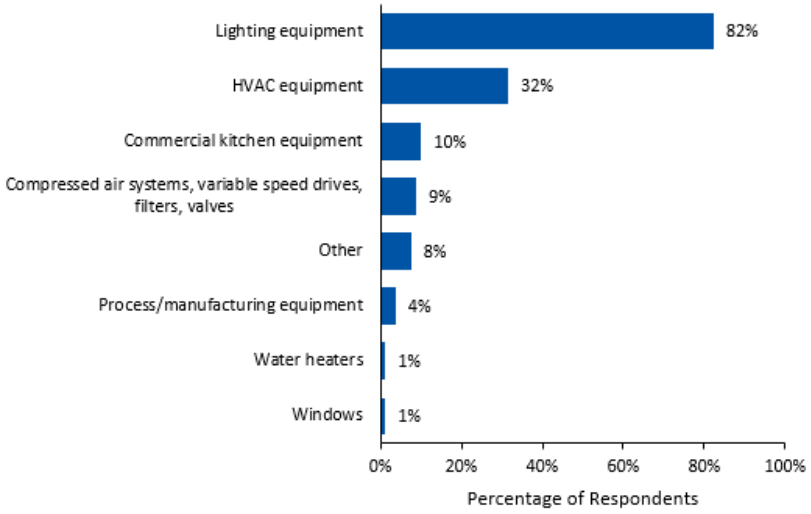


Source: CY 2018 Participant Survey Question D1. "What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed?" Multiple responses allowed.

Future Upgrades

The Evaluation Team asked respondents if they were considering other energy-efficient equipment or building upgrades in the next year. The majority of respondents (61%, n=134) indicated they were planning future energy-efficient upgrades, shown in Figure 133. A significantly higher percentage of chain stores or franchises respondents (75%, n=28) planned future upgrades than respondents from other industries (58%, n=106).[114]

Figure 133. Business Participant Planned Energy Efficiency Upgrades



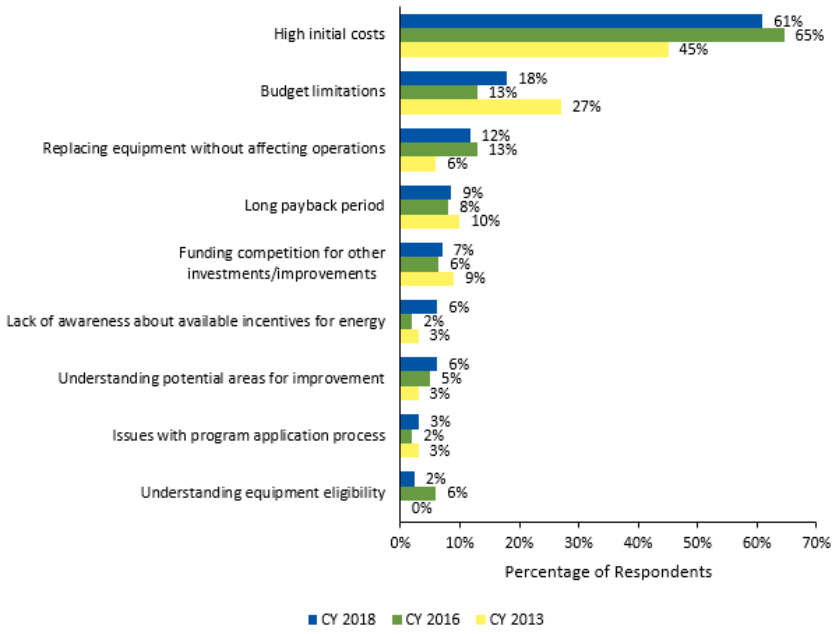
Source: CY 2018 Participant Survey Question C9. "What other upgrades are you considering?" Multiple responses allowed (n=79)

[114] p<0.05 using a binomial t-test.

Customer Participation Barriers

Surveyed participants cited high and initial costs and budget limitations as the biggest barriers to making energy-efficient improvements. A significantly higher percentage of CY 2018 respondents cited high initial costs (61%) as a barrier than CY 2013 respondents (45%).[115] The Evaluation Team did not ask this question in CY 2015. Figure 134 shows respondents' perceived barriers to energy efficiency for CY 2018, CY 2016, and CY 2013.

Figure 134. Perceived Barriers to Business Incentive Program Participation



Source: CY 2018 and CY 2016 Participant Survey Question D2 and CY 2013 Participant Survey Question E1. "What do so see as the biggest challenges to making energy-efficient improvements inside your company?" Multiple responses allowed (CY 2018 n=128, CY 2016 n=62, CY 2013 n=202)

The Evaluation Team asked participant survey respondents what could be done to help their companies overcome the challenges they experienced. Nearly one-half of the CY 2018 respondents (49%, n=121) said higher incentives would help them mitigate challenges, a response percentage similar to CY 2016 (54%, n=56) but significantly higher than in CY 2015 (27%, n=84) and CY 2013 (30%, n=189).[116]

Other than incentive level, there were several changes in what participants reported to be solutions to their challenges. A significantly higher percentage of participants suggested providing incentives upfront in CY 2018 (28%) compared to CY 2016 (14%) and CY 2013 (13%).[117] In CY 2018, 14% of respondents said

[115] $p<0.01$ using a binomial t-test.

[116] $p<0.01$ using a binomial t-test.

[117] $p<0.01$ for CY 2013 and $p<0.05$ for CY 2016 using a binomial t-test.

an energy audit would help them mitigate challenges—a rate significantly higher than in CY 2016 (5%) and CY 2013 (6%).[118] Responses pertaining to energy audits included requests for return on investment analysis, energy savings calculations, and an in-depth conversation about building operation and performance.

Only 9% of CY 2018 respondents said nothing could be done to overcome challenges to implementing improvements, a significantly lower percentage than CY 2015 (33%) and CY 2013 (21%) respondents.[119]

About one-quarter (23%) of respondents reported that more or better information would help overcome barriers. Most of these 13 respondents did not know of everything that Focus on Energy could offer and desired general information about Program offers. Five indicated they would like simplified information about eligible equipment, rebate amounts, and other Program aspects. In addition, five respondents wanted more in-depth information about the process (from start to finish), equipment eligibility, and/or experiences that other business owners had with Focus on Energy.[120]

Other responses included providing information on energy-saving programs for natural gas (one respondent), timers to help plan energy usage better (one respondent), and more education about why energy-efficient upgrades were recommended (one respondent).

Program participants were asked how Focus on Energy could best support their organization aside from providing incentives (Figure 135). The two top suggestions were providing information about project cost savings (mentioned by 51%) and providing help with navigating eligibility and paperwork (49%).

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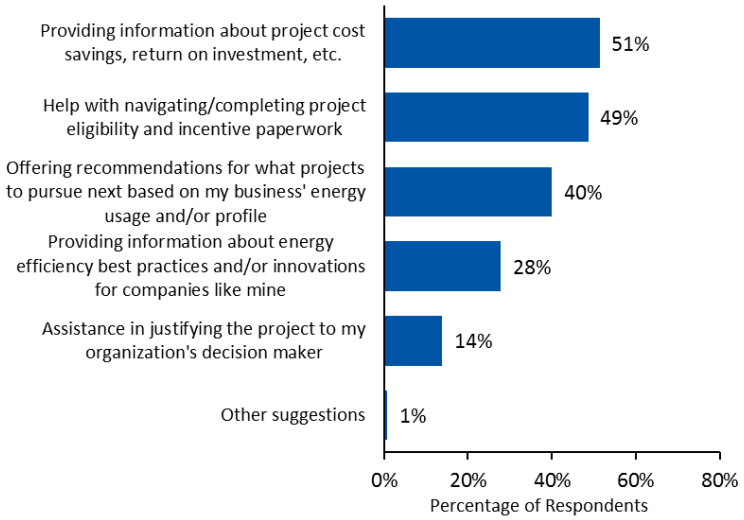
[118] $p<0.05$ using a binomial t-test.

[119] $p<0.01$ using a binomial t-test.

[120] Focus on Energy offers lists of qualified products and application instructions through its website and through a Catalog Guide. Though the Evaluation Team found many case studies on past Program participants, none of these materials offered details about participating in Focus on Energy's programs (from start-to-finish) from the customer's perspective.

Figure 135. CY 2018 Business Incentive Program Participants' Preferred Services from Focus on Energy



Source: CY 2018 Participant Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward? Choose your top two from the list below." Multiple responses allowed (n=115; this question was asked in online surveys but was not included in mail surveys)

Customer Experience

The Evaluation Team surveyed Program participants regarding their experiences with the Business Incentive Program.

Participants' Application Process

Most Business Incentive Program participants were satisfied with the application process. Of those involved in the application process (n=62), a significantly higher percentage of CY 2018 participants (89%) found the application process *very easy* or *somewhat easy* than in prior years (73%, n=36 in CY 2016; and 74%, n=64 in CY 2015).[121] Eleven percent of CY 2018 respondents found the process *somewhat challenging*. Most CY 2018 respondents reporting the application process as challenging described concerns with the time required to acquire and provide information for completing the application. Respondents noted some required information was not easy to provide, or there was too little room to enter all of the information required.

The Evaluation Team also reviewed SPECTRUM data and found, consistent with survey results, that the number of incomplete applications decreased over time, indicating the ease of completion. When comparing CY 2018 project applications with the CY 2017 Business Incentive (which included chain stores and franchises participants) and CY 2016 Business Incentive Program and Chain Stores and Franchises Program applications, the Team found that 37% of CY 2018 completed project applications

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

were submitted with incomplete information or documentation, compared to 41% of CY 2017 and 45% of CY 2016 applications noted in SPECTRUM as incomplete.[122]

Participants also expressed satisfaction with the time required to receive an incentive check. Almost two-thirds of respondents (62%, n=79) said they were *very satisfied*, a response consistent with CY 2016 (67%, n=48) and CY 2015 (59%, n=104). Five percent of CY 2018 respondents were *not too satisfied.*

Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2018, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Business Incentive Program (data do not include Communications Providers Initiative participants). Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.[123]

Figure 136 shows that average overall Program satisfaction was 9.0 among CY 2018 participants, identical to the average rating in CY 2016 and CY 2017. Ratings from the last three years of the quadrennial were significantly higher than the portfolio baseline of 8.8.[124] Although the CY 2018 rating was equivalent to CY 2017, ratings in Q2 (average of 9.4) were significantly higher than the previous year.[125]

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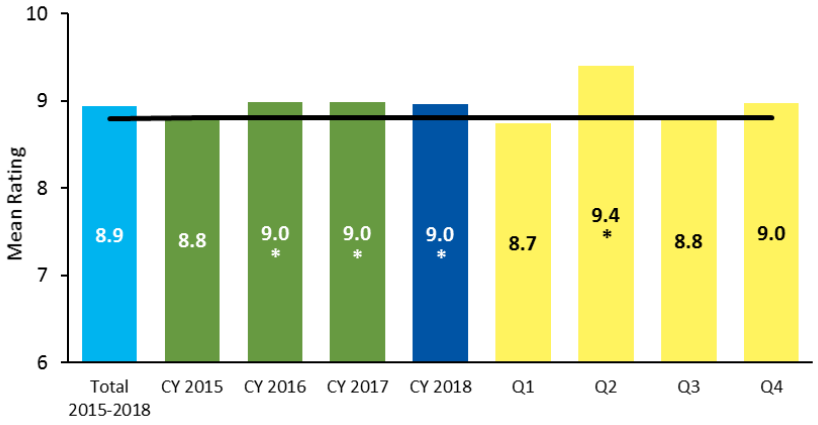
[122] $p<0.01$ using a binomial t-test.

[123] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[124] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 Program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

[125] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to Program participation dates. Survey responses without participation dates were included in the year-end total but not the quarterly breakdown.

Figure 136. CY 2018 Overall Business Incentive Program Satisfaction



Source: Participant Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=372, CY 2016 n=493, CY 2017 n=442, CY 2018 n=272, Q1 n=35, Q2 n=37, Q3 n=69, Q4 n=112). Total CY 2015 to CY 2018 is the participation-weighted average of four annual results.

[a] Denotes that the result for the year or quarter is statistically significant different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 237 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, the only rating that was significantly different from the previous year was satisfaction with the incentive amounts (8.4, up from 7.9 in CY 2017).

Table 237. CY 2018 Average Ratings for Business Incentive Program

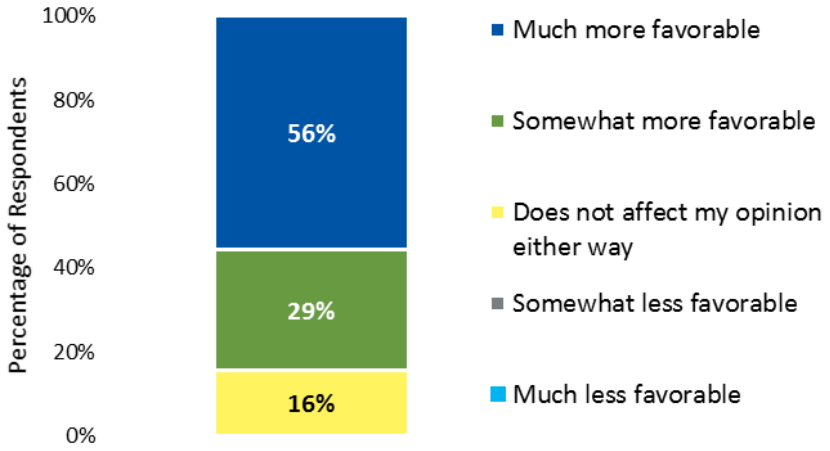
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.1	9.3	9.4	9.4
Satisfaction with Energy Advisor	9.0	9.2	9.3	9.3
Satisfaction with Trade Ally	9.0	9.1	9.1	9.2
Satisfaction with incentive	7.8	8.0	7.9	8.4[a]
Likelihood of more improvements	7.9	7.5	7.8	7.6
Likelihood of recommending the Program	Not asked	9.2	9.3	9.3

[a] Denotes that the result for CY 2018 is statistically significant different from CY 2017 (p<0.10 or better using binomial t-tests).

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 Business Incentive Program's NPS was +79 for CY 2018, which was identical to the Program's NPS in CY 2017.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and more than half (56%) gave the highest rating of *much more favorable* (Figure 137). Only 16% said their opinion was not affected, and no survey respondents (0%) reported that their opinion of their utility had become less favorable.

Figure 137. CY 2018 Effect of Focus on Energy Offerings on Opinion of Utilities



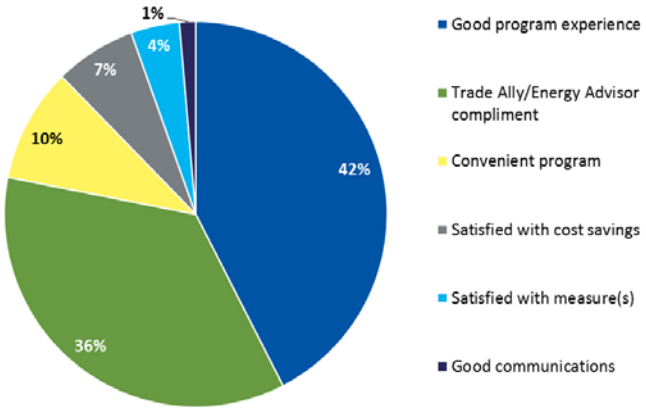
Source: CY 2018 Participant Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (n=108; this question was asked in online surveys but was not included in mail surveys)

Suggestions for Improvement

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 275 participants who responded to the survey, 87 (32%) provided open-ended feedback, which the Evaluation Team coded into a total of 102 mentions. Of these mentions, 73 were complimentary comments (72%) and 29 were suggestions for improvement (28%). Suggestions for improvement peaked in Q3, where 43% of comments (n=30) were a suggestion for an improvement.

Respondents' positive comments are shown in Figure 138. Most of these comments reflected a positive Program experience (42%) or were complimentary of Trade Allies and Energy Advisors (36%), which were also the two most common responses in CY 2017.

Figure 138. CY 2018 Positive Comments about the Program



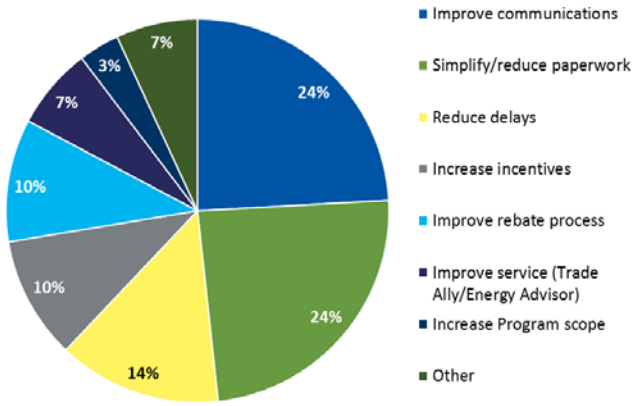
Source: CY 2018 Participant Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=73)

The most frequent suggestions were to improve communications about the Program (24% of mentions) and to simplify or reduce Program paperwork (24%), which was a change from CY 2017 where the most frequent suggestions were to improve communication (38%) and increase incentives (21%). Several CY 2018 suggestions relating to Program communications mentioned a lack of Program advertising. Respondents also said that navigating through the incentive website can be a challenge and reminders about application deadlines should be more frequent.

Other suggestions dealt with reducing delays (14%) and increasing incentives (10%). Other comments dealt with key Program components: improving the rebate process (10%), improving service (7%), and increasing the Program's scope (3%).

Suggestions for improvement are shown in Figure 139.

Figure 139. CY 2018 Suggestions for Improving the Business Incentive Program



Source: CY 2018 Participant Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=29)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 238 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for Business Incentive Program.

Table 238. Business Incentive Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$8,394,863	$9,453,441	$5,820,692	$6,943,989

The Evaluation Team found that the CY 2018 Business Incentive Program was cost-effective (4.45). Table 239 lists the evaluated costs and benefits.

Table 239. Business Incentive Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$269,194	$1,211,595	$943,943	$941,845
Delivery Costs	$7,000,426	$4,947,445	$3,854,513	$3,845,947
Incremental Measure Costs	$16,004,054	$25,917,820	$20,001,455	$25,188,784
Total Non-Incentive Costs	**$23,273,674**	**$32,076,860**	**$24,799,911**	**$29,976,576**
Benefits				
Electric Benefits	$78,563,183	$97,087,875	$39,469,899	$57,009,772
Gas Benefits	$10,462,908	$8,173,944	$8,431,618	$37,219,059
Emissions Benefits	$14,580,412	$17,102,397	$7,855,712	$14,059,978
Total TRC Benefits	**$103,606,504**	**$122,364,216**	**$55,757,229**	**$108,288,809**
Net TRC Benefits	**$80,332,830**	**$90,287,356**	**$30,957,319**	**$78,312,233**
TRC B/C Ratio	**4.45**	**3.81**	**2.25**	**3.61**

Evaluation Outcomes and Recommendations

Outcome 1. Although the Business Incentive Program met its gross energy savings and demand reduction goals in CY 2018, participation declined from CY 2017 to CY 2018 and over the quadrennial. The Program achieved 98% of its electric savings goal, 105% of its therm savings goal, and 114% of its peak demand reduction goal in CY 2018. However, the number of participants has decreased over the quadrennial. This attrition is predominantly due to increased participation in the Small Business Program, and possibly due to challenges in performing outreach with the diverse customers found in the commercial market, a segment that has experienced the greatest decline according to the Program Implementer. This attrition happened despite the Program Implementer targeting certain commercial segments (healthcare and senior care facilities) through marketing campaigns and materials.

Outcome 2. Trade Allies continue to be central in influencing customers to participate in the Business Incentive Program, acting as the main source of Program information and project initiation. Similar to previous years, CY 2018 survey respondents most often learned about the Program from Trade Allies. Respondents cited Trade Allies as their most trusted source for project information and as individuals most often involved in project initiation. Respondents were highly satisfied with their Trade Allies overall. The Program Implementer concentrated some of its marketing efforts in CY 2018 on relationship development through a direct mail campaign to Trade Allies.

Recommendation 1. The Program Implementer added a CY 2019 KPI goal to increase Business Incentive Program participation. One way to increase activity within the commercial segment would be to expand opportunities for commercial customers to interact more frequently with Energy Advisors. Consider assigning target market segments to each Energy Advisor and setting participation goals to assist with meeting the KPI. Design direct, personalized marketing campaigns that incorporate email communications to target markets, followed by periodic telephone calls from Energy Advisors, so these underserved segments engage with Program staff.

Further, due to the consistently strong influence of Trade Allies on project initiation and awareness of incentives, continue to invest in a strong Trade Ally network. Consider offering Trade Ally bonuses or incentives for recruiting participants from targeted market segments.

Outcome 3. To evaluate the Communications Providers Initiative, the Team was not able to verify baseline assumptions made in *ex ante* calculations for custom IT equipment upgrades and custom HVAC projects. The CY 2018 Communications Providers Initiative Program Implementer used custom calculation methods based on the site-specific EM&V and analysis of complex or emerging technologies to develop *ex ante* savings estimates. The Evaluation Team developed *ex post* savings estimates and calculated energy savings and demand reduction realization rates of 75% and 73%, respectively. Having better documentation of the baseline equipment and of the operating conditions of both the baseline and installed equipment can improve the Program realization rate in future evaluations.

Recommendation 2a. Have the Program Implementer collect sufficient documentation to accurately document baseline equipment and operating conditions. This could include photo documentation of equipment nameplate data, metering data, and trend data, as well as screenshots of equipment monitoring systems, photo documentation of total uninterruptible power supply load, and utility data.

Recommendation 2b. For custom HVAC and IT equipment measures, the Team frequently adjusted *ex ante* assumptions to reflect the actual load conditions of the equipment as observed during the post-installation on-site verification activities, per standard EM&V practices. In future years, we recommend a more rigorous verification process to achieve better realization rates for custom projects, with Focus on Energy providing guidelines for preferred or recommended calculation methodologies.

Recommendation 2c. For lighting projects, document the actual operating hours of lighting fixtures that were retrofitted. This can include screenshots of timeclock control, data from building management systems, or the actual operating hours of the building collected through interviews with site personnel.

Agriculture, Schools, and Government Program

Focus on Energy launched the Agriculture, Schools, and Government Program in CY 2015 to better serve agricultural and local government customers. APTIM serves as the Program Administrator, and CESA 10 serves as the Program Implementer. Through the Program, Focus on Energy offers prescriptive and custom incentives to customers with average peak monthly demand under 1,000 kW.

The following customer groups are eligible for the Program:

- **Agricultural producers** (producers of grain, livestock, milk, poultry, fruits, vegetables, bees and honey, fish, and shellfish as well as greenhouses, grain elevators, and feed mills)
- **Educational entities** (K-12 schools, two-year University of Wisconsin colleges, and private four-year colleges)
- **Government entities** (counties, cities, towns, villages, tribes, and state and federal agencies)
- **Municipal wastewater treatment facilities**

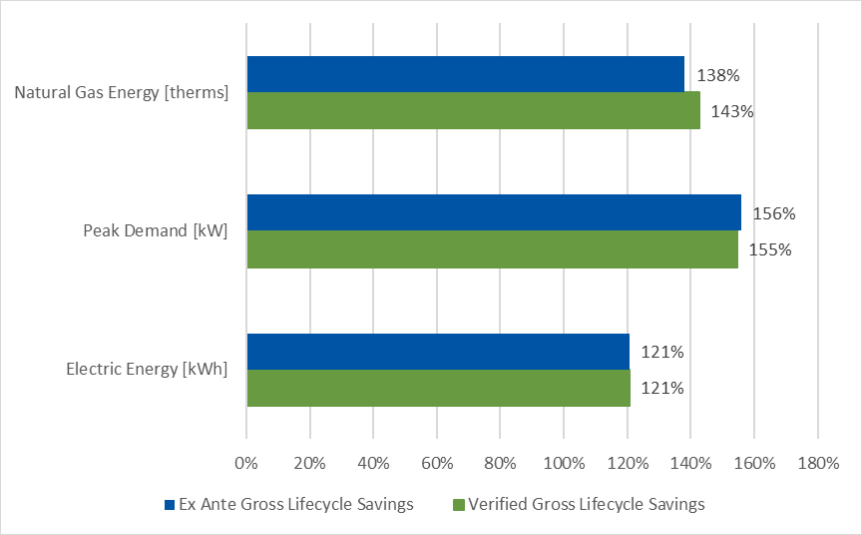
Currently, these customers can obtain all of Focus on Energy's commercial incentives through the Program as well as through specialized incentives that target agricultural producers, educational entities, and public buildings. Table 240 lists actual Program spending, savings, participation, and cost-effectiveness in CY 2017, CY 2018, and the quadrennial.

Table 240. Agriculture, Schools, and Government Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$8,441,694	$6,821,381	$27,308,253
Participation	Number of Participants	1,168	1,233	4,576
Verified Gross Lifecycle Savings	kWh	1,376,069,930	1,292,589,875	4,505,874,826
	kW	14,690	13,253	45,356
	therms	54,186,157	28,473,760	209,361,876
Verified Gross Lifecycle Realization Rate	% (MMBtu)	102%	95%	100%
Annual NTG Ratio	% (MMBtu)	47%	78%	71%
Net Annual Savings	kWh/year	46,042,921	66,852,000	213,426,077
	kW	6,904	10,295	30,354
	therms/year	1,835,842	1,485,720	14,256,557
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	6.24	4.18	3.66

Figure 140 shows the percentage of gross lifecycle savings goals achieved by the Agriculture, Schools, and Government Program in CY 2018. The Program exceeded the electrical savings goals and gas savings goals for CY 2018.

Figure 140. Agriculture, Schools and Government Program Achievement of CY 2018 Gross Lifecycle Savings Goals



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. Verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Agriculture, Schools and Government Program in CY 2018. The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 241 lists specific data collection activities and sample sizes used in the evaluations.

Table 241. CY 2017 Business Incentive Program Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	70
Ongoing Participant Satisfaction Surveys	381
Trade Ally Surveys	17
Delivering Energy Efficiency Together In-Depth Interviews	6
Engineering Desk Reviews	84
Verification Site Visits	42

Program Actor Interviews

In July 2018 the Evaluation Team interviewed the Program Administrator and the Program Implementer, seeking to learn about the Agriculture, Schools and Governments Program's current state and to assess its objectives, performance, and implementation challenges and solutions. The interviews covered the following topics:

- Program goals and achievements
- Program delivery changes

- Marketing and outreach strategies and effectiveness
- Participation barriers
- Data tracking
- Trade Ally management

Tracking Database Review

The Evaluation Team reviewed the census of Agriculture, Schools and Government Program records in the Focus on Energy's database, SPECTRUM. This review involved completing the following tasks:

- Thoroughly review the data to ensure SPECTRUM totals matched the Program Administrator's reported totals
- Reassign savings from a number of database adjustment measures to corresponding Program measures
- Check for complete and consistent applications of information across data fields (such as measure names, first-year savings applications, and EUL applications)

Participant Surveys

The Evaluation Team contacted a random sample of CY 2018 Program participants to assess their Program experiences and to gather data to inform NTG calculations.[126] Of 70 customers surveyed (with a 10.4% total response rate), 19 were in the agriculture sector and 51 were in the schools and government sector. The Team set this quota to match the Program's savings percentage attributable to agriculture customers versus school and government customers.

At the time of the survey, 342 agriculture customers and 411 schools and government customers made up the population of unique Program participants (as determined by unique account numbers). Based on this population size, the number of completed surveys achieved ±10% precision, with 90% confidence at the Program level. One agriculture sector respondent and six schools and government sector respondents completed custom projects, which is representative of the small percentage of agriculture and school and government participants that completed custom projects in CY 2018 (2% and 6%, respectively). The remaining 63 customers completed prescriptive projects. However, custom projects do make up a larger share of Program savings than they do Program participation: 19% of Program savings came from custom projects, 26% came from hybrid projects, and 55% came from prescriptive projects. Participants also received a verification battery of questions, which the Team used to calculate a Program-level ISR.

Whenever possible, the Evaluation Team compared CY 2018 participant survey results to the CY 2016 and CY 2015 participant survey results to document changes or progress. The Team also compared

[126] The Evaluation Team implemented a phone survey in September 2018 with a sample of the program's 727 total participants.

results between the agriculture sector and the schools and government sector in CY 2018 to identify differences in Program expectations, motivations, and experiences, where appropriate.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. These surveys were intended to accomplish the following:

- Provide recent Program participants with opportunities to offer feedback quickly and easily
- Ensure this feedback occurs closely in time with the participation experience
- Identify problems at any time of the year
- Discover opportunities for delivering follow-up information to interested participants

The Program Implementer also used data collected during ongoing participant satisfaction surveys to assess performance and to help meet KPIs related to customer satisfaction.

Within two weeks of completing Program participation, the Program Administrator deployed online surveys to all CY 2018 participants with email addresses available via SPECTRUM; the Evaluation Team sent paper surveys to participants without email addresses. The Team gathered the online survey results via SPECTRUM and received and scanned mail survey responses. After combining both models' results, the Team conducted its analysis. In CY 2018, 381 Program participants responded to the ongoing customer satisfaction survey.

In-Depth Interviews with *Delivering Energy Efficiency Together* Participants

During September and October 2018, the Evaluation Team conducted in-depth interviews with participating schools or school districts that joined the Delivering Energy Efficiency Together (DEET) initiative between CY 2015 and CY 2018. The Team used the interviews to understand the following:

- How schools or school districts implemented DEET
- The offering's influence on schools' energy-saving behaviors
- The schools' satisfaction with the Program
- Challenges or benefits that schools experienced through the Program

CESA 10 provided the Evaluation Team with contact information for school staff, representing 26 schools. Six of the 10 contacts managed DEET for just one school, but four contacts spearheaded DEET for multiple schools in their districts. The Evaluation Team interviewed six of 10 contacts provided by CESA 10; these six interviews represented 21 schools.

Trade Ally Surveys

The Evaluation Team conducted an online survey of participating Trade Allies that served agriculture customers through the Program (based on SPECTRUM data). The Team emailed a sample of 203 Trade

Allies, receiving 17 responses for an 8% response rate. The Trade Ally survey assessed Trade Allies' satisfaction and experience with the Program as well as the following:

- Practices in marketing the Program incentives to customers
- Perceived usefulness of Program resources
- Awareness of Program offerings
- Perceived benefits and economic impacts from the Program

Engineering Desk Review

The Evaluation Team reviewed all available project documentation in SPECTRUM for a sample of 84 Program measures. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation 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 in Wisconsin, the Focus on Energy TRM and associated workpapers were the primary sources used by the Evaluation Team to determine methodology and data in nearly all cases. For hybrid and custom measures, the Evaluation Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The evaluation sample for these reviews was selected using a weighted, random stratified sampling approach known as PPS, where size is based on lifecycle total energy savings.

Verification Site Visits

The Evaluation Team conducted 42 verification site visits for the CY 2018 Agriculture, Schools, and Government Program. Site visits 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 operational and occupancy schedules, claimed and observed setpoints, trend data, utility data and any other relevant details identified prior to or upon arrival at the site.

Impact Evaluation

The Evaluation Team used the following approaches to measure the impact of the Agriculture, Schools, and Government Program:

- Tracking database review
- ISR determination
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team used the CY 2018 tracking data to gather reported installations, then applied the results from engineering desk reviews (n=84) and verification site visits (n=42) to determine verified gross savings.

The Evaluation Team identified several types of measures for which savings calculations did not align with the applicable TRMs (2018 TRM and 2018 TRM Update) or current approved workpapers. There were also several adjustments made to *ex ante* calculations based on observed operating parameters and engineering best practices. The most notable of these adjustments are described in Table 242.

Table 242. CY 2018 Sample Detailed Projects

Measure ID	Project Measure	Ex Ante Savings (MMBtu)	Ex Post Savings (MMBtu)	RR	Share of Program	Notes
2314	Hybrid Energy Recovery Ventilation (ERV)	31,364	24,905	79%	2%	Cooling setpoints in the existing and installed cases were modified to 67°F, reduced from 74°F reported in the ex ante calculations. This adjustment resulted in twice as many cooling hours and higher electric savings because the ERVs are used during a greater number of cooling degree days. The actual heating space temperature setpoints in the existing and installed cases are lower than reported, resulting in fewer heating degree days and lower gas savings because ERV is used for fewer heating degree days.
2680	Custom HVAC Controls	30,031	36,361	121%	2%	The Team determined that the baseline (existing) piece of equipment that was being replaced was less efficient than claimed in the application (resulting in more savings). At the site visit, the output power of the proposed (current) piece of equipment was found to be lower than claimed in the application. The output power value is used for both the proposed and baseline output power metric input in the calculations (resulting in less savings due to less overall consumption from both cases). On balance between the two modifications, this adjustment resulted in more savings than projected in the ex ante calculations.
2727	Custom Aeration	20,260	12,857	63%	1%	The custom aeration calculations were modified in four ways, with a net result of fewer savings in ex post than in ex ante calculations. Modifications included more industry standardized calculations specific to this equipment including CFM, conversion factor, and VFD speed.

Measure ID	Project Measure	Ex Ante Savings (MMBtu)	Ex Post Savings (MMBtu)	RR	Share of Program	Notes
3276	Boiler	8,187	4,244	52%	0%	The returning hot water temperature at site visit was 155°F, and it appeared that the boiler had never returned below 140°F. For a boiler to operate in condensing mode, its return water temperature should be kept below 120°F. Because the return temperature was above the acceptable condensing range (120°F), the Team used the near-condensing boiler TRM algorithm (MMID 3277) to evaluate verified savings.
3656	Hybrid DEET	971	1,911	197%	0%	*Ex ante* natural gas savings were based on the difference in utility bill data between the most recent period (period 5) and the selected baseline period (period 1). The *ex post* verified savings calculations compare the current period (period 5) to last year's period (period 3), according to the 2018 TRM guidance. This adjustment resulted in higher natural gas savings.

The Team identified five measures where the *ex ante* energy savings received an adjustment to reference different deemed savings than reported in SPECTRUM. Four of the measures were MMID 3276 (Boiler, Hot Water, Condensing, ≥90% AFUE, ≥300 MBH) and one was MMID 2252 (Chiller, High Efficiency, Water Cooled 150-299 Tons, Replacement). The original *ex ante* reported savings referenced the 2018 TRM and the adjusted *ex ante* savings referenced the 2018 TRM Update. The Evaluation Team adjusted the initial *ex post* verified savings to reference the same deemed savings used in the *ex ante* savings calculations from the 2018 TRM Update. These adjustments did not impact measure realization rates.

The Team identified a number of measures in the Non-Residential portfolio which were evaluated inaccurately in CY 2017. In these cases, boiler measures were submitted using claimed savings values based on the input capacity instead of the output (AHRI) capacity. The commercial boiler measures in the TRM were based on a billing analysis and used a coefficient to correct for these rating issues. The Team revised the evaluated savings values for CY 2017 to back-out these adjustments. These impact changes were not applied to CY 2017, but rather applied in CY 2018 as part of the end-of-quadrennial reconciliation. In the Agriculture, Schools, and Government Program, *ex post* gross and *ex post* net savings values increase as a result of these adjustments.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2018, participant surveys were conducted and a weighted ISR has been derived from survey data and is equal to 100%. The Evaluation Team applied this weighted ISR of 100% to all engineering desk reviews (where no site visit was conducted) and applied a site-specific ISR to all measures verified during an on-site visit at the facility.

Verified Gross Savings Results

Table 243 lists the annual and lifecycle realization rates for the CY 2018 Program. Overall, the Program achieved a first-year evaluated realization rate of 90%, weighted by total (MMBtu) energy savings. Realization rates are generally the same for a given demand or energy savings type unless influenced by the ISR. EUL adjustments drive the difference between annual and lifecycle realization rates, particularly in therms savings. The totals presented in this report represent a weighted average realization rate for the entire Program.

Table 243. CY 2018 Agriculture, Schools, and Government Program
Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	100%	99%	110%	104%	100%	103%	102%

Table 244 lists the *ex ante* and verified annual gross savings for the Program for CY 2018 by measure type.

Table 244. CY 2018 Agriculture, Schools, and Government Program First-Year Gross Savings Summary

Measure	*Ex Ante Gross First Year*			Verified Gross First Year		
	kWh	kW	therms	kWh	kW	therms
Aeration	2,364,528	272	0	2,364,194	270	0
Air Sealing	3,739	0	37,743	3,738	0	41,097
Boiler	0	0	1,489,832	0	0	1,622,239
Chiller	4,844,405	1,231	0	4,843,720	1,222	0
Compressor	250,765	41	0	250,730	41	0
Controls	6,667,280	519	485,193	6,666,337	515	528,314
Delamping	485,426	99	0	485,357	99	0
Dishwasher, Commercial	114,825	0	618	114,809	0	673
Dryer	31,932	0	53,386	31,927	0	58,131
Energy Recovery	415,113	243	202,293	415,054	241	220,271
Fan	2,729,783	480	18,869	2,729,397	476	20,546
Fluorescent, Linear	87,912	14	0	87,900	13	0
Furnace	42,287	0	18,427	42,281	0	20,065
Grain Dryer	3,993	0	6,678	3,992	0	7,271
Greenhouse	0	0	4,111	0	0	4,477
Heat Exchanger	798,703	5	0	798,590	5	0
Hot Holding Cabinet	11,895	4	0	11,893	4	0
Infrared Heater	0	0	33,550	0	0	36,532
Insulation	15,934	18	28,141	15,932	18	30,642
LED	47,599,175	8,117	0	47,592,442	8,057	0
Livestock Waterer	575,928	0	0	575,847	0	0
Motor	728,673	200	0	728,570	199	0
Other	2,806,057	496	349,458	2,805,660	493	380,516
Oven	34,358	8	7,075	34,353	8	7,704
Pre-Rinse Sprayer	799	0	0	798	0	0

Measure	*Ex Ante Gross First Year*			Verified Gross First Year		
	kWh	kW	therms	kWh	kW	therms
Reconfigure Equipment	4,285	0	0	4,284	0	0
Refrigerator/Freezer—Commercial	1,545	0	0	1,545	0	0
Rooftop Unit/Split System Air Conditioner	198,741	287	22,123	198,713	285	24,089
Scheduling	554,152	84	70,039	554,074	83	76,264
Steam Trap	0	0	96,167	0	0	104,713
Steamer	8,265	4	2,811	8,264	4	3,061
Tune-Up/Repair/Commissioning	734,064	22	466,535	733,960	21	507,997
Unit Heater	0	0	31,817	0	0	34,645
Variable Speed Drive	25,842,842	2,654	0	25,839,186	2,634	0
Water Heater	8,850	2	8,167	8,849	2	8,893
Window	0	0	80,796	0	0	87,977
Study	0	0	0	0	0	0
Irrigation	11,266	0	0	11,264	0	0
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	48,361
Total First Year	**97,977,520**	**14,800**	**3,513,829**	**97,963,661**	**14,690**	**3,874,477**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 245 lists the *ex ante* and verified gross lifecycle savings by measure type for the Program in CY 2018.

Table 245. CY 2018 Agriculture, Schools, and Government Program Lifecycle Gross Savings Summary

Measure	*Ex Ante Gross Lifecycle*			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Aeration	47,290,560	272	0	47,278,168	270	0
Air Sealing	74,780	0	754,860	74,760	0	759,534
Boiler	0	0	29,796,937	0	0	29,981,442
Chiller	96,888,100	1,231	0	96,862,711	1,222	0
Compressor	3,761,486	41	0	3,760,500	41	0
Controls	73,542,113	519	6,063,555	73,522,842	515	6,101,101
Delamping	4,854,260	99	0	4,852,988	99	0
Dishwasher, Commercial	1,148,253	0	6,180	1,147,953	0	6,218
Dryer	478,981	0	800,797	478,855	0	805,756
Energy Recovery	6,232,050	243	3,110,547	6,230,417	241	3,129,808
Fan	42,858,466	480	283,036	42,847,235	476	284,789
Fluorescent, Linear	1,231,194	14	0	1,230,871	13	0
Furnace	760,985	0	331,600	760,785	0	333,653
Grain Dryer	79,860	0	133,560	79,839	0	134,387
Greenhouse	0	0	20,557	0	0	20,684
Heat Exchanger	11,980,545	5	0	11,977,406	5	0
Hot Holding Cabinet	142,740	4	0	142,703	4	0
Infrared Heater	0	0	503,250	0	0	506,366
Insulation	398,350	18	680,488	398,246	18	684,702
LED	642,739,498	8,117	0	642,571,074	8,057	0
Livestock Waterer	5,759,280	0	0	5,757,771	0	0

Measure	*Ex Ante Gross Lifecycle*			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Motor	13,070,282	200	0	13,066,857	199	0
Other	24,997,057	496	3,535,190	24,990,507	493	3,557,080
Oven	412,288	8	84,905	412,180	8	85,431
Pre-Rinse Sprayer	3,993	0	0	3,992	0	0
Reconfigure Equipment	42,850	0	0	42,839	0	0
Refrigerator/Freezer—Commercial	18,540	0	0	18,535	0	0
Rooftop Unit/Split System Air Conditioner	2,981,123	287	331,845	2,980,342	285	333,900
Scheduling	3,456,510	84	507,705	3,455,604	83	510,849
Steam Trap	0	0	577,000	0	0	580,572
Steamer	99,180	4	31,648	99,154	4	31,844
Tune-Up/Repair/ Commissioning	3,182,837	22	2,708,530	3,182,003	21	2,725,301
Unit Heater	0	0	477,256	0	0	480,211
Variable Speed Drive	387,642,742	2,654	0	387,541,164	2,634	0
Water Heater	132,716	2	111,837	132,681	2	112,530
Window	0	0	1,615,920	0	0	1,625,926
Study	0	0	0	0	0	0
Irrigation	168,993	0	0	168,949	0	0
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	0	0	0	1,394,074
Total Lifecycle	**1,376,430,611**	**14,800**	**52,467,202**	**1,376,069,930**	**14,690**	**54,186,157**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Agriculture, Schools, and Government Program. The Evaluation Team calculated a NTG percentage of 47% for the CY 2018 Program. For a detailed description of NTG analysis methodology and findings, refer to Appendix I.

Freeridership Findings

The Evaluation Team used the self-report survey method to determine the Program's freeridership for CY 2018. The Team estimated an average self-reported freeridership of 55%, weighted by evaluated savings, for the CY 2018 Program.

The two CY 2018 respondents with the greatest savings accounted for 48% of the total analysis sample gross savings, and together were estimated as 75% freeriders.

For comparison:

- In CY 2016, the two respondents with the greatest savings accounted for 39% of the total analysis sample gross savings, and both were estimated as 50% freeriders. These two respondents accounted for 19%of the overall 36% weighted freeridership estimate and were the main driver of the higher freeridership estimate observed in CY 2016 compared to CY 2015.
- The three CY 2015 respondents with the greatest savings accounted for 77% of the total analysis sample gross savings, and all three were estimated as 0% freeriders. These three respondents were the main driver of the low freeridership estimate of 12% observed in CY 2015.
- The Evaluation Team did not conduct participant surveys in CY 2017.
- The overall freeridership estimate is 40% for the Quad.

Table 246 lists the CY 2015, CY 2016, CY 2018, and quadrennial (CY 2015–CY 2018) self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 246. Summary of CY 2015, CY 2016, and CY 2018 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	77	12%
CY 2016	142	36%
CY 2017	n/a	n/a
CY 2018	70	55%
Quad (CY 2015–CY 2018)	289	40%

Spillover Findings

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Agriculture, Schools, and Government Program. The Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, as presented in Table 247.

Table 247. Agriculture, Schools and Government Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total Lifecycle MMBtu Savings Estimate
Variable Speed Drive	9	8,236
LEDs	54	168
Condensing units: (1x40 ton and 1x20 ton)	2	177

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in the following equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 2% spillover estimate,[127] rounded to the nearest whole percentage point, for the Agriculture, Schools and Government Program respondents (Table 248).

Table 248. Agriculture, Schools, and Government Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	8,581
Program Savings	453,219
Spillover Estimate	**2%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

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

This yielded an overall NTG estimate of 47% for the Program. Table 249 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu, as well as the overall Program NTG.

Table 249. CY 2018 Agriculture, Schools, and Government Program Annual Net Savings and Net-to-Gross

Net-of-Freeridership Savings (MMBtu)	Participant Spillover Savings (MMBtu)	Total First Year Gross Verified Savings (MMBtu)	Total First Year Net Savings (MMBtu)	Program First Year NTG Ratio
323,303	14,303	715,154	337,606	47%

Table 250 shows the annual net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category for the Program. The Evaluation Team attributed these savings as net of what would have occurred naturally without the presence of the Program.

Table 250. CY 2018 Agriculture, Schools, and Government Program Annual Net Savings

Measure	First Year Net		
	kWh	kW	therms
Aeration	1,111,171	127	0
Air Sealing	1,757	0	19,316
Boiler	0	0	762,452
Chiller	2,276,548	574	0
Compressor	117,843	19	0
Controls	3,133,178	242	248,308
Delamping	228,118	46	0
Dishwasher, Commercial	53,960	0	316
Dryer	15,006	0	27,321
Energy Recovery	195,076	113	103,527

[127] Actual value is 1.9%.

