

## Focus on Energy Calendar Year 2018 Evaluation Report

**APPENDICES**

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## Appendix A. Key Achievements and Figures for State of Wisconsin and Focus on Energy

### Program Participants

- CY 2018 Residential: 128,885
  - Upstream lighting participation: 920,738
- CY 2018 Nonresidential: 6,135
- CY 2018 Pilots: 43,399
- CY 2018 Rural: 55,698
- CY 2018 Total Participants: 234,117

### Total Electric and Natural Gas Energy Usage

- CY 2017 Electric Sales to Wisconsin Retail Customers megawatt hours (MWh): 69,079,109<sup>1</sup>
- CY 2017 Wisconsin Aggregated Electric Utilities Noncoincident Peak Demand megawatts (MW): 16,967
- CY 2018 Natural Gas Consumption (therms): 4,163,987<sup>2</sup>

### Total Verified Gross Lifecycle Savings

- CY 2018 Energy Savings (MWh): 12,286,794
- CY 2018 Demand Reduction (MW): 108
- CY 2018 Natural Gas Savings (therms): 401,960,018

### Total Verified Net Annual Savings

- CY 2018 Energy Savings (MWh): 516,392
- CY 2018 Demand Reduction (MW): 68
- CY 2018 Natural Gas Savings (therms): 17,916,882

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<sup>1</sup> U.S. Energy Information Administration. "Independent Statistics and Analysis Electricity Consumption." <https://www.eia.gov/electricity/state/Wisconsin/>

<sup>2</sup> U.S. Energy Information Administration. "Independent Statistics and Analysis Natural Gas Consumption by End Use." [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_dc\\_u\\_swi\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_dc_u_swi_a.htm)

## Population Numbers (CY 2018)

- Statewide Census Population: 5,813,568<sup>3</sup>
- Wisconsin Residential Electric Accounts: 2,681,341<sup>4</sup>
- Wisconsin Residential Gas Accounts: 1,757,817<sup>5</sup>
- Wisconsin Nonresidential Electric Accounts: 357,373
- Wisconsin Nonresidential Gas Accounts: 169,596

**Table A-1. CY 2018 Costs, Benefits, and Modified TRC Test Results by Sector Combined**

	Residential	Nonresidential	Total
Administrative Costs	\$1,080,112	\$2,358,264	\$3,438,377
Delivery Costs	\$18,006,106	\$29,234,737	\$47,240,843
Incremental Measure Costs	\$96,141,415	\$84,727,293	\$180,868,708
<b>Total Non-Incentive Costs</b>	<b>\$115,227,633</b>	<b>\$116,320,295</b>	<b>\$231,547,927</b>
Electric Benefits	\$185,409,704	\$343,231,080	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$209,803,790
Emissions Benefits	\$36,265,683	\$73,435,691	\$109,701,374
<b>Total TRC Benefits</b>	<b>\$272,736,367</b>	<b>\$575,409,580</b>	<b>\$848,145,948</b>
<b>TRC Benefits Minus Costs</b>	<b>\$157,508,735</b>	<b>\$459,089,286</b>	<b>\$616,598,020</b>
<b>TRC Ratio<sup>a</sup></b>	<b>2.37</b>	<b>4.95</b>	<b>3.66</b>

Note: Residential and Nonresidential totals include pilots and rural programs.

<sup>a</sup> The total resource cost test (TRC) ratio equals total TRC benefits divided by non-incentive costs.

**Table A-2. CY 2018 Costs, Benefits, and Modified TRC Test Results by Sector with Pilots and Rural**

	Residential	Nonresidential	Rural	Pilots	Total
Administrative Costs	\$972,610	\$2,178,289	\$133,862	\$153,616	\$3,438,377
Delivery Costs	\$14,420,186	\$23,003,392	\$5,083,364	\$4,733,901	\$47,240,843
Incremental Measure Costs	\$88,239,876	\$81,349,141	\$8,292,007	\$2,987,684	\$180,868,708
<b>Total Non-Incentive Costs</b>	<b>\$103,632,672</b>	<b>\$106,530,822</b>	<b>\$13,509,232</b>	<b>\$7,875,201</b>	<b>\$231,547,927</b>
Electric Benefits	\$179,655,302	\$323,757,939	\$12,409,589	\$12,817,952	\$528,640,783
Gas Benefits	\$46,911,621	\$133,540,221	\$4,481,898	\$24,870,049	\$209,803,790
Emissions Benefits	\$34,598,669	\$67,349,281	\$2,838,264	\$4,915,161	\$109,701,374
<b>Total TRC Benefits</b>	<b>\$261,165,592</b>	<b>\$524,647,442</b>	<b>\$19,729,752</b>	<b>\$42,603,163</b>	<b>\$848,145,948</b>
<b>TRC Benefits Minus Costs</b>	<b>\$157,532,920</b>	<b>\$418,116,619</b>	<b>\$6,220,519</b>	<b>\$34,727,962</b>	<b>\$616,598,020</b>
<b>TRC Ratio<sup>a</sup></b>	<b>2.52</b>	<b>4.92</b>	<b>1.46</b>	<b>5.41</b>	<b>3.66</b>

<sup>a</sup> The TRC ratio equals total TRC benefits divided by non-incentive costs.

<sup>3</sup> QuickFacts Wisconsin. <https://www.census.gov/quickfacts/fact/table/WI/PST045216>

<sup>4</sup> Electric power sales, revenue, and energy efficiency Form EIA-861 detailed data files. <https://www.eia.gov/electricity/data/eia861/>

<sup>5</sup> Number of Natural Gas Consumers. [https://www.eia.gov/dnav/ng/ng\\_cons\\_num\\_dcu\\_SWI\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_num_dcu_SWI_a.htm)

## Appendix B. Glossary and Acronyms

**Table B-1. Glossary of Terms**

Term	Definition
Attribution	The establishment of a causal relationship between action(s) taken by a group or program and an outcome. Being attributable to a program means that energy savings and demand reduction can be viewed as a result of the program influence, and the savings would not have been achieved in the program’s absence.
Avoided Costs	Costs to the utility avoided by implementing an energy efficiency measure, program, or practice.
Administrative Costs	Costs not directly associated with a specific program activity but necessary to the development and administration of programs, including record keeping, payroll, accounting, auditing, billing, business management, budgeting and related activities, overhead allocation, and other costs necessary to direct the organization of the program.
Baseline	Conditions (including energy consumption) that would have occurred without implementing the measure or project. These conditions can be either as-found (prior to the energy efficiency retrofit or to conditions that meet the state or federal efficiency codes) or can be a combination of efficient and nonefficient conditions derived from data.
Benefit/Cost Ratio	Mathematical relationship between the benefits and costs associated with implementing energy efficiency measures, programs, practices, or including emission reduction benefits resulting from such implementation.
Claimed Savings	Energy savings the Program Administrator or Program Implementer reports before verification by the Evaluation Team (also called <i>ex ante</i> savings, reported savings, or tracked savings).
Cost-Effectiveness	Comparison of the benefits and costs associated with implementing energy efficiency measures and programs. The actual benefits and costs included can vary based on the design and intent of different cost-effectiveness tests.
Custom Savings	Savings for nonprescriptive measures that do not meet the criteria for deemed savings, as calculated by the Program Administrator or Program Implementer at the time of project completion. The result reflects savings for the specific project based on pre- and post-installation energy use.
Deemed Savings	An estimate of energy, demand, or natural gas savings for a single unit of an installed energy efficiency measure. Deemed savings are typically developed from data sources and analytical methods that are widely considered acceptable for the measure and are applicable to the situation.
Downstream Program	An efficiency program that provides incentives to the end user by directly offsetting the first cost of the equipment and reducing the payback period.
<i>Ex Ante</i> Savings	Energy savings the Program Administrator or Program Implementer reports before verification by the Evaluation Team (also called claimed savings, reported savings, or tracked savings).
<i>Ex Post</i> Evaluation	An assessment of an activity’s impact(s) after completion.
Estimated Savings	Savings estimated by an evaluator after conducting an energy impact evaluation.
Freeriders	Participants who took part in an efficiency program but would have adopted the energy-efficient measure in the program’s absence. Freeriders can be total, partial, or deferred.
Gross Savings	The unadjusted program-reported change in energy consumption or demand resulting from efficiency program–related actions taken by participants.
Interactive Effects	The influence of one technology application in the energy required to operate another application.
Locational Marginal Price	The marginal cost to serve a unit of energy at a specific location at the time of delivery.