Measure	First Year Net		
	kWh	kW	therms
Fan	1,282,817	224	9,657
Fluorescent, Linear	41,313	6	0
Furnace	19,872	0	9,430
Grain Dryer	1,876	0	3,418
Greenhouse	0	0	2,104
Heat Exchanger	375,337	2	0
Hot Holding Cabinet	5,590	2	0
Infrared Heater	0	0	17,170
Insulation	7,488	8	14,402
LED	22,368,448	3,787	0
Livestock Waterer	270,648	0	0
Motor	342,428	93	0
Other	1,318,660	232	178,842
Oven	16,146	4	3,621
Pre-Rinse Sprayer	375	0	0
Reconfigure Equipment	2,014	0	0
Refrigerator/Freezer—Commercial	726	0	0
Rooftop Unit/Split System Air Conditioner	93,395	134	11,322
Scheduling	260,415	39	35,844
Steam Trap	0	0	49,215
Steamer	3,884	2	1,439
Tune-Up/Repair/Commissioning	344,961	10	238,759
Unit Heater	0	0	16,283
Variable Speed Drive	12,144,418	1,238	0
Water Heater	4,159	1	4,180
Window	0	0	41,349
Study	0	0	0
Irrigation	5,294	0	0
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	37,567
Total First Year	**46,042,921**	**6,904**	**1,835,842**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Table 251 lists the lifecycle net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category for the Program.

Table 251. CY 2018 Agriculture, Schools, and Government Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
Aeration	22,220,739	127	0
Air Sealing	35,137	0	356,981
Boiler	0	0	14,091,278
Chiller	45,525,474	574	0
Compressor	1,767,435	19	0
Controls	34,555,736	242	2,867,517

Measure	Lifecycle Net		
	kWh	kW	therms
Delamping	2,280,904	46	0
Dishwasher, Commercial	539,538	0	2,923
Dryer	225,062	0	378,705
Energy Recovery	2,928,296	113	1,471,010
Fan	20,138,201	224	133,851
Fluorescent, Linear	578,510	6	0
Furnace	357,569	0	156,817
Grain Dryer	37,524	0	63,162
Greenhouse	0	0	9,722
Heat Exchanger	5,629,381	2	0
Hot Holding Cabinet	67,070	2	0
Infrared Heater	0	0	237,992
Insulation	187,175	8	321,810
LED	302,008,405	3,787	0
Livestock Waterer	2,706,152	0	0
Motor	6,141,423	93	0
Other	11,745,538	232	1,671,828
Oven	193,725	4	40,152
Pre-Rinse Sprayer	1,876	0	0
Reconfigure Equipment	20,134	0	0
Refrigerator/Freezer—Commercial	8,712	0	0
Rooftop Unit/Split System Air Conditioner	1,400,761	134	156,933
Scheduling	1,624,134	39	240,099
Steam Trap	0	0	272,869
Steamer	46,602	2	14,967
Tune-Up/Repair/Commissioning	1,495,541	10	1,280,892
Unit Heater	0	0	225,699
Variable Speed Drive	182,144,347	1,238	0
Water Heater	62,360	1	52,889
Window	0	0	764,185
Study	0	0	0
Irrigation	79,406	0	0
CY 2017 *Ex Post* Evaluation Adjustment[a]	0	0	1,082,944
Total Lifecycle	**646,752,867**	**6,904**	**25,895,223**

[a] CY 2017 *ex post* evaluation adjustments for prescriptive boiler measures.

Process Evaluation

The Evaluation Team focused the process evaluation on the following key Agriculture, Schools and Government Program topics:

- Participant satisfaction and experience, compared to prior years in the Quadrennial
- Changes to market barriers and solutions over time
- Trade Ally and customer engagement

- Customers' perceptions of Focus on Energy and of participation drivers
- Program design, delivery, and coordination among the Program Administrator, Program Implementer, and utility partners
- School satisfaction and experience with the DEET Program offering

Program Design, Delivery, and Goals

The Evaluation Team interviewed key Program Administrator and Program Implementer staff to obtain an overview of the Program's design and delivery processes and to identify any associated changes or challenges.

Program Design

The Program focused on direct and personal communications between dedicated Energy Advisors (Program Implementer staff) and customers, with each Energy Advisor assigned to a territory located within 150 miles of his or her customers. This ensured that customers could access a local Focus on Energy representative familiar with their specific needs. Customers might, however, be assigned to other Energy Advisors, depending on the following criteria:

- Project types
- Customers' participation levels
- Energy Advisors' experience in specific industries and their past project experience
- Customer-Energy Advisor relationships

Although the Program's design emphasized customer outreach and engagement through Energy Advisors, participants could be recruited through a utility contact, a Trade Ally, or a direct customer contact.

Program Management and Delivery Structure

Since the Program's launch in CY 2015, CESA 10 has served as the Program Implementer, taking responsibility for conducting customer outreach, providing Energy Advisors, training Trade Allies, and ensuring application submissions had complete and correct information. In CY 2018, CESA 10 created a new Trade Ally advisor position to conduct more outreach and coordination with Trade Allies, particularly in the areas of wastewater, agriculture, HVAC, and lighting. In spring CY 2018, this Trade Ally advisor led a campaign to hold multiple Trade Ally breakfasts; 128 Trade Allies participated across seven locations.

The Program Implementer said Program offerings such as the Comprehensive Lighting Initiative and the Agriculture Multiple Equipment Bonus have started to generate deeper savings, and the Program has reached more customers as it has matured. The Program Administrator, however, expressed concern

that the savings goals could be harder to reach cost-effectively in future years as the Program seeks more savings from the agriculture sector, which is in line with recent commission priorities.[128]

Both the Program Implementer and Administrator said the Program budget was sufficient to meet their savings and marketing goals for the Program year (and the Program met its goals). Both also explained that the Program received carryover funds from CY 2017, using the extra funding to develop new bonus and special offerings for CY 2018. The following offerings began in summer 2018:

- Benchmarking for schools
- Wastewater treatment plant energy assessments
- Variable speed drives (VSDs) for agriculture customers

Program Changes

From CY 2017 to CY 2018, Focus on Energy made several changes to the Program's savings goals, design, and delivery, including the following:

- Updating core incentives
- Offering new special offerings and bonus incentives
- Refining incentives for bonus offerings first offered in prior years (see Appendix A)

Updates to Standard Measures and Incentive Levels

The Program Implementer made several changes to its standard measure offerings in CY 2018, including the following:

- Increased custom therm incentives, from $0.60/therm in CY 2017 to $0.80/therm in CY 2018; custom therm incentives were $0.40 per therm in CY 2016
- Removed fluorescent lighting measures
- Removed programmable thermostat measures and added smart and Wi-Fi thermostats

New Special Offerings and Bonus Incentives

The Program Administrator said the bonus incentives and special offerings set goals to reach previously uncontacted customers and to create equity for ratepayers who lacked the funds to conduct energy efficiency projects. Table 252 summarizes all bonus incentives and special offerings, followed by a description of those new in CY 2018.

[128] In 2017, the program was highly cost-effective with a total resource cost test ratio of 4.18 (using the modified Wisconsin version of the total resource cost test).

Table 252. Agriculture, Schools and Government Program Bonus Incentives and Special Offerings

Program Offerings	Offering Type	Status
Agriculture Multiple Equipment Bonus	Bonus Incentive	Same incentive as CY 2017; application process streamlined
Boiler Tune-Up	Bonus Incentive	Same as CY 2017
Comprehensive Lighting Initiative	Bonus Incentive	Changed incentive level
DEET	Special Offering	Same as CY 2017 (the Program was modified significantly in CY 2017)
Retro-commissioning	Bonus Incentive	Changed incentive levels for audit and implementation phases
Water/Wastewater Bonus	Bonus Incentive	Modified the incentive (custom vs. prescriptive)
Wastewater Plant Energy Assessment	Special Offering	New in CY 2018
Wastewater Energy Management	Special Offering	New in CY 2018
Wastewater Project Assessment Incentive	Special Offering	New in CY 2018
Double VFD Bonus for schools and government customers	Bonus Incentive	New in CY 2018
Future Farmers of America to Farm Fundraiser with Engine Block Heater Timer	Special Offering	Same as CY 2017
Double incentives on VSDs for agricultural customers	Bonus Incentive	New in CY 2018
Benchmarking for Schools	Special Offering	New in CY 2018

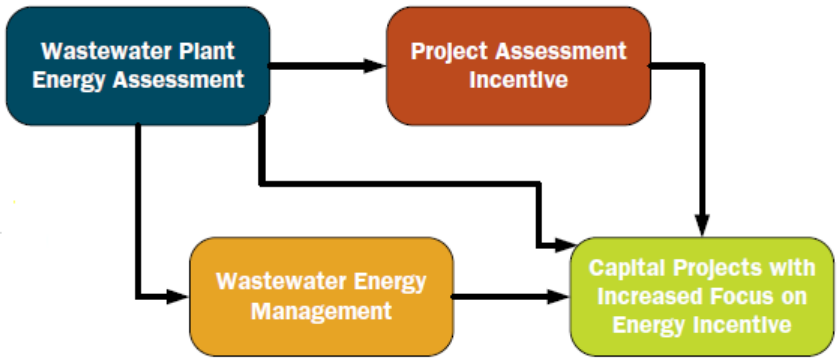
Double Incentives for VSDs for Agricultural Producers. Incentives were limited to 75% of the project's entire cost and could not exceed $7,500 per VSD.

School Benchmarking Offering. The Program revamped a school benchmarking program, last offered in 2006. The benchmarking offering provides school districts an ENERGY STAR score for its buildings, a peer comparison score comparing it to other to other Wisconsin districts, and a B3 score comparing building actual use to the expected use based on energy code. The B3 software is more robust than the 2006 software in that the new offering allows data to be pulled electronically from utilities and uploaded to the B3 database. The B3 software also applies weather normalization to usage data using an algorithm. Additionally, the 2006 offering did not provide customers with a B3 baseline, which is based on the current energy code. While the Program did not plan to claim savings for this initiative, its aid to schools is meant to generate leads for other projects.

Wastewater Treatment Plant Energy Assessment Bonus (WWPEA). The special offering seeks to create a feeder pipeline by funding a significant portion of an in-depth audit to generate projects and help small and medium facilities develop a roadmap for energy efficiency. Focus on Energy began the Program in June 2018 and used a portion of CY 2017 carryover funds to cover 90% of audits' assessment costs, up to $10,000. These audits were conducted by Trade Allies whom the Program enrolled as qualified wastewater service providers (WSPs). The WSPs provided customers with a report that lists measures they can complete to save energy, as well as a list of no-cost/low-cost capital improvement measures that the plants can complete.

The special offering for CY 2018 built upon a short-term offering from CY 2017 called the Wastewater Bridge Initiative, which was offered in conjunction with the DOE Wastewater Infrastructure Accelerator. The Wastewater Bridge Initiative offered customers incentives for implementing no and low-cost conservation measures (see Figure 141).

Figure 141. Program Bonus and Special Offerings for Wastewater Treatment Plants



Source: Focus on Energy. "2018 Special Offerings to Improve Your Wastewater Plant." https://www.focusonenergy.com/sites/default/files/inline-files/Focus%20on%20Energy_Wastewater%20Service%20Offerings_2018%286-25-18%29.pdf

Wastewater Treatment Plant Energy Management Special Offering. This offering provides incentives for wastewater treatment plants that implement no-cost/low-cost improvement measures, as identified through the WWPEA (see above), and achieve verified electric bill savings. The Program, which requires a one-year participation term, will continue into the next Quadrennial. Wastewater plants receive $1 to $3 per kilowatt-hour per million gallons saved for flows up to 5 million gallons per day.

Wastewater Project Assessment Incentive. For customers completing a WWPEA audit, the Project Assessment Incentive covers 50% of the cost required to develop a detailed assessment for a specific capital project designed to increase a plant's efficiency. The Project Assessment Incentive covers 50% of the assessment cost for projects up to $7,500.[129]

[129] While the Project Assessment Incentive is a key component to the engagement with the wastewater market, any Agriculture, Schools & Government or Large Energy Users Programs customers can receive a Project Assessment Incentive.

Program Goals

The Program's overall objective is to encourage businesses to use more energy-efficient products. For CY 2018, Focus on Energy set the following savings goals:

- Demand reduction of 9,500 kW (this goal did not change from CY 2017).
- Lifecycle electric savings of 1,118,693,000 kWh (an increase from 1,012,000,000 kWh in CY 2017)
- Lifecycle natural gas savings of 38,000,000 therms (a decrease from 47,500,000 therms in CY 2017)[130]

In CY 2018, the Program met its electric savings and demand goals and the gas saving goals in CY 2018.

In addition to energy and demand goals, the Program Administrator and Program Implementer tracked several KPIs, as shown in Table 253. The Program did not meet all CY 2018 KPI goals.

Table 253. CY 2018 Agricultural, Schools and Government Program Key Performance Indicators

KPI	Goal	CY 2018 Result	CY 2018 Result Source
Internal Days Incentive Processing	Minimize incentive processing times as measured by internal DIO. Meet or improve on the internal 12-calendar-days DIO.	Reached goal (12.66)	As reported by the Program Implementer
Customer Satisfaction	Increase or maintain the baseline customer satisfaction score of 9.0.	Reached goal (9.2 average satisfaction score).	Evaluation Team Satisfaction Survey
Success Story Development	Under the guidance of the Program Administrator, identify and develop six success stories.	Reached goal (7 success stories)	As reported by the Program Implementer
Private K-12 And Municipal Customers Participation	Increase the number of Private K-12 and Municipal government customers participating in CY 2018 by 10%	Did not reach goal. Recruited 325 Private K-12 and Municipal government customers	As reported by the Program Implementer
Dairy Customers Participation	Increase participating dairy customers by 5%.	Did not reach goal. Dairy customer participation decreased by 6%	SPECTRUM
Non-dairy agriculture applications	Expand Focus on Energy into more non-dairy agriculture markets demonstrated by increasing non-dairy agriculture applications by 10%	Did not reach goal. Non-dairy agriculture applications decreased by 6%.	SPECTRUM
Emerging Technologies	Integrate four Emerging Technologies in existing Program structures and incentive offerings through quad.	Five technologies adopted in four years (swimming pool sensors, control systems in CY 2015, spring-loaded garage door hinges and advanced circulator pumps in	As reported by the Program Implementer

[130] The program's lifecycle natural gas savings goal for CY 2018 could not carryover savings from previous years within the CY 2015–CY 2018 quadrennial and hence were reduced from the CY 2017 goals.

KPI	Goal	CY 2018 Result	CY 2018 Result Source
		CY 2016, permanent magnet synchronous air conditioner motors in CY 2017, and demand defrost controls in CY 2018)	
Customer Participation in Express Building Tune-Up or Retro-commissioning Offer (Combined Goal)	Achieve 15 customers enrolling in Express Building Tune-Up and Retro-commissioning	Did not reach goal. 12 customers enrolled in Express Building Tune-Up and Retro-commissioning	SPECTRUM
DEET Participation	Achieve 10 new enrollees in DEET	Did not reach goal; enrolled six new school districts	As reported by the Program Implementer
Agricultural Trade Ally Participation	Increase number of agriculture Trade Allies participating in Focus on Energy by 10%.	Did not reach goal. Trade Allies associated with agricultural projects decreased by 3%	SPECTRUM

Data Management and Reporting

The Program uses SPECTRUM as a primary data management tool as well as a customer resource database and as a Program information tracking database. According to the Program Implementer, the data management system meets the Program's needs, though the Program Administrator said that, while SPECTRUM allows them to process incentives and do basic analysis, its reporting capabilities are very limited and slow. The Program Administrator went on to identify the following SPECTRUM shortcomings:

- Lacks desired fields
- Does not provide sector or customer type visibility
- Provides a limited ability to monitor workflows

The Program Administrator works closely with the database provider to address these concerns and with a third party to supplement SPECTRUM's provisions.

Marketing and Outreach

Customer Outreach

In CY 2018, CESA 10 and APTIM worked closely to develop marketing and outreach materials and strategies. APTIM's Strategic Alignment Plan created a marketing and outreach plan, and CESA 10 developed materials to implement the plan.

The Program's marketing plan emphasized different outreach strategies for agricultural producers, wastewater treatment plants, and schools and governments, due to differently preferred information sources. For example, as schools and government customers are very relationship-oriented, the Program relied heavily on Energy Advisers in CY 2018 to engage these customers by presenting at school and municipal events. To reach agricultural customers, the Program relied less on Energy Advisors and more on Trade Allies and subject matter experts in the industry. The Program also marketed more to

agricultural customers through trade magazines and e-blasts than it did to schools and government customers, because agricultural customers typically prove harder to reach in person.

The Program sent email-blasts to each sector and tailored content specifically for dairy, greenhouse, and poultry customers as well as a wastewater treatment plan and public-sector customers. Additionally, the Program created three *Energy Efficiency Best Practices Guidebooks* during the CY 2015–CY 2018 quadrennial: one for agriculture customers, one for schools and government customers and one for water and wastewater industry customers. The Program Implementer reported that the Program saw high open rates for email blasts for both sectors (68% for agriculture customers and 91% for schools and government customers) and that offering a return postcard/email in exchange for a free Energy Efficiency Best Practices Guidebook garnered strong interest.

The Program developed materials, such as best practices guides for specific sectors (published on Focus on Energy's website and shared with customers, Trade Allies, and key industry partners). As one of its KPIs, the Program planned to create six case studies, exceeding this goal by creating seven case studies, featured on Focus on Energy's Website:

- Express Building Tune-Up, featuring Milwaukee's Center Street Library
- LED Greenhouse Lighting, featuring Heidi A. Heath Farms, Inc.
- Dairy New Construction, featuring Peterson's Dairy LLC
- Retro-commissioning, featuring Sun Prairie Area School District
- Variable Frequency Drives on Poultry Farms, featuring S&R Egg Farm
- Aeration Efficiencies, featuring the Village of Reedville's wastewater treatment facility
- Aeration System Retrofit, featuring the City of Waupaca's wastewater treatment facility

The Program partnered with several local organizations to conduct marketing and outreach activities for agriculture sector customers and schools and government customers (shown in Table 254).

Table 254. Example Marketing and Outreach Activities with Local Organizations

Program Offerings	Offering Type
Wisconsin Association of School Boards	• Gold-level partner in CY 2018. • Moderated a panel discussion at the Sustainable Schools Pavilion with DEET Program participants, and delivered a presentation on the topic *Maximizing the Efficiency of Your Facility Management Team.*
League of Wisconsin Municipalities	• Submitted a full-page ad for the *2018 Products and Services Guide*. • Exhibited at the League's annual conference.
Wisconsin Municipal Clerks Association	• Presented a Focus on Energy update at regional clerks' and treasurers' spring meetings.
Wisconsin Wastewater Operators' Association	• Advertised water and wastewater bonus offerings in its newsletters. • Exhibited at the Association's annual conference, and presented in collaboration with Neenah Water Utility.
Professional Dairy Producers of Wisconsin	• Mission Sponsor in CY 2018 ($25,000). • Promoted the Program through editorial content in its printed publication *Dairy's Bottom Line* and its e-newsletter *Manager's Memo*.

Program Offerings	Offering Type
	• Sent out an innovative barn door mailer to 1,700+ Wisconsin-based membership list. • Presented at the annual conference, including a full-page color ad in conference proceedings. • Included marketing collateral on VSD bonus in event folders for the ACE-Twilight meetings. • Dairy Energy Specialists provided a Focus on Energy update at the Financial Literacy Workshop.
UW-Extension	• Attended the annual Wisconsin Potato and Vegetable Grower/UW-Extension conference. • Hosted a small informational table at UW-Extension events, including *Heart of the Farm* and *Farm Management Update for Ag Professionals.* • Provided ads and editorial content for e-Blasts sent to regional farming communities.
Wisconsin Corn Grower Association/American Soybean Association	• Exhibited at the annual conference

Source: Program Implementer.

Trade Ally Outreach

Although the Program Implementer primarily focused its marketing efforts on customers, it conducted several outreach activities for Agricultural Sector Trade Allies. The Program Implementer explained that the Program communicated Program changes to Trade Allies in the following ways:

- Energy Advisor outreach
- Trade Ally newsletters, website, and e-blasts
- Training on new measure types and expectations for new Program initiatives
- Separate lunch-and-learns for dairy Trade Allies and non-dairy Trade Allies
- Trade Ally breakfasts (spearheaded by the Agriculture, Schools & Government advisor though all business Trade Allies were invited).

CESA 10 also provided optional opportunities for Trade Allies to receive training on how to sell energy-efficient products. While most trainings were optional, the Program required Trade Allies who provided wastewater energy assessments to complete a training with CESA 10 staff to become a WSP. In CY 2018, WSP training provided Trade Allies with a template of actions necessary to complete during wastewater energy assessments and shared available cobranding tools.

The Program Implementer reported that, as of June 2018, 195 registered Trade Allies and 159 unregistered Trade Allies participated in the Program. The Program Implementer explained that, in CY 2018, it worked to register additional agricultural Trade Allies and WSPs and to increase the number of platinum-rated Trade Allies (see Figure 142 for descriptions of Trade Ally levels). The Program Implementer said the Program recruited 15 WSPs in CY 2018, meeting the Program's expectations.

Figure 142. Focus on Energy Trade Ally Rating Criteria

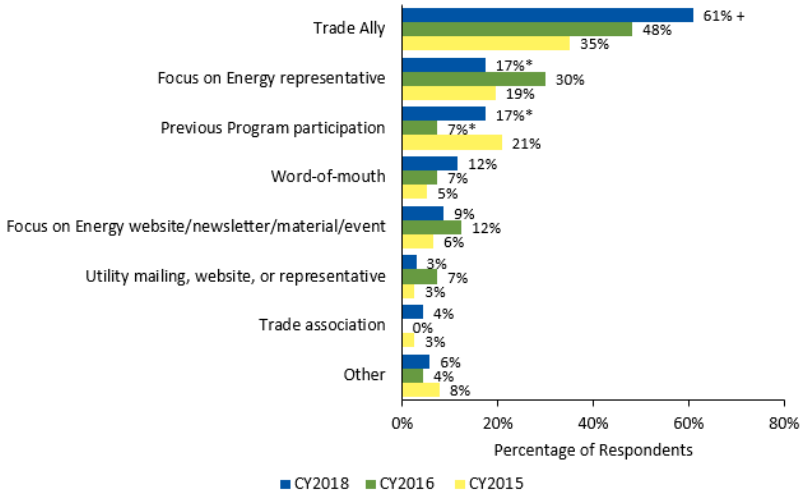
Here's how to get to the next level:

LEVEL	NUMBER OF APPLICATIONS	LIFECYCLE ELECTRIC SAVINGS	LIFECYCLE GAS SAVINGS
PLATINUM	12+ PER YEAR	≥12,500,000 KWH	≥400,000 THERMS
GOLD	5 TO 11 PER YEAR	≥2,500,000 KWH	≥150,000 THERMS
SILVER	4 OR FEWER PER YEAR	ANY KWH IN LAST YEAR	ANY THERMS IN LAST YEAR
GREEN	NO APPLICATIONS OR SAVINGS IN THE LAST YEAR		

Customer Program Awareness

In CY 2018, most customers learned about the Focus on Energy incentives from Trade Allies (61%, n=69), followed by previous Program participation (17%) and a Focus on Energy representative (17%), as shown in Figure 143. The Evaluation Team found several changes when comparing awareness channels across years. Although Trade Allies were the Program's top awareness source for CY 2018 and CY 2015 survey respondents, significantly more respondents learned about the Program through Trade Allies in CY 2018 than in CY 2015.[131] Significantly fewer CY 2018 survey respondents than CY 2016 survey respondents heard from a Focus on Energy representative.[132] Awareness from prior participation also increased by 10% from CY 2016 to CY 2018—another statistically significant change.[133]

Figure 143. Source of Program Awareness



Source: CY 2018, CY 2016, and CY 2015 Participant Survey Question A5. "How did your organization learn about the incentives available for this project?" Multiple responses allowed (CY 2018 n=69, CY 2016 n=137, CY 2015 n=77)

* Signifies CY 2018 results significantly differed from CY 2016 results.

\+ Signifies CY 2018 results significantly differed from CY 2015 results.

131 p<0.01 and p<0.05, respectively, using a binomial t-test.

132 p<0.01 using a binomial t-test.

133 p<0.05 using a binomial t-test.

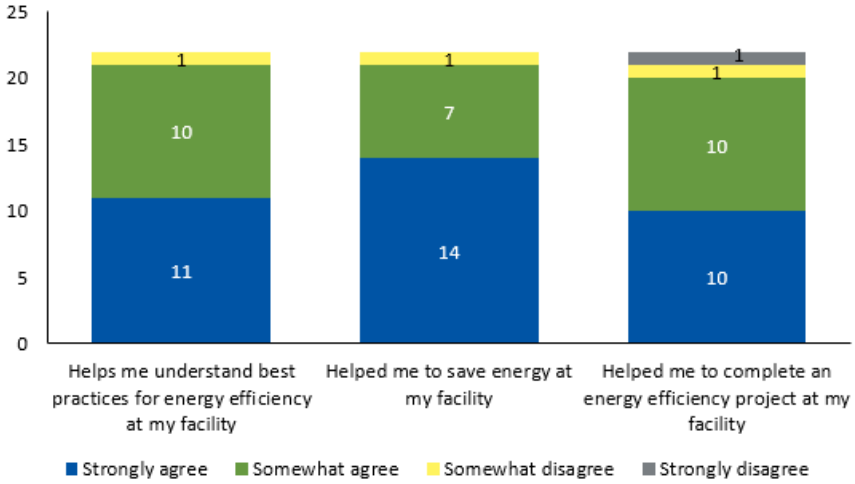
The awareness channel also differed by sector. Trade Allies served as the top information source for agriculture, schools, and government customers, though agriculture respondents proved significantly more likely (84%) to learn about the incentives through Trade Allies, as opposed to school and government respondents (54%),[134] who more frequently learned of the Program from a Focus on Energy representative.

This finding aligns with the Program's marketing strategy. Schools and government respondents also were more likely to report that they knew about the Program from previous Program participation (22%) than were agriculture customers (5%). When asked how they wanted to stay informed about Focus on Energy's incentives, one-half of customers said emails (nine, n=17), followed by mailings (seven), and Trade Allies (four).

Guidebooks

Over one-half (55%, n=66) of agriculture, school, and government respondents to the survey reported receiving the Guidebook or seeing it online. As shown in Figure 144, of participants who read the Guidebooks (22 respondents), almost all found the Guidebooks helpful. Most *strongly agreed* (14, n=22) or *somewhat agreed* (seven) that the Guidebook helped them save energy at their facilities, and 21 respondents said they *strongly agreed* (11) or *somewhat agreed* (10) that the Guidebook helped them to understand energy efficiency best practices for their facilities. Twenty respondents *strongly* or *somewhat agreed* that the Guidebook helped them complete an energy efficiency project at their facility.

Figure 144. Usefulness of Energy Efficiency Best Practices Guidebook



Source: CY 2018 Participant Survey Question B10. "Please tell me whether you agree or disagree with these statements about the Energy Efficiency guidebook." (n=22)

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

Perceptions of the Focus on Energy Brand

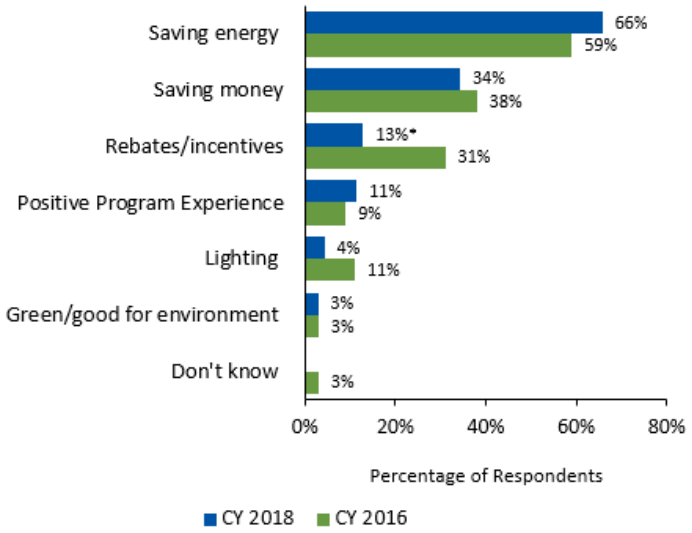
In CY 2016, to gauge participants' perceptions of Focus on Energy, the Evaluation Team asked several questions pertaining to brand identity. The Team reassessed these questions in CY 2018 to investigate if customer perceptions had changed. The survey asked respondents to report the first three terms that came to mind when they thought about Focus on Energy.

As shown in Figure 145, the most common themes associated with the Focus on Energy Program included the following:

- Saving energy (66%, n=70)
- Saving money (34%)
- Rebates/incentives (13%)

Largely, these associations remained consistent over the past two years. A significantly lower percentage of CY 2018 respondents associated Focus on Energy with rebates/incentives compared to CY 2016 respondents.[135] All reported customer associations were positive.

Figure 145. Respondent Word Association with "Focus on Energy"



Source: CY 2018 and CY 2016 Participant Survey Question B1. "What are the first three words that come to mind when you hear 'Focus on Energy'?" (CY 2018 n=70, CY 2016 n=142)
* Signifies CY 2018 results significantly differed from CY 2016 results.

The Evaluation Team then asked respondents to indicate the extent to which they agreed with several statements about Focus on Energy, with most respondents agreeing positively with the statements shown in Figure 146.

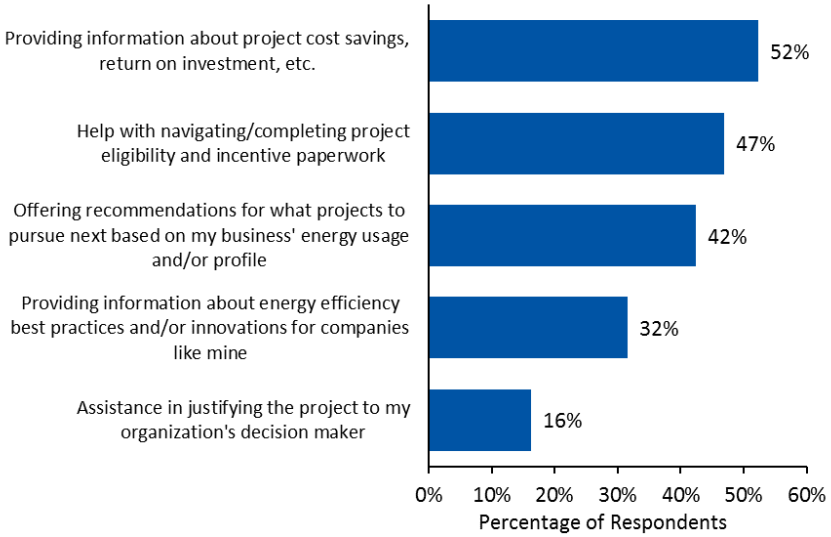
[135] $p<0.01$ using a binomial t-test.

Figure 146. Agreement with Focus on Energy Claims

Source: CY 2018 Participant Survey. Question B2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you agree or disagree with these statements." (n=70)

Program participants were asked how Focus on Energy could best support their organizations aside from providing incentives (Figure 147). The two top suggestions were providing information about project cost savings (mentioned by 52%) and help with navigating eligibility and paperwork (47%).

Figure 147. CY 2018 Agriculture, Schools and Government Program Participants' Preferred Services from Focus on Energy



Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward? Choose your top two from the list below." (n=111; this question was asked in online surveys but was not included in mail surveys)

Marketing Messages

The Evaluation Team asked survey respondents to identify which statements shown in Table 255 would make them most interested in learning more about Focus on Energy. Cost-oriented statements most resonated with both sectors: 53% of agricultural customers and 43% of schools and government customers said reducing their energy costs and saving money resonated the most.

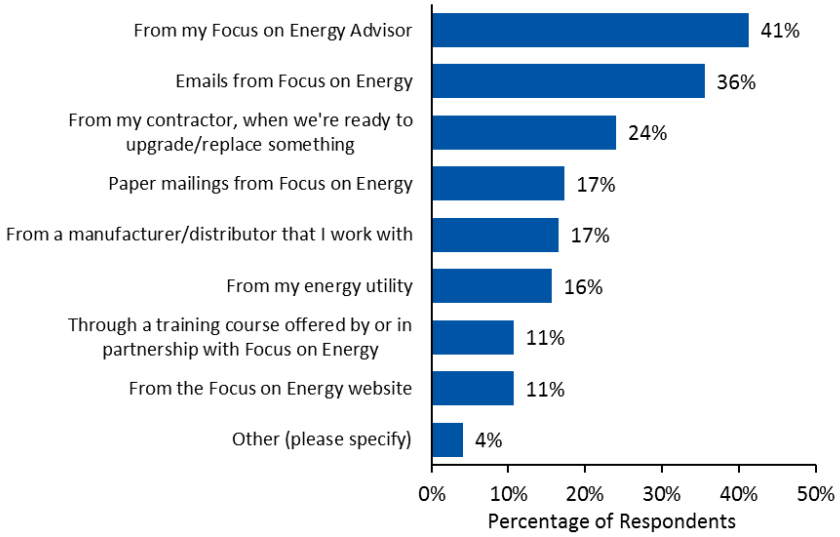
Table 255. Participant Reaction to Marketing Statements

Focus on Energy Helps Wisconsin Businesses….	Top Statements by Percentage of Respondents	
	Agriculture	Schools and Governments
Reduce their energy costs and save money	53%	43%
Lower their energy costs	26%	35%
With solutions to use energy smarter and save money	16%	16%
Grow by making smarter decisions about their energy use	5%	6%

Source: CY 2018 Participant Survey Question B3. "Which of the following statements would make you most interested in learning more about Focus on Energy?" (Agriculture n=19, Schools and government n=51)

Program participants were asked how they most preferred to learn about energy efficiency opportunities for their organization (Figure 148). The two top responses were from Focus on Energy Advisors (mentioned by 41%) and emails from Focus on Energy (36%); the least-mentioned responses were training courses offered by Focus on Energy and the Focus on Energy website (both mentioned by 11%).

Figure 148. CY 2018 Agriculture, Schools and Government Program Participants' Preferred Methods for Learning About Energy Efficiency Opportunities

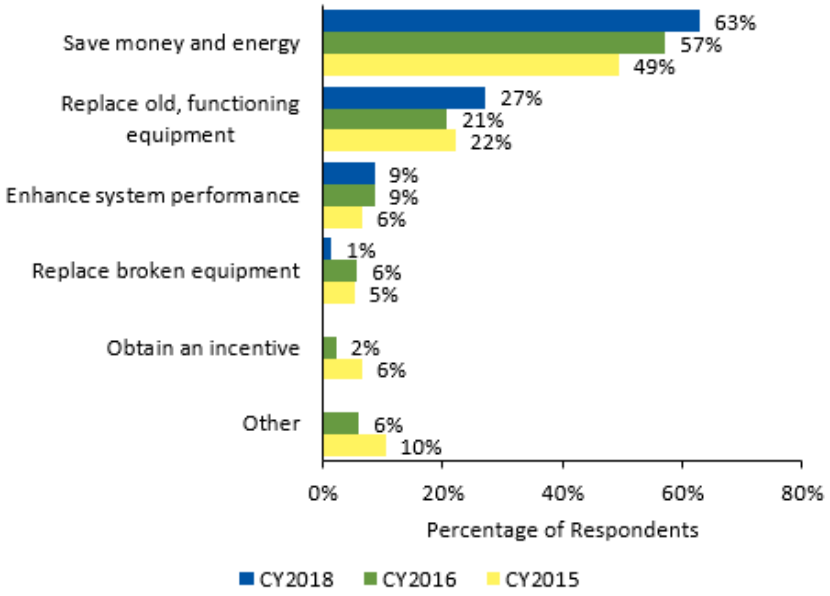


Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "How do you MOST prefer to learn about energy efficiency opportunities for your organization? Please choose your top two from the list below." (n=121; this question was asked in online surveys but was not included in mail surveys)

Customer Experience and Decision Making

For CY 2018, Agricultural, Schools and Government Program participants shared their reasons for implementing energy efficiency projects through the Program. Almost two-thirds of respondents (63%, n=70) cited saving money and receiving energy savings as the most important factors in making energy efficiency improvements, followed by replacing old yet functioning equipment (27%) and enhancing system performance (9%) (the same percentage as in CY 2016). Figure 149 shows the full breakdown of CY 2018 survey respondents' drivers for making energy efficiency upgrades, compared to CY 2016 and CY 2015. Responses were consistent between the agriculture sector and schools and government sector.

Figure 149. Drivers for Energy Efficiency Upgrades



Source: Participant Survey Question C1. "What factor was most important to your company's decision to make the energy-efficient upgrades for which you received an incentive?" (CY 2018 n=70, CY 2016 n=140, CY 2015 n=77)

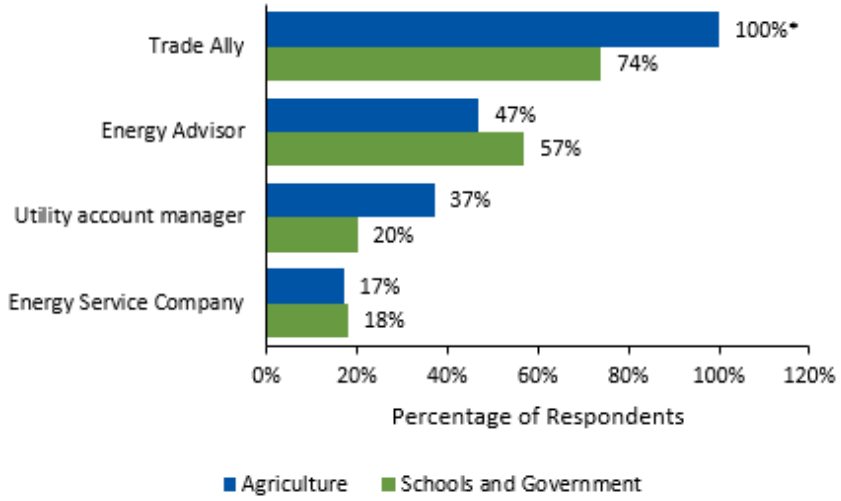
Most CY 2018 respondents indicated that energy efficiency was *very important* (79%, n=70) or *somewhat important* (20%) to their organization when making capital upgrades or improvements, a result consistent with CY 2017's surveys.

When asked who helped in initiating their projects, CY 2018 survey respondents (n=69) most often cited Trade Allies (84%, n=69), followed by Energy Advisors (55%) and utility account managers (25%).[136] A significantly higher percentage of CY 2018 respondents (100%; Figure 150) than CY 2016 respondents

[136] Multiple responses were allowed for this question, leading to totals greater than 100%.

(74%) identified a Trade Ally as someone who had helped initiate their project (n=141).[137] Project initiation also appeared to differ by sector during CY 2018: all agriculture respondents (n=19) reported receiving help from Trade Allies (contractors or vendors)—a result significantly higher than schools and government respondents (74%, n=50).[138]

Figure 150. CY 2018 Actors Who Helped Initiate Energy Efficiency Projects



Source: Participant Survey Question A4. "Please tell me who, if anyone, was involved in helping you initiate your energy efficiency project?" (Agriculture n=18-19, Schools and Government n=47–50)
* Agriculture results with an asterisk symbol significantly differed from Schools and Government results.

Respondents also identified multiple resources as trusted information sources. Overall, those answering identified Trade Allies (70%, n=70), followed by Energy Advisors (39%), utility account managers (16%), other business owners (13%), and web resources (3%). Both the Agriculture sector and School and Government sector chose Trade Allies and Energy Advisors as their top two trusted information sources. The proportion who selected these information sources did not significantly differ between sectors.

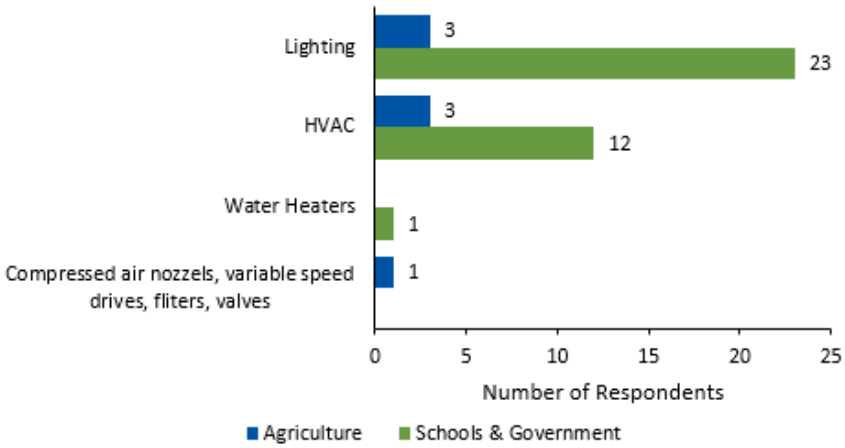
When asked who is responsible for making decisions about energy-efficient upgrades, 95% of agriculture customers said the farm or facility owner makes the decision (n=19). Ninety percent of schools and government respondents (n=51) said they require approval from another member of their organization before pursuing energy efficiency projects, and organization decision-makers varied among those customers. For example, schools and government respondents most commonly identified a board of directors or a school board (35%, n=46) as key decision-makers for energy efficiency decisions; in other cases, respondents identified facility maintenance managers, school administrators, or principals. Over one-half of schools and government respondents requiring project approval said it took four weeks or longer to receive approval for energy efficiency upgrades.

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

[138] $p<0.01$ using a binomial t-test.

The Evaluation Team asked survey respondents if they were considering other energy-efficient equipment or building upgrades during the next year. Sixty-seven percent of schools and government respondents (n=49) indicated they planned energy-efficient upgrades for CY 2019—a result very different than that of agriculture respondents, who proved less committal (32% of these respondents said they planned a project for CY 2019, n=19).[139] Figure 151 shows the types of upgrades that respondents said they considered for CY 2019, with most considering lighting and HVAC upgrades.

Figure 151. Agriculture, Schools and Government Participant Planned Energy Efficiency Upgrades



Source: Participant Survey Question C9. "What other upgrades are you considering?" Multiple responses allowed (Agriculture n=6, Schools and Government n=33)

Participants' Application Process

The Evaluation Team asked Program participants about their experiences with the application process.

Most Program participants expressed satisfaction with the application process and the time required to receive their incentive checks. Further, 36% of respondents (n=69) said they took the lead role in completing the financial incentive application. Of those participants, 91% found the application process *very easy* (29%) or *easy* (62%) (n=24). Responses did not vary significantly between sectors. A significantly higher percentage of CY 2018 participants (62%, n=24) said the application process was *easy* (62%) compared to CY 2015 (33%).[140] Just two CY 2018 respondents considered it *somewhat challenging,* reporting that the application contained too many questions (one) and that the application requirements were too detailed, especially the technical report requirements. Not all respondents could answer questions about incentive processing times, but, of those who could (n=50), 98% were *very satisfied* or *somewhat satisfied* with the time required to receive an incentive check.

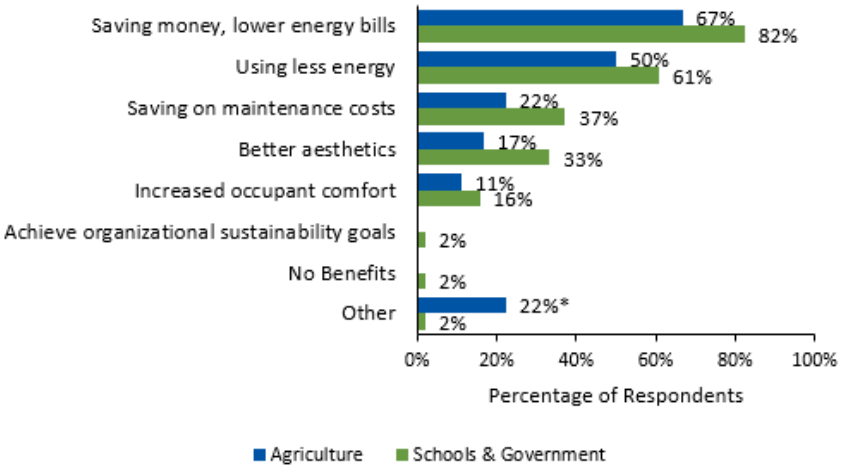
[139] p<0.01 using a binomial t-test.

[140] p<0.05 using a binomial t-test.

Participation Benefits

The Evaluation Team asked survey participants about benefits their organizations experienced due to energy efficiency upgrades they made through the Program. Agriculture sector and schools and government sector respondents provided similar answers for CY 2018, with the top three benefits reported as follows: saving money on utility bills; using less energy; and saving on maintenance costs. Significantly more agriculture sector respondents fell into the *Other* category than school and government sector respondents.[141] Within the *Other* category, four agriculture customers said their equipment performed better or produced a better product due to the energy-efficient upgrades. Figure 152 details benefits that participants reported from implementing energy-efficient upgrades.

Figure 152. CY 2018 Agriculture, Schools and Government Program Participation Benefits



Source: Participant Survey Question D1. "What would you say are the main benefits your organization has experienced as a result of the energy efficiency upgrades we've discussed?" Multiple responses allowed (n=69)
* Agriculture results significantly differed from Schools and Government results.

Participation Barriers

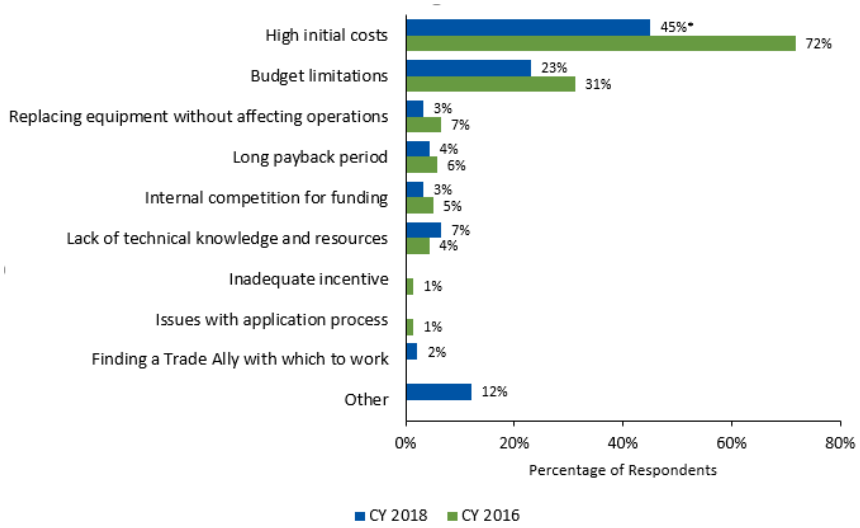
Surveyed participants said the biggest barriers to making energy-efficient improvements included high initial costs (45%, n=69) and budget limitations (35%). However, significantly fewer CY 2018 respondents mentioned high initial costs as a barrier compared to CY 2016 respondents.[142]

Figure 153 shows respondents' perceived participation barriers in CY 2018 and CY 2016. Most challenges were similar across sectors, although five respondents from the schools and government sector reported challenges with getting their projects approved (represented in the *Other* category), while the agriculture sector did not share this issue.

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

[142] $p<0.01$ using a binomial t-test.

Figure 153. Perceived Barriers to Agriculture, Schools and Government Program Participation



Source: CY 2018 and CY 2016 Participant Survey Question D2. "What do so see as the biggest challenges to making energy-efficient improvements inside your company?" Multiple responses allowed (CY 2018 n=69, CY 2016 n=138)

* CY 2018 results significantly differed from CY 2016 results.

The Evaluation Team asked participant survey respondents what could be done to help their companies overcome the challenges they experienced. Top suggestions included the following:

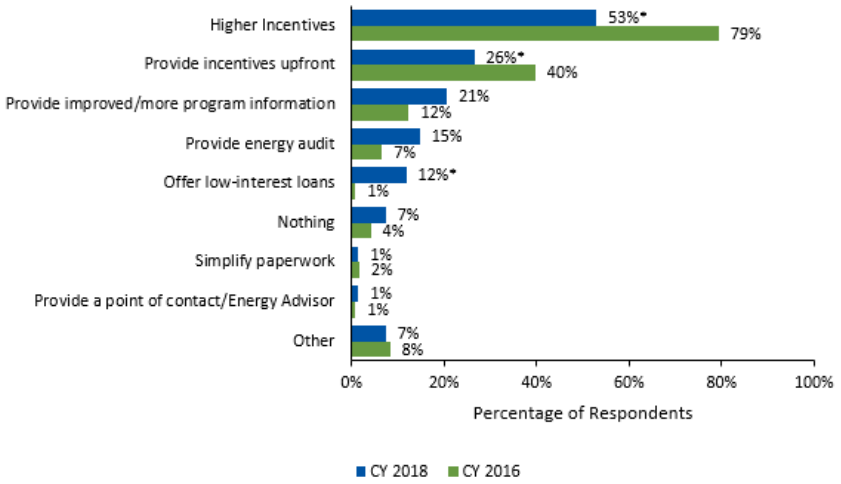
- Higher incentives (53%, n=68)
- Upfront incentives (26%)
- Additional information (21%)

Figure 154 details respondents' suggestions from CY 2016 and CY 2018. Although more than one-half of CY 2018 respondents said higher incentives would help, a significant drop occurred from CY 2016.[143] In CY 2018, however, significantly more respondents recommended low-interest loans than in CY 2016.[144]

[143] $p<0.01$ using a binomial t-test.

[144] $p<0.01$ using a binomial t-test.

Figure 154. Suggestions for Overcoming Challenges to Energy-Efficient Improvements



Source: CY 2018 and CY 2016 Participant Survey Question D3. "What could be done to help your company overcome challenges with energy efficiency improvements?" Multiple responses allowed (CY 2018 n=68, CY 2016 n=121)

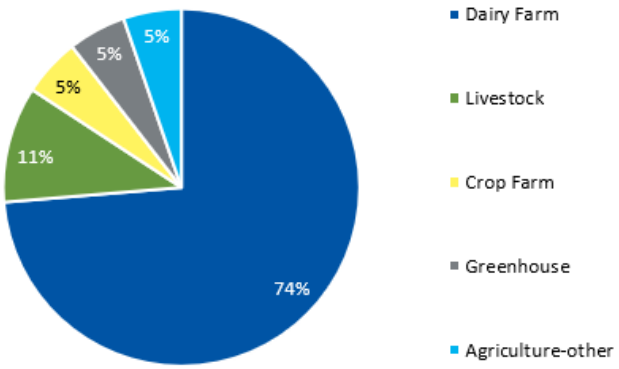
The Evaluation Team asked participants who suggested better or more information to elaborate on the kind of information they required. Respondents most commonly cited information about the project's return on investment or long-term benefits (five out of 11). Of those five respondents, four represented the schools and government sector. Other suggestions for more information included education on incentives available through Focus on Energy or other programs (four), help prioritizing upgrades (one), and explanations of new energy-efficient technologies (one).

Participant Firmographics

The Evaluation Team asked respondents about their businesses or organizations. Out of the 19 agricultural respondents, most classified their farms as individually run facilities that they owned rather than leased, while a few responded on behalf of a corporation. No respondents were part of a co-op or nonprofit.

Figure 155 shows the business types for the 19 agriculture respondents. Almost three-quarters of agriculture respondents represented the dairy sector, which closely mirrors the proportion in the full Program population. In CY 2018, dairy sector customers made up 75% of all agriculture sector participants.

Figure 155. Agriculture Respondent Business Sectors

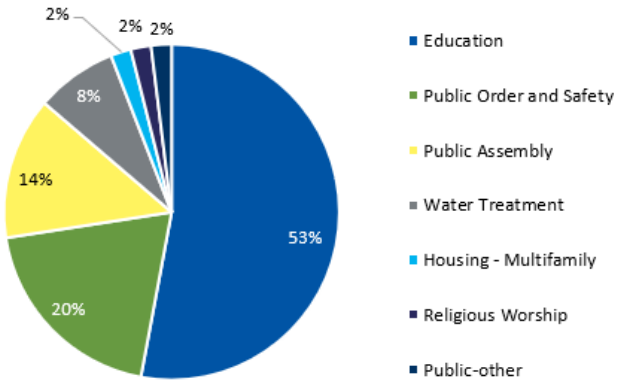


Source: SPECTRUM Database (n=19)

Figure 156 shows the types of organizations represented by the 51 school and government respondents:

- Twenty-seven respondents represented schools
- Twenty-three represented government organizations
- One represented a religious organization.

Figure 156. Schools and Government Respondent Facility Types



Source: SPECTRUM Database (n=51)

Most respondent organizations were small: all 19 agriculture respondents and 67% of schools and government respondents reported 50 or fewer employees in Wisconsin, and 40% of Agriculture respondents and 27% of schools and government respondents reported 10 or fewer employees.

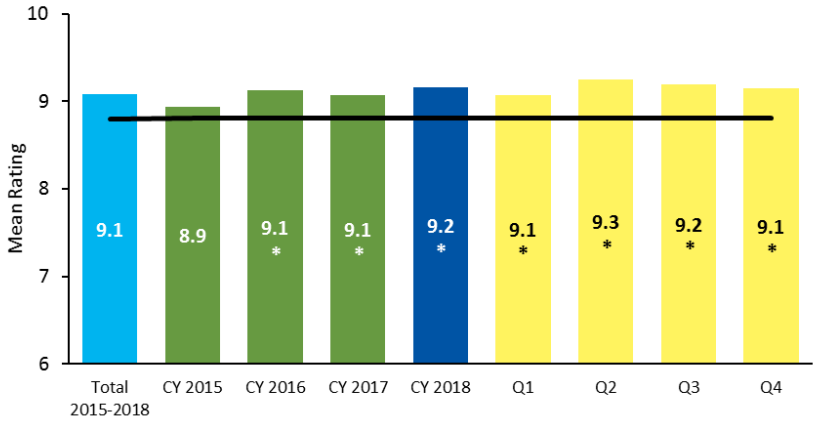
Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2018, the Program Administrator and Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Program. Respondents answered satisfaction and likelihood

questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.[145]

As shown in Figure 157, the average overall Program satisfaction rating among CY 2018 participants was 9.2, which was statistically higher than the portfolio baseline (8.8) and similar to the average Program rating for CY 2017 and CY 2016 (both 9.1).[146] The Program's satisfaction rating was statistically higher than the baseline during all four quarters of CY 2018.[147]

Figure 157. CY 2018 Overall Agriculture, Schools and Government Program Satisfaction



Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=323, CY 2016 n=471, CY 2017 n=482, CY 2018 n=378, Q1 n=61, Q2 n=56, Q3 n=93, Q4 n=159). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

* Denotes that the result for the year or quarter is statistically significant different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 256 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. In CY 2018, two ratings changed significantly from the previous year: participants' satisfaction with upgrades increased from 9.2 to 9.4, while the likelihood of their making more improvements decreased from 8.4 to 7.9.

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[145] The number of participants who completed a survey does not always match the number of responses for each question because some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[146] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

[147] The Evaluation Team found that some surveys did not include identifying information that would allow the matching of survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Table 256. CY 2018 Average Ratings for Agriculture, Schools and Government Program

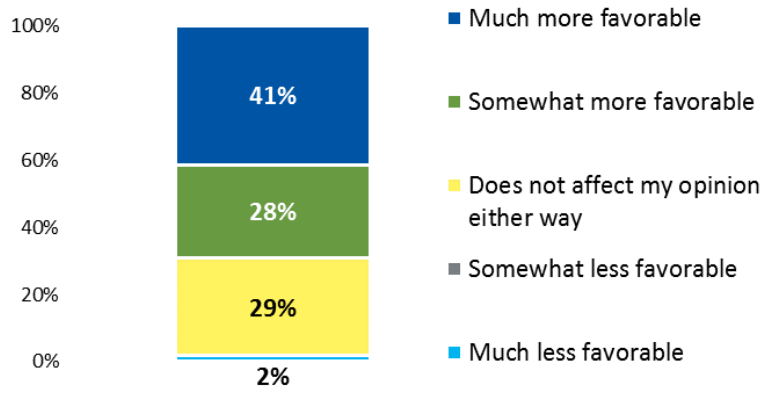
Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.2	9.2	9.2	9.4[a]
Satisfaction with Energy Advisor	9.1	9.3	9.4	9.4
Satisfaction with Trade Ally	8.8	9.0	9.1	9.2
Satisfaction with incentive	8.5	8.3	8.4	8.5
Likelihood of more improvements	8.5	8.2	8.4	7.9[a]
Likelihood of recommending the Program	*Not asked*	9.4	9.5	9.4

[a] Denotes that the result for CY 2018 is statistically significant different from CY 2017 (p<0.10 or better using binomial t-tests).

Using these survey data, the Evaluation Team calculated an NPS based on customers' likelihood to recommend the Program. 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 the percentage of detractors (respondents giving a rating of 0 to 6). The NPS for CY 2018 participants was +82, consistent with +83 in CY 2017 and +81 in CY 2016.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and 41% gave the highest rating of *much more favorable* (Figure 158). Only 29% said their opinion was not affected, and 2% reported that their opinion of their utility had become less favorable.

Figure 158. CY 2018 Effect of Focus on Energy Offerings on Opinion of Utilities

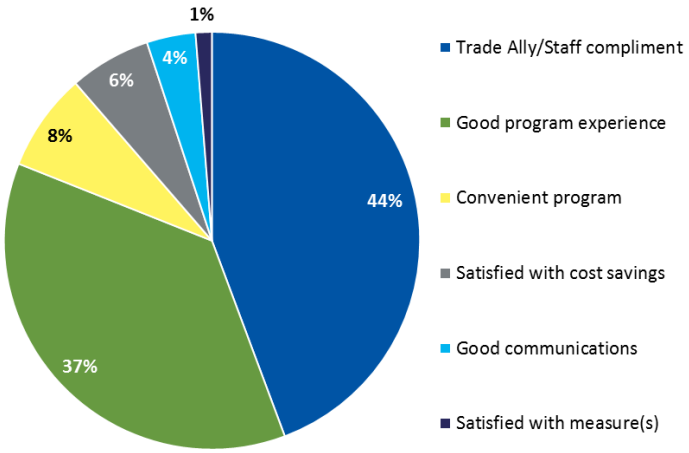


Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (n=116; this question was asked in online surveys but was not included in mail surveys)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 381 participants who responded to the survey, 98 (26%) provided open-ended feedback, which the Evaluation Team coded into a total of 105 mentions. Of these mentions, 79 were positive or complimentary comments (75%), and 26 were suggestions for improvement (25%).

Respondents' positive comments are shown in Figure 159. The largest share of these 79 comments were complimentary of the Program staff and Trade Allies (44%), followed by general sentiments of a positive experience (37%).

Figure 159. CY 2018 Positive Comments About the Program



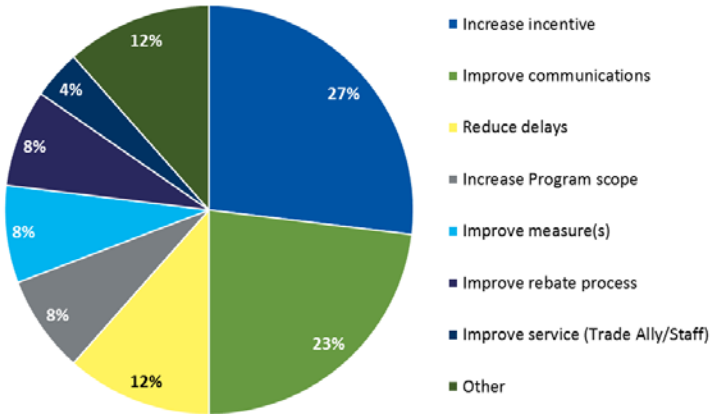
Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=79)

Respondents' suggestions for improvement are shown in Figure 160. The most common suggestions regarded increasing incentives (27%) and improving communications (23%), which were also the two most common suggestions in CY 2017. One respondent also suggested that Focus on Energy representatives receive more training on how to deal with growers and greenhouses.

Specific suggestions about improving communications were similar to CY 2017, and included these:

- More frequent updates about application and rebate status
- Provide resources that make it easier to confirm which projects are eligible for rebates before beginning the application process
- Provide more detail with rebate payments: clearly reference the applications that payments are associated with, itemize rebate amounts for multiple measures
- Increase outreach to improve awareness of the Program

Figure 160. CY 2018 Suggestions for Improving the Program



Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=26)

Agricultural Trade Ally Experience

The Evaluation Team surveyed 17 Trade Allies who completed projects with agriculture customers as part of the Agriculture, Schools and Government Program. These Trade Allies provided information on their marketing decisions, their engagement with the Program, their satisfaction levels, and their experiences with the incentive applications.

Perceptions of Focus on Energy's Brand

Similar to the participant survey, the Evaluation Team asked Trade Allies to report the first three terms that came to mind when thinking about Focus on Energy. The Team compared these responses to CY 2016 responses to investigate if Trade Ally perceptions changed. Trade Allies most commonly associated the following three themes with Focus on Energy's Program in CY 2018:

- Positive Program experience
- Rebates (or incentives)
- Saving money

These responses differed from CY 2016 responses in that positive Program experiences did not emerge as a top-three theme in CY 2016 (top-three themes in CY 2016 included saving energy, saving money, and rebates and incentives). Two Trade Allies responded to both the CY 2016 and CY 2018 survey: one Trade Ally who specializes in electrical and lighting equipment and one who specializes in new building construction. The top three words reported by the two Trade Allies reported were consistent between both CY 2016 and CY 2018.

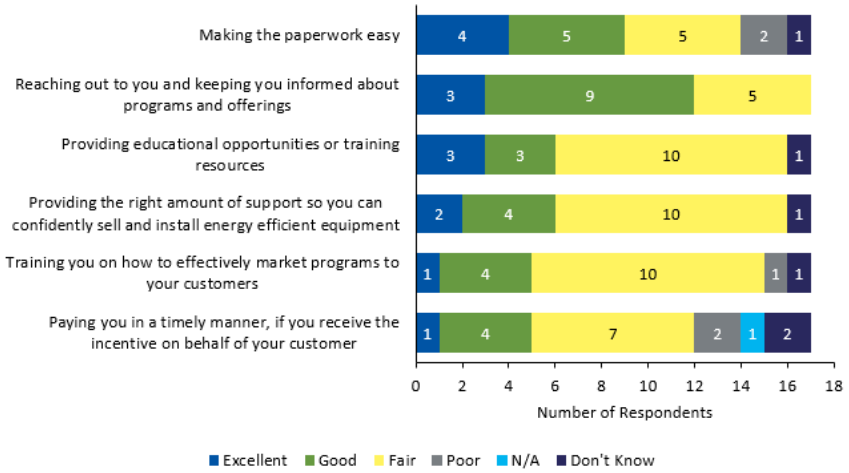
Satisfaction with the Program

On average, Trade Allies rated their satisfaction with the Program as a 7.9 on a scale of 0 to 10, where 0 indicted *not at all satisfied* and a 10 indicated *extremely satisfied* (n=17). This response remains consistent with the 7.6 average rating that Trade Allies gave the Program in CY 2016.

Trade Allies also rated Focus on Energy on how well it provided different types of support, including training, Program information, and education. Overall, most Trade Allies gave Focus on Energy *excellent*, *good*, or *fair* ratings on how well they supported Trade Allies.

As shown in Figure 161, over one-half of Trade Allies thought that Focus on Energy did an *excellent* or *good* job at making paperwork easy and keeping them informed about programs and offerings. No more than two Trade Allies thought Focus on Energy did a *poor* job on any of these Program implementation aspects.

Figure 161. Trade Ally Perceptions of Focus on Energy Support



Source: CY 2018 Trade Ally Survey Question F2. "How is Focus on Energy doing when it comes to the following…*excellent*, *good*, *fair*, or *poor*?" (n=17).

The majority (16 of 17) were *very satisfied* (11) or *somewhat satisfied* (5) with support they received from their Energy Advisors; just one was *not too satisfied*. When asked if they had recommendations for improving Program-related support they received from their Energy Advisors, just one Trade Ally offered a suggestion: "[Have] one advisor that handles all programs by region instead of different advisors by programs. It gets confusing who handles what program." Furthermore, all four Trade Allies who had attended a training in CY 2018 rated the usefulness of the training as an 8 or higher (on a scale of 0 to 10).

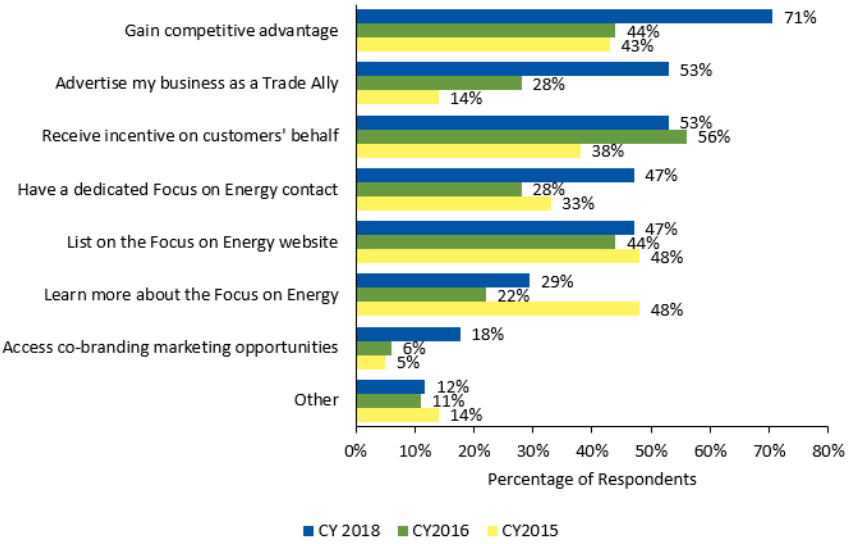
For Trade Allies who rated their overall Program satisfaction as less than 10, the Evaluation Team asked what Focus on Energy could do to increase their satisfaction. Trade Allies most commonly suggested simplifying the Program's paperwork (four). Trade Allies also provided the following suggestions:

- Speed up the payment process (two)
- Provide materials that show average monetary savings or benefits from equipment upgrades (one)
- Increase advertising (one)
- Add rebates for other equipment (one)

Motivation to Participate and Usefulness of Information Sources

The Evaluation Team asked Trade Allies why they participated in the Program. Respondents most commonly said they want to gain a competitive advantage (as shown in Figure 162), followed by the desire to receive an incentive on the customer's behalf and to advertise their business as a Trade Ally. The first two reasons also were the top reasons cited by CY 2016 Trade Ally respondents, except advertising their business as a Trade Ally was not a top motivator for CY 2016 respondents.

Figure 162. Reasons Trade Allies Chose to Participate



Source: CY 2018 Trade Ally Survey Question B2 and CY 2016 Trade Ally Survey Question C1. "What are the reasons that your company chose to enroll in Focus on Energy's Trade Ally Network?" Multiple responses allowed (CY 2018 n=17, CY 2016 n=18, CY 2015 n=22)

The Evaluation Team asked Trade Allies about their preferred source for staying informed about the Focus on Energy Program and the Trade Ally Network. Eleven of 17 respondents preferred email communications (compared to seven of 18 respondents in CY 2016), three preferred to learn about the Program from their Energy Advisor, two preferred to hear from their agriculture Trade Ally Liaison, and just one preferred to access Focus on Energy's website. Similarly, in a separate question about the usefulness of various information sources, respondents they rated emails and direct information from an Energy Advisor as much more useful than in-person meetings (such as Trade Ally forums and lunch-and-learns). Most preferred to hear from Focus on Energy on a monthly or quarterly basis.

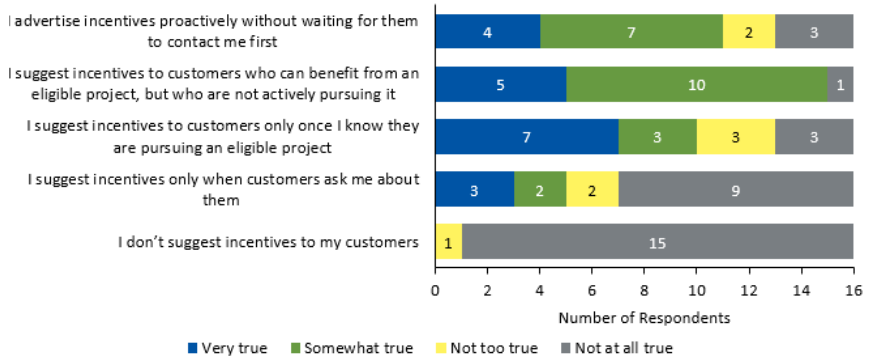
Trade Ally Marketing

When asked to select which marketing tactics they used to specifically target agricultural customers, 88% of Trade Allies cited word of mouth, followed by cold calls (41%) and newspaper ads (35%) (n=17, multiple response allowed). Other responses included trade show participation, flyers, mailers, email blasts, press releases, or radio ads, each of which was cited by less than 30% of respondents.

In terms of marketing the Program, just one Trade Ally said that he or she did not suggest Focus on Energy incentives to customers (n=16). As shown in Figure 163, Trade Allies most strongly agreed with

the statement "I suggest incentives to customers only once I know they are pursuing an eligible project" (seven of 16 said that this was *very true*), followed by the statements that "I suggest incentives to customers who can benefit from an eligible project but are not actively pursuing it" and "I advertise incentives proactively without waiting for customers to contact me first."

Figure 163. Trade Ally Marketing to Agriculture Customers



Source: CY 2018 Trade Ally Survey Question C3. "For each statement, please state whether it is *very true*, *somewhat true*, *not too true*, or *not at all true*." (n=16)

Three-fourths of respondents knew that the Energy Efficiency Best Practices Guidebook existed for agriculture customers, and one-half of those Trade Allies said they referred customers to the Guidebook (n=13). Of those who *did not* refer customers to the Guidebook, three said they typically did not remember to refer customers to the Guidebook, and two did not think customers would find it useful.

When asked if they had recommendations for ways that Focus on Energy could support them better in reaching agricultural customers, just five Trade Allies offered suggestions:

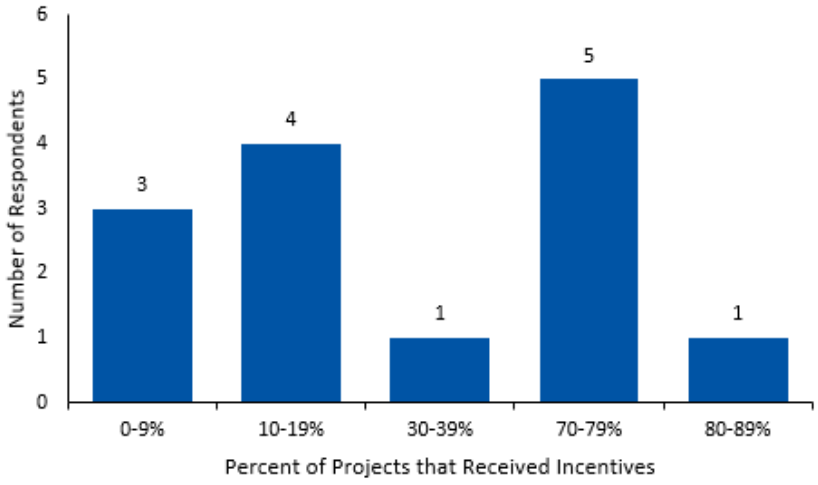
- Increased advertisements (three)
- Simplify the language in Focus on Energy resources (one)
- Refer more customers to Trade Allies (one)

Economic Impact

When asked to select the greatest benefit from promoting the Program, 11 of 15 Trade Allies selected "the financial incentives for my customer" (n=15), and four selected "increased business." These results remained consistent with CY 2016 Trade Ally survey results.

The Evaluation Team also asked Trade Allies about how Focus on Energy's Program impacted their companies economically. When asked what percentage of their companies' agricultural projects received an incentive from Focus on Energy this year, almost one-half of respondents (six out of 14) said more than 70% of their eligible projects received Focus on Energy incentives (see Figure 164).

Figure 164. Percentage of Trade Ally Projects who Received an Incentive from Focus on Energy in CY 2018



Source: CY 2018 Trade Ally Survey Question E1. "So far in 2018, what percentage of your company's agricultural projects were eligible and received an incentive from Focus on Energy this year? These are projects for which you or your agricultural customers submitted an application to Focus on Energy for an incentive. Use your best guess." (n=14)

Twelve out of 16 respondents said their sales *significantly increased* (three) or *somewhat increased* (nine) due to involvement with Focus on Energy. Of respondents with increased sales, 10 reported the that their businesses responded to increased sales in the following ways:

- Added more services (four)
- Added more products or equipment (four)
- Hired more staff (two)
- Expanded their service location (two)[148]

Program and Incentive Design

The Evaluation Team asked questions designed to assess the effectiveness of the Program's standard incentive, with 11 of 15 Trade Allies saying the CY 2018 Focus on Energy incentives were *very effective* (three) or *somewhat effective* (eight) in motivating agricultural customers to participate in the Program (n=15). These responses were consistent with the CY 2016 Trade Ally survey results. Of four Trade Allies in CY 2018 who said the incentives were *not very effective*, three said they specialized in electric or lighting work, and one said he specialized in building tune-ups or new construction.

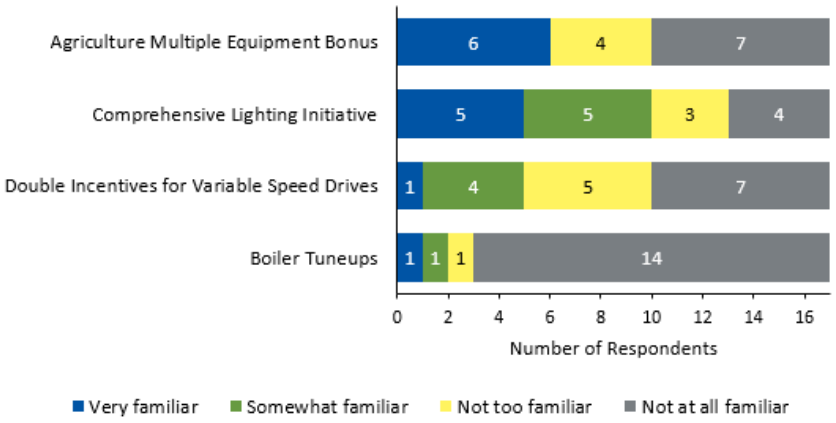
When asked how the increase therm incentives from $0.60/therm to $0.80/therm impacted customer interest in custom projects, just six of 17 respondents provided input, while the other 11 respondents

[148] Multiple responses were allowed, hence the responses sum to greater than 10.

did not know. One respondent thought the change in therm incentives significantly increased customer interest, while three respondents saw a slight increase, and three respondents saw no increase.

The Evaluation Team also asked questions to assess Trade Ally awareness of the Program's bonus incentives and special offers as well as the perceived effectiveness of those bonus incentives and offers. Figure 165 shows respondents had low familiarity levels with these offerings. Respondents were most familiar with the Comprehensive Lighting Initiatives and the Agriculture Multiple Equipment Bonus, which aligns with interviews with the Program Implementer and Administrator. While the Comprehensive Lighting Initiative and Agriculture Multiple Equipment Bonuses were offered in CY 2017, Double Incentives on VSDs was a new bonus offering for CY 2018.

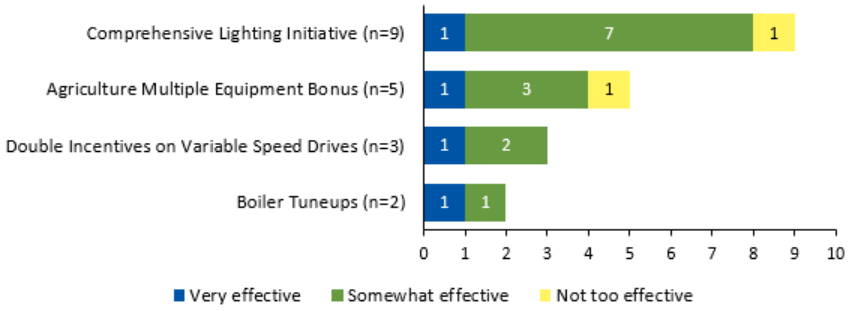
Figure 165. Trade Ally Familiarity with Program Bonuses and Special Offerings



Source: CY 2018 Trade Ally Survey Question D3. "How familiar are you with the following special Focus on Energy offerings available to agriculture customers?" (n=17)

The Evaluation Team asked Trade Allies who were *very familiar* or *somewhat familiar* with the Program's bonus incentives to rate those incentives' effectiveness. As shown in Figure 166, most respondents thought the bonus offerings and special incentives were *very effective* or *somewhat effective*. The four ratings of *very effective* were provided by four different respondents.

Figure 166. Trade Ally Ratings of Bonus and Special Offerings' Effectiveness

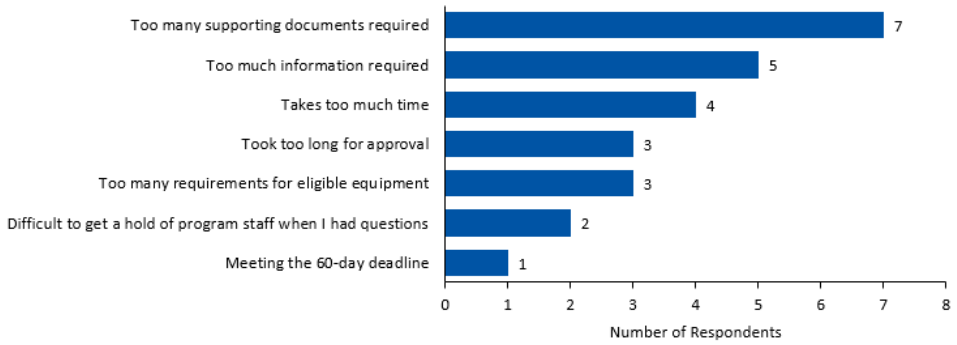


Source: CY 2018 Trade Ally Survey Question D4. "How effective are the following Special Incentive Offerings in motivating agricultural producers to participate in the Agriculture, Schools, and Government Program Comprehensive Lighting Initiative?"

Application Process

Fourteen of 17 Trade Allies said they helped customers with their applications *all the time* (12) or *sometimes* (two). Ten of 17 Trade Allies said they *seldom* (five) or *never* (five) ran into problems with the application process, while seven reported challenges. Figure 167 shows challenges reported by these Trade Allies.

Figure 167. Application Process Challenges Reported by Trade Allies



Source: CY 2018 Trade Ally Survey Question H4. "What are your most frequent challenges with the incentive application process?" Multiple responses allowed (n=7)

Four Trade Allies provided the following suggestions to improve the application process (verbatim responses):

- "Expand prescriptive programs."
- "Faster pre-approval. Customers want to work on their projects ASAP after getting approval."
- "Incorporate the utility release form with the Focus Application to have only two sheets, if possible."
- "Quick confirmation of receipt of application, with a firm date to be paid in a shorter time frame."

Program Challenges and Market Barriers

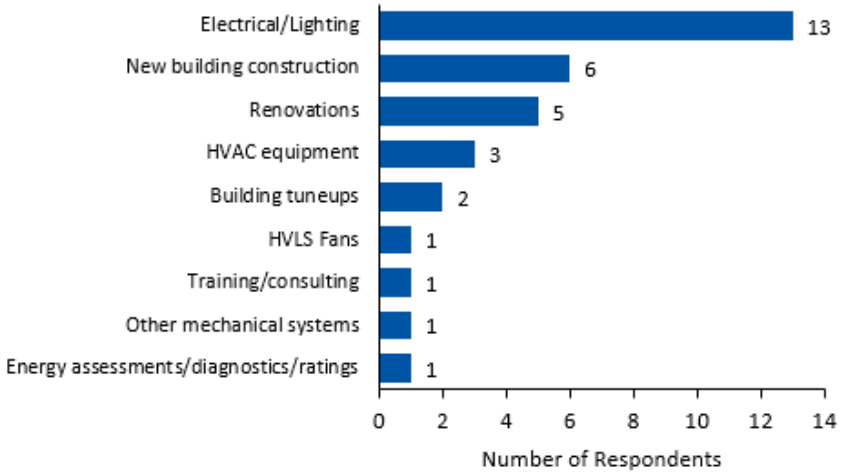
When asked what barriers they saw for dairy and non-dairy producers participating in the Program, five respondents reported barriers that they see to dairy farmer participation, and three respondents reported barriers that they see to non-dairy farmer participation. Those respondents most commonly reported that dairy farmers (four respondents) and non-dairy farmers (two respondents) lacked the financial means to participate. One Trade Ally said both dairy and non-dairy farmers faced a barrier of "paperwork and inspections."

Just four Trade Allies said they worked with agricultural producers in states other than Wisconsin. Of those four, two were *equally satisfied* and two were *less satisfied* with Focus on Energy incentives than another state's incentives.

Trade Ally Specialties

As shown in Figure 168, 13 of 17 Trade Allies reported their companies specialized in electrical or lighting work, and about one-third reported that their companies specialized in new building construction or renovations.

Figure 168. Trade Ally Specialties



Source: CY 2018 Trade Ally Survey Question J1. "What does your company specialize in?" Multiple responses allowed (n=17)

Delivering Energy Efficiency Together Participant Feedback

Program Background

DEET rewards K-12 schools for energy-efficient behavior changes that reduce their energy consumption. Schools earn incentives by making energy-smart choices, such as turning off lights when classrooms and offices are unoccupied, enabling computers' sleep mode when not in use, and optimizing heating and cooling equipment schedules to meet actual building occupancy needs. Eligible buildings must not have completed major renovations or energy upgrades within the last year or must not have planned for major renovations or energy upgrades within the next year. Schools received Program resources such as annual reports, Energy Advisor visits to document activities and reengage building champions and staff, and stickers and magnets for energy-savings reminders.

In September and October 2018, the Evaluation Team conducted interviews with designated Energy Champions (the Program's touchpoint), when available. Interview respondents held the following roles for their schools:

- Principal (three schools)
- School Custodian (two schools)
- School District Energy and Transportation Manager (one school)

Three respondents said their schools experienced recent turnover for their Energy Champions and could not speak to all interview topics.

Motivation and Engagement with the Program

When asked what motivated their schools or school districts to participate in the DEET Program, respondents most commonly cited the following reasons:

- Save money
- Earn incentives for energy savings
- Save energy

Two schools said they reinvested the DEET incentives into school improvements, such as installing T8 LED lighting or water fountains that filled water bottles (one school) or into books, individual electronic devices for students, or author visits by writers who focus on the environment (one school). Both of those school respondents said the ability to reinvest the DEET incentives motivated teachers to participate in the Program, and DEET incentives helped schools that have experienced budget cuts.

Interviews revealed that schools' long-term participation in the Program was influenced by individual School Champions and the amount of support received outside of the DEET Program. Three schools interviewed by the Evaluation Team were located within the same district and had participated in DEET each year since CY 2015. These respondents reported receiving outside support for DEET from their municipal utility and their District Green Team.

The municipal utility matched incentives provided by Focus on Energy and provided an educational energy Program called Cool Choices, which complemented the DEET Program. The District Green Team also provided direction to schools about how they can conserve energy and remotely control school HVAC equipment to optimize its performance and save energy. Finally, of the school district's three energy champions, all of whom were school principals, one respondent stated that he was very passionate about the DEET offering. This principal helped the other two champions, both who admitted that they were not very engaged with the Program, to complete their DEET paperwork and helped them to implement the Program at their schools. One principal who inherited the DEET Program in the fall of CY 2018 reported that he most likely would not have continued the DEET Program without the help of that other, more passionate principal.

Among the remaining three respondents interviewed by the Evaluation Team, one was a District Energy and Transportation Manager who was highly engaged with DEET. While he did not mention receiving outside support, his job's main role directly aligns with DEET, and schools within his district have participated each year since CY 2015. The last two respondents represented schools that experienced Energy Champion turnover at the end of May 2018, and they did not report receiving outside support for their programs, other than the support provided by Focus on Energy. Those two schools did not renew the DEET Program for the CY 2018-CY 2019 school year.

Respondents reported hearing from their Energy Advisors every month or every other month once they joined DEET. Most respondents were satisfied with their level of interaction with their Energy Advisor during the Program, but schools that experienced the Energy Champion turnover once the school year ended after May 2018 reported some Program confusion due to the loss of institutional knowledge. In

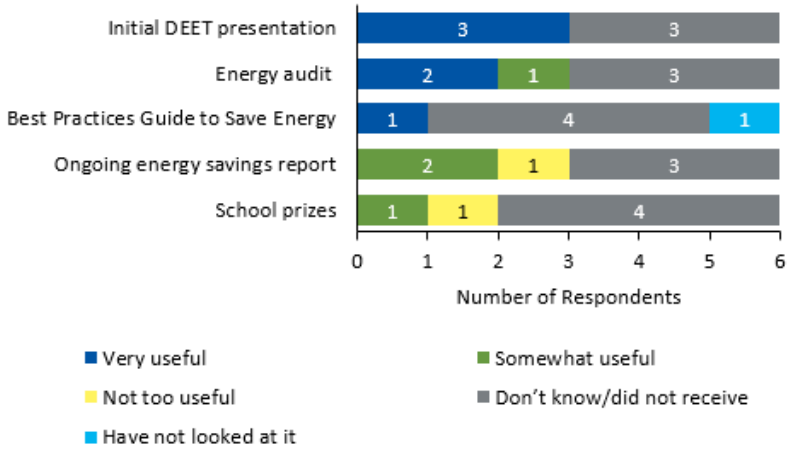
these cases, interviewees reported that earlier communication from Focus on Energy, at the end of the school year, shortly before or after the departure of the Energy Champion, would have been helpful.

Satisfaction with DEET Resources

Respondents expressed high satisfaction levels with the Program's new design, which began in CY 2017. Four of five respondents who could speak to the new design said they were *very satisfied* with DEET. Just one respondent said he was *somewhat satisfied* with the new Program, and he gave that rating because he has "been pretty hands off and [doesn't] know enough about it to be 'very satisfied.'" Just one respondent had experience with the old Program design, and he opted to stick with the old incentive structure since it worked best for his school.[149]

Many respondents did not know of DEET support or resources available to them. Those who did receive the resources found them *very useful* or *somewhat useful,* as shown in Figure 169. The lack of awareness among some respondents stemmed from the departure of three schools' Champions left; respondents did not know which DEET resources their previous Energy Champions received. Additionally, while another respondent served as his school's Energy Champion for at least one full school year, this respondent admitted he has not made the Program a priority, and he said he may find the resources provided by DEET to be less useful than would a more engaged Energy Champion.

Figure 169. Usefulness of DEET Resources



Source: CY 2018 DEET Participant Interviews Question E12. "How useful are the following resources provided by DEET: *very useful, somewhat useful, not too useful, not all useful, did not receive this resource.*" (n=6)

[149] Schools that joined DEET prior to CY 2017 entered under the old DEET model, which required three years of participation, and had nine incentive tiers for kilowatt-hours, therms, and kilowatt savings. Schools that joined DEET after CY 2016 entered under the new model, which requires one year of participation, provides a flat incentive for kilowatt-hour and therm savings ($0.04 per kilowatt-hour and $0.60 per therm), and provides prizes such as ENERGY STAR LED lightbulbs, power strips, watt meters, and scholarships that support energy awareness and education. For further information on the prior DEET program model, see the *Focus on Energy Calendar Year 2017 Evaluation Report*, Volume II.

The respondent who found the ongoing savings report *not too useful* wanted the report to show energy savings in addition to monetary savings. For two respondents who found the ongoing savings reports *somewhat useful*, both liked that the reports provided charts of monetary savings, so they could connect the reports to how much money they received from Focus on Energy. One of those two respondents, however, said, due to his lack of heavy engagement with the Program, he did not analyze savings reports the way that a more engaged Energy Champion would.

Just two respondents said their schools received energy prizes, and, while both considered the prizes as fun DEET perks, they did not distribute the prizes widely to teachers or students, and neither considered the prizes *very influential* in spurring schools to engage in energy-savings actions.

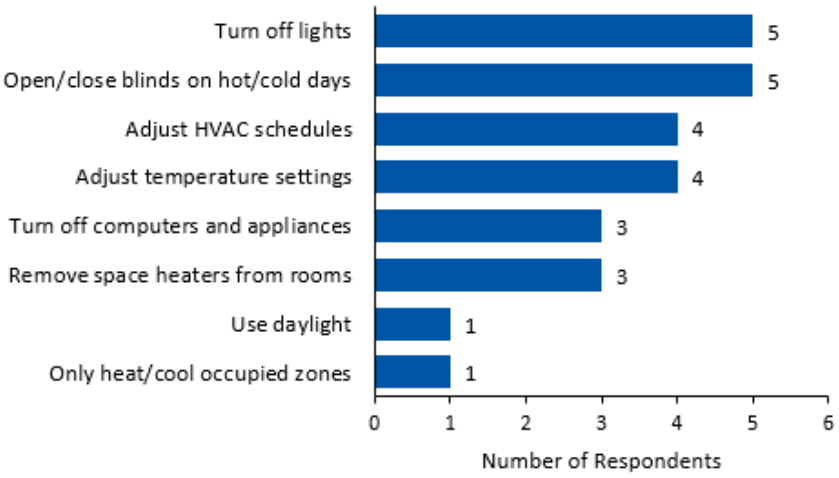
No schools reported using ENERGY STAR Portfolio Manager to monitor their energy usage. One school used a tool called My Meter, offered by the school's municipal utility. The respondent liked that this tool showed 15-minute interval energy usage data.

School Implementation of Energy-Saving Behaviors

All interviewed DEET participants reported taking actions to reduce their energy use. As shown in Figure 170, participants most commonly reported taking the following actions:

- Opening and closing their blinds (five)
- Turning off lights (five)
- Adjusting temperature settings (four)
- HVAC schedules (four)

Figure 170. School Actions to Save Energy



Source: CY 2018 DEET Participant Interviews Question D8. "Which actions has your school taken to reduce their energy usage?" (n=6)

For each respondent, building engineers and maintenance staff at the district or school levels served as key sources in helping implement the DEET Program. The Energy Champion who also served as his district's Energy and Transportation Manager said building engineers at participating schools served as

his main source of help, followed by school environmental groups and principals. Another respondent, a school principal, said he worked in close partnership with his school's head custodian to incorporate DEET with the school's mechanical systems and to generate ideas of how to save energy at school.