Term	Definition
Lifecycle Savings	Energy savings—expressed as verified gross or verified net—generated from measures installed in the current program cycle over each measure’s effective useful life.
Lifetime Savings	Energy savings—expressed as verified gross or verified net—produced as a result of measures installed in the current and previous program cycles, provided that the reporting period falls within the measure’s useful life. This incorporates annual savings and each measure’s effective useful life.
Market Effects	Changes in marketplace practices, services, and promotional efforts that induce businesses and consumers to buy energy-saving products and services without direct program assistance. Evaluators generally consider these effects as resulting from program impacts on the market.
Market Lift	An increase in efficient product sales above a pre-established baseline in response to program incentives, promotion, or advertising.
Measure Life	The life of an energy consuming measure, including its equipment life and savings persistence.
Midstream Program	An efficiency program that targets retailers, distributors, or both. Programs are designed to encourage the targeted audience to stock, promote, and sell more energy-efficient products. Incentives are paid directly to the retailer or distributor.
Net Savings	Savings net of what would have occurred in the program’s absence (observed impacts attributable to the program). Net savings are typically calculated by applying the net-to-gross ratio to the verified gross savings.
Net-to-Gross Ratio	The ratio of verified net savings (attributed to the program after evaluation) to the verified gross savings.
Non-Energy Benefits	An array of valued attributes, such as increased property values or reduced water usage, that were derived from energy-efficient measures in addition to energy savings.
Nonparticipant Spillover	The effect on general consumers who are eligible but did not participate in an efficiency program yet adopted energy saving products or practices because of program influence without program assistance.
Participant Spillover	The effect of participants who, after an initial program experience, adopt more energy saving products or practices without program assistance.
Precision	The degree to which repeated measurements under unchanged conditions produce the same results.
Realization Rate	The ratio of gross savings to verified gross savings.
Reported Savings	Energy savings the Program Administrator or Program Implementer reports before verification by the Evaluation Team (also called tracked savings, <i>ex ante</i> savings, or claimed savings).
Resource Acquisition Program	An efficiency program designed to directly achieve energy savings and/or demand reduction, as well as avoided emissions.
Standard Error	The measure of a data sample’s variability (that is, the distance of a typical data point from the sample mean).
Tracked Savings	Energy savings the Program Administrator or Program Implementer reports before verification by the Evaluation Team (also called reported savings, <i>ex ante</i> savings, or claimed savings).
Unclaimed Rewards	Incentives set aside for customers who fail to submit paperwork to claim program incentives.
Upstream Program	An efficiency program designed to encourage retailers and manufacturers to promote and sell more energy-efficient products. These programs provide incentives to retailers or manufacturers, which are passed through to customers.
Verified Gross Savings	Energy savings that are verified by an independent Evaluation Team and are based on inspections and reviews of the number and types of implemented energy efficiency measures and the engineering calculations used to estimate the energy saved. Verified gross savings reflect total calculated savings based on changes in energy consumption or demand resulting from program-related actions taken by participants in an efficiency program without considering the influence of freeridership or spillover.
Verified Net Savings	Energy savings that evaluators can confidently attribute to program efforts. For verified net savings, the Evaluation Team makes adjustments for outside influences, such as freeridership and spillover.

**Table B-2. Acronyms**

Acronym	Term
CDD	Cooling degree day
CREED	Consortium for Retail Energy Efficiency Data
CUSUM	Cumulative sum
CY	Calendar year
DOE	U.S. Department of Energy
ECM	Electronically commutated motor
EPA	U.S. Environmental Protection Agency
HDD	Heating degree day
NCP	National Consumer Panel
NPSO	Nonparticipant spillover
NTG	Net-to-gross
POS	Point-of-sale
PRISM	PRinceton Scorekeeping Method
PSC	Public Service Commission of Wisconsin
PV	Photovoltaic
RIM	Ratepayer impact measure test
RPP	Retail Products Platform
SEER	Seasonal energy efficiency rating
SEM	Strategic Energy Management
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
TRC	Total resource cost test
TRM	Technical reference manual
UAT	Utility administrator cost test
UEC	Unit energy consumption
UES	Unit energy savings
UMP	Uniform Methods Project
UPC	Universal product code
VFD	Variable frequency drive



## Appendix C. CY 2018 Program Descriptions

This section provides detailed descriptions of Focus on Energy residential and nonresidential programs included in the calendar year (CY) 2018 evaluation.