Teachers and students mostly received DEET information from the Energy Champions and did not play a large role in the Program's implementation. When asked how DEET engaged students and teachers, respondents cited the following strategies:

- DEET presentation school staff early in the school year (four respondents)
- Classroom audits where Energy Champions placed reminder post-it-notes by appliances (three respondents)
- Green teams with teachers and students, who made posters and shared energy-saving tips (two respondents)
- Light switch reminder stickers (one respondent)
- District-wide Blackout Days, where the district energy manager challenged elementary schools to limit usage for one day (one respondent)

Participation Barriers

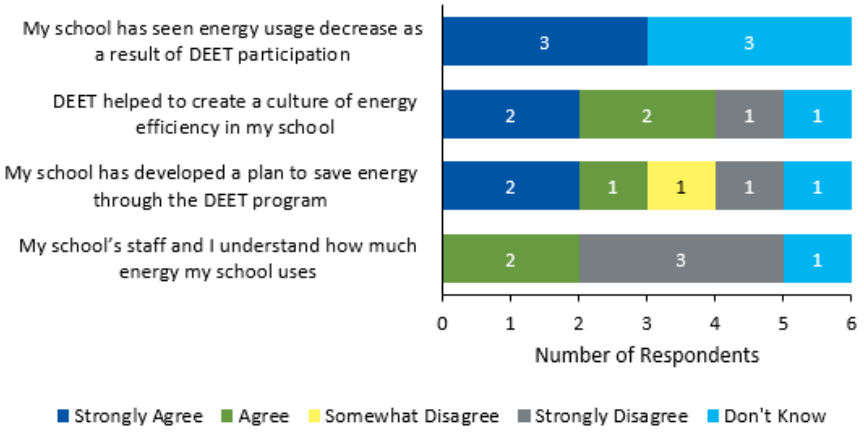
Five respondents listed the following barriers to Program engagement:

- Principals have limited ability to control HVAC systems
- Competing priorities and lack of time
- Not sure about the Program terms
- Difficulties in changing people's habits
- Schools could not take advantage of other Focus on Energy incentives while participating in DEET
- Lack of administrative buy-in: one respondent could not procure utility bills from the school's Financial Manager to share with the Energy Advisor.

Program Influence on Schools

As shown in Figure 171, DEET helped create a culture of energy efficiency at participating schools. The offering, however, had mixed impacts on schools' plans to save energy and on staff understanding school energy use.

Figure 171. DEET Offering Influence on Participants



Source: Participant Survey Question. "For each statement, do you *strongly agree, somewhat agree, somewhat disagree, or strongly disagree.*" (n=6)

Two respondents *strongly agreed* and one *somewhat agreed* that DEET helped the schools develop plans to save energy through the Program. One of those respondents said they "would not have looked so deeply into energy savings [strategies]" without the Program. The other two respondents said the DEET offering helped to supplement energy savings that their school districts already had in place.

For example, one school district had participated in a behavioral savings Program called Synergistic since 2002, and the respondent said the DEET incentives complemented this the Synergistic Program by allowing it to build its existing Program and maintain school motivation by reinvesting DEET incentive money into the school.

Another respondent said DEET complemented the Program that the municipal utility provided for his school and for two other respondents' schools every other year. These three schools received matching incentives from the municipal utility for DEET savings, and they reinvested their DEET incentives into the school. While satisfied with DEET, other respondents did not necessarily feel DEET helped their schools to develop an energy-savings plan, with one respondent saying, "Increased awareness is not a plan." No schools interviewed by the Evaluation Team had developed energy-savings goals as an outcome of DEET.

Participant Suggestions for Improvements

When asked for suggestions to improve the Program, respondents most commonly responded that they wanted better communication (four out of six respondents). For example, two said they wanted to receive more information about their schools' energy savings from Focus on Energy rather than just receiving incentives. One of those respondents said his former Energy Advisor used to provide information on school kilowatt-hour and therm savings when incentive checks were issued, but his current Energy Advisor no longer provided information on energy savings. Another respondent said that, if he was more involved in the Program, he would like his Energy Advisor to provide more tips on how the school could save energy.

Separately, two respondents recommended that the Program consider providing a reduced incentive rate to schools that could not participate in the full DEET offering due to implementation of capital projects. The Program currently has a rule that schools that implement capital projects that significantly change their energy use cannot receive incentives through the Program; three schools interviewed by the Evaluation Team had plans for capital projects to begin in CY 2019.

Finally, one respondent recommended that the Program try to more directly involve district maintenance staff in the Program as those staff can make changes to school mechanical systems (such as boilers) that school principals or custodial staff are not authorized to undertake.

DEET Initiative Impacts

Schools participating in the DEET initiative saved 72,742 kWh per year in CY 2018 according to the savings data in SPECTRUM as of January 2019. However, the cost of the avoided energy use was high—DEET savings cost $0.27 per kilowatt-hour, while the total Agriculture, Schools, and Government Program savings was $0.08 per kilowatt-hour, for comparison.[150]

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 257 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for Agriculture, Schools, and Government Program.

Table 257. Agriculture, Schools, and Government Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$8,441,694	$6,836,351	$6,373,340	$5,656,868

The Evaluation Team found that the CY 2018 Agriculture, Schools, and Government Program was cost-effective (6.24). Table 258 lists the evaluated costs and benefits.

[150] Calculated using incentive costs only.

Table 258. Agriculture, Schools, and Government Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$646,560	$808,476	$776,604	$762,602
Delivery Costs	$4,515,658	$3,301,342	$3,171,197	$3,114,023
Incremental Measure Costs	$7,166,940	$19,171,821	$27,047,432	$28,464,405
Total Non-Incentive Costs	**$12,329,159**	**$23,281,639**	**$30,995,232**	**$32,341,030**
Benefits				
Electric Benefits	$45,767,228	$69,239,637	$42,529,151	$49,956,749
Gas Benefits	$21,461,395	$15,309,240	$23,737,403	$47,207,282
Emissions Benefits	$9,691,744	$12,844,571	$10,146,612	$14,442,289
Total TRC Benefits	**$76,920,367**	**$97,393,447**	**$76,413,166**	**$111,606,319**
Net TRC Benefits	**$64,591,208**	**$74,111,809**	**$45,417,934**	**$79,265,289**
TRC B/C Ratio	**6.24**	**4.18**	**2.47**	**3.45**

Evaluation Outcomes and Recommendations

Outcome 1. Customers, particularly decision-makers in schools and government entities, can benefit from access to low-interest financing or increased education about a project's return on investment. Both agriculture participants and agriculture Trade Allies reported high upfront equipment costs as the main barrier to customer participation in the Program. Schools and government sector respondents also most commonly reported high upfront costs as the main barrier to participation, along with budget limitations and the need for project approval.

One-quarter of participants said upfront incentives could help overcome these barriers, and significantly more respondents in CY 2018 (12%) than CY 2016 (1%) said low-interest loans or energy performance contracts could help overcome these barriers. Of these respondents, three were agriculture sector customers, two were schools, and two were local government customers. Several schools and government respondents reported they would like to receive information on the projects' return on investment.

Recommendation 1a. Connect customers to existing sources of low-interest financing for high-efficiency upgrades or help develop partnerships with other Wisconsin or local entities for such financing, based on the customers' financing preferences. Connect schools and governments to information about the option for energy performance contracts, which allows customers to pay for the project over a longer period of time than a traditional loan based upon the project's energy savings.

Recommendation 1b. Focus on Energy should consider ways to educate school boards and municipal boards about the long-run cost-savings of efficiency projects so customers have a better chance to receive approval for their projects (such as lunch-and-learns and board presentations). Tailor the audience to each school or government customers' main decision-maker.

Recommendation 1c. Further, Focus on Energy should consider providing generic financial metrics (such as payback periods or return on investment information) for common prescriptive projects through the

website and other marketing materials. The Energy Efficiency Best Practices Guides for each sector state payback period estimates for some, but not most, equipment types and this information is not on the website. Focus on Energy can provide more specific payback and return on investment estimates for particular project proposals via Energy Advisors. This will aid customers in navigating the approval process.

Outcome 2. Trade Allies continue to play a significant role in the Program, acting as the main source of Program information for participants in both sectors as well as the main source of help in initiating projects. However, less than one-half of Trade Allies said the Program did an *excellent* or *good job* at training them on how to effectively market the Program to their customers or in providing the right amount of support to allow them to confidently sell and install energy-efficient equipment.

Recommendation 2a. Energy Advisors should identify specific support that agriculture Trade Allies need to sell and install energy-efficient equipment.

Recommendation 2b. Train Program Trade Allies to provide return on investment estimates to customers, and emphasize the importance of calculating project payback periods when communicating upfront costs.

Outcome 3. DEET participants are satisfied with the initiative overall, yet there is room for improvement in terms of how this initiative is offered and how the Program engages participating schools. The Evaluation Team found through its interviews that participants are not engaged in monitoring energy-savings trends and experience challenges taking steps that will result in deeper energy savings; meanwhile, data show that the cost of the initiative is high. Participants are not often aware of the resources available to them and struggle to connect incentive checks to their improvements in energy use. Additionally, the schools who experience a turnover in key staff and/or Energy Champions need more contact from Focus on Energy.

Recommendation 3a. The Program might consider transitioning DEET schools to the new school benchmarking offering, described in this report under the New Special Offerings and Bonus section, for a more structured and transparent approach to understanding school energy use. By providing participants with more clearly accessible data on their consumption, schools (including staff and students) may in turn be more engaged with the Program and undertake more actions to save energy.

Recommendation 3b. The Program Administrator might consider providing guidelines for normalizing electric data for weather or dramatic change in student population numbers. A standard benchmarking tool such as ENERGY STAR Portfolio Manager or the CY 2018 B3 benchmarking tool provides weather normalization for savings data. Weather normalization and a benchmarking tool can inform schools the extent to which their energy use is impacted by behavior change versus weather.

Recommendation 3c. Encourage the creation of Energy Champion teams consisting of at least two people within each school or district, as opposed to a single Energy Champion, thus limiting the impacts of Energy Champion turnover. Each team should include the school's facility or maintenance manager as well as a school administrator (such as a principal or finance officer), and each member of the team

should receive monthly updates from the school's Energy Advisor. Bringing in the school's facility or maintenance manager will be crucial in ensuring that the school implements best practices for HVAC or temperature scheduling or adjustments, and that the school's administrative staff can ensure the DEET initiative gains the necessary buy-in from teachers and other staff.

Recommendation 3d. Enhance communication. The Program should increase its touchpoints with the school staff engaged and proactively seek to identify who will be on the team of Energy Champions, checking in periodically with participants to identify changes. When turnover does occur, ensure that new Energy Champions or touchpoints have the resources they need from the Program.

Recommendation 3e. Market the DEET initiative to district-level staff who can spearhead behavior changes within schools across the district. Potentially, this outreach could also target district green teams or sustainability committees, district energy or facility managers, and superintendents. The Evaluation Team found district staff often control HVAC schedules or settings for schools within the district and can set policies that impact all schools within a district. These staff can also handle and streamline paperwork for participating schools, removing that administrative burden from individual schools. While individual schools may wish to maintain their own Energy Champions, the Team found that the more outside support schools receive, the more likely they will continue participating with DEET.

Outcome 4. Additional review and guidance is needed for the installation of condensing boilers. Because condensing boilers operate optimally at specific supply and returning temperatures, which often differs from how traditional boilers are programmed, it is important to make sure the building teams understand how to operate the more efficient condensing boilers such that they condense and therefore achieve their energy savings potential. Alternatively, it is important that Program Implementers help customers to understand if their configuration supports this type of equipment instead of traditional boilers.

Recommendation 4. Consider requiring post installation verification visits or additional attention from technical consultants for all boiler replacement projects where a traditional boiler is being replaced by a condensing boiler. In these cases, building teams may need additional guidance on the correct setpoints to achieve optimal efficiency. The Evaluation Team reviewed one project this calendar year where the condensing boilers were programmed to return water at a temperature too high to condense.

Outcome 5. To ensure that the HVAC Energy Ventilation Calculator does not cause customers to use inefficient cooling temperature setpoints as they seek to maximize their calculated energy savings, this calculator's methodology and assumptions may benefit from review. The Evaluation Team reviewed one new construction project for CY 2018 that used new ERV systems and found that the incentive application setpoints differed from the actual setpoints observed during the site visit. The energy savings resulting from this change were large and counter-intuitive, in that less efficient setpoints (cooler internal temperature setpoints in the summer) resulted in higher total savings. From how the calculator is programmed, the savings calculation is essentially cooling load multiplied by ERV efficiency. Therefore, if the project is using more cooling (from lower temperature setpoints), it is using

more energy but results in higher savings through the calculation. That is, the calculator does not estimate an energy penalty for having inefficient setpoints.

Recommendation 5. If this calculation is revisited, some possible solutions are to use an industry standard 72ºF internal temperature setpoint in both baseline and performance case or to set the comparison between the cooling energy of a non-ERV system at a standard 72ºF against the cooling energy of the installed ERV system at actual temperature setpoints.

Outcome 6. In some cases, the Evaluation Team and the Program Implementers used different versions of the TRM for calculating savings, which created inefficiencies. The Evaluation Team selects the appropriate TRM for evaluation based on the incentive paid dates in SPECTRUM**.** In five evaluated measures, the *ex ante* reported savings were adjusted by the Program Implementer to use different deemed savings based on a newer TRM version, released subsequently to when the project was paid. In these cases, the Team found the adjustments increased energy savings. The Evaluation Team concluded it was warranted to adjust the initial *ex post* verified savings to reference the same deemed savings calculations, therefore, measure realization rates were not impacted. However, the process could benefit from improved clarity and a consistent protocol.

Recommendation 6. Whenever possible, the decision about which TRM version to use for *ex ante* savings should be based on consistent decision-making criteria to ensure transparency (use the TRM in place at the time the project was paid, or, update all projects to reflect the latest TRM, but not both). Additionally, to improve coordination, the Program Administrator might consider adding a data field to the SPECTRUM database to include the TRM version that was used to calculate *ex ante* reported savings. This will help inform the evaluators about which TRM to use for evaluation activities and will help maintain consistency between reported and evaluated savings.

CY 2018 Changes to Existing Special Offerings and Bonus Incentives

Agricultural Multiple Equipment Bonus provides additional funds to agricultural producers who install more than one type of measure, with bonuses structured as follows:

- $400 for installing two measure types
- $500 for installing three measure types
- $600 for installing four+ measure types
- Capped at 50% of the normal incentive if costs are less than $800 for two measures; $1,000 for three measures; or $1,200 for four measures.

The bonus incentive structure did not change in CY 2018, but Focus on Energy streamlined the application process in response to a lower-than-anticipated participation rate in CY 2017. That year, Focus on Energy required customers to put both pieces of new or upgraded equipment on the same application to receive the incentive, and Program Implementers reported that customers sometimes had to find more than one Trade Ally if they sought to install multiple types of equipment.

In CY 2018, the Program modified the application process to allow customers to submit two separate rebate applications in one year to receive the bonus. CESA 10 sent emails to customers who completed

one project to inform them that they could receive a bonus by completing another project within a year. The Program Implementer explained that the bonus offering became more popular in CY 2018 than in CY 2017 due to Trade Allies' and customers' increased awareness about the bonus.

Comprehensive Lighting Initiative offers incentives to preapproved projects that complete LED and lighting control updates in areas greater than 50,000 square feet or with 75% or more of participants' building square footage. The initiative seeks to achieve deeper energy reductions from installing controls during a lighting upgrade rather than only upgrading lamp types. For CY 2018, Focus on Energy lowered the base incentive from $0.10 per kilowatt-hour to $0.07 per kilowatt-hour and offered an additional $0.03 per kilowatt-hour if customers saved over 60% of baseline energy usage. The Program Administrator explained that the extra $0.03 per kilowatt-hour bonus motivated some customers to achieve more aggressive savings by delamping or adding lighting sensors if their initial projected savings fell slightly under 60% of their baseline energy usage.

Retro-commissioning. The Program implemented new incentives for the audit phase ($0.02 per kilowatt-hour + $0.30 per therm; up to 50% of the audit cost) and new incentives for the implementation phase ($0.03 per kilowatt-hour + $0.30 per therm; up to 75% of total retro-commissioning costs).

Water/Wastewater Bonus. In CY 2017, the Bonus offered a 20% additional incentive for prescriptive measures and a 10% additional incentive for custom measures submitted for preapproval. For CY 2018, Focus on Energy continued the prescriptive incentive but removed the 10% bonus for custom measures because it increased incentive amounts for custom measures to $0.08 per kilowatt-hour and $150 per kilowatt. The Program Implementer said the prescriptive bonus proved very successful in CY 2018.

Discontinued Special Offerings and Bonus Incentives

TLED 50 Lamp Trial. Gave schools an opportunity to purchase 50 discounted TLEDs for $2 each before upgrading the entire facility.

Streetlights for Municipal Customers. Is now a standard offering.

Networked Lighting Controls. Focus on Energy transitioned networked lighting control measures from a pilot to a standard offering, including the incentive in its CY 2018 lighting incentive catalog. The Program offers incentives for DesignLights Consortium–listed controls, based on the number of square feet of new or existing fixtures included in the sensor network, along with a bonus for systems with energy monitoring capability to encourage participation in energy data collection. The Program Implementer reported that, although networked lighting controls measures were relatively successful when the Pilot Program marketed this to the schools and government sector, the offering did not experience a substantive uptake in CY 2018 with business customers, possibly due to more training required among Trade Allies. The Program Administrator agreed that the network lighting controls incentives proved popular with schools, largely because they understood the benefit from the controls, and their facilities made good candidates for the technology.

Large Energy Users Program

Through the Large Energy Users Program, Wisconsin Focus on Energy provides custom and prescriptive incentives to customers whose average monthly demand exceeds 1,000 kW of electricity or 100,000 therms of natural gas, and whose combined utility bills were at least $60,000 in any month of the preceding year. These participating customers, which include commercial, industrial, educational, healthcare, and governmental facilities, are assigned an Energy Advisor who helps them identify savings opportunities at their facilities. APTIM serves as the Program Administrator and Leidos Engineering, LLC serves as the Program Implementer.

In CY 2015, Focus on Energy launched the Strategic Energy Management Pilot to provide support for approximately 30 large energy customers implementing management systems and energy-saving initiatives at their facilities. The Strategic Energy Management Pilot maintains independent funding and energy-savings goals.

Through the Strategic Energy Management Pilot, Energy Advisors work with large energy customers to promote an energy management information system in their facilities, demonstrate its value, and develop a Wisconsin workforce with experience in leading strategic energy management initiatives. The Pilot is targeted to large industrial companies eligible for the Large Energy Users Program and showing a demonstrated commitment to improving energy performance.

In addition to the ongoing Pilot, Focus on Energy launched two new strategic energy management offerings during CY 2017 as part of the Large Energy Users Program:

- Strategic Energy Management Industrial
- Strategic Energy Management Healthcare

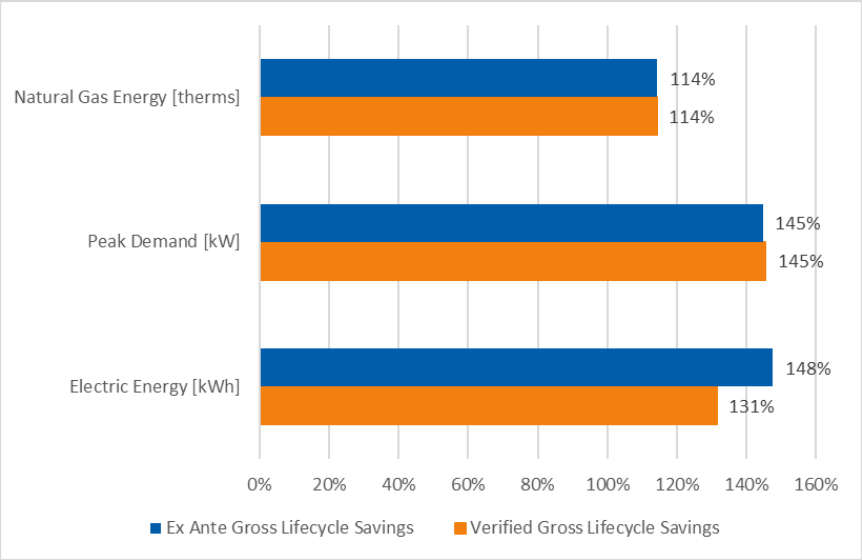
These permanent Large Energy Users Program offerings are managed and implemented by the Program Implementer and are included in the overall Large Energy Users Program savings rather than being treated as separate programs. Table 259 summarizes the impacts from these offerings, along with actual spending, savings, participation, and cost-effectiveness for the Large Energy Users Program. The Strategic Energy Management Industrial and Strategic Energy Management Healthcare offerings within the Large Energy Users Program accounted for 1.4% of total *ex ante* lifecycle electric savings and 0.1% of the total *ex ante* lifecycle therm savings (0.5% of total *ex ante* lifecycle MMBtu savings). Table 259 does not include the Strategic Energy Management Pilot.

Table 259. Large Energy Users Program Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$9,964,658	$9,118,075	$43,324,612
Participation	Number of Participants	363	386	1,539
Verified Gross Lifecycle Savings	kWh	2,306,479,992	2,233,657,429	8,835,679,704
	kW	20,285	21,084	77,532
	therms	187,849,746	144,988,131	741,167,136
Verified Gross Lifecycle Realization Rate	% (MMBtu)	92%	99%	97%
Annual Net-to-Gross Ratio	% (MMBtu)	62%	82%	77%
Net Annual Savings	kWh/yr	104,063,371	138,432,453	480,894,451
	kW	12,577	17,289	59,519
	Therms/yr	7,346,018	8,449,980	39,260,393
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	7.67	6.76	5.68

Figure 172 shows the percentage of gross lifecycle savings goals achieved by the Large Energy Users Program in CY 2018. The Large Energy Users Program exceeded all its electric and natural gas energy savings and peak demand reduction goals in CY 2018.

Figure 172. Large Energy Users Program Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Table 260 lists actual spending, savings, participation, and cost-effectiveness for the Strategic Energy Management Pilot.

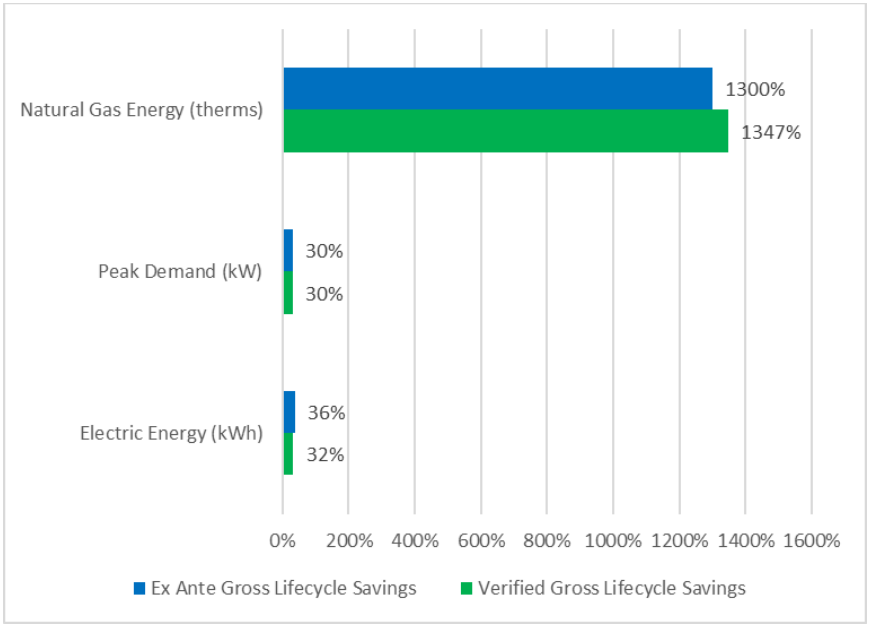
Table 260. Strategic Energy Management Pilot Summary

Item	Units	CY 2018	CY 2017	Quad (CY 2015–CY 2018)
Incentive Spending	$	$1,608,048	$875,573	$2,483,622
Participation	Number of Participants[a]	29	6	31
Verified Gross Lifecycle Savings	kWh	128,009,201	5,133,522	168,702,188
	kW	1,353	499	1,852
	Therms	31,361,132	1,315,102	34,986,809
Verified Gross Lifecycle Realization Rate	% (MMBtu)	101%	99%	101%
Annual Net-to-Gross Ratio	% (MMBtu)	100%	100%	100%
Net Annual Savings	kWh/yr	16,599,730	5,133,522	21,733,252
	kW	1,353	499	1,852
	Therms/yr	2,637,573	1,315,102	3,952,675
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	8.52	2.61	7.01

[a] Some participants had zero savings but received incentives. Some participants are the same across years.

Figure 173 shows the percentage of gross lifecycle savings goals achieved by the Strategic Energy Management Pilot in CY 2018. The Strategic Energy Management Pilot exceeded its goal for lifecycle natural gas savings, but did not meet its goals for lifecycle energy savings or peak demand reduction. The Program reached 222% of its goal for lifecycle MMBtu savings.

Figure 173. Strategic Energy Management Pilot Achievement of CY 2018 Gross Lifecycle Savings Goal



Note: The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2018. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

In CY 2018, the Evaluation Team conducted impact and process evaluations of the Large Energy Users Program and the Strategic Energy Management Pilot. In assessing the Programs' performance, the Team designed its EM&V approach to integrate multiple perspectives. Table 261 lists specific data collection activities and sample sizes used in the evaluations, specific to each Program.

Table 261. Large Energy Users Program and Strategic Energy Management Pilot Data Collection Activities and Sample Sizes

Activity	Large Energy Users Program CY 2018 Sample Size (n)	Strategic Energy Management Pilot CY 2018 Sample Size (n)
Program Actor Interviews	2	1
Tracking Database Review	Census	Census
Participant surveys	70	0
Participant interviews	1	12
Ongoing Participant Satisfaction Survey	129	0
Engineering Desk Review/Strategic Energy Management Regression Analysis	49	10
Verification Site Visits	42	0

Program Actor Interviews

In July 2018, the Evaluation Team interviewed the Program Administrator and Program Implementer to learn about the Large Energy Users and Strategic Energy Management Pilot status to assess objectives, performance, and implementation challenges and solutions.

Tracking Database Review

The Evaluation Team reviewed the census of Program records in SPECTRUM, the Focus on Energy database. The review involved the following tasks:

- Conducting a thorough data review to ensure SPECTRUM totals matched totals reported by the Program Administrator
- Reassigning savings from a number of database-adjustment measures to corresponding Program measures
- Checking for complete and consistent applications of information across data fields (such as measure names, application of first-year savings, and application of EUL)

Large Energy Users Program Participant Surveys

The Evaluation Team surveyed a random sample of 70 customers that participated in the Large Energy Users Program, assessing their Program experiences and gathering data for NTG calculations. At the time of the survey, the Program had a population of 259 unique participants (determined by unique

phone numbers).[151] The population size and number of completed surveys targeted 90% confidence with ±10% precision at the Program level.

Strategic Energy Management Pilot Participant Interviews

The Evaluation Team completed telephone interviews with 12 Strategic Energy Management Pilot participants and one Strategic Energy Management Industrial participant to assess their experiences and to gather information on the initiatives' benefits and challenges. The Strategic Energy Management Industrial participant who completed an interview had been paid for operational savings through the Large Energy Users Program. Of the 12 Pilot participants, seven reported either kilowatt-hour or therms savings. The Evaluation Team completed regression analysis for five of 12 interviewed participants.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the CY 2015–CY 2018 quadrennial. These surveys sought to provide a quick, easy opportunity for recent Program participants to accomplish the following:

- Provide feedback shortly after their experiences
- Reveal problems at any time of year
- Identify energy efficiency opportunities for follow-ups with interested participants

The Evaluation Team also used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfying KPIs.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2018 participants that had an email address, within two weeks of their completing Program participation. The Team gathered online survey results via SPECTRUM, along with collected mailed survey responses, combining these with online results for quarterly and annual reporting.

In CY 2018, 129 Large Energy Users Program participants responded to the participant satisfaction survey.

Engineering Desk Review

For a sample of 49 Large Energy Users Program measures, including five Strategic Energy Management Operational Savings measures, the Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM. The review included assessing the savings calculations and the methodology applied by the Program Implementer. The Team leveraged applicable TRMs (2018 TRM and 2018 TRM Update) and other relevant secondary sources, as needed, which included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue).

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[151] The population included in-progress Strategic Energy Management Industrial and Strategic Energy Management Healthcare participants.

For prescriptive measures in Wisconsin, the Team used the Focus on Energy TRM and associated workpapers as primary sources to determine the savings methodology and data in nearly all cases. For custom and hybrid measures, the Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgments and project documentation. For these reviews, the Team selected the evaluation sample using a weighted, random stratified PPS sampling approach based on lifecycle total *ex ante* energy savings.

Verification Site Visits

In CY 2018, the Evaluation Team conducted 42 verification site visits for the Large Energy Users Program. Site visits involved verifying the types and quantities of equipment installed, determining how installed equipment was controlled, and documenting the installed equipment's operating hours. The Evaluation Team installed an electric power meter for one hybrid VFD measure to confirm run hours and motor demand and collected trend data for one compressed air optimization measure.

Regression Modeling

For each fuel type, the Evaluation Team conducted regression analyses for one Strategic Energy Management Industrial participant facility, eight Strategic Energy Management Pilot facilities that joined the Pilot in CY 2018, and two Strategic Energy Management Pilot facilities that joined in CY 2017 and claimed further savings in CY 2018. This methodology allowed the Team to estimate savings that could not be quantified through engineering analyses, including behavioral, operational, and maintenance changes.

First, the Team created a model using weather, facility production, and consumption data, along with other possible energy-use drivers that described energy consumption during the baseline period (ideally beginning at least 12 months prior to implementation of the Strategic Energy Management Pilot). Then the Team used this model to predict energy use after the facility entered the Pilot (the reporting period). The difference between predicted and metered energy use provided an estimate of behavioral, operational, and maintenance savings resulting from the Pilot.

Large Energy Users Program Impact Evaluation

The Evaluation Team conducted several activities to assess the impact of Large Energy Users Program measures:

- Tracking database review
- ISR determination
- Engineering desk reviews
- Verification site visits

The following subsections outline the Team's findings for gross and net savings.

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2018 tracking data to determine reported installations then applied the results from engineering desk reviews (n=49) and verification site visits (n=42) to calculate verified gross savings.

The Team found that the overall accounting of demand reduction and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. SPECTRUM offers the typical date fields, such as "paid date" and "application received date," and offers several additional fields that help users track projects in greater detail. SPECTRUM also employs unique customer identifier numbers, a best practice not followed in many other jurisdictions, so account numbers and customer contact information can be used to easily classify unique customers.

The Evaluation Team made verified savings adjustments to several prescriptive, custom, and hybrid projects based on desk reviews and site visit findings. The Team worked with the PSC, Program Administrator, and Program Implementer to assess the causes and impacts of inaccuracies for these projects.

During the desk review for three custom measures under MMID 2499 (Process, Not Otherwise Specified), the Evaluation Team found that the *ex ante* lifetime savings calculations did not align with the 2018 TRM or 2018 TRM Update. The *ex ante* reported lifetime savings calculations were based on a measure life of 20 years but the 2017 and 2018 TRMs list a measure life of 15 years. The Team calculated verified lifetime savings based on a 15-year measure life.

Prescriptive MMID 2301 (Dock Door Infiltration Reduction, Replace Existing) does not have a protocol or guidance in any of the available TRMs (2015 through 2019 TRM) except for measure life. The submitted project documentation in SPECTRUM also did not include any savings calculations. The Team used the deemed savings for replacing existing dock door seals from a 2012 Franklin Energy Services workpaper[152] to calculate verified savings for this measure. This adjustment decreased savings.

The Evaluation Team also reviewed the submitted custom and hybrid project calculations for accuracy. The Team made multiple adjustments to the *ex ante* savings calculations for MMID 4678 (SEM Operational Savings, Industrial), which included savings for three unique measures. During desk review, the Team found the *ex ante* energy savings for two of the measures were calculated using a regression model and identified discrepancies in the chosen baseline regression models related to weather data and chosen heating degree day and cooling degree day inputs. The regression model also only calculated savings through October 31, 2018, so the Team annualized the verified savings. The *ex ante* energy savings for the third measure were calculated using a standard bottom-up (engineering) analysis approach, but the Team found that the submitted calculations erroneously multiplied metered 15-

[152] Franklin Energy Services. April 24, 2012. "Truck Loading Dock Seals."

minute average demand data by four to calculate average hourly demand. Overall these adjustments decreased savings.

Site visits generally confirmed that Program measures were installed and operating as planned, but the Team did find deviations:

- During the site visit for a hybrid MMID 2249 (Chiller, High Efficiency, Air Cooled, Replacement), only one of the two Program space conditioning chillers operated at a time in a lead/lag control strategy, instead of operating simultaneously as reported in the *ex ante* savings calculations. The site contact explained that the maximum chiller load over the past year and a half has been approximately 80% of one chiller's capacity. The Team also reduced the reported annual operating hours for the one chiller from 4,000 hours in the *ex ante* savings calculations to 2,800 hours based on typical annual cooling load hours for Milwaukee, Wisconsin.
- The Evaluation Team inspected the compressed air system and collected six months of energy consumption (kilowatt-hour) and compressed air production (CFM) for custom MMID 2265 (Compressed Air, Not Otherwise Specified) during the site visit. The Team normalized this trend data on a CFM-produced basis and compared the results to the project documentation in SPECTRUM. Detailed *ex ante* savings calculations were not submitted, but a PowerPoint presentation had been uploaded to SPECTRUM with summaries of baseline and post-installation system energy consumption. Based on the Team's comparison, the efficiency of the compressed air system did not increase with the installed controls (the energy consumption per 100 CFM produced has increased slightly). While the site contact did not indicate any changes in production, the Team has a few observations on the reasons for the increase: the site installed a master controller for the compressed air system and expected to save energy based on a more efficient sequencing scheme and reduced operating pressure of 95 psig. Pressure data in the submitted audit report in SPECTRUM shows the average baseline pressure varying from 102 psig to 105 psig. During the Team's site inspection, the setpoint was 104 psig, indicating no reduction in system pressure. The submitted audit report also did not account for idle/down time of the fixed speed load/unload compressors in the post-installation case.
- Based on the site visit for hybrid MMID 3280 (Variable Frequency Drive, Constant Torque), the Team reduced the positive displacement pump motor operating hours from 6,240 hours per year to 1,345 hours per year based on metered energy use data collected over 85 days at a one-minute interval, reducing energy savings. The metered data also indicated that the average motor load is lower than expected, increasing demand reduction over a constant speed baseline. The Team also updated the motor full load efficiency in the savings calculator based on nameplate data. Overall these adjustments decreased savings.
- The Team reduced the verified hours of use for hybrid MMID 2726 (Variable Frequency Drive, Chilled Water Distribution Pump). According to the site contact, the three chilled water pumps operate approximately 4,000 hours per year, versus the 6,000 hours listed in the *ex ante* savings calculations.
- Two of the four measures at one site under custom MMID 2499 (Process, Not Otherwise Specified) were not yet installed. For one of the two installed measures for a pump motor VFD,

the site operated the pump motor at a higher speed (56 Hz) than assumed in the *ex ante* savings calculation (42 Hz). These adjustments decreased savings.

- Finally, during the site visit for custom MMID 285 (Ventilation Filtration vs. Make Up Air System), the Team found the site installed fewer but larger filtration units for its manual welding area. The site installed two units with 40-hp blower motors versus four units with 5-hp blower motors as reported in the *ex ante* savings calculations. This adjustment reduced savings.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2018, the Evaluation Team conducted participant surveys to verify the installed measures and estimate ISRs at the measure level.

The Evaluation Team applied a combined, weighted ISR of 100.8% from these surveys to all engineering desk reviews without a completed site visit. The Evaluation Team applied a site-specific ISR to all measures where verification site visits were performed.

Verified Gross Savings Results

Table 262 lists the annual and lifecycle realization rates. Overall, the Large Energy Users Program achieved a first-year evaluated realization rate of 92%, weighted by total (MMBtu) energy savings.[153] These results represent weighted average realization rates for the entire Program.

Table 262. CY 2018 Large Energy Users Program Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Total	91%	100%	95%	92%	89%	100%	92%

Table 263 lists the total *ex ante* and verified annual gross savings for the CY 2018 Program by measure category.

Table 263. CY 2018 Large Energy Users Program First-Year Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	1,020,647	117	0	933,793	117	0
Air Sealing	-2,977	0	66,221	-2,724	0	62,824
Boiler	78,766	9	158,898	72,063	9	150,748
Chiller	9,634,011	1,819	0	8,814,186	1,828	0
Compressor	3,475,952	445	0	3,180,159	448	0
Controls	5,681,102	567	456,823	5,197,657	570	433,391
Delamping	1,038,024	216	0	949,691	217	0
Dishwasher, Commercial	21,350	0	723	19,533	0	686

[153] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Door	1,040	3	2,401	951	3	2,278
Dryer	260,650	46	0	238,469	46	0
Energy Recovery	2,059,504	94	1,716,942	1,884,247	94	1,628,874
Filtration	-252,767	-63	494,111	-231,257	-63	468,766
Hot Holding Cabinet	12,280	2	0	11,235	2	0
Insulation	0	0	197,681	0	0	187,541
LED	47,302,796	6,979	0	43,277,471	7,014	0
Other	24,817,911	2,441	9,064,549	22,705,981	2,453	8,599,596
Oven	15,096	3	0	13,811	3	0
Reconfigure Equipment	924,274	166	0	845,621	167	0
Rooftop Unit/Split System Air Conditioner	277,680	77	-3,942	254,050	78	-3,740
Scheduling	1,219,127	11	45,716	1,115,383	11	43,371
Specialty Pulp & Paper	1,597,139	188	0	1,461,227	189	0
Steam Trap	0	0	202,192	0	0	191,821
Tune-Up/Repair/ Commissioning	8,769,480	329	6,048	8,023,224	331	5,738
Variable Speed Drive	73,856,473	6,662	0	67,571,510	6,695	0
Water Heater	0	0	3,211	0	0	3,046
Ice Machine	816	0	0	746	0	0
Window	1,654	0	2,085	1,513	0	1,978
Pump	483,607	56	0	442,454	56	0
Variable Air Volume (VAV)	1,162,037	18	75,364	1,063,151	18	71,498
Total First-Year Savings	**183,455,672**	**20,185**	**12,489,024**	**167,844,147**	**20,285**	**11,848,417**

Table 264 lists the *ex ante* and verified gross lifecycle savings by measure type for the CY 2018 Program.

Table 264. CY 2018 Large Energy Users Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	20,412,940	117	0	18,185,726	117	0
Air Sealing	-59,540	0	758,630	-53,044	0	757,652
Boiler	791,060	9	2,759,149	704,749	9	2,755,594
Chiller	155,595,383	1,819	0	138,618,690	1,828	0
Compressor	52,139,255	445	0	46,450,448	448	0
Controls	67,434,819	567	8,088,401	60,077,144	570	8,077,978
Delamping	10,380,240	216	0	9,247,673	217	0
Dishwasher, Commercial	213,503	0	7,230	190,208	0	7,221
Door	20,800	3	48,020	18,531	3	47,958
Dryer	3,909,750	46	0	3,483,165	46	0
Energy Recovery	30,892,561	94	25,540,581	27,521,937	94	25,507,669
Filtration	-6,465,105	-63	7,411,666	-5,759,711	-63	7,402,115
Hot Holding Cabinet	147,360	2	0	131,282	2	0
Insulation	0	0	3,052,935	0	0	3,049,001
LED	675,229,830	6,979	0	601,556,888	7,014	0

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Other	375,894,192	2,441	137,692,622	334,881,147	2,453	137,515,191
Oven	181,146	3	0	161,382	3	0
Reconfigure Equipment	16,322,298	166	0	14,541,406	167	0
Rooftop Unit/Split System Air Conditioner	4,165,222	77	-59,130	3,710,763	78	-59,054
Scheduling	7,643,715	11	328,300	6,809,725	11	327,877
Specialty Pulp & Paper	23,957,091	188	0	21,343,182	189	0
Steam Trap	0	0	1,213,154	0	0	1,211,590
Tune-Up/Repair/ Commissioning	17,580,857	329	30,240	15,662,646	331	30,201
Variable Speed Drive	1,107,842,360	6,662	0	986,967,952	6,695	0
Water Heater	0	0	48,165	0	0	48,103
Ice Machine	8,156	0	0	7,266	0	0
Window	33,080	0	41,700	29,471	0	41,646
Pump	7,254,105	56	0	6,462,624	56	0
Variable Air Volume	17,430,555	18	1,130,460	15,528,743	18	1,129,003
Total Lifecycle Savings	**2,588,955,633**	**20,185**	**188,092,122**	**2,306,479,992**	**20,285**	**187,849,746**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Large Energy Users Program. The Team calculated a NTG of 62% for the CY 2018 Program. For a detailed description of the NTG analysis methodology and findings, refer to Appendix I.

Freeridership Findings

The Evaluation Team used the self-report survey method to determine the Program's freeridership level for CY 2018. The Team estimated an average self-reported freeridership of 38%, weighted by evaluated savings, for the CY 2018 Program.

In CY 2018, the Evaluation Team relied solely on the self-reported freeridership of 38% and applied this to all the Program measure categories. Two CY 2018 respondents with the second and third greatest savings accounted for 33% of the total analysis sample gross savings, with an average weighted freeridership rate of 75%.

For comparison:

- In CY 2016, the three respondents with the greatest savings accounted for 48% of the total analysis sample of gross savings and had an average weighted freeridership rate of 22%.
- In CY 2015, the three respondents with the greatest savings accounted for 37% of the total analysis sample gross savings and had an average weighted freeridership rate of 17%.

Table 265 lists the CY 2015, CY 2016, and CY 2018 self-reported freeridership estimates, weighted by participant gross evaluated energy savings. The Evaluation Team did not conduct participant surveys in CY 2017.

Table 265. Summary of CY 2015, CY 2016, and CY 2018 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	73	18%
CY 2016	70	19%
CY 2017	n/a	n/a
CY 2018	70	38%

Spillover Findings

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Large Energy Users Program. The Team applied evaluated and deemed savings values to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table 266.

Table 266. Large Energy Users Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total Lifecycle MMBtu Savings Estimate
LEDs	1	99

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings for the entire survey sample:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 0% spillover estimate,[154] rounded to the nearest whole percentage point, for the Large Energy Users Program respondents (Table 267).

Table 267. Large Energy Users Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	99
Program Savings	2,484,653
Spillover Estimate	**0%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

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

This yielded an overall NTG estimate of 62% for the Program. Table 268 shows total first-year gross and net savings in MMBtu as well as the overall Program NTG.

[154] The actual value is 0.004%.

Table 268. CY 2018 Large Energy Users Program Annual Net Savings and Net-to-Gross Ratio

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total First-Year Gross Verified Savings (MMBtu)	Total First-Year Net Savings (MMBtu)	Program First-Year NTG Percentage
1,074,389	0	1,732,886	1,074,389	62%

Table 269 shows the annual Program net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category.

Table 269. CY 2018 Large Energy Users Program First-Year Net Savings

Measure	First-Year Net		
	kWh	kW	Therms
Aeration	578,952	73	0
Air Sealing	-1,689	0	38,951
Boiler	44,679	6	93,463
Chiller	5,464,795	1,134	0
Compressor	1,971,699	278	0
Controls	3,222,548	353	268,702
Delamping	588,809	135	0
Dishwasher, Commercial	12,111	0	425
Door	590	2	1,412
Dryer	147,851	28	0
Energy Recovery	1,168,233	58	1,009,902
Filtration	-143,380	-39	290,635
Hot Holding Cabinet	6,966	1	0
Insulation	0	0	116,276
LED	26,832,032	4,348	0
Other	14,077,708	1,521	5,331,749
Oven	8,563	2	0
Reconfigure Equipment	524,285	104	0
Rooftop Unit/Split System Air Conditioner	157,511	48	-2,319
Scheduling	691,537	7	26,890
Specialty Pulp & Paper	905,961	117	0
Steam Trap	0	0	118,929
Tune-Up/Repair/Commissioning	4,974,399	205	3,557
Variable Speed Drive	41,894,336	4,151	0
Water Heater	0	0	1,889
Ice Machine	463	0	0
Window	938	0	1,226
Pump	274,321	35	0
Variable Air Volume	659,154	11	44,329
Total First-Year Savings	**104,063,371**	**12,577**	**7,346,018**

Table 270 lists the lifecycle Program net demand and energy impacts (kilowatt-hour, kilowatt, and therms) by measure category.

Table 270. CY 2018 Large Energy Users Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	Therms
Aeration	11,275,150	73	0
Air Sealing	-32,887	0	469,745
Boiler	436,944	6	1,708,468
Chiller	85,943,588	1,134	0
Compressor	28,799,278	278	0
Controls	37,247,829	353	5,008,347
Delamping	5,733,557	135	0
Dishwasher, Commercial	117,929	0	4,477
Door	11,489	2	29,734
Dryer	2,159,562	28	0
Energy Recovery	17,063,601	58	15,814,755
Filtration	-3,571,021	-39	4,589,311
Hot Holding Cabinet	81,395	1	0
Insulation	0	0	1,890,381
LED	372,965,271	4,348	0
Other	207,626,311	1,521	85,259,418
Oven	100,057	2	0
Reconfigure Equipment	9,015,671	104	0
Rooftop Unit/Split System Air Conditioner	2,300,673	48	-36,613
Scheduling	4,222,029	7	203,284
Specialty Pulp & Paper	13,232,773	117	0
Steam Trap	0	0	751,186
Tune-Up/Repair/Commissioning	9,710,840	205	18,725
Variable Speed Drive	611,920,130	4,151	0
Water Heater	0	0	29,824
Ice Machine	4,505	0	0
Window	18,272	0	25,821
Pump	4,006,827	35	0
Variable Air Volume	9,627,821	11	699,982
Total Lifecycle Savings	**1,430,017,595**	**12,577**	**116,466,843**

Strategic Energy Management Pilot Impact Evaluation

For the Strategic Energy Management Pilot, the Evaluation Team conducted regression modeling to verify gross savings. The Team did not assess net savings for the Pilot in CY 2018 due to the challenges of measuring freeridership for Strategic Energy Management programs. Strategic Energy Management Program requires at least a one-year engagement, where participants are coached to identify and implement operational and behavioral activities, therefore the Team assumes that freeridership is low.