### *Descriptions of Residential Programs*

During the CY 2018 evaluation, the Evaluation Team assessed the seven residential programs and three residential pilot programs described below. All residential pilot programs operated independently.

#### Appliance Recycling Program

**Program Dates:** The current Appliance Recycling Program was relaunched with a new Program Implementer in January 2017 after Focus on Energy suspended it in November 2015 following complications with the previous Program Implementer.

**Program Purpose:** The Appliance Recycling Program expedites the retirement of old, inefficient refrigerators and freezers to reduce peak demand and energy consumption. The Program offers customers free pick-up and incentives for recycling old refrigerators and freezers.

**Target Audience:** The Program targets customers in single-family homes who have extra refrigerators and freezers or customers replacing an existing appliance to reduce the number of used appliances sold into the secondary market. Customers must own their appliances to participate.

**Program Implementer:** ARCA

**Process and Associated Measures:** The Program offers 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, customers' refrigerators or freezers must be in working condition and between 10 and 30 cubic feet in size, in addition to other logistical requirements. The Program Implementer arranges for these appliances to be dismantled and recycled in an environmentally responsible manner.

The Program Implementer oversees 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. The Program Implementer also purchases media for advertising (sometimes combining advertising budgets with the Program Administrator to take advantage of lower bulk rates). The Program Administrator maintains the Focus on Energy website and manages outreach through social media, with content provided by the Program Implementer.

#### ENERGY STAR Retail Products Platform Pilot

**Program Dates:** The ENERGY STAR Retail Products Platform (RPP) launched in the summer of 2016 and ended in December 2018.

**Program Purpose:** The RPP is a coordinated national effort designed to permanently transform the market for select home appliances and consumer electronics products toward more efficient models.

**Target Audience:** The RPP targets retailers by delivering incentives that encourage them to stock, promote, and ultimately sell more energy-efficient products than they otherwise would absent the Pilot.

**Program Implementer:** The RPP partners with ENERGY STAR, the U.S. Environmental Protection Agency (EPA), and national retailers. The Program Administrator is ICF.

**Process and Associated Measures:** Table C-1 lists the products offered in CY 2018, all of which were at or above ENERGY STAR specifications.

**Table C-1. CY 2018 Retail Products Platform Qualified Products and Specifications**

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

### Low-E Storm Windows Pilot

**Pilot Dates:** The Low-E Storm Windows Pilot launched in September 2017 and was incorporated into the Retail Lighting and Appliance Program in CY 2018.

**Pilot Purpose:** The Pilot encourages the purchase of energy-saving low-E storm windows by providing instant point-of-sale (POS) rebates to customers and spiffs to participating distributors.

**Target Audience:** The Pilot targets residential, small commercial, and multifamily customers.

**Pilot Implementer:** D+R

**Process and Associated Measures:** The Low-E Storm Windows Pilot is a retail-based promotion that provides midstream incentives and price markdowns for low-E storm windows. The Pilot pays a spiff to each participating distributor, and customers receive an instant discount at the POS. The Pilot runs in the early fall during the prime season for storm window sales.

The Pilot did not claim savings in CY 2017. However, these savings are being evaluated and credited in CY 2018 as part of the Retail Lighting and Appliance Program.

## Home Performance with ENERGY STAR Program

**Program Dates:** The Home Performance with ENERGY STAR Program launched January 1, 2006.

In CY 2018, the Program operated as a single program, offering three paths: the Whole Home path, the HVAC path, and the Renewable Rewards path. The Whole Home and HVAC paths offer two tiers of incentive levels—Tier 1 (the standard track) and Tier 2 (the income-qualified track). The Program also offered increased HVAC incentives for equipment installed between August 17, 2018 and March 1, 2019 through a flood relief campaign.