Evaluation of Gross Savings

In CY 2018, 18 facilities reported savings in the Strategic Energy Management Pilot. In addition, three facilities with reported savings in CY 2017 and 10 facilities with reported savings in CY 2016 were not

previously evaluated and are included under CY 2018. The reported savings were based on an engineering analysis for individual custom or prescriptive projects implemented at the Strategic Energy Management Pilot facilities. The Evaluation Team applied two different methods to verify savings. When data were available to support a regression analysis, the Team applied this methodology as the preferred approach. For the remaining facilities, the Team observed that these projects were capital and O&M projects where savings were estimated with engineering algorithms, similar to the types of projects in the Large Energy Users Program. Therefore, the Team applied the realization rate from the Large Energy Users Program.

This approach differed from the CY 2017 evaluation. In CY 2017, the Pilot reported savings based on regression analysis for all facilities and the Evaluation Team also used regression analysis to verify savings.

Regression Modeling

The Evaluation Team conducted regression analyses for each fuel type for eight Strategic Energy Management Pilot facilities from CY 2018 and two Strategic Energy Management Pilot facilities from CY 2017 that claimed further savings in CY 2018. This is the recommended methodology for evaluating strategic energy management programs, per the UMP *Strategic Energy Management Evaluation Protocol*.[155] This method estimates savings that are difficult to quantify through engineering analyses, including operational and behavioral changes.

The Program Implementer provided the Evaluation Team with raw energy consumption and facility production data from the beginning of the baseline period through the end of the reporting period. The Program Implementer also produced its own regression models (even though the Program Implementer did not claim savings based on these models) and provided the Evaluation Team with a summary of its model parameters and findings.

The Evaluation Team developed regression models using only data from the baseline period. The Program Implementer defined the date boundaries of each facility's baseline period, which is meant to capture "business-as-usual" energy consumption. The Team built each baseline model by selecting the combination of heating degree days, cooling degree days, production variables, and holiday indicators that optimized the adjusted R-squared and Akaike Information Criterion. Appendix H includes detailed descriptions of each facility's regression models and a comparison of the Evaluation Team's models to the Program Implementer's models.

To estimate a facility's savings during the reporting period, the Team forecasted baseline consumption into the reporting period to predict what consumption would have been if the Program had not been implemented. The Team then took the difference between predicted and measured energy

[155] National Renewable Energy Laboratory. May 2017. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. "Chapter 24: Strategic Energy Management Evaluation Protocol." https://www.nrel.gov/docs/fy17osti/68316.pdf

consumption during the reporting period. To not double count savings, the Evaluation Team then deducted prorated savings resulting from capital projects that received incentives through the Large Energy User Program. These savings were prorated based on when they were installed during the reporting period.

Lastly, the Evaluation Team calculated a weighted average EUL for each facility based on the reported EULs and savings for the capital projects that were implemented. Where the verified savings were greater than the sum of reported savings for the capital projects, the Team applied the weighted average EUL to the sum of the capital project savings and applied a three-year EUL to the remaining savings to calculate the lifetime savings. Where verified savings were less than the reported savings, the Team applied the weighted average EUL based on the assumption that when verified savings were greater than the reported capital project savings, these savings stemmed from operational and behavioral activities, which have an EUL of three years.[156]

Verified Gross Savings Results

The Evaluation Team found an annual MMBtu realization rate of 109% and a lifecycle MMBtu realization rate of 101% across the Strategic Energy Management Pilot (Table 271). The CY 2018 Pilot achieved total annual savings of 320,396 MMBtu. The difference between the verified and *ex ante* savings stems from the different methods used to calculate savings. The *ex ante* savings are based on engineering algorithms for capital projects, while the verified savings are based on regression analysis for 10 of the facilities and captured additional energy savings from operational and behavioral activities. In CY 2017, the annual and lifecycle MMBtu realization rates were 99% and 100%, respectively. This realization rates were closer to 100% in CY 2017 because both *ex ante* and *ex post* savings were based on regression analysis for all facilities.

Table 271. CY 2018 Strategic Energy Management Pilot Annual and Lifecycle Realization Rates

Measure	Annual Realization Rate				Lifecycle Realization Rate		
	kWh	kW[a]	Therms	MMBtu	kWh	Therms	MMBtu
Total	116%	101%	108%	109%	87%	104%	101%

[a] The Evaluation Team did not verify demand reduction but assumed the realization rate was 100% for sites where savings were verified using a regression analysis because the verified energy savings were larger than the claimed energy savings. For the remaining facilities, the Large Energy Users realization rate for demand reduction was applied.

Table 272 lists the *ex ante* and verified annual gross savings for the CY 2018 Pilot.

Table 272. Strategic Energy Management Pilot Annual Gross Savings Summary by Measurement Type

Measure	*Ex Ante* Gross Annual				Verified Gross Annual			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Total	14,343,497	1,344	2,443,021	293,242	16,599,730	1,353	2,637,573	320,396

[156] The *Wisconsin Focus on Energy Technical Reference Manual* (v20) assigns an EUL of three years to the DEET Behavioral Savings (see page 448).

Table 273 lists the *ex ante* and verified lifecycle gross savings for the CY 2018 Pilot.

Table 273. Strategic Energy Management Pilot Lifecycle Gross Savings Summary by Measurement Type

Measure	*Ex Ante* Gross Lifecycle				Verified Gross Lifecycle			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Total	147,358,953	1,344	30,279,874	3,530,776	128,009,201	1,353	31,361,132	3,572,881

Process Evaluation

In CY 2018, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities for the Large Energy Users Program and Strategic Energy Management Pilot. The inquiries focused on these key topics:

- Customer satisfaction with Program components
- Decision-making factors
- Benefits and barriers to participation
- Energy management components

Program Design, Delivery, and Goals

The Evaluation Team interviewed Program Administrator and Program Implementer key staff to obtain an overview of the Program's design and delivery process and any associated changes or challenges.

Program Design and Implementation

Through the Large Energy Users Program, Customers become eligible for prescriptive and custom incentives, provided they have monthly demand of at least 1,000 kW of electricity or 100,000 therms of natural gas, and have combined utility bills of at least $60,000 for any month of the preceding year. The incentives are for measures that reduce customers' energy use and demand. Custom incentives are available for more complex, site-specific projects.

Each participant is assigned an Energy Advisor (an employee of Leidos or CleanTech Partners, a subcontractor to Leidos). Energy Advisors coordinate with utility key account managers (KAM) and Trade Allies to help customers identify and quantify opportunities for saving energy, apply for incentives, manage energy-use fundamentals, and access other available resources. To become eligible for custom measures, customers must work with an Energy Advisor to estimate savings and to receive preapproval prior to purchasing or beginning the project. The KAM may lead project meetings and use the Energy Advisor as a resource. According to the Program Implementer, the high retention rate among their core Energy Advisor staff contributes to customer satisfaction through relationship building and experience.

Trade Allies play a key role in introducing project ideas, working through project implementation and savings calculations, and completing the project, from initiation to closure, with the large energy user. As noted by the Program Administrator, the Program maintains a sufficient Trade Ally network to support the Program in all regions of the state.

The Program Implementer offers several webinars to Trade Allies on various topics throughout the year, in addition to information about the Program provided in its newsletter. When introducing a substantially different measure, the Program Implementer typically offers measure-specific training to Trade Allies.

Strategic Energy Management Pilot Design

In CY 2015, the Strategic Energy Management Pilot launched at the direction of the PSC, designed to provide support for 27 large energy-use customers that seek to implement management systems and energy saving initiatives in their facilities. Participants conducted Program elements, or milestones, in a sequential order in which each step built on the previous step, with a full active engagement period of 16 to 22 months. The duration of this process with each participant depended on the participant's budget, schedule facility size, and other factors, in particular whether a participant decided to pursue achievement of full ISO 50001 certification or ISO-ready status as defined by the DOE. This Program was designed as a traditional strategic energy management program and is consistent with offerings in other states. Although the Program concluded at the end of CY 2018, customers can continue Program participation in subsequent years through one of two ways:

- As a Large Energy Users participant without Strategic Energy Management
- As a Large Energy Users Strategic Energy Management Industrial or Strategic Energy Management Healthcare participants

A key Pilot accomplishment was increasing participants' interest in ISO 50001 and ISO 50001 Ready certification. Nine of 12 participants interviewed said they are pursuing this certification.

Strategic Energy Management Industrial and Strategic Energy Management Healthcare

The Strategic Energy Management Industrial and Strategic Energy Management Healthcare offerings seek to provide technical support and incentives that help companies within these specific sectors advance beyond project-level savings to managing energy continuously. The Program assists participants through establishing energy baseline use, monitoring, and pursuing improvement opportunities for six months. These offerings require a shorter engagement and fewer milestones than the Strategic Energy Management Pilot, providing customers with a lower-effort approach to implementing strategic energy management concepts. According to the Program Implementer, the offering's primary objective is to obtain savings for the customer, with a longer-term goal of encouraging customers to pursue ISO 50001 certification[157] as they begin realizing savings through strategic energy management initiatives.

After a company enrolls, a kickoff meeting is held to discuss ideas for operational savings. Following the kickoff meeting, the Program Implementer creates a regression model of the facility's past performance to generate a baseline, allowing energy performance to be tracked over time. Program participants

[157] ISO 50001 is a framework for organizations that manage energy use and procurement, seeking to achieve goals addressing sustainable reduction in energy costs and greenhouse gas emissions. More information is available at: https://www.energy.gov/ISO50001

receive incentives for performance rather than for milestone achievements (as in the Strategic Energy Management Pilot). Lasting for six months, the engagement period consists of data collection, monthly energy team meetings, and reviewing potential improvement opportunities. The Program relies on Energy Advisors to manage relationships and handle all strategic energy management aspects, from data collection to facilitating monthly meetings to reviewing progress. Monthly meetings provide participants with an opportunity to discuss energy performance and potential operational changes with their Energy Advisors, which serve to overcome a key barrier identified by the Program: customers are unsure how to identify and undertake operational changes that lead to meaningful savings on their own.

The Program Implementer hoped to enroll about 30 participants; currently, they have about 40 participants interested and beginning to participate in the Strategic Energy Management Industrial and Strategic Energy Management Healthcare initiatives, and the Program continues to actively explore opportunities to maintain long-term engagement to create lasting change, even after completing the engagement period.

Program Changes

Focus on Energy made several changes in CY 2018, as summarized in Table 274.

Table 274. CY 2018 Summary of Changes

Change	CY 2017	CY 2018
Custom incentive per therm	$0.60	$0.80
Maximum incentive as percentage of project cost	30%	50%
Project cap	$200k	$300k
Annual customer cap	$400k	$500k
New construction	Added incentives for all catalog measures	
	Added a watts-reduced option for lighting, along with the usual catalog options	
New Construction and retrofit	Added chiller and process specialty equipment (HVAC and process catalog)	
VFD incentives	Vacuum pumps up to 30 Hp are now eligible for VFD incentives	
Retro-commissioning	Added industrial	

According to the Program Administrator, increasing the annual per customer cap to $500,000 stimulated greater interest and participation in the Program than other incentive changes. Furthermore, the Program continued to implement a Customer Annual Cap Override in CY 2018. On a case-by-case basis this allowed the Program Implementer to request approval on behalf of a Large Energy User customer to exceed annual project caps of $300,000 to $800,000 in one calendar year for a three-year project (capped at $1.2M over three years). The Program Administrator said the annual cap override proved particularly useful as it allowed customers to front-load project implementation, helping large customers to implement projects that they would not consider otherwise.

Program Goals

The Program seeks to achieve energy savings and demand reduction goals, reported to the PSC, as well as internal KPIs set by the Program Administrator. In CY 2018, the Program exceeded its electric, therms, and demand goals. The Strategic Energy Management Program exceeded its goal for natural gas savings,

but did not meet its goals for lifecycle energy savings or peak demand reduction. Table 275 shows CY 2018 performance targets for the Program and the Strategic Energy Management Pilot.

Table 275. CY 2018 Savings Goals

Type	Large Energy Users	Strategic Energy Management Pilot
Gross annual savings goal (kW)	13,950 kW	4,531 kW
Gross lifecycle goal (kWh)	1,755,000,000 kWh	404,132,200 kWh
Gross lifecycle goal (therms)	164,577,679 therms	2,328,544 therms

Table 276 shows KPIs and CY 2018 results reported by the Program Implementer (and, where possible, verified by the Evaluation Team through SPECTRUM). The Program met 10 of 12 KPIs in CY 2018. The Program did not meet the wastewater savings or energy modeling KPIs.

Table 276. Large Energy Users Program CY 2018 Key Performance Indicators

KPI	Goal	CY 2018 Result	Source
Customer Contact	Every Large Energy Users Program customer is contacted by their Energy Advisor at least three times per year	Reached goal	Reported by Program Implementer
Large Therm Project RFP	Offer new Large Therm Project RFP by the end of Q2; Energy Advisors will actively engage customers to target generation of at least 10 viable proposals	Reached goal (21 proposals). The Program offered two RFPs: one for kilowatt-hours and one for therms; received 27 total proposals and funded all 5 of the therms project proposals and 16 of the 22 kilowatt-hour project proposals.	Reported by Program Implementer
Modeling Support	Provide energy use modeling support to 15–20 additional Strategic Energy Management Industrial and Strategic Energy Management Healthcare projects by the end of CY 2018	Reached goal	Reported by Program Implementer
New Market Opportunities	Increase affiliations with 1–3 new organizations that can lead to new market opportunities	Reached goal (2 organizations; New North and Converter's Expo)	Reported by Program Implementer
Energy Advisor Training	Provide Energy Advisor training for 1–3 new Emerging Technologies, particularly those identified and showcased by CleanTech Partners	Reached goal (1 training by Exxon on new formulation hydraulic oil)	Reported by Program Implementer
Savings for Municipal Wastewater Sector	Increased claimed savings from projects in CY 2018 from the municipal wastewater sector. The baseline was average annual savings in CY 2015 through CY 2017.	Did not reach (938,943 kWh savings in CY 2018 compared to 8,307,685 kWh average savings per year)	SPECTRUM
Customer Satisfaction	Achieve 8.6 out of 10 among surveyed customers	Reached goal (average rating 9.0)	CSAT Customer Survey
Award Nominations	Nominate at least 3 Large Energy Users Program customers for Focus on Energy's Excellence in Energy Efficiency Awards	Reached goal (5 applications submitted)	Reported by Program Implementer
Board Meetings and Conference Attendance	Represent Focus on Energy at Board meetings and high-level conferences	Reached goal (7 meetings attended)	Reported by Program Implementer

KPI	Goal	CY 2018 Result	Source
Action Plan for Utility KAM Survey	Follow-up action plan based on CY 2017 Utility KAM Survey	Reached goal (Action plan developed through discussions between the Program Implementer and Program Administrator)	Reported by Program Implementer
Days Incentive Outstanding	Maintain baseline DIO as established over the past two Program years (under 45 business days)	Reached goal (27 days)	SPECTRUM, application received/received-complete-date against the date of status change to paid
Success Story Development	Develop and submit 6–10 Success Stories to the Program Administrator for the CY 2018 Program year	Reached goal (developed 8 success stories)	Reported by Program Implementer

[a] Included any company in SPECTRUM with operational savings or any company with strategic energy management included in the application name, including in-progress projects.

Data Management and Reporting

In CY 2018, the Program Implementer continued to manage project data and generate reports through SPECTRUM. According to implementation staff, the data management system met the Program's needs, enabling staff to extract information as needed.

Strategic Energy Management Industrial and Strategic Energy Management Healthcare Management and Reporting

For these offerings, the Program Implementer also tracks projects and savings in SPECTRUM. Capital projects completed by Strategic Energy Management Industrial and Strategic Energy Management Healthcare Program participants are recorded in SPECTRUM as finished, but strategic energy management project results are not recorded until analyses of non-energy benefits are completed. Once the Program Implementer completes operational analysis, savings are recorded in SPECTRUM.

The Program Implementer said the main data analysis challenge arose from synchronizing the regression model results with observed results at the facility. To address this, the Program Implementer developed and implemented a methodology in CY 2018 that used both regression models and physical observations to calculate claimed savings. The Program Implementer assessed savings using a regression model and compared those to engineering algorithm savings estimates for individual projects, and claimed the lower of the two savings estimates.

Marketing and Outreach

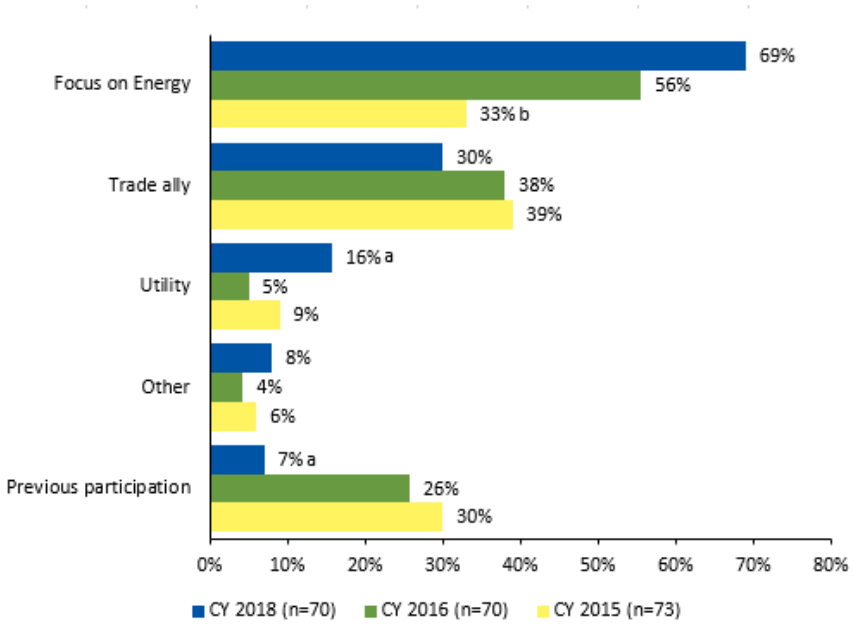
The Program Implementer uses a direct, customer-centered approach to market to their customers, marketing the Program through established relationships with Energy Advisors, utility representatives, and Trade Allies, and through features on Focus on Energy's website. Energy Advisors work closely with KAMs, Trade Allies, and customers to identify potential projects and to coordinate Program offerings that best meet each customer's needs. However, the Strategic Energy Management Industrial and Strategic Energy Management Healthcare Programs are exclusively marketed to the healthcare and

industrial and commercial segments through Energy Advisors and are not addressed through Focus on Energy's website.

Customer Program Awareness

Customers learned about the Program through an array of sources. CY 2018 survey respondents most frequently reported learning about the Program through Focus on Energy channels such as Energy Advisors, other Focus on Energy representatives, and the Focus on Energy website (69%). This represents a significant increase over CY 2015 results, but not over CY 2016 results, as shown in Figure 174.

Figure 174. Source of Program Awareness



Source: Participant Survey Question A6. "How did your organization learn about the Focus on Energy incentives available for this project?" Multiple responses allowed.

[a] Denotes statistical difference between CY 2018 and CY 2016 ($p<0.10$ using a difference in proportions t-test)

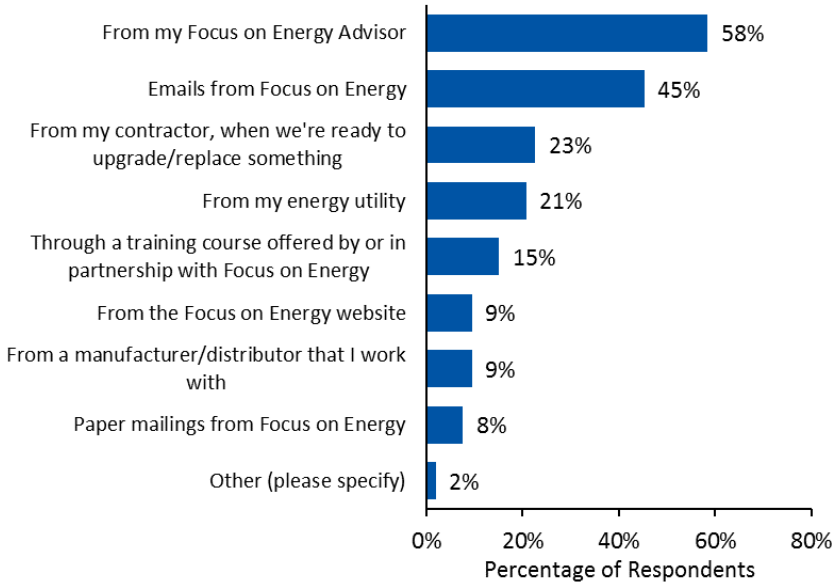
[b] Denotes statistical difference between CY 2018 and CY 2015 ($p<0.10$ using a difference in proportions t-test)

In CY 2018, the percentage of survey respondents saying they learned about the Program from their utility increased significantly over past years. Although the percentage of customers previously participating in the Program remained consistent with past years (as shown in Figure 176), the percentage of survey respondents saying they learned about the Program through past Program participation was significantly lower in CY 2018 over past years. As reported by the Program Implementer and survey respondents, all Strategic Energy Management Industrial and Strategic Energy Management Healthcare participants learned about the Program from their Energy Advisors.

Program participants were asked in the customer satisfaction survey how they most preferred to learn about energy efficiency opportunities for their organization (Figure 175). The two top responses were from Energy Advisors (mentioned by 58%) and via emails from Focus on Energy (45%); the least-

mentioned responses were from a manufacturer or distributor (9%) and paper mailings from Focus on Energy (8%).

Figure 175. CY 2018 Large Energy User Program Participants' Preferred Methods for Learning About Energy Efficiency Opportunities

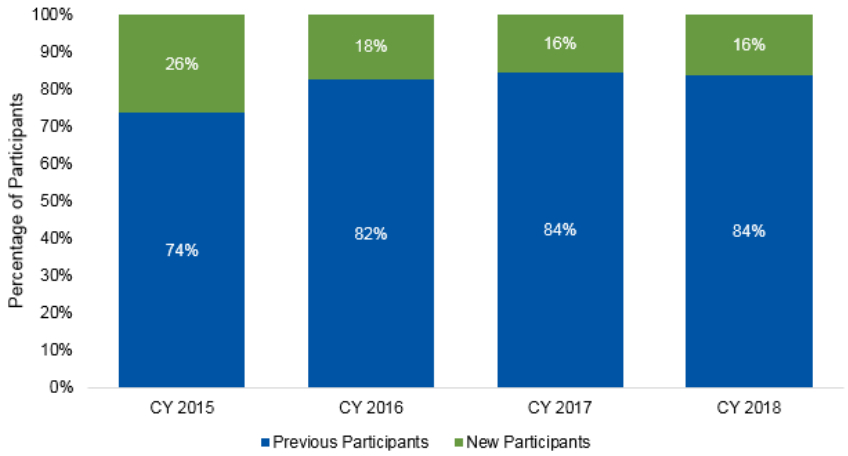


Source: Large Energy Users Program Ongoing Participant Satisfaction Survey Question. "How do you MOST prefer to learn about energy efficiency opportunities for your organization? Please choose your top two from the list below." (n=53; this question was asked in online surveys but was not included in mail surveys)

Past Participation

The Evaluation Team reviewed the Program database to determine percentages of CY 2018 Program participants that participated in the Program during any of the previous three years. Based on this analysis, 16% of customers were new to the Program in CY 2018. This percentage of new participants has remained consistent across past years, as shown in Figure 176.

Figure 176. Participation Across Calendar Years



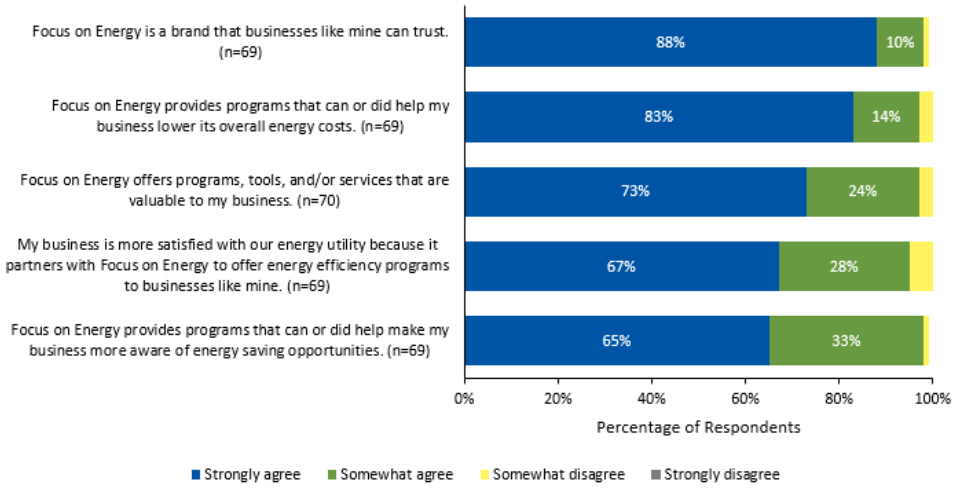
Source: SPECTRUM Database.

Perceptions of Focus on Energy

The Evaluation Team asked respondents what three words first came to mind when they thought about Focus on Energy. In CY 2018, the three most common words were, "savings," "energy," and "incentives"—results similar to the three most common words in CY 2016: "energy," "savings," and "rebates."

The Evaluation Team then asked survey respondents to gauge the extent that they agreed with several statements about Focus on Energy. Most survey respondents agreed with all of the statements, with the respondents agreeing most strongly on three statements: Focus on Energy is a trustworthy organization; it helps businesses lower overall energy costs; and it offers valuable Programs, tools, and/or services. Figure 177 shows the results.

Figure 177. Large Energy Users Program Agreement with Focus on Energy Statements



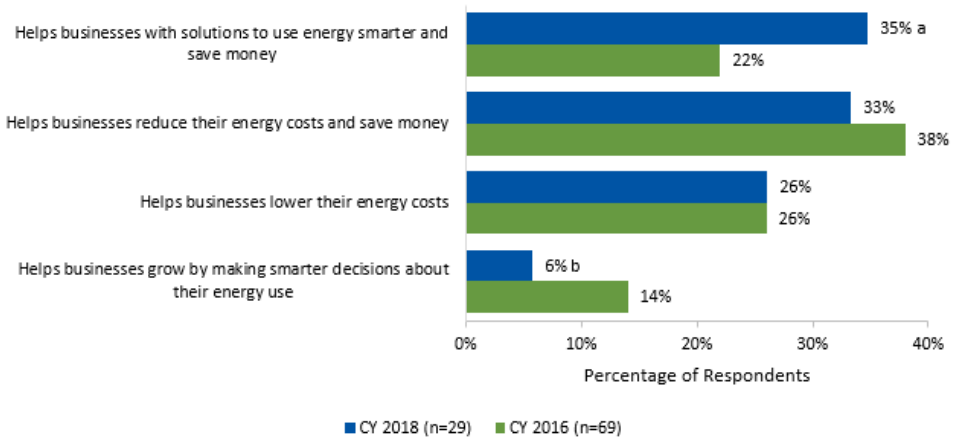
Source: Participant Survey Question B2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you *strongly agree*, *somewhat agree*, *somewhat disagree*, or *strongly disagree* with the following statements."

Marketing Messages

When the Evaluation Team asked survey respondents to identify which statements (shown in Figure 178) would most interest them in learning more about Focus on Energy, respondents identified the following message: "Focus on Energy helps Wisconsin businesses with solutions to use energy smarter and save money." In CY 2018, interest in this statement was significantly higher than in previous years.[158]

[158] $p<0.10$ using a difference in proportions t-test.

Figure 178. Participant Reaction to Marketing Statements



Source: Participant Survey Question B3. "Which of the following statements would make you most interested in learning more about Focus on Energy?" Percentage exceeds 100% due to rounding.

[a] Denotes statistical difference (p<0.10 using a difference in proportions t-test)

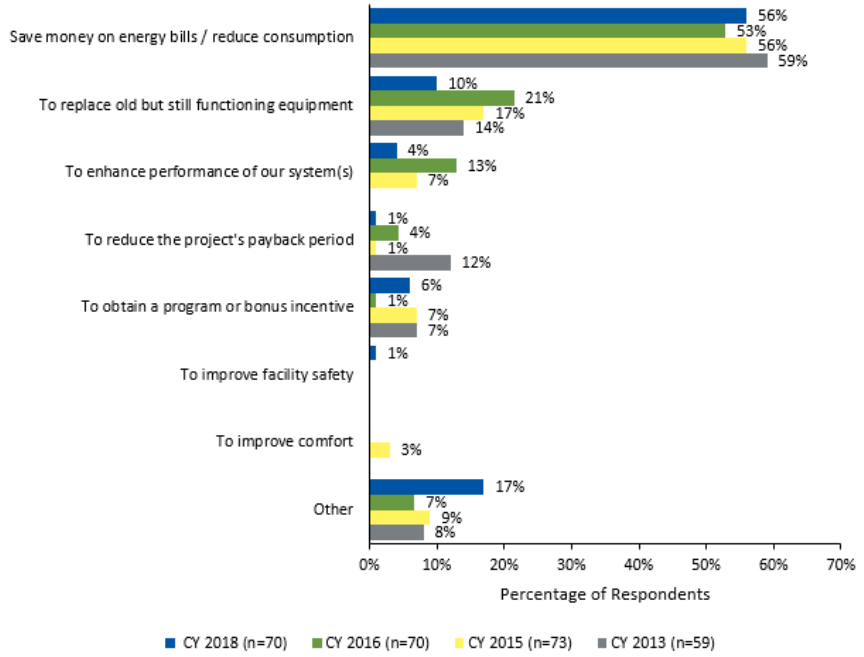
[b] Denotes statistical (p<0.05 using a difference in proportions t-test)

Large Energy Users Decision-Making Process

Over one-half of respondents (56%, n=70) said saving money and energy was the most important factor in making energy efficiency improvements. Figure 179 shows the full breakdown of CY 2018 survey respondents' drivers for making energy efficiency upgrades, as compared to past years (no significant differences occurred between years). "Other" responses included:

- Become more robust
- Gain efficiency
- Increase production
- Increase compressor size
- Environmental reasons
- Save on maintenance
- Due to a colleague's recommendation

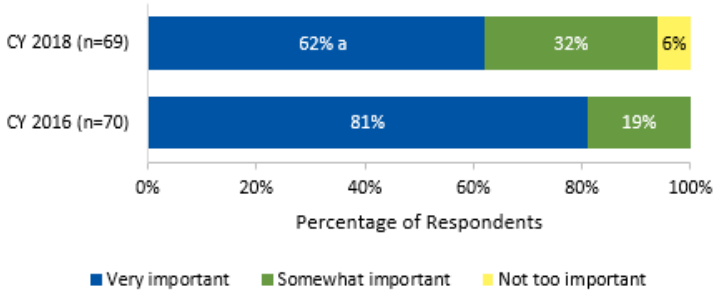
Figure 179. Large Energy Users Program Drivers for Energy Efficiency Upgrades



Source: Participant Survey Question C1. "What factor was most important to your company's decision to make the energy-efficient upgrades for which you received an incentive?" Multiple responses allowed.

Over one-half of CY 2018 survey respondents (62%) indicated that energy efficiency was *very important* to their organizations when making capital upgrades or improvements; this is, however, a significantly lower proportion of respondents who said *very important* compared to CY 2016, as shown in Figure 180.[159]

Figure 180. Large Energy Users Program Importance of Energy Efficiency



Source: Participant Survey Question C2. "How important is energy efficiency to your organization when making capital upgrades or improvements in energy efficiency…?"

[a] Denotes statistical difference (p<0.10 using a difference in proportions t-test)

[159] p<0.10 using a proportions t-test.

Most survey respondents (77%; n=64) said they planned other energy efficiency upgrades during the next year, with the two most common being lighting (70%; n=47) and HVAC (51%) upgrades.

Large Energy Users Benefits and Barriers

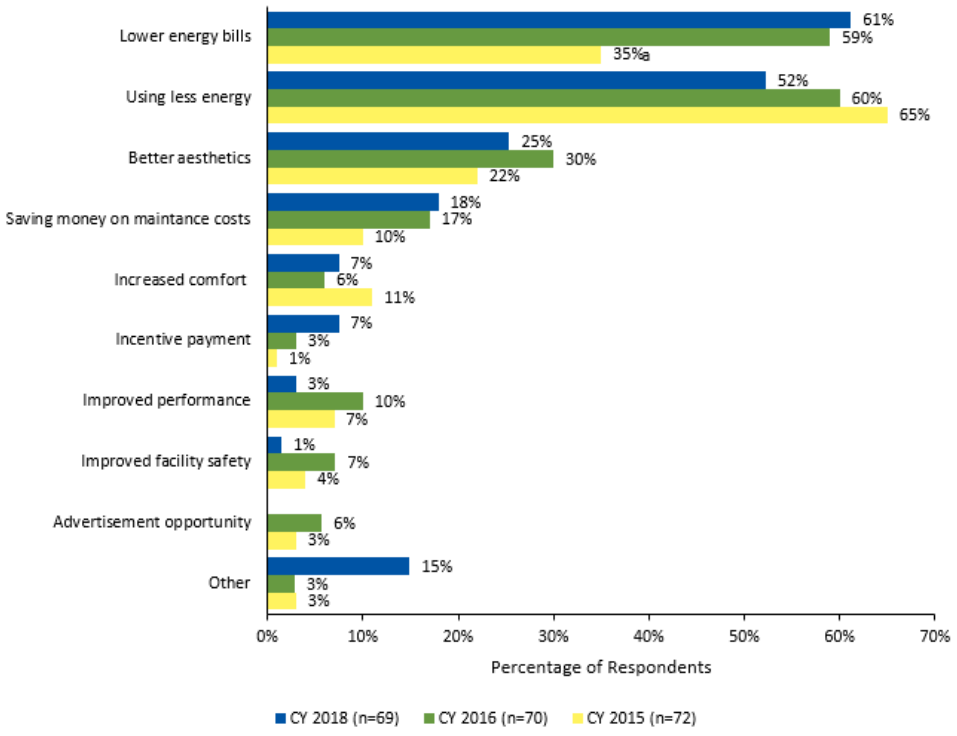
Participation Benefits

Survey respondents described numerous benefits that their companies experienced due to energy efficiency upgrades made through the Program, with results largely consistent with CY 2016. The majority of respondents (61%, n=69) cited saving money on utility bills as a benefit from Program participation. "Other" responses included the following:

- Collaboration
- Better control
- Environmental reasons
- Equipment reliability

Figure 181 details benefits that participants reported from implementing energy-efficient upgrades.

Figure 181. Large Energy Users Participation Benefits



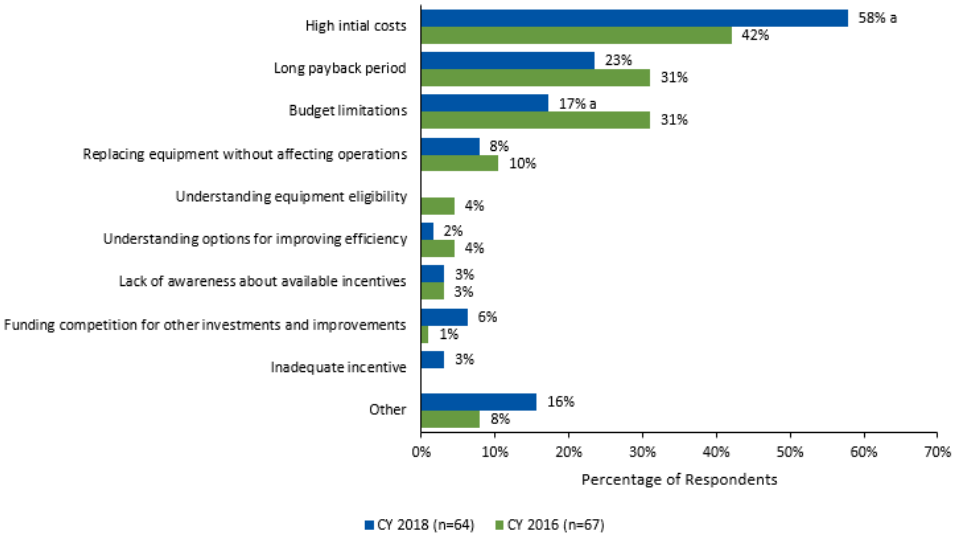
Source: Participant Survey Question D1. "What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed?" Multiple responses allowed.

[a] Denotes statistical difference between CY 2018 and CY 2015 ($p<0.10$ using a difference in proportions t-test)

Participation Barriers

Respondents (n=70) said the biggest barriers to making energy-efficient improvements included high initial costs (58%) and long payback periods (23%). A significantly higher percentage of CY 2018 respondents cited high initial costs as a barrier than in previous years.[160] Figure 182 shows respondents' perceived energy efficiency barriers.

Figure 182. Perceived Barriers to Energy-Efficiency Improvements



Source: Participant Survey Question D2. "What do so see as the biggest challenges to making energy-efficient improvements inside your company?" Multiple responses allowed.

[a] Denotes statistical difference (p<0.10 using a difference in proportions t-test)

In addition to the above barriers, a majority of survey respondents (84%; n=69) said they require approval from others in the company before committing to energy efficiency upgrades, and procuring this approval can be time-consuming. Of those requiring approval (n=57), 58% said the process requires four or more weeks to obtain approval to move forward with energy efficiency upgrades; the remainder said it took fewer than three weeks.

The Evaluation Team asked survey respondents what could be done to help their companies overcome challenges they experienced. Respondents most commonly suggested higher incentives (47%), followed by upfront rewards (33%). The percentage of survey respondents saying upfront rewards was significantly lower than in CY 2016.[161]

Energy Management

The Evaluation Team asked Large Energy Users that did not participate in the Strategic Energy Management Industrial and Strategic Energy Management Healthcare Program questions about

[160] p<0.10 using a difference in proportions t-test.

[161] p<0.10 using difference in proportions t-test.

whether they currently monitored energy use, how they monitored energy use, and how frequently they monitored energy use.

Most survey respondents not participating in Strategic Energy Management Industrial or Strategic Energy Management Healthcare Programs monitor energy use (89%; n=61), with the largest proportion monitoring it monthly (72%; n=54), followed by daily (20%) and weekly (7%). Two-thirds (66%; n=53) monitor energy use through reviewing their energy bills, followed by 28% using software or an app, 23% using an energy management system, 4% using an Excel workbook, and 4% using other methods.

Seventy-nine percent of participants not participating in Strategic Energy Management Industrial or Strategic Energy Management Healthcare Programs (n=61) said they are *very interested* or *somewhat interested* in learning more about how their facilities use energy and that can be reduced, though this varied somewhat by industry type and company size. For example, small companies with fewer employees were more interested in learning about their energy use than larger companies, as shown in Table 277. Additionally, all education and government survey respondents (n=7) said they are *very interested* or *somewhat interested* in learning more about energy use, while 67% of manufacturing respondents (n=47) said they were *very interested* or *somewhat interested*. Respondents in the healthcare industry were least interested: four out of eight reported the same interest levels.

Table 277. Interest in Learning More about Energy Use by Company Size

Company Size	Percentage *Very Interested* or *Somewhat Interested*
Fewer than 100 employees (n=16)	94%
100 to fewer than 500 employees (n=29)	72%
500 or more employees (n=15)	80%

Source: Participant Survey Question K4. "How many people are employed at the location where the project took place?"

Strategic Energy Management Pilot Elements

The Evaluation Team asked Pilot interviewees about three Program elements: energy team meetings, employee engagement, and the energy performance model.

Energy Team Meetings

Energy teams consist of dedicated staff for energy and energy efficiency management. These team meetings are designated times where an organization's staff gathers to discuss the facility's energy efficiency agenda and projects—an important Pilot element for keeping energy efficiency projects and communications moving forward. All 12 Pilot participants reported holding energy team meetings regularly, from monthly to semiannually. In contrast to Pilot participants, the Large Energy Users Program participant participating in the Strategic Energy Management Industrial offering did not dedicate staff for managing energy efficiency.

Eleven Pilot participants with an energy team said Focus on Energy's Strategic Energy Management Pilot influenced their team's operations in a variety of ways. Six respondents said the Strategic Energy Management Pilot gave their energy team structure, focus, and organized goals in terms of achieving energy efficiency. One respondent specifically said: "The [Strategic Energy Management] Program itself

has helped us in a technical matter, meeting with the [Focus on Energy] team and [other] leaders has driven a deeper awareness and responsibility for managing energy consumption. We didn't realize we had as much opportunity as we do now."

Other areas of influence included the following:

- Increased awareness of energy use and energy-saving opportunities (three responses)
- Provided technical resources and consulting to steer the teams' focus (three responses)
- Helped establish goals and agenda setting (two responses)

Although respondents were generally pleased with their energy teams, they reported internal and external communication-related difficulties. Communication barriers inside and outside of energy team meetings included the following:

- Competing company priorities, such as production and return on investment (two responses)
- Lack of energy awareness and company policies to facilitate awareness outside of the energy team (two responses)
- Lack of involvement from staff during energy team meetings (one response)
- Deciding on areas of emphasis within the energy team (one response)
- Tracking and implementing projects (one response)
- Getting the plant to integrate energy-saving projects without the team's direct involvement (one response)

Employee Engagement

Eleven of 13 respondents held employee engagement activities or planned to in the near future. The two most common employee engagement activities noted by respondents included holding special events to highlight ways to save energy (seven responses) and seeking employee involvement in identifying ways to save energy around the facility (five responses). Additional activities that respondents cited included increased communication through newsletters and weekly postings of energy use (two responses) and hiring additional staff for energy-related projects (one response).

Past Energy Performance Model

Modeling a facility's past energy performance generates a baseline, so energy performance can be tracked over time. Of 13 respondents, 11 referenced their energy performance model since its creation. One participant preferred to use a previous performance model that their company developed, and another respondent said it was too complicated to use.

All 11 participants who modeled past energy performance referenced the model at least once during the past year, though the frequency with which they revisited the model varied. Five respondents reviewed their energy performance model once a month, four reviewed it quarterly, and three reviewed it on a weekly basis. Energy-use data were shared with the energy team, senior management, employees across the company, and the accounting department. On a scale of 0 to 10, where 10 was *extremely*

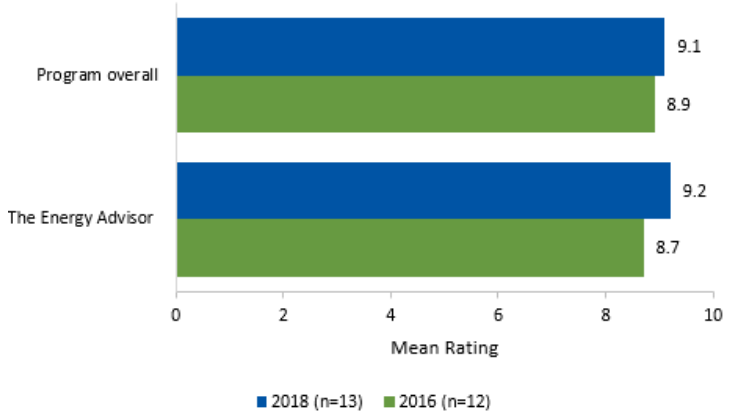
valuable and 0 was *not at all valuable,* respondents' mean rating for the energy performance model was 8.2.

The Evaluation Team asked respondents if their companies planned to enhance their energy data acquisition or analysis capability. Of 13 respondents, 10 planned to improve their analysis capabilities, including increased metering to track energy usage (three responses), creating a dashboard to track trends over time and create additional energy reports (three responses), and improving their ability to present findings to broader audiences with less technical backgrounds (two responses).

Strategic Energy Management Participant Satisfaction

The Evaluation Team asked respondents about their overall satisfaction with the Strategic Energy Management Pilot and their interactions with their Energy Advisor. Respondents measured their satisfaction levels using a 10-point scale, with 10 being *very satisfied* and 0 being *not at all satisfied*. Since CY 2016, respondents' satisfaction ratings increased for the Program overall and with Energy Advisors, though statistical significance could not be determined due to the small sample size. Figure 183 shows the satisfaction ratings in detail. Participants who claimed savings in CY 2018 had lower overall satisfaction than participants who did not claim savings (9.0 and 9.2 respectively). Additionally, participants who claimed savings were less satisfied with their Energy Advisor than participants who did not claim savings (8.9 and 9.6). The sample sizes were too small to determine whether these differences were significant.

Figure 183. Strategic Energy Management Pilot Satisfaction



Source: Participant Interview Questions H3 and H2. "Overall, how satisfied are you with the Strategic Energy Management Pilot?" and "How satisfied are you with the Energy Advisor who has assisted you while participating in the Strategic Energy Management Program?"

High Program satisfaction levels also correlated with a high likelihood to recommend the Program. The Evaluation Team asked respondents about their likelihood to recommend the Pilot to another facility on a scale of 0 to 10, with 10 being *extremely likely*; an average rating of 9.1 (n=13) resulted.

Satisfaction with Pilot Financial Incentives

The Pilot delivers various incentives for different milestones. Respondents rated the value of these incentives on a scale of 0 to 10, where 10 was *extremely valuable* and 0 was *not at all valuable*. Table 278 details the mean responses.

All 13 respondents cited the $70,000 incentive for strategic energy management completion as the most valuable. Respondents said the strategic energy management completion incentive helped kick off their projects by giving them the ability to purchase additional equipment and hire outside resources that they would not have had otherwise, helping them to justify their projects. One respondent said the strategic energy management completion incentive *"really gave upper management a reason to buy-in [to the Strategic Energy Management Pilot]."*

Respondents were asked to indicate the least valuable incentives. Four considered all of the incentives valuable, declining to name one. Five respondents said the $2,000 professional training incentive was the least valuable, with one interviewee stating the incentive was not valuable as their budget already accounted for training time, while three other respondents said they did not have the time to take advantage of the incentive. Two respondents said the $12,500 low-cost project support incentive proved the least valuable as they had yet to make use of it.

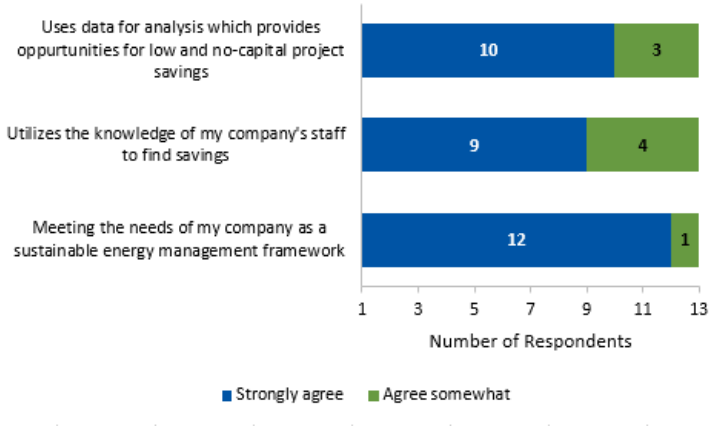
Table 278. Financial Incentives Satisfaction

Financial Incentive Type	Mean Rating
$70,000 for strategic energy management completion (n=13)	9.9
$15,000 for energy management information system implementation (n=13)	9.3
$15,000 for energy management information system study (n=12)	9.2
$12,500 for low cost project support (n=12)	8.9
$2,000 for professional training (n=12)	8.6

Source: Participant Interview Question H4. "On a scale where 0 means *not at all valuable* and 10 means *extremely valuable*, how valuable were the following financial incentives on your company's decision to participate in the Strategic Energy Management Pilot?"

Figure 184 provides insights into how the Pilot meets participating companies' needs by asking respondents to rate their agreement levels with several statements beginning with "The Strategic Energy Management Pilot…". All 13 interviewed participants agreed with the three statements.

Figure 184. Agreement with Strategic Energy Management Pilot Goals



Source: Participant Interview Question H9. "Please rate these statements: (1) The Strategic Energy Management Pilot is meeting the needs of my company or organization as a sustainable energy management framework; (2) The Strategic Energy Management Pilot uses the knowledge of my company's staff to find savings; and (3) The Strategic Energy Management Pilot uses data for analysis which provides opportunities for low and no-capital project savings." (n=13)

Senior Management Feedback

The Evaluation Team asked respondents what type of feedback they received from upper management regarding their participation in the Strategic Energy Management Pilot. Of 13 respondents, nine said they received positive feedback directly from senior management about participation in the Program. Two respondents said management's feedback depended on their ability to meet the company's financial expectations. One respondent said they had not received any feedback yet, and another respondent said they received negative feedback as the Program was not a high priority to their executive team.

The respondents reported that senior management planned a variety of ways to support the energy team in continuing to implement strategic energy management in the future:

- Financial backing from senior management helps facilitate future projects for continuous energy improvement (nine responses)
- General support from senior management helps their energy team expand energy management across their facilities (two responses)
- Support from senior management helps move forward with ISO 50001 certification (one response)
- Senior management's attendance in energy team meetings provides additional moral support (one response)

Strategic Energy Management Benefits and Participation Barriers

Benefits

The Evaluation Team asked respondents what they believed was the most beneficial aspect of participating in the Pilot. Eight of 13 respondents cited the Pilot's providing tools and resources to

enhance energy management and tracking. These participants' responses about a higher level of understanding included comparative analysis to track energy management progress, financial incentives to jump-start projects, and being equipped with the knowledge to identify new opportunities for continuous improvement.

Two respondents said technical support from Focus on Energy was the Pilot's most beneficial aspect. Two other respondents cited developing a performance and baseline model. Some non-energy benefits cited by respondents included the following:

- Improving company culture by increasing energy awareness and education (four responses)
- Developing a structured process to look at energy use, and applying the same process to other business evaluations (three responses)
- Gaining a competitive edge in the market (two responses)
- The incentives provided a financial benefit (one response)

Additionally, three respondents sought to achieve the ISO 50001 Energy Management standard, and six wanted to pursue 50001 Ready certification. The Evaluation Team asked respondents if they planned to participate in the ENERGY STAR Challenge or Superior Energy Performance certification through the DOE.[162] Only two respondents expressed interest in participating in the ENERGY STAR Challenge, while six respondents said they might be interested in achieving DOE's Superior Energy Performance certification in the future. Typical reasoning from respondents, explaining why they were not interested in the ENERGY STAR Challenge or Superior Energy Performance, included a lack of awareness about the Program, insufficient time and resources, slow returns on investment, or not ready to tackle certification.

Barriers

According to respondents, the most challenging aspects of participating in strategic energy management were conflicting priorities over internal roles and resources (cited by 7 of 13). For example, two respondents said defining staff roles and maintaining communications between the energy team and equipment control staff were difficult Program aspects, and one respondent said the large time and resource commitment posed strategic energy management participation challenges. Other respondents noted staff members' limited availability to help implement initiatives, ability to maintain production levels while pursuing energy efficiency, and limited financial resources.

Pilot participation, however, has helped address some of these challenges. For example, respondents reported that financial incentives and technical support from Focus on Energy staff helped participants

[162] The ENERGY STAR Challenge for Industry is a global call to action for industrial sites to reduce their energy intensity by 10% within five years.
Superior Energy Performance provides guidance, tools, and protocols to drive deeper, more sustained savings from ISO 50001. To achieve certification, facilities must implement an energy management system that meets the ISO 50001 standard and demonstrates improved energy performance.

justify their projects and reduce internal competition for resources. Technical support also helped participants develop a baseline for energy efficiency improvements and identify new opportunities that they had not been previously aware of.

The most common challenge in promoting energy efficiency internally was competition for capital resources (five responses), followed by return on investment (three responses), and having adequate staff resources (two responses). Additional challenges included changing company cultured, adapting to technological innovations, and maintaining production output (one response each).

Respondents said Focus on Energy's continued technical assistance and capital resources will help justify energy efficiency projects to senior management. For example, one respondent recommended assembling materials or an information packet outlining typical savings, thus helping justify energy metering projects and facilitate project approval. Moreover, six of 13 respondents said continued financial and staff support from Focus on Energy presented the best way to alleviate barriers to future energy efficiency improvements.

Strategic Energy Management Customer Commitment

According to all 13 respondents, strategic energy management resulted in greater understanding of energy use and production process opportunities, and 11 of 12 Pilot participants said it helped them complete their energy efficiency projects sooner than they would have without Pilot participation.

All 13 respondents said they planned to continue adding capital energy-saving opportunities. These included the following:

- Upgrade air compressor systems (seven responses)
- LED re-lamps (five responses)
- Increasing metering capacity (three responses)
- HVAC equipment changes (three responses)
- Installing VSDs (two responses)
- Recycling heat waste (two responses)
- New building management systems (two responses)

Large Energy Users' Customer Experience

The Evaluation Team surveyed Program participants about their experiences with the Large Energy Users Program. These Program participants provided feedback through an ongoing customer satisfaction survey, administered monthly, and through an annual, in-depth participant survey.

Large Energy Users Participants' Application Process

Most Large Energy Users Program respondents were satisfied with the application process. Of those involved in the application process (n=32), 90% found the application process *very easy* or *somewhat easy*, while 9% found it *somewhat challenging*. One respondent said the detail required was excessive, and two respondents said the application did not include enough information about materials required for submissions.

A majority of respondents also expressed satisfaction with the time required to receive the rebate check (95% said *very satisfied* or *somewhat satisfied*; n=37). Most respondents (72%) reported receiving the rebate in six weeks or less.

Participant Suggestions for Improvement

The Evaluation Team asked survey respondents if Focus on Energy could have done anything to improve their overall Program experience. A majority of respondents (81%; n=70) could not identify anything Focus on Energy could do. Those offering suggestions most commonly made the following recommendations:

- Provide more face-time with their Energy Advisors (three responses out of 13 respondents)
- Better or more communications about Program processes (two responses)
- More availability from Energy Advisors (two responses).

Other responses included the following:

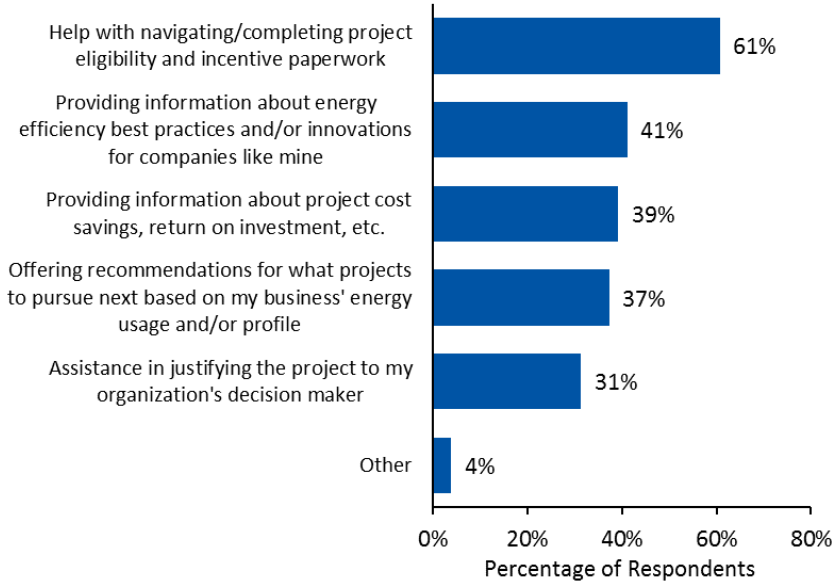
- Simplifying the website and application
- Allowing online application submissions
- Having Focus on Energy complete applications
- Providing quicker response and approval times
- Sending incentive checks sooner
- Providing more prescriptive grants
- Providing more case studies about energy use and consumption

Strategic Energy Management Industrial and Strategic Energy Management Healthcare Program survey respondents suggested that Focus on Energy provide more descriptive text on incentive checks and more assistance with analyzing their energy models.

Program Support

Program participants were asked in the customer satisfaction survey how Focus on Energy could best support their organizations aside from providing incentives (Figure 185). The two top suggestions were help with completing project and incentive paperwork (61%) and providing information about energy efficiency best practices and innovations (41%).

Figure 185. CY 2018 Large Energy Users Program Participants' Preferred Services from Focus on Energy



Source: Large Energy Users Program Ongoing Participant Satisfaction Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward? Choose your top two from the list below." (n=51; this question was asked in online surveys but was not included in mail surveys)

Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2018, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Large Energy Users Program. Respondents answered questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest. [163]

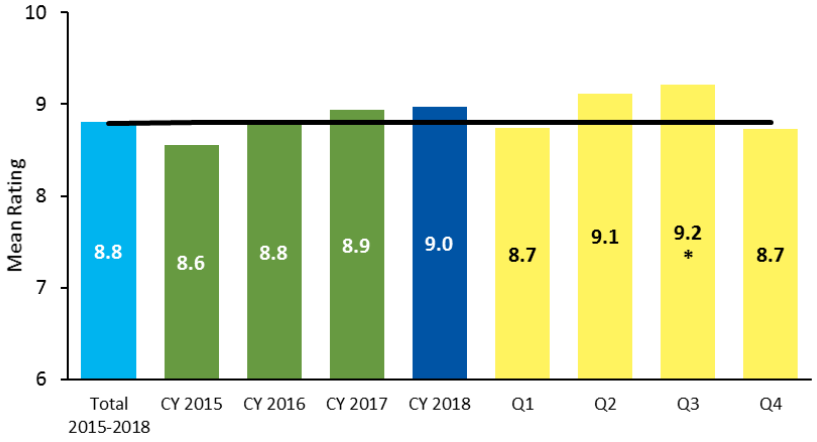
Figure 186 shows that CY 2018 respondents gave the Program an average overall satisfaction rating of 9.0, which was not statistically different from the portfolio baseline of 8.8.[164] The rating from Q3 in CY 2018 was significantly higher than the portfolio baseline, while all other quarters of CY 2018 were equivalent to the baseline.[165]

[163] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

[164] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (to meet or exceed the baseline value over the last three years of the CY 2015–CY 2018 quadrennial).

[165] The Evaluation Team found that some surveys did not include identifying information to allow matching survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

Figure 186. CY 2018 Large Energy Users Program Overall Program Satisfaction



Source: Large Energy Users Program Ongoing Participant Satisfaction Survey Question. "Overall, how satisfied are you with the Program?" (CY 2015 n=129, CY 2016 n=170, CY 2017 n=149, CY 2018 n=128, Q1 n=23, Q2 n=17, Q3 n=48, Q4 n=37). Total CY 2015–CY 2018 is the participation-weighted average of four annual results.

* Denotes that the result for the year or quarter is statistically significant different from the portfolio baseline (p<0.10 or better using binomial t-tests). The portfolio baseline (8.8) is indicated by a dark line.

Table 279 shows the average satisfaction and likelihood ratings for each year of the CY 2015–CY 2018 quadrennial. For all these ratings, CY 2018 results were not statistically different from CY 2017.

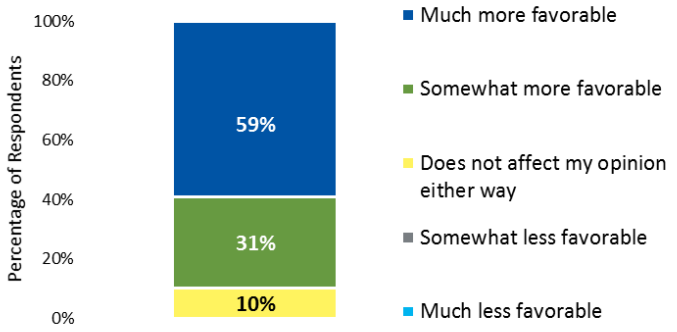
Table 279. CY 2018 Average Ratings for Large Energy Users Program

Item	CY 2015	CY 2016	CY 2017	CY 2018
Satisfaction with upgrade(s)	9.0	9.2	9.2	9.3
Satisfaction with Energy Advisor	9.0	9.2	9.3	9.2
Satisfaction with Trade Ally	8.6	8.7	9.0	8.9
Satisfaction with incentive	7.9	8.1	8.3	8.5
Likelihood of more improvements	9.0	9.0	9.2	9.1
Likelihood of recommending the Program	*Not asked*	9.5	9.5	9.5

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. 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 percentage of detractors (respondents giving a rating of 0 to 6). The Large Energy Users Program NPS was +87 for CY 2018, which was similar to the Program's NPS of +85 for CY 2017.

CY 2018 Program participants were asked if Focus on Energy offerings affected their opinion of their utilities, and more than half (59%) gave the highest rating of *much more favorable* (Figure 187). Only 10% said their opinion was not affected, and no respondents reported that their opinion of their utility had become less favorable.

Figure 187. CY 2018 Effect of Focus on Energy Offerings on Opinion of Utilities

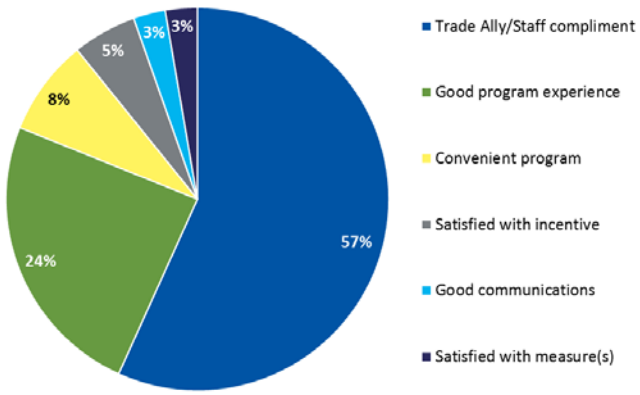


Source: Large Energy User Program Ongoing Participant Satisfaction Survey Question. "Your energy utility partners with Focus on Energy to offer energy efficiency programs to its customers. How have these offerings affected your opinion of your utility, if at all?" (n=49; this question was asked in online surveys but was not included in mail surveys)

The ongoing participant satisfaction surveys also included a question about whether participants had any comments or suggestions for improving the Program. Of the 129 participants who responded to the survey, 45 (35%) provided open-ended feedback, which the Evaluation Team coded into a total of 53 mentions. Of these open-ended responses, 37 (70%) were complimentary comments, and 16 (30%) were suggestions for improvement.

Respondents' positive comments are shown in Figure 188. Respondents most frequently complimented the Program Energy Advisors and Trade Allies (57%), as they had done in CY 2017. Respondents also commonly commented on a generally positive Program experience (24%).

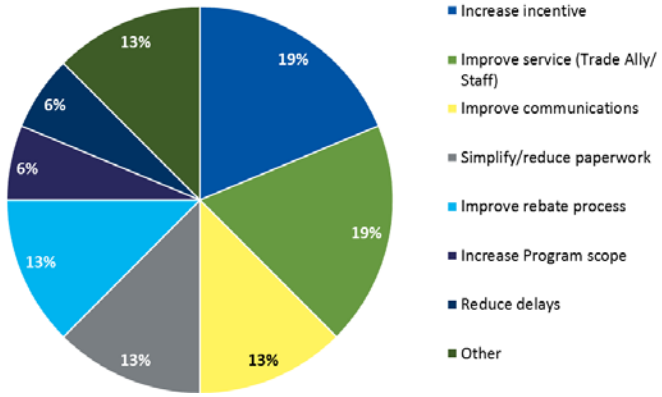
Figure 188. CY 2018 Positive Comments about the Program



Source: Large Energy Users Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=37)

The most frequent suggestions for improvement were to increase incentives (19% of mentions) and improve service from Trade Allies and/or Energy Advisors (19%; Figure 189), which was a change from CY 2017 where the most frequent suggestions were to improve communication (29%) and increase incentives (24%).

Figure 189. CY 2018 Suggestions for Improving the Program



Source: Large Energy Users Program Ongoing Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=16)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 280 lists the CY 2015, CY 2016, CY 2017, and CY 2018 incentive costs for the Large Energy Users Program.

Table 280. Large Energy Users Program Incentive Costs

	CY 2018	CY 2017	CY 2016	CY 2015
Incentive Costs	$9,964,658	$9,097,292	$10,341,953	$13,920,708

The Evaluation Team found that the CY 2018 Large Energy Users Program was cost-effective (7.67). Table 281 lists the evaluated costs and benefits.

Table 281. Large Energy Users Program Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017	CY 2016	CY 2015
Costs				
Administration Costs	$911,347	$1,164,121	$1,201,920	$1,048,361
Delivery Costs	$6,072,690	$4,753,592	$4,907,942	$4,280,895
Incremental Measure Costs	$20,328,799	$31,310,130	$49,792,860	$53,682,911
Total Non-Incentive Costs	**$27,312,836**	**$37,227,843**	**$55,902,722**	**$59,012,167**
Benefits				
Electric Benefits	$99,551,696	$132,259,787	$97,457,224	$132,363,885
Gas Benefits	$84,341,719	$87,348,431	$124,834,595	$133,828,779
Emissions Benefits	$25,697,994	$31,961,008	$31,688,806	$37,417,087
Total TRC Benefits	**$209,591,409**	**$251,569,225**	**$253,980,625**	**$303,609,751**
Net TRC Benefits	**$182,278,573**	**$214,341,382**	**$198,077,903**	**$244,597,584**
TRC B/C Ratio	**7.67**	**6.76**	**4.54**	**5.14**

Table 282 lists the CY 2017and CY 2018 incentive costs for the Strategic Energy Management Pilot.

Table 282. Strategic Energy Management Pilot Incentive Costs

	CY 2018	CY 2017
Incentive Costs	$1,608,048	$875,573

The Evaluation Team found that the CY 2018 Strategic Energy Management Pilot was cost-effective (8.52). Table 283 lists the evaluated costs and benefits.

Table 283. Strategic Energy Management Pilot Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017
Costs		
Administration Costs	$53,967	$220,367
Delivery Costs	$3,173,109	$899,849
Incremental Measure Costs	$1,612,080	$543,819
Total Non-Incentive Costs	**$4,839,156**	**$1,664,035**
Benefits		
Electric Benefits	$11,971,014	$2,006,117
Gas Benefits	$24,555,047	$1,791,770
Emissions Benefits	$4,727,530	$541,499
Total TRC Benefits	**$41,253,591**	**$4,339,387**
Net TRC Benefits	**$36,414,436**	**$2,675,352**
TRC B/C Ratio	**8.52**	**2.61**

Evaluation Outcomes and Recommendations

The Evaluation Team identified three outcomes and recommendations for improving the Large Energy User Program.

Outcome 1. Participants prefer to learn about energy efficiency opportunities from Energy Advisors and via emails from Focus on Energy. Focus on Energy played a greater role in Program awareness in CY 2018 (69%) than in CY 2015 (33%) and represents how most participants want to learn about energy efficiency opportunities. In CY 2018, the top suggestion for improving the Program was to improve service from Energy Advisors and Trade Allies. Additionally, survey participants said Focus on Energy could best support their organization by providing more help completing incentive paperwork (61%) and providing information about energy efficiency projects from similar companies (41%).

Recommendation 1. Consider ways to improve service among Energy Advisors and other support staff. This may include providing more help to customers when completing their project and incentive paperwork or directing them to success stories on the Focus on Energy website about energy efficiency opportunities in similar companies. Consider creating a checklist for customers and contractors outlining the steps and materials needed for submitting incentive paperwork. Additionally, consider developing and publishing a video on the Focus on Energy website with how-to steps for completing and submitting incentive paperwork.

Outcome 2. The Evaluation Team used a different approach for verifying energy savings from Strategic Energy Management projects than the Program Implementer used. The evaluation savings relied on

regression analysis, while the reported savings were calculated using an engineering analysis. This led to a large difference between the evaluation savings and reported savings.

Recommendation 2. Savings for Strategic Energy Management projects that are estimated using a regression analysis will be evaluated differently than Strategic Energy Management capital projects, therefore we recommend identifying these projects with a unique and consistent measure name so that these can be assigned to a separate evaluation sample stratum. Strategic energy management capital projects that are similar to Large Energy Users' typical projects will follow the same evaluation methodology applied to non-Strategic Energy Management measures.

Outcome 3. *Ex ante* savings for sampled projects in the Large Energy Users Program referenced trend and/or metered data that was not included in the project documentation uploaded to SPECTRUM. The Evaluation Team collected third party metered or trend data to calculate verified savings and these adjustments resulted in reduced electric and natural gas therms savings.

Recommendation 3. Consider requiring *ex ante* metered and/or trend data collection for high impact (high savings) projects be uploaded to SPECTRUM with other supporting documentation. Enabling the Evaluation Team to review the raw metered and trend data used in the *ex ante* savings calculations will assist with savings verification and potentially reduce discrepancies due to methodology and timeline. Currently, there is not a savings threshold to trigger required metering or trend data collection in the Large Energy Users Program. The Evaluation Team is available to work the Program Implementer to determine a reasonable threshold.

Outcome 4. The Evaluation Team calculated verified lifetime energy savings for three large custom measures using a different measure life from the *ex ante* reported lifetime savings. All three measures were submitted under MMID 2499 (Process, Not Otherwise Specified), which has a 15-year measure life in the 2017 TRM and 2018 TRM. The Program Implementer's *ex ante* reported lifetime savings calculations were based on a measure life of 20 years because the measures involved process chilled water equipment (such as chiller, cooling towers, and heat exchangers), which usually have a life of 20 years.

Recommendation 4. Consider requiring that lifetime electric and natural gas energy savings be calculated based on the measure life assigned to the selected MMID in SPECTRUM. This will encourage more accurate MMID selection in SPECTRUM and hopefully reduce discrepancies between measure lives used in *ex ante* reported and *ex post* verified savings calculations.

Training Program

The Focus on Energy commercial Training Program, designed and managed by APTIM, is designed to provide Program Trade Allies, building managers, efficient equipment sales personnel, and other energy management professionals with increased knowledge on how to sell, use, and manage energy saving equipment or implement energy saving behaviors. This report presents key findings from the impact and process evaluations of the trainings offered through Focus on Energy from CY 2015 through CY 2018. The evaluations relied upon data collected through an online training participant survey. The Evaluation Team leveraged the information the survey gathered about the participants' actions, perceptions, and experiences to calculate energy savings attributable to the training courses, which are presented in the Impact Evaluation section.

Program Offerings

Focus on Energy offers training to customers in the commercial, industrial, and school and government sectors, as well as contractors working in residential HVAC and whole home trades. The training and education offerings include courses related to the topics presented in Table 284.

Table 284. Focus on Energy Training Program Offerings

Program Topic Areas		
Air Sealing	Home Efficiency Sales and Marketing	Introduction to Energy Management
Building Analyst Training	HVAC	Motors and VFDs
Commercial Air Conditioning	Industrial Refrigeration	Operations and Maintenance
Compressed Air	Industrial Ventilation	Optimizing BAS Control Strategies
Energy Management & Technology: Fundamentals and Beyond	Intermediate Energy Management	Process Heat & Heat Recovery
		Strategic Energy Management

Program Accomplishments

While the Program trainings are intended to generate energy savings and demand reductions through increased awareness of efficient measures and behaviors, the design of the Training Program does not include the calculation of *ex ante* Program savings. Participants are not required to report savings back to the implementer, and the Program design is not intended to achieve specific energy savings goals or targets. Table 285 summarizes the savings attributable to the Program. These include:

- Total energy savings and demand reductions for all projects that participants initiated after they participated in their training.
- All rebated projects for which the participant said the Training Program played either a *somewhat important* or *very important* role in the decision to complete the project, are defined here as "Influenced Projects." Influenced projects just provides the context of which projects are

at least *somewhat influenced* by Program participation, but are cannot be claimed as Program induced savings.

- Portfolio spillover, where the Training Program was described as *very important* in the decision to complete the project, and where the project measures were not rebated or incented by another Focus on Energy sponsored Program. The only savings that were attributed to the Program are included in Program spillover.

Table 285. CY 2015–CY 2018 Training Program Pilot Annual and Lifecycle Net Savings Summary

Measure	Net Annual			Net Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Total Reported Projects	84,182,392	15,514	644,696	1,467,474,568	15,514	13,734,233
Influenced Projects	15,516,059	2,666	230,489	268,952,628	2,666	5,162,996
Program Spillover	2,125,081	155	89,319	40,722,084	155	1,412,889

Program spillover, the bottom row seen in Table 285, reflects a lowest-bound estimate of the Program's impact. There were many projects influenced by the Training Program that could not be attributed as Program spillover because they were rebated by another Focus on Energy sponsored program or were only *somewhat influenced* by the Training Program. Rebated projects are credited to the individual programs, so attributing them to the Training Program as well would double-count savings.

Evaluation, Measurement, and Verification Approach

The Evaluation Team completed online surveys and follow up telephone interviews with a sample of Program participants after their participation in a training course. An engineering analysis using information found in the TRM and SPECTRUM database was completed to determine total project savings. Savings were then categorized as potential uplift and portfolio spillover based on survey responses. This approach closely mirrored the one employed in the CY 2011–CY 2014 evaluation period, though that process relied on telephone, rather than online, surveys.

Process Evaluation

In CY 2018, the Evaluation Team conducted online surveys as part of the process evaluation activities. The findings from these surveys are described below.

Online Survey

Between November 11 and December 4, 2018, the Evaluation Team completed 68 online surveys with course participants.[166] The Evaluation Team then analyzed the results from the surveys to understand Program successes and areas for improvement or expansion.

[166] The majority of the respondents (65) completed the survey. Three respondents partially completed the survey but provided enough information that their responses were useful for the analysis.

The survey covered the following topics:

- Confirmation of training participation
- Project implementation related to the training course
- Achievement of project savings, some of which may not have been tracked or otherwise counted by Focus on Energy
- Satisfaction with the Training Program
- Characteristics of the participants and their businesses

Survey Methodology

To initiate the survey, the Evaluation Team contacted all eligible participants by email to inform them of their opportunity to participate and included a link to the survey. Multiple follow up reminders were sent following the first email message. Some online survey participants who showed potential for Program attributable savings did not provide enough information to determine savings. The Evaluation Team then made efforts to follow up with these participants by phone, ultimately performing three follow-up telephone interviews with survey participants who completed projects.

Table 286 shows the number of participants, completed surveys, and additional follow-up interviews for Program participants.

Table 286. Survey Population and Completes

Subprogram	Participants[a]	Surveys[b]	Interviews
Air Sealing	84	11	0
Building Analyst Training	14	3	0
Commercial Air Conditioner	9	0	0
Compressed Air	21	2	0
Energy Management & Technology: Fundamentals and Beyond	11	2	0
Home Efficiency Sales & Mktg	23	1	0
HVAC	56	6	0
Industrial Refrigeration	45	5	0
Industrial Ventilation	28	5	1
Intermediate Energy Management	74	0	0
Introduction to Energy Management	73	2	0
Motors & VFDs	57	6	0
Operations & Maintenance	89	11	1
Optimizing BAS Control Strategies	11	6	0
Process Heat & Heat Recovery	41	5	1
Strategic Energy Management	72	2	0
Total	**535**	**89**	**3**

[a] The total number of individual Program participants is lower than the sum of individual course participants as multiple participants completed more than one training

[b] The total number of surveys completed by individuals is lower than the sum of survey participants per course as multiple participants that responded to the survey completed more than one training

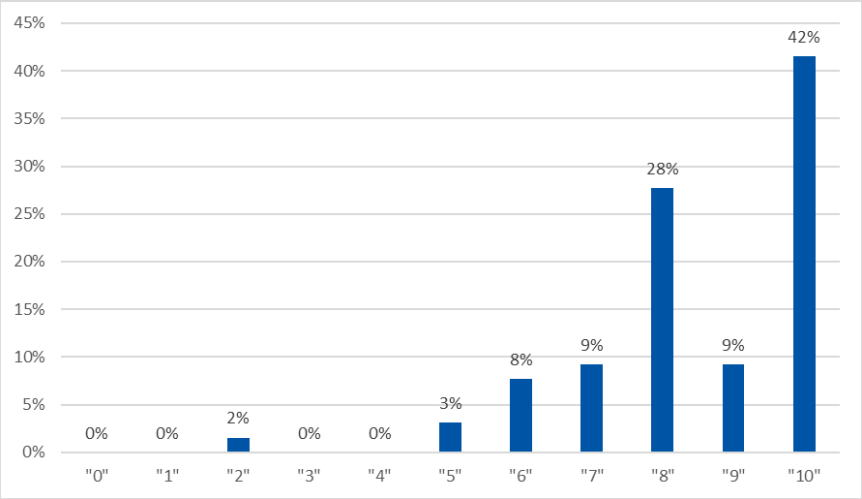
Customer Experience

The Evaluation Team used survey findings to gather information about participants' experiences in the training sessions.

Likelihood to Recommend Training Courses

Respondents were asked to rate the likelihood of recommending a training course to a colleague on a 0 to 10 scale, with 0 representing *not at all likely* and 10 representing *extremely likely*. Figure 190 shows the percentage of respondents who selected each value. The average likelihood to recommend was 8.5.

Figure 190. Likelihood to Recommend Training to Colleague



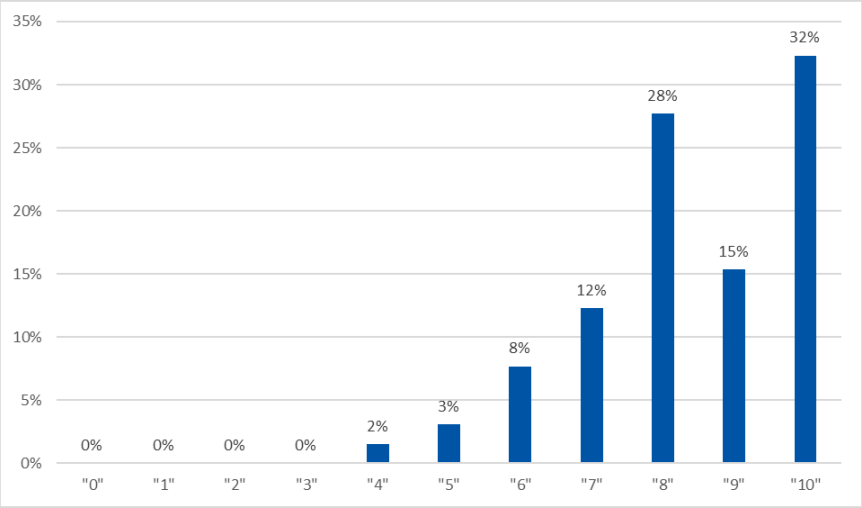
Source: Participant Survey Question D1. "On a scale of 0 to 10, where 0 is *not at all likely* and 10 is *extremely likely*, how likely are you to recommend Focus on Energy trainings to a colleague?" (n=65)

When asked, 79% of respondents rated their likelihood of recommending the Program to a colleague as at least an eight. A plurality, 42% chose ten, the highest rating, as their response.

Satisfaction with Training Course

Participants were also asked to rate their satisfaction with the training they attended on a similar zero to ten scale, where 0 indicated *not at all satisfied* and 10 indicated *extremely satisfied*. The Evaluation Team found similar results to the likelihood to recommend question. As shown in Figure 191, three quarters of participants (75%) rated their satisfaction as an eight or higher on the scale, with nearly a third of the participants (32%) giving the Program the highest possible rating. The average satisfaction with the Training Program components was 8.4.

Figure 191. Satisfaction with Components of Training Sessions



Source: Participant Survey Question D2. "On a scale of 0 to 10, where 0 is *not at all satisfied* and 10 is *extremely satisfied*, how satisfied are you to recommend Focus on Energy trainings to a colleague?" (n=65)

Course Improvements

Participants were asked which parts of the Program were working well, and what could be improved. Several responses indicated that people were pleased that the Program was offered in multiple geographic locations across Wisconsin; the subjects were taught by well informed, highly professional instructors; the information was useful and applicable; and the content of the courses was interesting.

Responses about suggested improvements were more varied. The most common responses were requests for additional trainings in specific locales; additional courses on other types of mechanical equipment, such as building automation[167]; and courses in settings where participants could get hands-on practical experience with large, complex systems, particularly at larger facilities in Madison or Milwaukee. There were no complaints about Focus on Energy, but one respondent did express reservations with a course instructor.[168]

Participant Firmographics

Participants reported a wide range of job titles, with maintenance personnel, energy consultant or advisor, business owner or manager, and facility engineer representing the most common responses. Figure 192 highlights the most common responses to the job title question.

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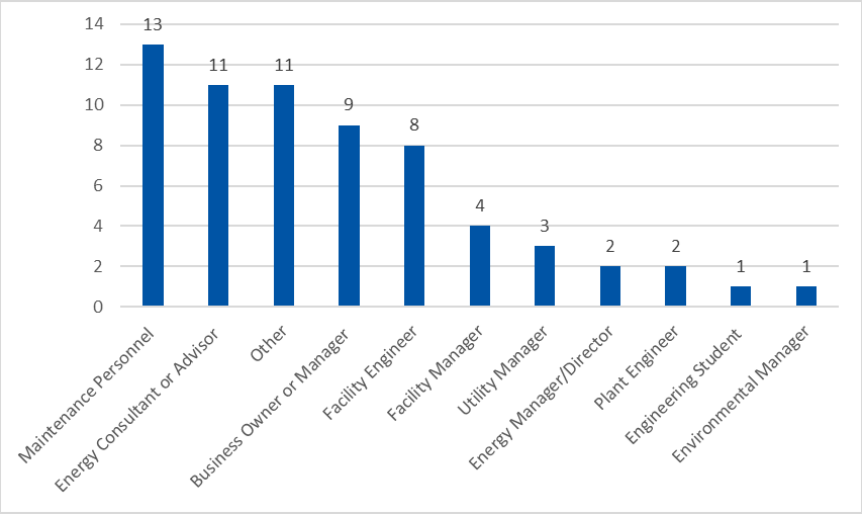
[167] A Building Automation Systems course was offered in Fall CY 2018 in partnership with UW–Madison. This course will again be offered in 2019.

[168] A respondent reported that a course instructor was "politically biased and had an anti-renewable agenda." Instructors may be asked for personal opinions and are instructed to identify their viewpoints as their own.

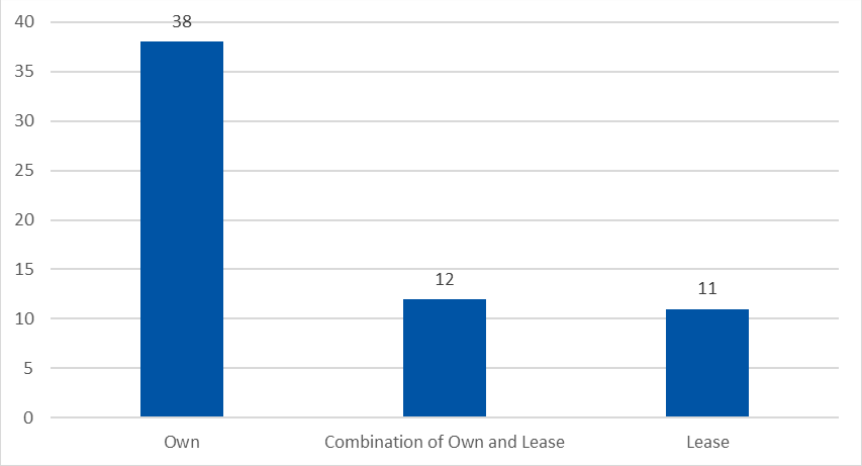
Figure 192. Self-Reported Job Title



Source: Participant Survey Question B2. "Which of the following best describes your title?" (n=65)

The majority of participants work for firms that own their own facilities, and fewer than one in four participants reported working at a facility that is leased.[169] Figure 193 shows the full distribution of these responses.

Figure 193. Self-Reported Firm Facility Status

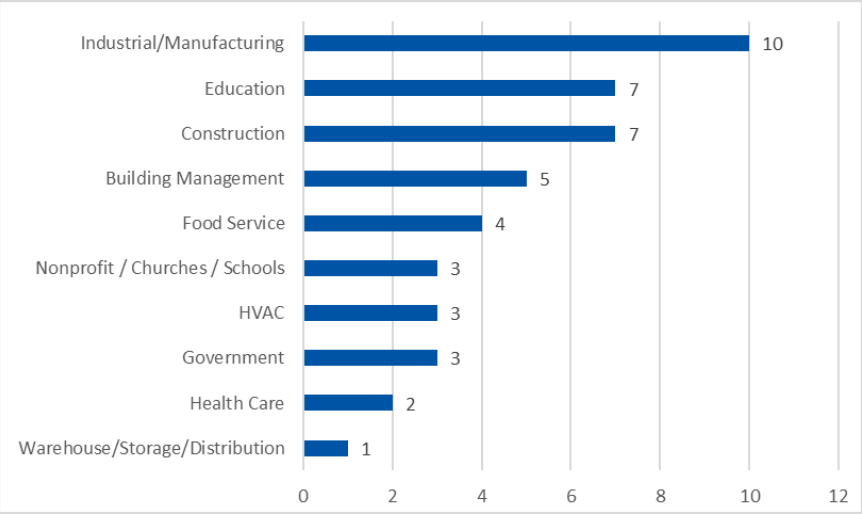


Source: Participant Survey Question E3. "Does your organization lease or own the facility or facilities?" (n=61)

Participants were also asked about the industry in which they work. The most common answers were Industrial/Manufacturing, Education, Construction, and Building Management. The ten most common responses are listed in Figure 194.

[169] Four respondents chose "Don't know" on this question.

Figure 194. Participant Company's Industry



Source: Participant Survey Question E1. "What industry is your company in?" (n=65)

Impact Evaluation

Collectively, 65 survey respondents who answered a sufficient number of questions reported that they participated in 84 training courses and completed 73 projects whose implementation was at least *somewhat influenced* by the Program. Of these projects, 30 were rebated or incented by another Focus on Energy sponsored program. Savings for these projects is credited to the program that provided them and is thus not attributable to the Training Program. Spillover savings is attributed only to the 18 non-rebated projects where participants rated the influence of the Program as *very important*. This section describes the categorization of participants' project descriptions, the methodology used to estimate energy savings, challenges to and solutions regarding the survey process, and energy savings by project type and training course.

Project Categorization

Replacing equipment or improving controls can be classified into the following categories: lighting, motors, HVAC, water heating, and building shell improvements. These categories are typical to most facilities that have been proven to achieve energy savings.

Calculation Methodology

The following section describes the calculation methodology for the categories described above. Savings algorithms, and assumptions were taken from the TRM and SPECTRUM database

Lighting

One respondent replaced 1,000 watts of incandescent/halogen bulbs with 315 watts of LEDs in a personal home. Another respondent added photo lighting controls to the exterior of the respondent's business. The general methodology for calculating energy savings for these projects involves establishing baseline and proposed conditions and deriving energy savings from the difference between the two conditions.

For lamp replacement, the Evaluation Team calculated energy savings using the following equations:

Annual Energy Savings Algorithm

$$kWh_{SAVED} = [(Qty_{BASE} * Watts_{BASE}) – (Qty_{EE} * Watts_{EE})]/1{,}000 * HOU$$

Where:

Qty_{BASE}	=	Quantity of standard lamps
$Watts_{BASE}$	=	Electricity consumption of standard lamp (baseline)
Qty_{EE}	=	Quantity of efficient lamps
$Watts_{EE}$	=	Electricity consumption of LED lamp (efficient)
1,000	=	Kilowatt conversion factor
HOU	=	Residential direct install value (=734)

Summer Coincident Peak Savings Algorithm

$$kW_{SAVED} = [(Qty_{BASE} * Watts_{BASE}) – (Qty_{EE} * Watts_{EE})]/1{,}000 * CF$$

Where:

CF	=	Coincidence factor (= 0.055)

For photo-lighting controls, the TRM calculates savings using the following equation:

Annual Energy Savings Algorithm

$$kWh_{SAVED} = kW_{FIXTURES} * (HOU_{PRE} – HOU_{POST})$$

Where:

$kW_{FIXTURES}$	=	Input of the fixture(s) being controlled (= 0.1496 kW)
HOU_{PRE}	=	Average annual run hours of existing system (= 4,380)
HOU_{POST}	=	Average annual run hours of post-installation system (= 2,628)

This results in deemed annual savings for photo-lighting controls of 262 kWh. There are no summer coincident peak savings for exterior lighting applications.

Motors, VSDs, Fans, Pumps

The motors, VSDs, fans, and pumps Project category included only one VSD project. VSDs, or VFDs, generate energy savings by modulating the motor speed when full-speed capacity is not required. VSDs are commonly installed on air-handling unit fans, but can be applied to many other types of applications including pumps. The TRM calculates energy savings for VSD projects using the following equations:[170]

Annual Energy-Savings Algorithm

$$kWh_{SAVED} = [(BASE_{hp} * 0.746 / BASE_{eff}) – (EE_{hp} * VSD_{spd} * 0.746 / EE_{eff})] * HOU$$

[170] Both equations are from: U.S. Department of Energy, Energy Efficiency and Renewable Energy. November 2012. "Advanced Manufacturing Office. Energy Tips: Motor Systems." http://www1.eere.energy.gov/manufacturing/tech_assistance/pdfs/motor_tip_sheet11.pdf

Where:

$BASE_{hp}$	=	Horsepower of baseline motor
$BASE_{eff}$	=	Efficiency of baseline motor
EE_{hp}	=	Horsepower of proposed motor
EE_{eff}	=	Efficiency of proposed motor
0.746	=	Horsepower conversion factor
VSD_{spd}	=	Average speed of VSD during all hours of operation
HOU	=	Average annual run hours based on survey results

Summer Coincident Peak Savings Algorithm

$$kW_{SAVED} = [(BASE_{hp} * 0.746 / BASE_{eff}) – (EE_{hp} * VSDspd * 0.746 / EE_{eff})]$$

Survey respondents did not provide information on baseline or proposed horsepower or average VSD speed. To calculate energy savings, the Evaluation Team used the VSD measure category from the SPECTRUM Agriculture, Schools, and Government Program. The spillover savings prescribed is the average of the projects contained in the database, which relied on the above algorithm to determine savings.