**Program Purpose:** The Program encourages comprehensive energy efficiency retrofits in utility customers’ homes. Focus on Energy designed the Program to address uncertainty about the possible costs and potential for energy savings of home improvements by providing information and recommendations specific to each participant’s home.

**Target Audiences:** Single-family homes, defined as all homes with three or fewer units (all paths), small businesses (renewables path), and low-income customers (income-qualified track)

**Program Implementer:** CLEAResult

**Process and Associated Measures:** Table C-2. through Table C-4. list the measures offered through the two tracks.

**Table C-2. CY 2018 Home Performance with ENERGY STAR Program  
Eligibility and Incentives: Whole-Home Measures**

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	No bonus

**Table C-3. CY 2018 Home Performance with ENERGY STAR Program  
Eligibility and Incentives: Heating and Cooling Measures**

Eligibility	Standard Track <sup>a</sup>	Income-Qualified Track
Household Income Qualification	None	80% or less of State Median Income
Measures	Incentive	
Propane multistage furnace with electronically commutated motor (ECM), 90%+ AFUE	\$100	\$300
Natural gas furnace, 95%+ AFUE	n/a	\$350 <sup>b</sup>
Natural gas multistage furnace with ECM, 95%+ AFUE	\$125 <sup>b</sup>	\$525 <sup>b</sup>
Natural gas multistage furnace with ECM, 95%+ AFUE installed with a 16+ SEER air conditioner	\$250 <sup>b</sup>	\$750 <sup>b</sup>
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 <sup>b</sup>
ECM replacement (must replace existing permanent split capacitor motor)		\$100
Natural gas home heating boiler, 95%+ AFUE	\$400 <sup>b</sup>	\$550 <sup>b</sup>
Indirect water heater (installed at same time as qualified boiler)	\$100	\$150
Natural gas combination boiler, 95%+ AFUE	\$500 <sup>b</sup>	\$675 <sup>b</sup>
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	n/a
Electric heat pump water heater, ENERGY STAR-certified	\$100 <sup>c</sup>	n/a
High-efficiency natural gas storage water heater, ENERGY STAR-certified	\$200 <sup>c</sup>	n/a
Whole-home tankless natural gas water heater, ENERGY STAR-certified	\$300 <sup>c</sup>	n/a
High-capacity, natural gas storage water heater, ENERGY STAR-certified	\$400 <sup>c</sup>	n/a

<sup>a</sup> Focus on Energy temporarily doubled all standard track incentives in response to flood relief, as described in Program Changes.

<sup>b</sup> These measures are eligible for a larger smart thermostat rebate when installed with a smart thermostat.

<sup>c</sup> Water heater measures are only available through the flood relief effort. These measures are not available as part of the standard track. Incentives are not doubled for flood relief path participants.

**Table C-4. CY 2018 Home Performance with ENERGY STAR Program  
Eligibility and Incentives: Renewable Energy Measures**

Measure	Residential	Small Business
Geothermal Heat Pump	\$650	\$650
Solar Electric Photovoltaic System	12% of total cost (\$2,000 maximum)	12% of total cost (\$4,000 maximum)

**Rural Home Performance:** In CY 2018, the Program offered customers in rural zip codes a \$250 rebate for tuning up their natural gas furnace and installing a smart thermostat at the same time.

### Multifamily Energy Savings Program and Multifamily New Construction Program

**Program Dates:** Multifamily offerings launched in 2001 under the Apartment and Condominium Efficiency Services Program. In CY 2012, the programs were revised and renamed the Multifamily Energy

Savings Program and the Multifamily Direct Install Program. At the end of CY 2017, Focus on Energy discontinued the Multifamily Direct Install Program, replacing it with offerings for tenants or condominium owners through the Simple Energy Efficiency Program. Focus on Energy launched a Multifamily New Construction Program in CY 2017, offering incentives for projects or measures that do not qualify for the Design Assistance Program.

**Program Purpose:** The Focus on Energy Multifamily Energy Savings and Multifamily New Construction Programs (collectively called the Multifamily Programs) provide education and energy-saving opportunities to multifamily buildings and condominiums of four or more units. The Programs offer incentives for energy-efficient upgrades.

**Target Audience:** The Multifamily Programs target condominium and apartment associations and multifamily building owners and managers.

**Program Implementer:** Franklin Energy Services, LLC

**Process and Associated Measures:** The Multifamily Energy Savings Program offers two types of rewards: prescriptive rebates for eligible measures with an emphasis on discounts for common area lighting, and custom incentives for performance-based projects. The Multifamily New Construction Program offers prescriptive or custom incentives for multifamily new construction projects or measures, and although any multifamily building owner is qualified to participate, the Program targets projects that do not qualify for the Design Assistance Program, such as projects or measures that arise after completing the building design phase or after the funds from the Design Assistance Program have been exhausted.

The Program Implementer markets the Multifamily Programs through regionally based Energy Advisors to building owners and managers and to the Trade Allies working with these customers. The Program Implementer also processes customer applications, manages Program data, and educates Trade Allies to help cost-effectively promote the Multifamily Programs.

## New Homes Program

**Program Dates:** The New Homes Program originated in CY 2000 and continued until CY 2011 under the name Wisconsin ENERGY STAR Homes. During CY 2011 and CY 2012, Focus on Energy modified the Program design and launched the current version as the New Homes Program in CY 2012.

Because a billing analysis published in May 2016 of Program homes rebated from CY 2012–CY 2014 found that most builders in Wisconsin were constructing new homes to efficiency levels above the Wisconsin Uniform Dwelling Code, Focus on Energy conducted a Baseline and Market Characterization Study. The study, conducted by Seventhwave (now Slipstream),<sup>6</sup> established a market baseline in Wisconsin by obtaining data about the efficiency levels of homes built outside of the Program. The study also informed the redesign of the New Homes Program: In CY 2018 the Program began to calculate savings for Program homes based on a market baseline rather than the Uniform Dwelling Code, which it

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<sup>6</sup> Seventhwave and Wisconsin Energy Conservation Corporation merged in 2019 to form a new company: Slipstream.

had used as a baseline in previous years. In CY 2018 the Program also increased the minimum efficiency requirement for incentives from at least 25% more efficient than Wisconsin’s Uniform Dwelling Code, to at least 30% more efficient than code.

In CY 2018, builders could achieve an incentive of \$1,000 for gas and electric homes and \$350 for electric-only homes with no gas heat. Builders could achieve higher incentives if they built more efficient homes.

**Program Purpose:** The Program provides information, implementation assistance, and incentives for builders of new, single-family (one- to three-unit) homes in Wisconsin that meet energy efficiency requirements.

**Target Audience:** The Program targets builders of new, single-family homes. In CY 2018 the Program also targeted new home buyers with marketing messages about the Program.

**Program Implementer:** Wisconsin Energy Conservation Corporation, known as Slipstream beginning in CY 2019.

**Process and Associated Measures:** The New Homes Program offers builders graduated incentives for constructing homes that are at least 30% more efficient than Wisconsin’s Uniform Dwelling Code. In CY 2018, the Program offered tiered incentive levels for Program home that received electric service and tiered incentive levels for homes that received electric and gas service. Table C-5. shows the incentive levels for each type of home available in CY 2018.

**Table C-5. CY 2018 New Homes Program Incentive Levels**

Certification Level	Incentive	
	Electric Homes	Electric and 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 100% more efficient than code	\$1,000	\$5,000

### Retail Lighting and Appliance Program

**Program Dates:** The Retail Lighting and Appliance Program launched January 1, 2006.

**Program Purpose:** The Program is a retail-based promotion that provides upstream incentives and price markdowns for efficient lighting, and customer-directed incentives for qualified appliances purchased through participating retailers.

**Target Audience:** The Program targets residential customers. The lighting component is delivered as an upstream program, so eligible products may be purchased by customers in other sectors and by participants who are not customers of participating Focus on Energy utilities.