HVAC

The HVAC project category included seven project types: boiler replacement, furnace replacement, air conditioner replacement, chiller replacement, heat exchanger replacement, steam trap replacement, and smart thermostats. Two respondents replaced a furnace, and one replaced a boiler. The TRM calculates energy savings for boiler and furnace replacement based on the following equation:

Annual Energy-Savings Algorithm

$$Therms_{SAVED} = Quantity * Cap * EFLH * (1 – EFF_{baseline} / EFF_{ee}) / 100$$

Where:

Cap	=	Boiler or furnace Capacity (= Actual or 373 MBh)
EFLH	=	1,759 hours
$EFF_{baseline}$	=	AFUE of baseline measure (=82%)
EFF_{ee}	=	AFUE of efficient measure (=90%)
100	=	Therm conversion

Survey respondents did not provide information on baseline or proposed efficiency. To calculate energy savings, the Evaluation Team used the furnace measure category from the SPECTRUM Business Incentives Program. The spillover savings prescribed is the average of the projects contained in the database, which relied on the above algorithm to determine savings.

One respondent completed a chiller project. Chillers provide cooled water (typically 45°F to 55°F) to mechanical and process equipment. Chillers come in a variety of configurations including air cooled, water cooled, reciprocation, rotary screw, scroll, and centrifugal. Each chiller type has a specific performance curve with efficiencies that vary depending on chiller load. To accurately calculate energy

consumption of a chiller, the Evaluation Team required a chiller load profile and manufacturer-provided performance curve. However, respondents did not provide this information in the survey. To calculate energy savings, the Evaluation Team used chiller capacity provided by the respondent and minimum code compliant chiller efficiencies. The Evaluation Team based the chiller selection for the baseline and proposed conditions survey responses on the information listed in Table 287.

Table 287. Chiller Plant Selection: Minimum Efficiencies from ASHRAE 90.1-2007

Equipment Type	Size Category	Minimum Efficiency
Air Cooled, with Condenser	All capacities	2.80 COP; 3.05 IPLV
Air Cooled, without Condenser	All capacities	3.10 COP; 3.45 IPLV
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	All capacities	4.2 COP; 5.05 IPLV
Water Cooled, Electrically Operated, Positive Displacement (Rotary Screw and Scroll)	<150 tons	4.45 COP; 5.20 IPLV
	≥150 tons and <300 tons	4.90 COP; 5.60 IPLV
	≥300 tons	5.50 COP; 6.15 IPLV
Water Cooled, Electrically Operated, Centrifugal	<150 tons	5.00 COP; 5.25 IPLV
	≥150 tons and <300 tons	5.55 COP; 5.90 IPLV
	≥300 tons	6.10 COP; 6.40 IPLV

The TRM calculates energy and demand savings using the following equations:

Annual Energy-Savings Algorithm

ASHRAE 2007 minimum efficiency for chillers is the proposed efficiency.

Existing Equipment as a Baseline:

$$kWh_{SAVED} = (IPLV_{Baseline\ Existing} - IPLV_{Proposed}) * \text{ton-hours}$$

Where:

$IPLV_{Baseline\ Existing}$ = Integrated part load volume of baseline chiller, provided by survey participant

$IPLV_{Proposed}$ = Integrated part load volume of efficient chiller, provided by survey participant

Ton-hours = Determined from weather bin hours and building design cooling load, based on survey participant response

Summer Coincident Peak Savings Algorithm

Existing Equipment as a Baseline:

$$kW_{SAVED} = (\text{Full Load kW/Ton}_{Baseline\ Existing} - \text{Full Load kW/Ton}_{Baseline\ Proposed}) * CF * \text{Tons}$$

Code Minimum Efficiencies as a Baseline:

$$kW_{SAVED} = (\text{Full Load kW/Ton}_{\text{Baseline Code}} - \text{Full Load kW/Ton}_{\text{Baseline Proposed}}) * CF * Tons$$

Where:

Full Load kW/ton$_{\text{Baseline Existing}}$	=	Full load power draw of baseline chiller, provided by survey participant
Full Load kW/ton $_{\text{Baseline Proposed}}$	=	Full load power draw of efficient chiller, provided by survey participant
Full Load kW/Ton$_{\text{Baseline Code}}$	=	Full load power draw of baseline chiller using code standard
CF	=	Coincidence factor (= 0.8)
Tons	=	Full load tons of chiller, provided by survey participant

One respondent completed an air conditioner project. The TRM calculates energy and demand savings for air conditioners using the following algorithms.

Annual Energy-Savings Algorithm

$$kWh_{SAVED} = (CAP / 1{,}000) * (1 / SEER_{BASE} - 1 / SEER_{EE}) * EFLH_c$$

Where:

CAP	=	Rated cooling capacity of the energy-efficient unit (= 29,100 in BtuHcool)
1,000	=	Kilowatt conversion factor
$SEER_{BASE}$	=	Seasonal efficiency rating of the baseline unit (= 13)
$SEER_{EE}$	=	Seasonal efficiency rating of the energy-efficiency unit (= 14, 15, or 16)
$EFLH_c$	=	Equivalent full load hours for the cooling season (= 380)

Summer Coincident Peak Savings Algorithm

$$kW_{SAVED} = (CAP / 1{,}000) * (1 / EER_{BASE} - 1 / EER_{EE}) * CF$$

Where:

CF	=	0.66 coincidence factor
EER_{ee}	=	11.7 for 14 SEER, 12.2 for 15 SEER, and 12.7 for 16 SEER

Four respondents installed smart thermostats. The TRM provides algorithms and deemed savings values for smart thermostats for businesses. The Evaluation Team assumed a natural gas roof-top unit with air conditioner and prescribed savings calculated using the following equations:

Annual Energy-Savings Algorithm

$$Therm_{SAVED} = EFLH_{HEAT} * CAP_{HEAT} / (EFF_{HEAT} * 100) * ESF_{HEATING}$$

$$kWh_{SAVED} = EFLH_{COOL} * CAP_{COOL} / EFF_{COOL} * RLF_{COOL} * ESF_{COOLING}$$

Where:

$EFLH_{HEAT}$	=	Equivalent full-load heating hours (= 1,890 average for Wisconsin commercial buildings)
CAP_{HEAT}	=	Heating system capacity
EFF_{HEAT}	=	Efficiency of the heating system (= 80.3% for roof-top units)
100	=	Conversion factor from MBh to therms
ESF_{HEAT}	=	Heating energy savings fraction (= 4.6% for furnaces and roof-top units)
$EFLH_{COOL}$	=	Equivalent full-load cooling hours (= 599 average for Wisconsin commercial buildings)
CAP_{COOL}	=	Cooling system capacity in MBh
EFF_{COOL}	=	Cooling system efficiency (= 11.4 SEER for roof-top units)
RLF_{COOL}	=	Rated load factor for cooling; the peak cooling load/nameplate capacity. This factor compensates for oversizing the air conditioning unit (= 0.90 for roof-top units)
ESF_{COOL}	=	Cooling energy savings fraction (= 20.5%)

There are no peak savings for thermostats. It is assumed that businesses will be occupied during this time, and therefore no programmed or automatic setbacks will occur.

One respondent replaced 10 failed steam traps. The Evaluation Team assumed that these failed in the open position allowing steam to escape into the condensate lines before the available heat energy could be used for space heating, thereby wasting the energy used to make the steam. Replacing or repairing traps that have failed in the open position conserves the heating energy. The TRM calculates energy saved using the following equation:

Annual Energy-Savings Algorithm

$$Therm_{SAVED} = 1.9 * K * 60 * (\pi * D^2/4) * \sqrt{([P_{ABS} - \{P_1 - P_2\}] * [P_1 - P_2])} * h_{FG} * HOU * DF / (100{,}000 * eff)$$

Where:

1.9	=	Constant based on units and fluid flow equation
K	=	Discharge coefficient (= 0.55)
60	=	Conversion from minutes to hours

D	=	Steam trap orifice diameter (= 7/32-inches, 1/4-inches, 5/16-inches, or 3/8-inches)
P_{ABS}	=	System absolute pressure in pounds per square inch (= 20.7 psia; steam gage pressure at trap inlet (6 psig) + atmospheric pressure at sea level in pounds per square inch (14.7 psi))
P_1	=	Steam pressure at trap inlet (= 6 psig)
P_2	=	Steam pressure at trap outlet, condensate tank pressure (= 0 psig)
h_{FG}	=	Latent heat of steam at system absolute pressure (= 959 Btu/lb)
HOU	=	Annual hours of operation the boiler is on and the system is at design pressure (= 5,510)
DF	=	Derating factor to account for the average percentage of time the trap fails in the open position and actual versus theoretical energy loss (= 5.9%)
100,000	=	Conversion factor from Btu to therms
eff	=	Boiler efficiency (= 80%)

One respondent replaced a heat exchanger. For this measure, the Evaluation Team used the heat exchanger measure category from the SPECTRUM Agriculture, Schools, and Government Program. The spillover savings prescribed is the average of the projects contained in the database.

Shell

Two respondents reported installing building insulation. The Evaluation Team used the building insulation measure category from the SPECTRUM Business Incentives Program. The spillover savings prescribed is the average of the projects contained in the database.

Water Heating

Two respondents reported replacing a water heater. The TRM calculates energy savings for water heaters using the following equation:

Annual Energy-Savings Algorithm

$$Therm_{SAVED} = GPY * 8.33 * 1.0 * \Delta T * [(1 / EF_{BASELINE}) – (1 / EF_{EFFICIENT})] / 100,000$$

Where:

GPY	=	Gallons per year of DHW usage (derived from days per year of operation and gallons per day)
8.33	=	Density of water in pounds per gallon
1.0	=	Specific heat of water in Btu per (pound-°F temperature change)
ΔT	=	Water temperature change produced by the DHW heater (= 52.3°F as user-defined on application;[5] If actual water heater setpoint temperature is unknown, = 130°F as the default[10])
$EF_{BASELINE}$	=	Efficiency metric for baseline DHW heater

$EF_{EFFICIENT}$ = Efficiency metric for efficient DHW heater

100,000 = Conversion factor for Btu per therm

Energy Saving Results

Table 288 shows total Program savings, both rebated and non-rebated, for all projects broken down by the importance of the Program to the project according to participant survey responses and rolled up to all Program participants. The projects included in the final row, those that are very important and non-rebated, are considered Program spillover.

Table 288. CY 2015–CY 2018 Pilot Annual Total Project Savings by Program Importance

Program Influence	Annual Savings			
	kWh	kW	therms	MMBtu
Not at All Important	**2,727,984**	**343**	**67,315**	**10,040**
Rebated	142,965	30	0	42
Non-Rebated	2,585,019	314	67,315	9,998
Not Too Important	**60,082,690**	**12,149**	**69,090**	**32,832**
Rebated	57,387,432	11,846	31,342	20,407
Non-Rebated	2,695,259	302	37,748	12,425
Somewhat Important	**6,716,543**	**804**	**212,927**	**40,258**
Rebated	2,985,965	603	24,445	7,836
Non-Rebated	3,730,579	201	188,482	32,421
Very Important	**14,655,175**	**2,218**	**295,363**	**46,777**
Rebated	12,530,094	2,063	206,044	30,121
Non-Rebated	2,125,081	155	89,319	16,656

Table 289 shows rebated and non-rebated savings by project type rolled up to all Program participants.

Table 289. CY 2015–CY 2018 Pilot Annual Project Savings by Project Category

Project Category	Annual Savings			
	kWh	kW	therms	MMBtu
HVAC	**6,853,223**	**842**	**131,045**	**36,016**
Rebated	985,597	347	35,583	6,859
Non-Rebated	5,867,627	495	95,462	29,157
Shell	**746,291**	**-457**	**490,245**	**58,413**
Rebated	184,712	-182	209,944	24,576
Non-Rebated	561,579	-274	280,301	33,837
Lighting	**73,064,892**	**14,447**	**0**	**21,414**
Rebated	70,503,548	14,114	0	20,663
Non-Rebated	2,561,344	332	0	751
Water Heating	**2,554**	**0**	**23,386**	**2,662**
Rebated	0	0	16,283	1,860
Non-Rebated	2,554	0	7,102	803
Motors, VSDs, Fans, Pumps	**3,515,432**	**682**	**20**	**11,401**
Rebated	1,372,598	263	20	4,448
Non-Rebated	2,142,834	419	0	6,952

Table 290 shows total Program savings for all projects based on the training course each individual survey respondent attended rolled up to all Program participants.

Table 290. CY 2015–CY 2018 Pilot Annual Project Savings by Training Course

Training Course Name	Annual Savings				Participants		Number of Projects[a]
	kWh	kW	therms	MMBtu	Surveyed	Total	
Air Sealing	564,002	-366	330,373	39,509	11	84	13
Building Analyst Training	38,493	0	59,494	6,811	3	14	9
Energy Management & Technology: Fundamentals and Beyond	406,853	81	0	1,324	2	11	2
Home Efficiency Sales & Mktg	1,479	0	15,671	1,794	1	23	1
HVAC	2,160,074	347	1,469	1,002	7	56	5
Industrial Refrigeration	3,329,401	460	67,315	12,739	6	45	10
Industrial Ventilation	3,829,075	322	24,425	15,252	6	28	7
Introduction to Energy Management	57,954,963	11,934	0	16,986	3	73	3
Motors & VFD	3,962,241	750	31,342	8,042	6	57	13
Operations & Maintenance	1,031,456	299	89,304	12,865	14	89	14
Optimizing BAS Control Strategies	2,359,914	309	9,611	8,678	7	11	5
Process Heat & Heat Recovery	208,821	25	15,691	2,461	8	41	4
Strategic Energy Management	8,335,619	1,353	0	2,443	4	72	1

[a] Number of projects completed by surveyed participants only

Spillover Results

After determining total Program savings, the Evaluation Team attributed spillover savings to projects completed by surveyed participants for which they did not receive an incentive and for which Program participation was *very important*. These projects achieved first-year annual savings of 266,132 kWh, 19.46 kW, and 11,186 therms.

As shown in Table 291, the largest proportion of first-year electric savings from training participants came through the chiller replacement project. Most of the therm savings came from HVAC and shell projects.

Table 291. First-Year Annual Savings by Project Type

Measure Category	kWh Savings	kWh % of Savings	kW Savings	kW % of Savings	Therm Savings	Therm % of Savings
HVAC	248,868	93.5%	18	90.2%	6,589	58.9%
Shell	371	0.1%	0	0.2%	3,925	35.1%
Lighting	765	0.3%	0	0.2%	0	0.0%
Water Heating	-6	0.0%	0	0.0%	672	6.0%
Motors, VSDs, Fans, Pumps	16,134	6.1%	2	9.4%	0	0.0%
Total	**266,132**	**100%**	**19.46**	**100%**	**11,186**	**100%**

Note: Savings are for surveyed participants only.

Table 292 shows these savings allocated to the specific course that the respondents attended. The large percentage of savings from the Optimizing BAS Control Strategies course is from the respondent with the chiller replacement project.

Table 292. First-Year Annual Savings by Training Program

Training Course Name	kWh Savings	kWh % of Savings	kW Savings	kW % of Savings	Therm Savings	Therm % of Savings
Building Analyst Training	4,450	1.7%	0.02	0.1%	3,526	31.5%
HVAC	1,417	0.5%	0.00	0.0%	184	1.6%
Industrial Refrigeration	22,187	8.3%	0.00	0.0%	0	0.0%
Operations & Maintenance	20,064	7.5%	3.95	20.3%	6,457	57.7%
Optimizing BAS Control Strategies	218,013	81.9%	15.49	79.6%	1,020	9.1%
Total	**266,132**	**100%**	**19.46**	**100%**	**11,186**	**100%**

Note: Savings are for surveyed participants only

Surveyed participants represent a significant sample of all training participants. Therefore, it is reasonable to assume that the per-participant savings achieved by the surveyed participants are representative of the savings achieved by all training participants. Table 293 shows the total first-year annual savings from Focus on Energy training programs for all participants during the CY 2015–CY 2018 period.

Table 293. Total First-Year Spillover Savings

All Training Programs	Savings (kWh)	Savings (kW)	Savings (therm)
CY 2015–CY 2018 Trainings	2,125,081	155.4	89,319

Because the measures installed by participants continue to realize savings through the life of the equipment, lifecycle savings were also calculated by applying the individual measure EULs from the TRM to the total savings for each project. An average EUL was applied to the total savings for each type of project. Table 294 shows the total lifecycle savings built out across the total population of training participants.

Table 294. Lifecycle Spillover Savings

All Training Programs	Lifecycle Total Savings (kWh)	Lifecycle Total Savings (therm)
CY 2015–CY 2018 Trainings	40,722,084	1,412,889

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. Participants completed a substantial number of projects after they participated in their trainings. While there was more limited evidence for attributable and non-rebated project savings, the Training Program interacted with a population responsible for implementing projects that saved, in total, approximately 84 million kilowatt-hours, 16,000 kW, and 644,000 therms of energy and demand.

There is a substantial overlap between Program participants and meaningful savings, indicating that the training audience can achieve large savings.

Recommendation 1. Continue offering training courses to audiences with a high potential for savings.

Outcome 2. Program attributable spillover was much more limited in CY 2019 than in CY 2015, largely due to increases in the percentage of participants who sought out Focus on Energy Rebates, though there is more evidence for Program uplift. In contrast to the last evaluation of this Program, the vast majority of projects completed by participants were rebated, especially for lighting measures. However, there is some evidence to suggest that participants are being driven, in part, toward these rebate programs when they are considering what types of measures to install and projects to complete. Among projects where the participant said their participation was either *somewhat important* or *very important* in their decision making, nearly 2,000,000 kWh in rebated savings were achieved in the first year.

Recommendation 2. Consider further emphasizing the role that Focus on Energy Program sponsored rebates and incentives can play in lowering the costs of projects in an effort to increase the Program uplift effect.

Outcome 3. Participants are overwhelmingly satisfied with the Training Program and are likely to recommend the Program to their colleagues. A large majority of Program participants rated their experience with the Focus on Energy commercial Training Program as at least an eight out of ten, and a similar share reported being *very likely* to recommend the Program using the same scale. Feedback from surveyed participants indicated that they liked the course offerings, course instructors, and the variety of courses and course locations. They also recommended more courses across the state, particularly the part of the state north of Wisconsin Highway 29, and in the Milwaukee area. Multiple respondents also requested a course on building automation.

Recommendation 3. Continue to operate the course as designed with various opportunities for participants to learn about different equipment and other topics at locations across the state, with increased opportunities for courses in the Milwaukee area and additional courses on building automation beyond what are currently planned.

Pilots and Initiative

This chapter summarizes the CY 2018 Focus on Energy pilots and an initiative that are unaffiliated with other residential or nonresidential programs: the Seasonal Savings Pilot, the Midstream Commercial Kitchen Equipment Pilot, the Low-E Storm Windows Pilot, the Midstream Commercial and Industrial Lighting Initiative, and the Digital Customer Engagement for Business Pilot. Focus on Energy did not claim savings for the Digital Customer Engagement for Business Pilot.

The following sections provide pilot descriptions and *ex ante* and *ex post* verified gross savings, as well as describe completed evaluation activities. Table 295 lists the *ex ante* annual and lifecycle gross savings for the pilots and initiative evaluated in CY 2018.

Table 295. CY 2018 Evaluated Pilots Annual and Lifecycle *Ex Ante* Gross Savings Summary

Pilot	*Ex Ante* Gross Annual			*Ex Ante* Gross Lifecycle		
	kWh	kW	Therms	kWh	kW	Therms
Pilots and Initiative						
Seasonal Savings Pilot	859,956	0	283,662	1,604,311	0	506,807
Midstream Commercial Kitchen Equipment Pilot	547,081	36	25,681	5,808,989	36	303,464
Low-E Storm Windows Pilot	9,125	15	16,692	137,709	15	250,380
Midstream Commercial and Industrial Lighting Initiative	433,149	88	0	5,577,990	88	0
Rural Pilot						
Digital Customer Engagement for Business	-	-	-	-	-	-
Total	**1,849,311**	**139**	**326,035**	**13,128,999**	**139**	**1,060,651**

Note: Some savings from the pilots and initiative reflect activities in earlier years that were credited to the year in which they were evaluated. See Appendix E, Tables E-13, E-14, and E-15 for more details.

Table 296 lists the *ex post* annual and lifecycle verified gross savings for the pilots and initiative evaluated in CY 2018.

Table 296. CY 2018 Evaluated Pilots Annual and Lifecycle Verified Gross Savings Summary

Pilot	*Ex Post* Verified Gross Annual			*Ex Post* Verified Gross Lifecycle		
	kWh	kW	Therms	kWh	kW	Therms
Pilots and Initiative						
Seasonal Savings Pilot	859,956	0	283,662	1,652,720	0	507,290
Midstream Commercial Kitchen Equipment Pilot	560,007	48	26,047	6,019,351	48	309,298
Low-E Storm Windows Pilot	10,154	11	5,842	203,086	11	116,844
Midstream Commercial and Industrial Lighting Initiative	433,134	88	0	5,577,825	88	0
Rural Pilot						
Digital Customer Engagement for Business	-	-	-	-	-	-
Total	**1,863,251**	**147**	**315,551**	**13,452,982**	**147**	**933,432**

Note: Some of the savings evaluated in CY 2018 were claimed in prior years. See Appendix E, Tables E-13, E-14, and E-15 for more details

Table 297 lists the total *ex post* annual and lifecycle verified gross savings for evaluated CY 2015–CY 2018 pilots and initiative.

Table 297. CY 2015–CY 2018 Pilots Annual and Lifecycle Verified Gross Savings Summary

Pilot	*Ex Post* Verified Gross Annual			*Ex Post* Verified Gross Lifecycle		
	kWh	kW	Therms	kWh	kW	Therms
Pilots and Initiative						
Seasonal Savings Pilot	1,652,720	0	507,290	1,652,720	0	507,290
Midstream Commercial Kitchen Equipment Pilot	560,007	48	26,047	6,019,351	48	309,298
Low-E Storm Windows Pilot	10,154	11	5,842	203,086	11	116,844
Midstream Commercial and Industrial Lighting Initiative	433,134	88	0	5,577,825	88	0
Rural Pilot						
Digital Customer Engagement for Business	-	-	-	-	-	-
Total	**2,656,015**	**147**	**539,179**	**13,452,982**	**147**	**933,432**

Seasonal Savings Pilot

The Seasonal Savings Pilot, implemented by Nest Labs, was offered from summer CY 2016 until winter CY 2018. It used an algorithm to make small, energy-saving adjustments to thermostat setpoints during peak summer months, peak winter months, or both in qualifying homes with Nest thermostats. The Pilot objective was to generate kilowatt-hour and therm savings through these minor setpoint changes without affecting homeowner comfort. The Pilot Implementer enlisted 16,568 participants in CY 2016, 18,160 participants in CY 2017, and 43,067 participants in CY 2018.

Other than zip codes, the Pilot Implementer did not collect any Pilot customer information. Nest algorithms used customer temperature setpoints and schedules, along with additional information gathered from Nest thermostats, to determine Pilot eligibility. Qualifying participants opted into the Seasonal Savings Pilot through their Nest thermostat. An algorithm was then applied remotely over a period of three weeks, adjusting temperature settings slightly during the winter and summer seasons. Across CY 2015–CY 2018, the Pilot achieved verified gross lifecycle savings of 56,368 MMBtu.

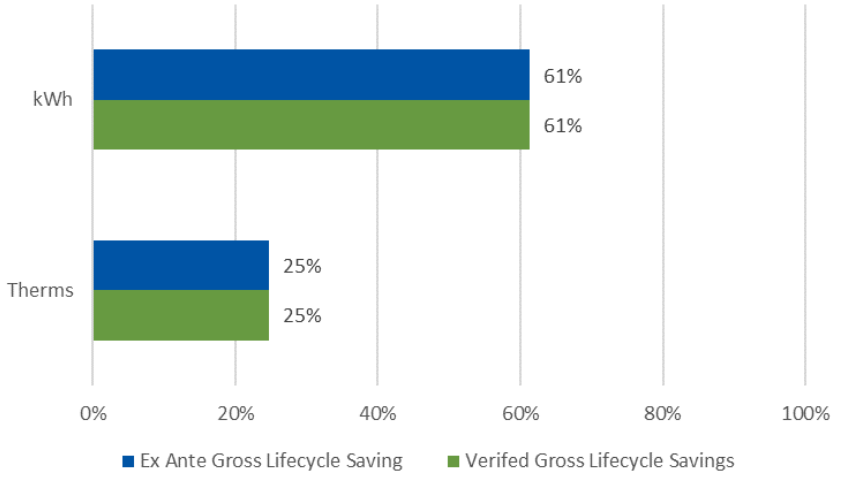
Table 298 lists the spending, savings, participation, and cost-effectiveness for the Seasonal Savings Pilot. No demand reduction was claimed for the Pilot.

Table 298. Seasonal Savings Pilot Summary

Item	Units	CY 2018	CY 2017	CY 2016	CY 2015–CY 2018
Incentive Spending	$	0	0	0	0
Participation	Number of Participants	43,067	18,160	16,568	77,795
Verified Gross Lifecycle Savings	kWh	859,956	351,576	441,188	1,652,720
	kW	0	0	0	0
	therms	283,662	174,864	48,764	507,290
	MMBtu	31,300	18,686	6,382	56,368
Verified Gross Lifecycle Realization Rate	MMBtu (%)	100%	100%	103%	100%
Net Annual Savings	kWh	859,956	351,576	441,188	1,652,720
	kW	0	0	0	0
	therms	283,662	174,864	48,764	507,290
Annual Net-to-Gross	MMBtu (%)	100%	100%	100%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.09	2.34	0.63	1.69

Figure 195 shows the percentage of gross lifecycle savings goals achieved by the Seasonal Savings Pilot in CY 2018. The Pilot achieved 61% of its kilowatt-hour savings goals and 25% of its therm savings goals.

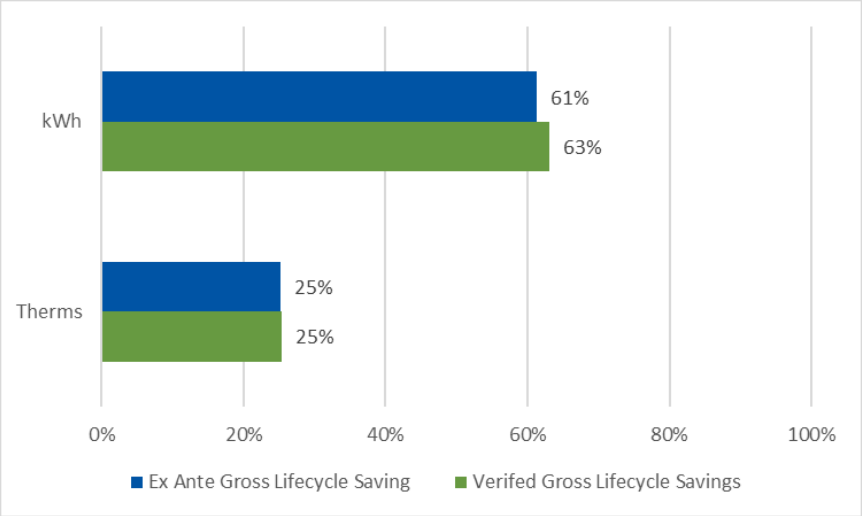
Figure 195. Seasonal Savings Pilot Percentage of CY 2018 Gross Lifecycle Savings Goals Achieved



Note: For *ex ante* gross lifecycle savings, 100% reflects the Seasonal Savings Pilot Implementer's contract goals of 1,402,992 kWh and 1,144,899 therms for CY 2018.

Figure 196 shows the percentage of gross lifecycle savings goals achieved by the Seasonal Savings Pilot over CY 2016–CY 2018. The Pilot achieved 63% of its verified kilowatt-hour savings goals and 25% of its verified therm savings goals.

Figure 196. Seasonal Savings Pilot Percentage of CY 2016–CY 2018 Gross Lifecycle Savings Goals Achieved



Note: For *ex ante* gross lifecycle savings, 100% reflects the Seasonal Savings Pilot Implementer's contract goals of 2,619,647 kWh and 2,003,573 therms for CY 2016–CY 2018.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted an impact evaluation of the Seasonal Savings Pilot in CY 2016, which revealed that *ex post* and *ex ante* savings were nearly identical. Based on that analysis, the Team used a realization rate of 100% for the CY 2017 and CY 2018 evaluations.

Pilot Goals and Key Performance Indicators

The Pilot goals and KPIs are shown in Table 299. The Pilot did not have a stated demand reduction goal, but did have a numeric energy savings goal and performance metrics for a percentage of energy and therm reduction in relation to the baseline. The Pilot frequently reached its customer opt-in goal but fell short of its energy savings goals.

Table 299. Pilot Key Performance Indicators and Goals

KPI or Goal	Goal	CY 2018	CY 2017	CY 2016
Customer opt-in rate	At least 75% of customer products that receive an invitation to participate accept that invitation and participate (opt-in)	Opt-in rate was 69% in winter and 67% in summer	Opt-in rate was 76% in winter and 72% in summer	Opt-in rate was 64% in winter and 79% in summer
Percentage cooling savings (kWh)	5%	3.3% cooling savings achieved	3.7% cooling savings achieved	3.7% cooling savings achieved
Percentage heating savings (kWh and therms)	5%	3.7% heating savings achieved	3.5% heating savings achieved	1.92% heating savings achieved

Pilot Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 300 lists the CY 2017 and CY 2018 incentive costs for the Seasonal Savings Pilot.

Table 300. Seasonal Savings Pilot Incentive Costs

	CY 2018	CY 2017
Incentive Costs	$0	$0

The Evaluation Team found that the CY 2018 Seasonal Savings Pilot was cost-effective (2.09). Table 301 lists the evaluated costs and benefits.

Table 301. Seasonal Savings Pilot Costs and Benefits

Cost and Benefit Category	CY 2018	CY 2017
Costs		
Administration Costs	$0	$19,932
Delivery Costs	$145,642	$45,453
Incremental Measure Costs	$0	$0
Total Non-Incentive Costs	**$145,642**	**$65,385**
Benefits		
Electric Benefits	$40,819	$12,394
Gas Benefits	$227,497	$120,831
Emissions Benefits	$36,321	$19,755
Total TRC Benefits	**$304,637**	**$152,980**
Net TRC Benefits	**$158,994**	**$87,595**
TRC B/C Ratio	**2.09**	**2.34**

Midstream Commercial Kitchen Equipment Pilot

Focus on Energy and the Pilot Administrator (APTIM) designed the Midstream Commercial Kitchen Equipment Pilot to test the feasibility of incorporating the midstream delivery channel across multiple programs in Focus on Energy's portfolio. Through the Pilot, participating distributors pass point-of-sale discounts directly to customers who purchase qualifying ENERGY STAR and Consortium for Energy Efficiency Tier II commercial kitchen equipment. Focus on Energy launched the Midstream Commercial Kitchen Equipment Pilot in CY 2017 and continued to offer the Pilot through CY 2018.

Franklin Energy (Pilot Implementer) implements the Pilot, recruiting and working with distributors in Wisconsin. The Pilot Implementer assigns an Energy Advisor to each participating distributor. These Energy Advisors work with distributors, helping them understand the Pilot and set up systems to capture and report qualifying sales. The Energy Advisors provide an Excel-based sales template to each distributor; developed and enhanced based on distributor feedback, this template is pre-populated with all eligible equipment and incentive levels and is set up to mimic distributor invoices (the template

includes invoice numbers, customer contact information, and similar information). Energy Advisors communicate and regularly visit distributors, helping them with marketing and education efforts (such as by ensuring there are updated labels on showroom equipment).

Table 302 lists actual Pilot spending, savings, participation, and cost-effectiveness in CY 2017 and CY 2018. In CY 2017 and CY 2018, the verified gross lifecycle savings were 51,468 MMBtu and the net annual savings were 1,440 MMBtu. The savings for CY 2017 and CY 2018 were evaluated in the same time span, so the tables below combine the two years of savings into CY 2018 evaluated savings.

Table 302. Midstream Commercial Kitchen Equipment Pilot Summary

Item	Units	CY 2018 Evaluated Savings
Incentive Spending	$	$62,670
Participation	Number of Participants	315
Verified Gross Lifecycle Savings	kWh	6,019,351
	kW	48
	therms	309,298
	MMBtu	51,468
Verified Gross Lifecycle Realization Rate	MMBtu (%)	102%
Annual Net-to-Gross	MMBtu (%)	32%
Net Annual Savings	kWh	178,642
	kW	15
	therms	8,309
	MMBtu	1,440
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	0.60

Pilot Offerings

Through the Midstream Commercial Kitchen Equipment Pilot, Focus on Energy seeks to achieve four overall objectives:

- Provide greater long-term, cost-effective savings for the portfolio
- Reduce Focus on Energy's administrative burden in processing commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient commercial kitchen equipment
- Increase dealers' stock of qualifying commercial kitchen equipment

Table 303 outlines the available Pilot incentives.

Table 303. Incentives Available through Midstream Commercial Kitchen Equipment Pilot

Measure	Incentive
ENERGY STAR Steam Cooker	$350–$700/Unit
ENERGY STAR Fryer	$120–$250/Fry Pot
ENERGY STAR Griddle	$30–$50/Linear Foot
ENERGY STAR Hot Holding Cabinet	$160/Cabinet
ENERGY STAR Convection Oven	$160/Oven
ENERGY STAR Combination Oven	$300–$500/Oven
ENERGY STAR Rack Oven	$300–$500/Unit
Infrared Salamander Broiler	$300/Broiler
ENERGY STAR Commercial Dishwasher	$200–$800/Unit
Consortium for Energy Efficiency Tier II Pre-Rinse Spray Valve	$25/Valve
Kitchen Hood Ventilation Controls—Temperature and Optical Sensing	$80–$600/Horsepower Controlled
Kitchen Hood Ventilation Controls—Temperature Sensing Only	$40–$200/Horsepower Controlled
Food Service Multiple Equipment Bonus, Two Types	$100
Food Service Multiple Equipment Bonus, Three Types	$300

Table 304 shows participant counts by measure, incentive amounts, and available *ex ante* savings. This does not include bonus incentives provided to Midstream Commercial Kitchen Equipment Pilot distributors for carrying additional types of equipment or increasing energy-efficient sales. From 287 unit measurements in CY 2017 and CY 2018, the Pilot claimed savings of 547,081 kWh, 36 kW, and 25,681 therms in *ex ante* annual savings.

Table 304. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot Incentives and Gross Savings Summary

Measure	Summary Data		*Ex Ante* Gross Annual			*Ex Ante* Gross Lifecycle		
	n	Incentives	kWh	kW	therms	kWh	kW	therms
Ventilation Controls	3	$1,100	7,943	1.36	482	79,425	1.36	4,820
Dishwasher, Commercial	45	$14,030	322,845	0.95	1,782	3,228,447	0.95	17,820
Fryer	11	$2,750	0	0	5,987	0	0	71,844
Hot Holding Cabinet	7	$1,120	12,303	2.14	0	147,636	2.14	0
Ice Machine	9	$450	8,374	0.92	0	83,744	0.92	0
Oven	69	$11,320	16,664	3.84	11,254	199,984	3.84	135,050
Pre-Rinse Sprayer	2	$50	834	0	26	4,170	0	130
Refrigerator/Freezer—Commercial	130	$13,220	89,548	10.23	0	1,074,576	10.23	0
Steam Cooker	11	$7,400	88,570	16.84	6,150	991,007	16.84	73,800
Bonuses	84	$12,250	-	-	-	-	-	-
Total[a]	**371**	**$63,690**	**547,081**	**36.27**	**25,681**	**5,808,989**	**36.27**	**303,464**

[a] There were also 17 water-related energy savings measures that were not included in this table since they did not have any incentives (and their values were already integrated into the *ex ante* savings above).

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted Pilot impact and process evaluations in CY 2017 and CY 2018. The Team designed its EM&V approach to integrate multiple perspectives to assess Pilot performance. Table 305 lists the specific data collection activity and sample size used in the CY 2017 and CY 2018 evaluations.

Table 305. Pilot Data Collection Activities and Sample Sizes

Activity	CY 2018 Sample Size (n)	CY 2017 Sample Size (n)
Pilot Actor Interviews	2	n/a
Tracking Database Review	Census	n/a
Participant Surveys	29	14
Distributor In-Depth Interviews (participating)	5	0
Distributor In-Depth Interviews (nonparticipating)	5	0

Pilot Actor Interviews

In August 2018, the Evaluation Team interviewed the Pilot Administrator and the Pilot Implementer about the Pilot's current state and to assess its objectives, performance, and implementation challenges and solutions. The interviews covered several topics:

- Pilot goals and achievements
- Pilot delivery changes
- Participation barriers

Tracking Database Review

The Evaluation Team reviewed the Midstream Commercial Kitchen Equipment Pilot data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EUL in adherence with the TRM or other deemed savings sources.

Participant Surveys

The Evaluation Team deployed online surveys each quarter to all CY 2017 and CY 2018 participants (end-users) with email addresses available via SPECTRUM. The Team gathered the online survey results via Qualtrics for this analysis, with 43 out of 149 participants with available email addresses responding. The survey covered participant satisfaction and gathered data to inform freeridership and spillover estimates for NTG calculations.

Distributor Interviews

The Evaluation Team conducted 10 distributor interviews during October and November 2018: five with participating distributors and five with nonparticipating distributors who were invited to participate but declined. The Evaluation Team designed distinct interview guides for both distributor types; Table 306 shows the researchable questions for each interview type.

Table 306. Distributor Interview Researchable Questions

Distributor Type	Researchable Questions
Participating	What market(s) do participating distributors sell in? Who are potential customers?
	Why are distributors deciding to participate in the Pilot?
	Has the Pilot increased distributors' level of knowledge about energy efficiency?
	What was the Pilot setup experience like for participating distributors?
	Has participating in the Pilot changed sales of eligible products?
	In what ways has the Pilot influenced distributors' stocking and promotional practices?
	What areas of the Pilot have been successful? Where does the Pilot need to change?
	How does the Pilot compare to other similar pilots, both within and outside Focus on Energy?
Nonparticipating	What market(s) do nonparticipating distributors sell in? Who are potential customers?
	How knowledgeable are distributors about energy-efficient commercial kitchen products?
	Why did distributors decide not to participate in the Pilot? What would need to change to encourage them to participate?
	How does the Pilot compare to other similar pilots, both within and outside Focus on Energy?

Impact Evaluation

To calculate gross savings, the Evaluation Team reviewed the Pilot tracking data provided by the Pilot Implementer, then combined these data with results from the participant surveys. To calculate net savings, the Evaluation Team used participant survey data to determine freeridership.

This section provides impact evaluation findings for the Pilot based on the tracking database review and participant surveys.

Verified Savings Results and Realization Rates

Table 307 lists the CY 2018 evaluated *ex post* verified savings for the Midstream Commercial Kitchen Equipment Pilot.

Table 307. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot *Ex Post* Annual Verified Savings

Measure	kWh	kW	Therms	MMBtu
Ventilation Controls	7,943	1.36	482	75
Dishwasher, Commercial	326,338	1.01	1,060	1,219
Fryer	0	0	6,919	692
Hot Holding Cabinet	12,185	2.01	0	42
Ice Machine	13,164	1.48	0	45
Oven	48,476	10.72	11,410	1,306
Pre-Rinse Sprayer	834	0	26	5
Refrigerator/Freezer—Commercial	50,229	5.74	0	171
Steam Cooker	100,838	26.05	6,150	959
Total	**560,007**	**48.36**	**26,047**	**4,515**

Table 308 lists the annual realization rates for the Midstream Commercial Kitchen Equipment Pilot. Overall, the Pilot achieved a first-year evaluated realization rate of 102%, weighted by total (MMBtu)

energy savings. The total represents a weighted average realization rate for the entire Pilot. The Evaluation Team found that certain appliances were claiming a higher amount of savings then expected based on the TRM. For example, the *ex ante* savings for freezers and refrigerators in CY 2017 were exactly double the amount expected when they came from one specific appliance retailer, leading to a relatively low realization rate for freezers and refrigerators for the year. There was also one specific oven model that did not claim any demand reduction or electric savings, even though it should have according to the TRM. This led to a significantly higher realization rate for electric savings for this measure category, as shown in the table.

Table 308. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot Realization Rates

Pilot	kWh	kW	Therms	MMBtu
Ventilation Controls	100%	100%	100%	100%
Dishwasher, Commercial	101%	107%	59%	95%
Fryer	-	-	116%	116%
Hot Holding Cabinet	99%	94%	-	99%
Ice Machine	157%	160%	-	157%
Oven	291%	279%	101%	111%
Pre-Rinse Sprayer	100%	-	100%	100%
Refrigerator/Freezer—Commercial	56%	56%	-	56%
Steam Cooker	114%	155%	100%	105%
Total	**102%**	**133%**	**101%**	**102%**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Midstream Commercial Kitchen Equipment Pilot, calculating an NTG percentage of 32%. Although this may seem low in comparison to typical core program NTG values, it has a very different interpretation in a midstream context. The Midstream Commercial Kitchen Equipment Pilot claimed savings for every Pilot-eligible piece of equipment sold; this automatically results in a lower NTG since the retailer would have sold some of these products in absence of the Pilot.

In a midstream context, the 32% NTG translates to a 47% increase in efficient kitchen equipment sales at participating distributors. For example, for every 100 qualifying units the retailers would have sold in absence of the Pilot, they instead sold 147 units due to the Pilot's influence. The NTG estimate is the increase in sales above the baseline relative to the total volume sold in the Pilot period (47/147=32%).

Freeridership

The Evaluation Team used the self-report survey method to determine the Pilot freeridership, shown in Table 309, and applied results to all the Pilot measure categories. The Team estimated an average self-reported freeridership of 69% from surveys with Pilot participants.

Table 309. Midstream Commercial Kitchen Equipment Pilot Self-Reported Freeridership

Survey Respondents	Percentage of Freeridership
43	69%

Spillover Findings

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Midstream Commercial Kitchen Equipment Pilot. The Team applied evaluated and deemed savings values to the spillover measures customers said they had installed as a result of their Pilot participation, presented in Table 310.

Table 310. Midstream Commercial Kitchen Equipment Pilot
Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total Lifecycle Savings Estimate (MMBtu)
LEDs	80	148

Next, the Evaluation Team divided the sample spillover savings by the Pilot gross savings from the entire survey sample:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Pilot Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, rounded to the nearest whole percentage point, for the Midstream Commercial Kitchen Equipment Pilot respondents (Table 311).

Table 311. Midstream Commercial Kitchen Equipment Pilot Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	148
Pilot Savings	10,035
Spillover Estimate	**1%**

Verified Net Savings Results

To calculate the Pilot's NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

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

This yielded an overall NTG estimate of 32% for the Pilot. Table 312 shows total savings net of freeridership, participant spillover, and total annual gross and net savings in MMBtu, as well as the overall Pilot NTG.

Table 312. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot
Annual Net Savings and Net-to-Gross Percentage

Net of Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Pilot Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Pilot NTG
3,142	67	4,515	1,440	32%

Table 313 shows the annual Pilot net demand and energy impacts (kilowatt-hours, kilowatts, and therms). The Evaluation Team attributed these savings as net of what would have occurred naturally without the presence of the Pilot.

Table 313. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot Annual Net Savings

Measure Category	Annual Net Savings			
	kWh	kW	therms	MMBtu
Midstream Commercial Kitchen Equipment Pilot	178,642	15	8,309	1,440

Table 314 lists the lifecycle Pilot net demand and energy impacts (kilowatt-hours, kilowatts, and therms).

Table 314. CY 2018 Evaluated Midstream Commercial Kitchen Equipment Pilot Lifecycle Net Savings

Measure Category	Lifecycle Net			
	kWh	kW	therms	MMBtu
Midstream Commercial Kitchen Equipment Pilot	1,920,173	15	98,666	16,418

Process Evaluation

Pilot Delivery

The Evaluation Team interviewed the Pilot Administrator and the Pilot Implementer regarding Pilot delivery. Per the Pilot Administrator, distributors who designated an internal champion to work with the Pilot Implementer's Energy Advisor were more successful with integrating the Pilot into their business practices and boosting sales of efficient equipment.

In CY 2017, the Pilot Implementer attempted to recruit 15 distributors who they had worked with previously (primarily through the Business Incentive Program). While about half these distributors opted to participate, only five were active at the end of CY 2017 (according to the Pilot Implementer, three distributors decided not to continue participation since the Pilot processes did not align well with their business practices). Therefore, the Pilot Implementer increased its recruiting efforts in CY 2018, and met their goal of enrolling three additional Pilot distributors. The Pilot eligibility was also widened to include national distributors in CY 2018, though none enrolled. The Pilot Implementer reported that the largest recruitment hurdle was that some distributors' point-of-sale systems did not allow them to efficiently integrate Pilot incentives without creating additional administrative burdens.

Per the Pilot Implementer, smaller, local distributors fit best for the Pilot as it proved easier to form a relationship with a key contact who could champion integrating the Pilot into their existing business practices. In addition, the Pilot Implementer suggested that smaller distributors tended to offer higher customer service levels, making them more likely to already have helped customers with the downstream incentive forms, whereas larger distributors preferred to pass the Pilot's utility incentive administrative aspects to their customers.

Participating distributors submit monthly sales data to the Pilot Implementer, and the Pilot Implementer reimburses distributors for the incentives within 30 days of receiving these data. Distributors also

generate invoices showing instant discounts through their point-of-sale systems. The Pilot Implementer audits a sample of these invoices (10% of each distributors' sales) to verify data submitted in the sales template. The Pilot Implementer collects data from participating distributors via the provided Excel template; uploaded tracking data are reported to the Pilot Implementer, the Pilot Administrator, and the Pilot Evaluator through the SPECTRUM tracking and reporting system.

Currently, Focus on Energy still offers traditional, downstream incentives for commercial kitchen equipment, with the same equipment eligibility and incentive levels, avoiding confusion related to determining qualification. The Midstream Commercial Kitchen Equipment Pilot, however, includes sales performance incentives (spiffs) paid to distributors. As of CY 2018, these incentives were tiered by the customer incentive amount as opposed to CY 2017, when a fixed incentive was in place. Focus on Energy intends for these spiffs to offset increased overhead costs for participating in the Pilot, or distributors can pass the spiffs to sales staff or even to customers as additional discounts.

According to the Pilot Administrator, the spiffs offered in CY 2018 were not as successful as the Pilot Administrator hoped in offsetting barriers to recruiting additional distributors' participation. These barriers are distributors' primary concerns regarding the additional administrative burden. Both the Pilot Administrator and Pilot Implementer hypothesized that the Business Incentive Program's continued existence, with end-use customers bearing the burden of applying for incentives, created disincentives for some distributors' transition to the midstream delivery channel.

Marketing and Outreach

Though the Pilot Implementer recruits distributors for participation, participating distributors drive customer outreach. The Pilot Implementer provides marketing and educational materials to participating distributors. In CY 2018, these included incentive labels for qualifying equipment, fact sheets co-branded with ENERGY STAR (including incentives ranges for qualifying equipment), and a tri-fold brochure discussing the benefits of ENERGY STAR equipment to commercial customers (such as efficient cooking times and reduced waste heat exhausted to kitchens). Finally, the Pilot Implementer provides participating distributors with a separate document explaining overall Pilot processes.

The Pilot Implementer reported that distributors' staff and marketing efforts serve as the primary Pilot participation drivers. As distributors can have small showrooms, sometimes stocked with refurbished equipment, and with many equipment sales that occur over the phone, visual merchandizing materials offer limited impacts. Consequently, distributors' sales staff should know of Pilot offerings and be motivated to promote qualifying products to customers.

The Pilot Administrator said CY 2018 marketing succeeded with local customers such as schools, but they found it more difficult to engage franchised restaurants, which tend to buy in bulk via national distribution channels. The Pilot Administrator reported that national distributors tend to resist participating in utility programs, since they vary by state and pose implementation barriers on a national level.

Distributor Awareness of Energy Efficiency and Value Proposition

Participating distributors' familiarity varied regarding the benefits of energy-efficient commercial kitchen equipment prior to participating in the Pilot: two distributors said they were *very familiar*, two said they were *somewhat familiar*, and one said they were *not too familiar* with the benefits. Three of the five participating distributors said their knowledge level increased since participating in the Pilot, with two specifying details of equipment qualification criteria. These three distributors considered the increased knowledge as a benefit to their business, specifically because it helped their sales staff to talk more effectively about the benefits of energy-efficient equipment to customers.

Of the nonparticipating distributors, one was currently *very familiar* with energy-efficient equipment benefits, three were *somewhat familiar*, and one was *not too familiar* but explained that their primary role was not in customer sales.

All the distributors cited energy cost savings as the primary benefit of energy-efficient commercial kitchen equipment for their customers. One distributor noted that this is especially important for restaurants, where utility bills can be a significant expense. Distributors also mentioned several secondary benefits:

- Lower operating costs due to higher-quality equipment, which increases both equipment longevity and production rates
- Allowing environmentally conscious companies to promote their environmental stewardship
- Better warranties than standard equipment
- Customers' trust in the Focus on Energy brand as denoting quality and optimal efficiency

Only two of the five participating distributors reported that their customers often know that they want energy efficiency kitchen equipment before learning about the Pilot discounts. One distributor said the knowledge level differs by customer size, and that "larger institutions know about qualifying equipment and want those products, while many smaller customers don't get it." All distributors (even nonparticipating distributors) said they tell customers about Focus on Energy incentives (either instant discounts or the traditional Business Incentive Program), and six of 10 said they help customers with downstream incentive applications.

Participating Distributors' Experience and Participation Motivations

All five interviewed participating distributors said the Midstream Commercial Kitchen Equipment Pilot launched consistently with their expectations. When asked the effort required to launch the Pilot, two of five distributors said it took *a small amount* while three said it took *a moderate amount*. Two distributors reporting *a moderate amount* thought it took more time than they initially anticipated to get their point-of-sale and quoting systems working with the Pilot; the third said there were initial tracking workbook issues (which were remedied relatively quickly). One distributor said the Pilot's launch was "a learning process for everyone [distributors and the Pilot Administrator]." Another distributor said they provided the Pilot Implementer with feedback, which was then used to streamline Pilot operations. Two distributors thought the Pilot setup process could have been improved if the

enhanced Excel template had been available from the beginning, while another distributor preferred more support from Focus on Energy (such as more frequent meetings with Pilot representatives).

Distributors identified three main reasons for participating in the Midstream Commercial Kitchen Equipment Pilot:

- **Saves customers money, which helps with sales**: The Pilot saves customers money up-front, which can help distributors close sales more easily than when customers must wait for an incentive payment.
- **Requires less of customers**: As distributors handle the paperwork, the customer does less to receive the discount. One distributor who used to receive a great deal of customer questions regarding the downstream incentive form said these questions have decreased now that they participate in the Pilot.
- **Competitiveness**: Instant discounts make distributors more competitive relative to other businesses selling similar equipment (but where customers have to wait for rebates).

Outside these primary benefits, participating distributors said Pilot participation allows them to more easily sell higher-quality equipment than before. Distributors held that these benefits would likely increase customer satisfaction and repeat business.

The Evaluation Team asked distributors about their concerns with the Pilot across specific areas:

- **Providing information to customers**: Two distributors cited this as a challenge: one found it difficult to obtain information from the website, while another kept running out of point-of-purchase Pilot materials for customers and their sales staff forget to order more.
- **Data requirements**: Only one participating distributor identified a challenge related to data requirements, saying it resulted from their staff not understanding what information was required from customers. All five distributors reported that fulfilling Pilot data requirements became easier once the enhanced Excel template was introduced. Four participating distributors specifically mentioned finding the template straightforward and easy to use, while the other said, "I have not used the Excel template to its full potential."
- **Setting up the point-of-sale system**: One participating distributor identified this as an issue and said they had to add each incentive as its own item in their system (another said they followed this same process, but did not consider it an issue).
- **Receiving incentive payments**: No distributors reported issues with receiving payments, but one said the process took too long. This distributor suggested making it possible to submit invoices on a more regular basis (such as weekly) to speed up the payment process.[171]
- **Calculating commissions**: No participating distributors considered this an issue.

[171] It is now possible for distributors to submit invoices as often as they wish.

Overall, participating distributors reported high satisfaction levels with the Midstream Commercial Kitchen Equipment Pilot. On a scale from 0 to 10, three distributors rated their satisfaction as a 10, one as a 9, and one as an 8. All participating distributors preferred the Pilot over traditional incentive programs as it made it easier for customers to participate and it encouraged more sales of qualifying equipment. One distributor said, "In the rebate program, customers need to do the legwork themselves, and many of my customers are too busy [and don't end up getting the rebate]."

Participation Barriers (Nonparticipating Distributors)

The Evaluation Team asked nonparticipating distributors why they declined to participate in the Pilot. Four of five distributors said the primary reason was that the Pilot proved too labor intensive. Specifically, distributors identified the amount of required paperwork and the effort required to set up their point-of-sale system to run the Pilot. One distributor said, "We want to help customers, but we just don't have the bandwidth to participate [in the Pilot]." Still, only one of these distributors recalled seeing the current Excel template, which many participating distributors said made the Pilot administration easier. The final distributor (excluding the four considering the Pilot as too labor intensive) forgot about the Pilot when they got too busy, and reported being interested in learning more about the Pilot from its representatives.

Outside of these primary reasons, distributors expressed concerns in other areas:

- Three distributors cited calculating commissions as a factor in their decisions to not participate. Specifically, they thought it would add another step to the administrative process and would delay providing sales staff with accurate commissions until receiving reimbursement checks.
- One distributor considered it difficult to generate sufficient customer demand to offset the administrative burden.
- Two distributors considered the lag time too long between submitting an invoice and receiving payment.[172]

In addition to the nonparticipating distributors we interviewed, eight more distributors declined full interviews but briefly provided feedback regarding why they chose not to participate in the Pilot. Three of these distributors did not know of the Pilot's existence (one said all utility Pilot coordination went through their corporate office). Three other distributors said they do not sell much equipment that qualifies for incentives, so do not see the value in participating. Specifically, one distributor has a significant lease-to-own business to which the Pilot would not apply. The remaining two said they were simply too busy to participate.

[172] The Pilot Implementer is committed to reimbursing distributors within 30 days of receiving the sales template. When the template is received after the end of each month, some sales may not be reimbursed for up to 60 days.

Pilot Impact on Sales, Stocking, and Promotional Practices (Participating Distributors)

The Evaluation Team asked participating distributors about impacts from the Midstream Commercial Kitchen Equipment Pilot participation on sales, stocking, and promotional practices. Prior to the Pilot's start, distributors achieved a wide variety of estimated sales across three categories:

- New, ENERGY STAR–certified models: 12%–90%
- New, non-ENERGY STAR–certified (standard efficiency) models: 10%–68%
- Refurbished equipment: 0%–40%

Only two distributors said their proportion of sales across these categories changed due to their Pilot participation. One distributor estimated that their ENERGY STAR–certified commercial kitchen equipment sales rose from 12% of all commercial kitchen equipment sales up to 25%, with this entire increase from a decrease in non-ENERGY STAR model sales. The other distributor was unsure how much sales increased, but found it was a relatively small amount. Both distributors thought sales changes likely resulted from incentives encouraging customers to purchase qualifying equipment and from spiffs encouraging sales staff to promote qualifying equipment.

Participating distributors reported customer demand as the primary factor influencing which products they stocked, both before and after Pilot launch. Two distributors, however, changed how they stocked items upon beginning their Pilot participation: one now prioritizes ENERGY STAR products in general, while the other stocks a greater number of Pilot-qualifying products. Two distributors reported that they changed some promotional practices—specifically providing more information to their customers regarding ENERGY STAR equipment in their showrooms. All five distributors use the Pilot stickers and educational materials provided by Focus on Energy. No distributors changed their base pricing due to their Pilot participation.

Desired Pilot Changes

Participating and nonparticipating distributors offered various recommendations for improving the Pilot, specifically related to support from Focus on Energy, the eligible products, and the discount levels.

Participating Distributors

When asked how Focus on Energy could better support the Pilot, participating distributors offered several suggestions:

- One distributor requested an easier way to identify Pilot-qualified products. This distributor suggested working with manufacturers to include incentive information in their product listings on quoting software, thus automatically importing these to distributors' systems.
- One distributor requested an easier method for determining a customer's utility to determine Pilot eligibility. Though another distributor did not request this, they noted that they did not include Pilot discounts when providing quotes to customers due to uncertainty regarding their eligibility.
- One distributor requested better quality control of Pilot information due to finding conflicting details on the website.

- One distributor requested more frequent communication from Focus on Energy to inform them about Pilot developments and new, available marketing materials.
- One distributor requested more frequent opportunities to submit invoices for reimbursement (such as weekly).
- One distributor requested additional referral opportunities, potentially through on-site audits that direct customers to participating distributors in their areas.

Participating distributors provided numerous requests for products they want added to the Pilot, including pressure fryers, more types of holding cabinets, clamshell grills, ice machines, additional freezers, three-door refrigeration units, and warmer/steamer ovens. The distributor who wants warmer/steamer ovens specifically said these product types use a great deal of energy and are increasing in popularity with his customers.

Most participating distributors did not cite issues regarding discount levels, with three participating distributors saying discounts levels are sufficiently high to encourage customers to purchase qualifying equipment. One distributor did not consider incentives as a large driver of participation, as they effect the purchase price so little. This distributor said incentive amounts would have to increase a great deal to become effective. Another distributor said the incentives are effective for lower-priced items, but are less effective for higher-ticket items. Finally, one distributor said incentives did not serve as a major sales driver since customers who purchase Pilot-eligible equipment would likely have done so without the incentive.

Nonparticipating Distributors

Nonparticipating distributors suggested the following Pilot changes:

- Three distributors requested an easier way to identify Pilot-qualified products. One nonparticipating distributor said, “When we are quoting someone, it’s easier to give them a link to the Focus on Energy website where they can learn more [instead of having to look the product eligibility up ourselves].”
- Two distributors requested lower administrative burdens, such as collecting less information or making it easier to import incentives into their point-of-sale system.
- One distributor requested a wider array of educational materials focused on benefits from energy-efficient commercial kitchen equipment, such as a calculator that shows customers how much they can save with this equipment. One distributor, struggling with small business customers, wanted materials focused on targeting these customers.

The Evaluation Team asked nonparticipating distributors how likely they would be to join the Midstream Commercial Kitchen Equipment Pilot if Focus on Energy made their requested change. Two found it *very likely*, while the remaining three found it *somewhat likely*. The three saying it *somewhat likely* shared the same sentiment that the Pilot had to be easy for them to implement (which, based on what they knew of the Pilot, they were not sure would be possible).

Distributor Profiles

As shown in Table 315, interviewed participating and nonparticipating distributors had relatively common characteristics. Most distribute nearly all of their commercial kitchen equipment in Wisconsin, primarily working with contractors and business owners/managers and tending to maintain ongoing relationships with their customers. Distributors reported that their direct-business customers most commonly operated restaurants and bars, but they included a wide variety of industries involving food service, such as education and healthcare or other institutions.

Table 315. Distributor Profiles

	Participants (n=5)	Nonparticipants (n=5)
Distribution Reach	Three distribute >95% in Wisconsin (one conducts 25% of business outside of Wisconsin)	Four distribute >95% in Wisconsin (one conducts 50% of business outside of Wisconsin, primarily in the Michigan upper peninsula)
Top Customer Types	• Contractors: 30%–75% • Business owners/managers: 25%–70% • Retailers: 0%–15%	• Business owners/managers: 40%–90% • Contractors: <5–50% • Retailers: 0%–10%
Customer Industries	Restaurants and bars are the primary customers, followed by education facilities, healthcare facilities (such as hospitals and nursing), sports arenas, casinos, corporate cafeterias, prisons, and delis	
Percentage of Repeat Customers	40%–75%	40%–90%

Customer Satisfaction

The Evaluation Team conducted an online survey of Pilot end-use participants. Not all respondents answered all questions, so sample sizes may differ by question. The Team asked respondents to rate their overall satisfaction with the Midstream Commercial Kitchen Equipment Pilot on a scale of 0 to 10, where 0 meant *not at all satisfied* and 10 meant *extremely satisfied*. Respondents reported a mean score of 8.3 (n=24). The Team also asked about respondents satisfaction with energy-efficient equipment they purchased and with their contractors. Respondents reported mean ratings of 9.4 for satisfaction with their purchased equipment (n=9) and of 8.2 for their contractors (n=6).

The Evaluation Team calculated a NPS for the likelihood that they would recommend the Pilot. Depending on the answers provided, the Team distinguished three participant categories:

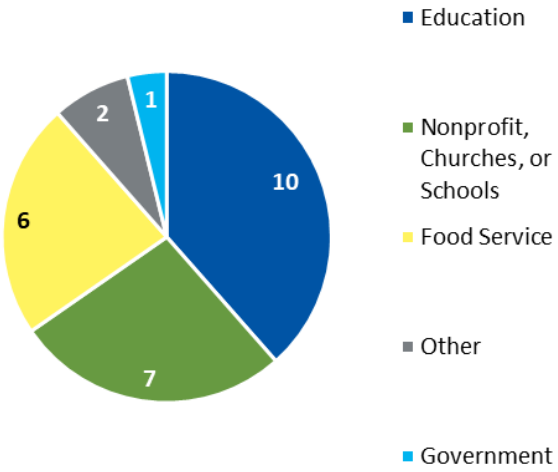
- Promoters: respondents assigning a 9 or 10 rating
- Passives: respondents assigning a 7 or 8 rating
- Detractors: respondents assigning a 1 to 6 rating

The Evaluation Team calculated the NPS as the difference between the percentage of promoters and the percentage of detractors, expressed as an absolute number between -100 and +100. A positive NPS is generally considered good. Respondents reported an NPS of +44.

Customer Business Types

Of surveyed respondents (n=25), 21 owned their facilities, three reported combined leasing and ownership, and one leased. Respondents were from different industry types, shown in Figure 197.

Figure 197. Industry Type



Source: Midstream Commercial Kitchen Equipment Pilot Survey Question E1. "What industry is your company in?" (CY 2018 n=26)

Pilot Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 316 lists the CY 2018 incentive costs for the Midstream Commercial Kitchen Equipment Pilot.

Table 316. Midstream Commercial Kitchen Equipment Pilot Incentive Costs

	CY 2018
Incentive Costs	$62,670

The Evaluation Team found that the CY 2018 Midstream Commercial Kitchen Equipment Pilot was not cost-effective (0.64). Table 317 lists the evaluated costs and benefits.

Table 317. Midstream Commercial Kitchen Equipment Pilot Costs and Benefits

Cost and Benefit Category	CY 2018
Costs	
Administration Costs	$0
Delivery Costs	$84,674
Incremental Measure Costs	$266,785
Total Non-Incentive Costs	**$351,460**
Benefits	
Electric Benefits	$120,218
Gas Benefits	$74,721
Emissions Benefits	$30,721
Total TRC Benefits	**$225,660**
Net TRC Benefits	**($125,800)**
TRC B/C Ratio	**0.64**

Evaluation Outcomes and Recommendations

The Evaluation Team identified several outcomes and recommendations to improve the Midstream Commercial Kitchen Equipment Pilot.

Outcome 1. Many nonparticipating distributors did not believe they could overcome the amount of administrative work needed to implement the Pilot; however, they were not familiar with the improved sales submission template that Focus on Energy provides. Meanwhile, participants appreciated the enhanced template and said it aided them in understanding the requirements. Four of five nonparticipating distributors chose not to join the Pilot primarily due to the amount of administrative work needed to implement and run it. However, only one nonparticipating distributor recalled seeing the Excel template, which three of four participating distributors thought made the Pilot much easier to implement.

Recommendation 1. Reconnect with distributors who declined to participate and show them the improved sales submission template that helps with implementing the Pilot; this should reduce negative reactions regarding the administrative burden. When recruiting new distributors, ensure that they see the sales template early on, so they understand how it can help them gather and report required data.

Outcome 2. The personal support provided by Pilot representatives serves as a highly motivating factor in distributor participation. Participating distributors reported successful interactions with their Pilot representatives (Energy Advisors), lauded their quick answers to questions, and took their feedback for Pilot improvements into account. Conversely, some nonparticipating distributors felt they received only partial Pilot information, which did not assure them they could run the Pilot.

Recommendation 2. When recruiting distributors, emphasize the number of touchpoints participating distributors have with Pilot representatives, during both the Pilot setup and duration, to help them resolve issues. Continue to provide regular support to participating distributors, as needed.

Low-E Storm Windows Pilot

The Low-E Storm Windows Pilot, implemented by D+R International and its manufacturer partners (Larson Manufacturing and Quanta Technologies, Inc.) adds low-E storm windows to Focus on Energy's measure portfolio. Low-E storm windows have low-E glass and offer the benefits of replacement windows at a fraction of the cost.

The goal of this Pilot is to test the potential for targeted promotion and discounts to increase the sales and installations of low-E storm windows in Milwaukee area's residential single family and multifamily sectors, and to enable Focus on Energy to accurately assess the achievable savings from a full-scale low-E storm windows program.

The Pilot took place in October and November of 2017, and the low-E windows measure was integrated into the Retail Lighting and Appliance Program in CY 2018. Evaluated savings for the CY 2017 Pilot, shown in Table 318, were not evaluated in CY 2017, but are being evaluated and credited in CY 2018.

Table 318. Low-E Storm Windows Pilot Summary

Item	Units	CY 2018 Evaluated Savings
Incentive Spending	$	$34,644
Units	Number of Units	1,391
Verified Gross Lifecycle Savings	kWh	203,086
	kW	11
	therms	116,844
	MMBtu	12,377
Verified Gross Lifecycle Realization Rate	MMBtu (%)	36%
Annual Net-to-Gross	MMBtu (%)	29%
Net Annual Savings	kWh	2,945
	kW	3
	therms	1,694
	MMBtu	179

Pilot Offerings

Through this Pilot, Focus on Energy offers incentives for low-E storm windows through upstream sales and targeted multifamily markets, as well as through a multichannel marketing campaign to promote the measure. Table 319 provides the available Pilot incentives.

Table 319. Incentives Available through Low-E Storm Windows Pilot

Measure	Incentive
Upstream Sales (Larson Manufacturing) of Low-E Windows	25% markdown on eligible windows
Targeted Multifamily Sales (Quanta Technologies) of Low-E Windows	$3.00 per square foot per window/maximum per-customer incentive of $1,000

Pilot Goals and Key Performance Indicators

The Pilot established goals and KPIs, as shown in Table 320. The Pilot did not have stated numeric energy saving or demand reduction goals, but did aim to increase the sales of eligible units by 28% in the greater Milwaukee area and to increase the market share of low-E windows by 25 percentage points.

Table 320. Low-E Storm Windows Pilot Key Performance Indicators and Goals

KPI or Goal	Goal
Low-E Storm Window Sales	28% increase in total unit sales in the Pilot region by manufacturers
General Product Category Market Growth	Increase in market share of low-E storm windows in Pilot region by 25 percentage points
Low-E Storm Window Market Share	Accelerate market transformation in Pilot area

Participant counts by measure, incentive amounts, and available *ex ante* savings are shown in Table 321. The Pilot claimed savings from two participating retailers for sales that took place in CY 2017, amounting to *ex ante* savings of 9,125 kWh. Again, though these sales took place in CY 2017, savings were not evaluated and credited until CY 2018.

Table 321. CY 2018 Evaluated Low-E Storm Windows Pilot
Annual and Lifecycle Gross Savings Summary

Measure	Summary Data		*Ex Ante* Gross Annual			*Ex Ante* Gross Lifecycle		
	Participants	Average Incentive	kWh	kW	therms	kWh	kW	therms
Low-E Storm Windows	Two Retailers (Home Depot and Menards)	n/a	9,125	15	16,692	137,709	15	250,380

Verified Net Savings Results

To calculate the Pilot NTG, the Evaluation Team subtracted modeled freeridership results using the following equation:

$$NTG = 1 - Freeridership\ Ratio$$

Sales data modeling is described in detail in Appendix I. The modeling yielded an overall NTG estimate of 29% for the Pilot. Although this may seem low in comparison to typical core program NTG values, it has a very different interpretation in a midstream context. The Low-E Storm Windows Pilot claimed savings for every low-E storm window sold at participating retailers; this automatically results in a lower than 100% NTG since the retailers would have sold some of these low-E storm windows in absence of the Pilot.

In a midstream context, the 29% NTG translates to a 41% increase in low-E storm window sales at participating distributors. For example, for every 100 qualifying storm windows the retailers would have sold in the absence of the Pilot, 141 low-E storm windows were sold instead, due to the Pilot's influence. The NTG estimate is the increase in sales above the baseline relative to the total volume sold in the Pilot period (41/141=29%). This 41% sales increase is significantly higher than the Pilot goal of a 28% increase in total unit sales.

Table 322 shows total savings net of freeridership and total annual gross and net savings in MMBtu as well as the overall Pilot NTG.

Table 322. CY 2018 Evaluated Low-E Storm Windows Pilot Annual Net Savings and Net-to-Gross

Measure Category	Total Pilot Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Pilot Net-to-Gross
Low-E Storm Windows	12,377	940	29%

Table 323 shows the annual Pilot net demand and energy impacts (kilowatt-hours, kilowatts, and therms). The Evaluation Team attributed these savings as net of what would have occurred naturally without the presence of the Pilot.

Table 323. CY 2018 Evaluated Low-E Storm Windows Pilot Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Low-E Storm Windows	2,945	3	1,694

Table 324 lists the lifecycle Pilot net demand and energy impacts (kilowatt-hours, kilowatts, and therms).

Table 324. CY 2018 Evaluated Low-E Storm Windows Pilot Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Low-E Storm Windows	58,895	3	33,885

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcome for the Low-E Storm Windows Pilot.

Outcome 1. The Pilot successfully met its KPI to achieve a 28% increase in low-E storm window sales at participating retailers.

Midstream Commercial and Industrial Lighting Initiative

Focus on Energy and the Initiative Administrator (APTIM) designed the Midstream Commercial and Industrial Lighting Initiative to test the feasibility of incorporating the midstream delivery channel across multiple programs in Focus on Energy's portfolio. Through the Initiative, participating distributors pass point-of-sale discounts directly to customers who purchase qualifying LED measures. Focus on Energy launched the Initiative in CY 2018 and it has operated exclusively in the Green Bay area.

Franklin Energy implements the initiative, recruiting and working with distributors in Wisconsin. Incentives are designed to be consistent with the Business Incentive Program.

Table 325 lists actual initiative spending, savings, participation, and cost-effectiveness during CY 2018. Over the course of the initiative, the verified gross lifecycle savings were 19,032 MMBtu and the net annual savings were 463 MMBtu.

Table 325. Midstream Commercial and Industrial Lighting Initiative Summary

Item	Units	CY 2018
Incentive Spending	$	$20,774
Units	Number of Units	8,903
Participating Retailers	Number of Retailers	2
Verified Gross Lifecycle Savings	kWh	5,577,825
	kW	88
	therms	0
	MMBtu	19,032
Verified Gross Lifecycle Realization Rate	MMBtu (%)	100%
Annual Net-to-Gross	MMBtu (%)	31%
Net Annual Savings	kWh	135,735
	kW	27
	therms	0
	MMBtu	463
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.80

Initiative Offerings

This Initiative has three goals:

- Provide more cost-effective savings from prescriptive measures
- Engage an under-participating market segment in lighting and electrical distributors
- Streamline access to incentives

Verified Net Savings Results

This Initiative was not anticipated to have claimed savings in CY 2018; therefore, an Initiative-specific evaluation plan was not executed in CY 2018. In the absence of other available data, the Evaluation Team calculated a savings-weighted NTG based on verified gross savings and NTG for the CY 2018 Midstream Commercial Kitchen Equipment Pilot and the Low-E Storm Windows Pilot. This calculation resulted in a 31% NTG for the Midstream Commercial and Industrial Lighting Initiative.

Table 326 shows total net savings and total annual gross and net savings in MMBtu, as well as the overall applied NTG.

Table 326. Net-to-Gross and MMBtu of Midstream Commercial Kitchen Equipment Pilot and Low-E Storm Windows Pilot

Midstream Commercial Kitchen Equipment Pilot		Low-E Storm Windows Pilot		Initiative NTG Ratio
NTG	Verified Savings (MMBtu)	NTG	Verified Savings (MMBtu)	
32%	51,468	29%	12,377	31%

To calculate the Initiative's NTG, the Evaluation Team used the weighted average formula:

$$\text{NTG}_{Lighting} = \frac{(\text{Net Annual Savings}_{Kitchen} * \text{NTG}_{Kitchen}) + (\text{Net Annual Savings}_{Windows} * \text{NTG}_{Windows})}{(\text{Net Annual Savings}_{Windows} + \text{Net Annual Savings}_{Kitchen})}$$

This yielded an overall NTG estimate of 31% for the Initiative. Table 327 shows total net savings and total annual gross and net savings in MMBtu, as well as the overall applied NTG.

Table 327. CY 2018 Midstream Commercial and Industrial Lighting Initiative Annual Net Savings and Net-to-Gross Ratio

Total Pilot Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Initiative NTG Ratio
19,032	5,964	31%

Table 328 shows the annual net demand and energy impacts (kilowatt-hours, kilowatts, and therms). The Evaluation Team attributed these savings as net of what would have occurred naturally without the presence of the Initiative.

Table 328. CY 2018 Midstream Commercial and Industrial Lighting Initiative Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Midstream Commercial and Industrial Lighting	135,735	27	0

Table 329 lists the lifecycle net demand and energy impacts (kilowatt-hours, kilowatts, and therms).

Table 329. CY 2018 Midstream Commercial and Industrial Lighting Initiative Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Midstream Commercial and Industrial Lighting	1,747,967	27	0

Initiative Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix F includes a description of the TRC test.

Table 330 lists the CY 2018 incentive costs for the Midstream Commercial and Industrial Lighting Initiative.

Table 330. Midstream Commercial and Industrial Lighting Initiative Incentive Costs

	CY 2018
Incentive Costs	$20,774

The Evaluation Team found that the CY 2018 Midstream Commercial and Industrial Lighting Initiative was cost-effective (2.80). Table 331 lists the evaluated costs and benefits.

Table 331. Midstream Commercial and Industrial Lighting Initiative Costs and Benefits

Cost and Benefit Category	CY 2018
Costs	
Administration Costs	$0
Delivery Costs	$31,390
Incremental Measure Costs	$23,558
Total Non-Incentive Costs	**$54,947**
Benefits	
Electric Benefits	$133,119
Gas Benefits	$0
Emissions Benefits	$20,655
Total TRC Benefits	**$153,774**
Net TRC Benefits	**$98,827**
TRC B/C Ratio	**2.80**

Digital Customer Engagement for Business Pilot

As part of PSC's initiative to enhance Focus on Energy services to rural customers, in CY 2018, Focus on Energy collaborated with Alliant Energy to offer the Digital Customer Engagement for Business Pilot. Through this Pilot, Focus on Energy sought to help business owners in Alliant's service territory better understand and manage their organization's energy. APTIM was the Pilot Administrator and First Fuel was the Pilot Implementer.

The online platform, Energy Edge, located within Alliant Energy's My Account webpage, provided nonresidential customers with detailed information about their organization's energy usage, such as billing history per month, year-over-year consumption, weather impacts, and end uses (how energy usage breaks down by use type). Customers must have logged in to see the platform, then could add information about their business premise on a Facility Profile page to increase the accuracy of the energy usage information. The online platform also provided each business with customized energy-saving recommendations on the Ways to Save page, which included the estimated payback period and potential savings per year for each recommendation.

Evaluation, Measurement, and Verification Approach

The Evaluation Team did not conduct an impact analysis, as the Pilot did not claim energy savings. The Team did conduct a process evaluation of the Pilot in CY 2018.

Pilot Actor Interviews

The Evaluation Team spoke to the Pilot Administrator and Pilot Implementer about the Pilot design and progress toward goals.

Participant Surveys

The Evaluation Team conducted a participant survey between September 2018 and January 2019 to assess participant satisfaction, the extent to which the Pilot motivated energy-saving actions, and Pilot cross-promotion activities. The Pilot Implementer provided the Evaluation Team with a sample frame of

213 participants who had visited the Energy Edge platform by January 2019. The Team invited 206 of those participants to take the survey via email,[173] offering survey respondents an incentive opportunity to win one of five $100 gift cards. Table 332 lists the sample sizes used in the process evaluation.

Table 332. Online Platform Pilot Data Collection Activities and Sample Sizes

Activity	Date Fielded	Invitations Sent	Started Survey	Screened from Survey[a]	Completed Surveys
Participant Survey Round 1	September 2018	128	19	4	15
Participant Survey Round 2	January 2019	78	5	1	4
Totals		**206**	**24**	**5**	**19**

[a] Respondents were screened from the survey if they said they did not visit or did not remember visiting the online platform.

Process Evaluation

In CY 2018, the Evaluation Team interviewed the Pilot Administrator and Pilot Implementer and surveyed participating businesses as part of the process evaluation activities. The findings from these interviews are described below.

Pilot Design, Delivery, and Goals

The goal of the Pilot was to increase nonresidential customer engagement and participation in Focus on Energy programs. The Pilot Implementer gave approximately 27,000 eligible businesses access to the online platform, Energy Edge. Not all nonresidential customers were eligible: Alliant Energy excluded large nonresidential organizations and specific industries that were not expected to be a good fit for the platform. Alliant Energy primarily targeted small- and medium-sized business customers with a focus on customers who were already engaged with Alliant Energy in some way (for example, those who previously created an account or participated in a program). Of the approximate 27,000 eligible businesses, 213 had accessed the platform as of January 2019. The primary way customers found the online platform was via the Energy Edge button on the Alliant Energy My Account page, although Alliant Energy also connected some eligible customers to the platform through KAMs. Alliant Energy sent out two direct mailings to their customers in CY 2018 to promote the platform.

When an eligible customer visited the platform through their Alliant Energy My Account page, they had access to a variety of energy use information customized for their business, such as end uses, historical energy use data, and ways to save money based on their current energy consumption. Focus on Energy designed the Pilot to achieve three main goals:

- Increase customer satisfaction
- Motivate energy-saving actions
- Cross-promote other Focus on Energy offerings

[173] Seven participants did not receive the survey invitation due to bounced emails.

User Experience

As described above, the Evaluation Team administered a participant survey in two waves. As described by the Focus on Energy Pilot Manager at Alliant Energy, one challenge was how to ensure that information on Energy Edge was accessible to the target audience—facility managers, energy managers, and decision makers who could use energy trend information—as opposed to administrative staff who logged onto Alliant Energy's website to pay energy bills. Therefore, in the second wave, the Team added several questions about the participant's role at their organization and their decision-making ability and asked more details about the end user. For this reason, the sample sizes for certain questions are very small and data should be viewed as anecdotal.

User Information

The Evaluation Team included survey questions to assess how often the respondent accessed the platform and whether they were sharing information from the platform with others at the organization.[174]

Surveyed respondents (n=16) most frequently reported accessing Energy Edge two or more times (nine respondents), while three respondents accessed it once and four did not know. Respondents also indicated that, to their knowledge, no one else at their organization had accessed Energy Edge (three respondents). Three of four respondents who had accessed the platform reported the ability to make upgrade decisions at their organization, although two of these individuals needed to get approval from someone else at the organization.

After accessing the platform, three of four respondents frequently shared its information with others at their organization. Respondents reported sharing Energy Edge information specifically with the president, CEO, or owner (two respondents) or with an accountant/controller (one respondent).

Survey respondents rated their satisfaction with the ease of finding the Energy Edge platform, helpfulness of the information provided, level of detail provided, and their overall satisfaction with the platform.

When asked how easy it was to find the Energy Edge platform, most respondents said it was *somewhat easy* or *very easy* to find (13 of 16 respondents). Respondents then rated their satisfaction with Energy Edge before and after they input additional information about their facility.[175] Most respondents (10) found the platform to be *somewhat helpful* or *very helpful* before including additional information about their facility, whereas three respondents found the platform to be *not too helpful* or *not at all helpful* (one respondent said neutral).

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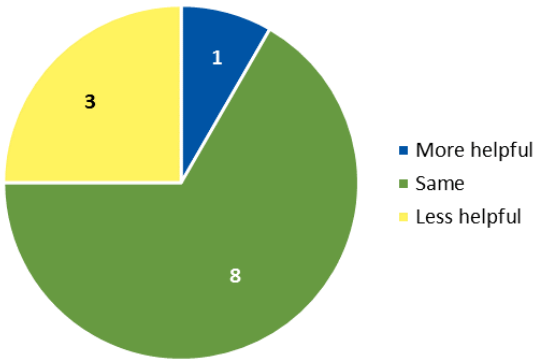
[174] The Team added several of these questions to the second survey wave, so the response size is small.

[175] Energy Edge provided an opportunity for customers to add detailed information about their facility to increase the customization of the information provided about ways for the facility to save energy. Four respondents did not provide facility information.

As shown in Figure 198, after adding facility information, eight respondents (n=12) did not view the platform as any more or less helpful. One respondent said the platform was *more helpful* after adding facility information, while three respondents said the platform was *less helpful* after adding facility information. Seven of the 12 respondents who added facility information said they needed to add a moderate amount or a lot of information in order for Energy Edge to provide useful information.

Figure 198. Helpfulness of Platform after Adding Facility Information

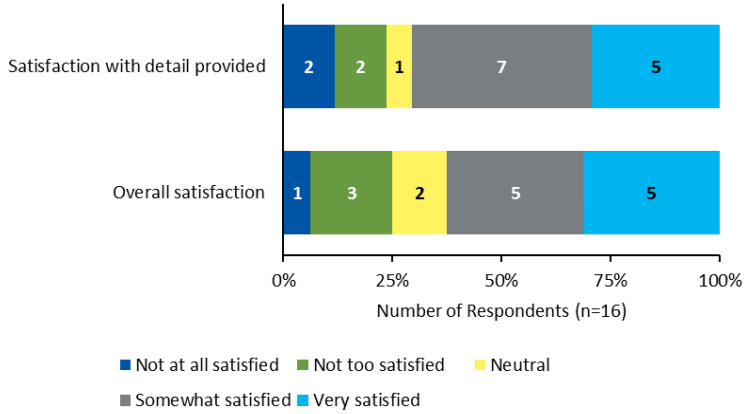


Source: Digital Customer Engagement for Business Participant Survey Questions B2 and B3. "How helpful did you find the information on the Energy Edge page before [after] you added additional information about your facility (such as entering the facility size in square feet)?" (CY 2018 n=12)

Of all the information provided on Energy Edge, five of seven respondents said the historical information about facility energy consumption was the most helpful. One respondent said the information about billing was most helpful and one respondent said the information about lighting was most helpful.

When asked about their satisfaction with the level of detail provided by the platform, most respondents (n=16) said they were *somewhat satisfied* or *very satisfied*. Similarly, when asked about their overall satisfaction, respondents primarily said they were *somewhat satisfied* or *very satisfied* (see Figure 199).

Figure 199. Overall Satisfaction



Source: Digital Customer Engagement for Business Participant Survey Questions B6 and B8. "How would you rate your satisfaction with the level of detail provided on the Energy Edge page?" (CY 2018 n=17) and "How would you rate your overall satisfaction with the Energy Edge platform?" (CY 2018 n=16)

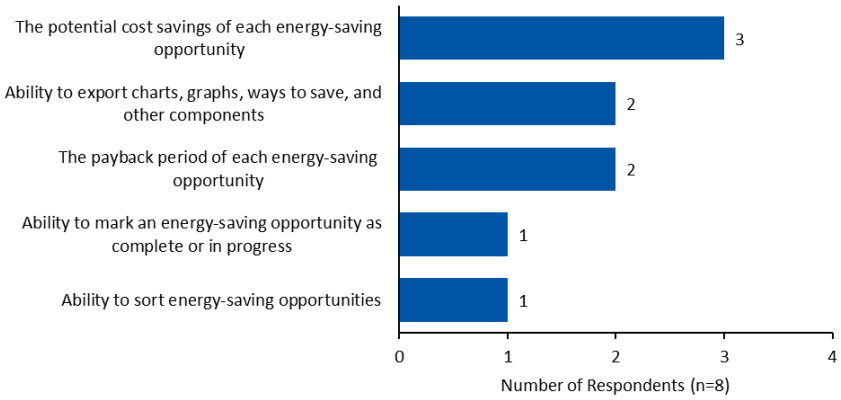
Despite this relatively high satisfaction, 13 of 15 respondents said the platform could be improved. Seven respondents offered suggested improvements, which included requiring fewer questions about the facility, adding more graphs to the homepage, better tailoring the information to each business, adding more information about which factors impact consumption, providing better historical information, and making sure the page is working (this respondent said the pages were blank). Seven of 10 respondents said a training on how to use the Energy Edge platform would be helpful.

Decision Making Process

Of the 16 surveyed respondents, eight remembered visiting the Ways to Save page on the Energy Edge platform (six did not visit the page, and two did not remember). When asked how helpful the Ways to Save page was, five of eight respondents rated it as *somewhat helpful* or *very helpful.* Three respondents said the page was *not too helpful*, citing that the recommendations to save energy were generic or were not relevant to their facility.

Respondents (n=8) were then asked which specific features of the Ways to Save page were helpful. As shown in Figure 200, respondents most frequently said the potential cost savings estimate provided for each energy-saving opportunity was helpful, followed by the ability to export materials and to see the provided payback period for each opportunity.

Figure 200. Most Helpful Features on the Ways to Save Page



Source: Digital Customer Engagement for Business Participant Survey Question D4. “Which of the following features on the Ways to Save page did you find helpful? (Select all that apply).”

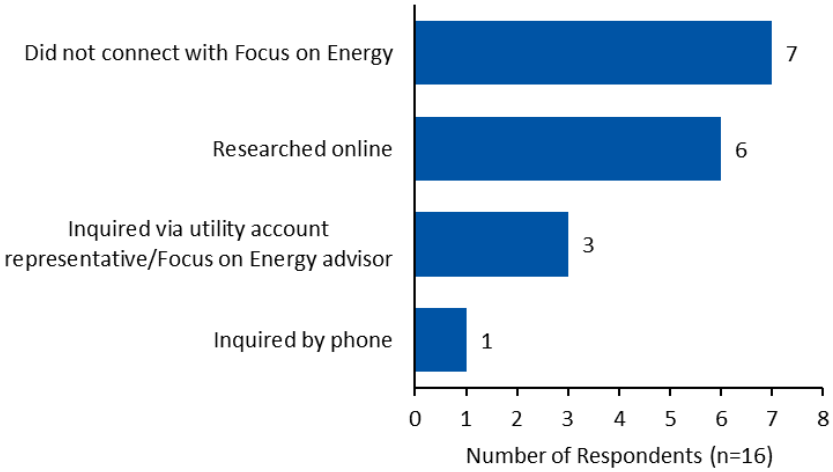
The survey asked whether businesses had taken or planned to take any energy-saving actions due to the information they received on Energy Edge. Three respondents (of 16) reported having already taken energy-saving actions based on information they received from the platform, and three respondents said they planned to take energy-saving actions in the next six months. Some respondents provided detail on their planned or completed actions:

- Two reported lighting upgrades
- One reported envelope sealing
- One reported controlling energy more during business hours (such as by turning off lights and computers and using more zone heating and cooling)

Pilot Cross-Promotion

Survey respondents (n=16) answered whether they were aware of Focus on Energy incentives before visiting the Energy Edge platform. Twelve respondents said they were already aware of Focus on Energy incentives, whereas three respondents learned about these incentives through the platform (one did not know). Although most respondents were already aware of Focus on Energy incentives before visiting the platform, nine of 16 respondents reported connecting with Focus on Energy to learn more about its offerings. Figure 201 shows the method in which respondents contacted Focus on Energy or conducted further research.

Figure 201. How Respondents Further Investigated Focus on Energy Program Offerings



Source: Digital Customer Engagement for Business Participant Survey Question E4. "Did you connect with Focus on Energy to learn more about incentives? (Select all that apply)." Multiple responses allowed (n=16)

Pilot Cross-Promotion

Of the surveyed businesses (n=16), most respondents owned the facility or had the ability to make capital improvements. Roughly half the surveyed businesses had five or more buildings in their organization and had annual electric costs exceeding $20,000. Respondent characteristics are summarized in Table 333.

Table 333. Online Platform Respondent Characteristics

Own Facility	Able to Make Capital Improvements	Annual Electric Costs Exceed $20,000	Building(s) Built After 1990	Five or More Buildings
13	15	7	5	7

Evaluation Outcomes and Recommendations

Although Focus on Energy does not plan to continue the Pilot in CY 2019, the Evaluation Team identified several recommendations that may be relevant this or a similar platform in the future.

Outcome 1. Most surveyed participants were satisfied with the online platform, although satisfaction did not change after adding facility information. Of the 16 surveyed respondents, 10 said the platform

was at least *somewhat helpful*. This baseline satisfaction with the platform is notable because satisfaction did not meaningfully change after respondents added their facility information (which allows the platform to produce more customized results). The survey did not reveal why satisfaction did not change after respondents added their facility information. However, most respondents noted that they had to add at least a moderate amount of facility information for Energy Edge to provide useful information and were frustrated with needing to spend time answering questions about their facility and not seeing the result (in terms of getting updated information and customized recommendations from the tool).

Recommendation 1. Consider ways to make the facility information questions easier or quicker. It is possible that asking complex questions about facility features increases participants' expectations about the types of recommendations that should be provided. Therefore, reducing the time and effort it takes to complete facility information questions may have a beneficial impact on participants' experiences.

Outcome 2. The historical facility information was viewed as the most helpful component. Respondents viewed the historical facility information as the most helpful feature of the Energy Edge platform. In fact, when asked what could be improved with the platform, several respondents suggested providing even more specific or tailored information regarding the facility's historical data.

Recommendation 2. Consider ways to increase the level of detail provided on the historical consumption page. Although respondents were already *very satisfied* with the detail, their interest in the historical consumption information suggests that additional complexity on the historical consumption page will likely have a positive impact on their experience. For example, Focus on Energy could add information about how end uses impact month over month (or year over year) consumption to help customers better understand how operations affect energy use. This could be similar to how the platform helps customers understand how weather impacts consumption.

Outcome 3. Visibility and use of the platform are relatively low among eligible customers invited to participate. As of January 2019, fewer than 0.01% of eligible customers had visited the online platform (213 of approximately 27,000 customers). The primary way customers found the online platform was via the Energy Edge button on the Alliant Energy My Account page. Beyond the provided link to the page, Alliant Energy also connected some eligible customers to the platform through KAMs.

The low engagement with the platform suggests an opportunity to enhance marketing.

Recommendation 3. Increase the visibility of the online platform, such as by using an email or bill insert campaign explaining the platform, its uses and benefits, and where to find it on the Alliant Energy website. The participant survey revealed that once a customer found the platform, most accessed it more than once. This suggests that taking additional steps to increase awareness of the platform and its benefits will increase the number of organizations that actively look for information and recommendations on the platform.