**Program Implementer:** ICF International

**Process and Associated Measures:** For the lighting component, the Program partners with national, regional, and local retail stores to discount ENERGY STAR®-qualified lighting technologies at the POS. Markdowns vary by products and stores and change throughout the year. The Program increases brand awareness through Focus on Energy signage on marked-down products and through events at participating stores. Starting in CY 2018, the Program incentivized LEDs exclusively. The Program also offers smart thermostats, advanced power strips (Consortium for Energy Efficiency Tier 1), and connected lighting measures. Smart thermostats are offered via a downstream rebate that customers can submit on the Focus on Energy website, or via instant discounts applied to online purchases from select retailers (Nest.com, ecobee.com). Advanced power strips, along with a limited selection of LEDs, are offered via pop-up retail events managed by the Program Implementer. Discounts on connected lighting are offered through partner retailers, in the same manner as other LEDs. Finally, the Program transitioned low-E storm windows from a stand-alone Pilot to the Retail Lighting and Appliance Program in September of 2018 and expanded the discount availability to one additional retailer.

## Simple Energy Efficiency Program

**Program Dates:** The Simple Energy Efficiency Program encourages customers to install energy-saving measures that are delivered to participants in packs. Originally launched as the Express Energy Efficiency Program in CY 2012, the Program was rebranded as the Simple Energy Efficiency Program on January 1, 2016 and changed to a mail-by-request package delivery structure.

**Program Purpose:** The Simple Energy Efficiency Program mails no-cost packs containing various combinations and quantities of LEDs, faucet aerators, showerheads, smart strips, and other energy-saving measures directly to residential customers.

**Target Audience:** The Program targets single-family homes with one to three units and multifamily homes with four or more units.

**Program Implementer:** Energy Federation, Inc. (EFI)

**Process and Associated Measures:** Table C-6. lists the measures in each of the pack types offered to customers who participated in the Program in CY 2018. 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.

**Table C-6. CY 2018 Simple Energy Efficiency Program Packs**

Measure	Quantity per Pack					
	Light Bulb Pack	Fixed Showerhead Pack	Hand-Wand Showerhead Pack	Flood Light Pack	Decorative Light Pack	Pack with Advanced Power Strip
LED A19 (800 lumens)	4	2			2	3
LED A19 (1,100 lumens)	2					
LED BR30 Reflector				6		
LED G25 Globe		3	3			
LED Candelabra					6	
Pipe Wrap (15 ft. roll)	1	1	1			1
Pipe Tape		1	1			
Showerhead		1 <sup>a</sup>	1 <sup>b</sup>			
Bathroom Faucet Aerator		2	2			
Hot H <sub>2</sub> O Temp Card		1	1			1
Advanced Power Strip						1

<sup>a</sup> Fixed showerhead

<sup>b</sup> Hand-wand showerhead

**Connected Devices Kits Program:** At the direction of the Public Service Commission (PSC) of Wisconsin, Focus on Energy added the Connected Devices Kits Program in CY 2017, which is similar to but operates independently of the Simple Energy Efficiency Program.<sup>7</sup> The Program offers five kits (three free and two copay) with measures such as smart thermostats, smart power strips, and LED light bulbs that are available to customers in designated rural zip codes. Having previously made kits available to customers exclusively through their internet service providers, Focus on Energy made kits available through participating Focus on Energy utilities as well in CY 2018 to improve Program reach. Similar to Simple Energy Efficiency, customers could only receive one Connected Devices Kit, unless they moved to a new address. Table C-7. lists the items in each kit.

**Table C-7. CY 2018 Connected Devices Kits Program Kits**

Measure	Free Kit 1	Free Kit 2	Free Kit 3	Copay Kit 1	Copay Kit 2
<b>Copay</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$120</b>	<b>\$120</b>
Embertec Bluetooth Advanced Power Strip	✓				
Philips Hue Connected LEDs	✓				
Emerson Sensi Wi-Fi Thermostat		✓			
Nest E Thermostat			✓		
Nest Learning Thermostat				✓	
ecobee4 Smart Thermostat					✓

<sup>7</sup> Focus on Energy uses the term “pack” to distinguish the Simple Energy Efficiency Program from other Wisconsin utility programs that offer energy-saving kits. Furthermore, Focus on Energy uses the term “kits” to distinguish the Connected Devices Kits Program from the Simple Energy Efficiency Program.



## Seasonal Savings Pilot

**Pilot Dates:** The Seasonal Savings Pilot operated in CY 2016, CY 2017, and CY 2018.

**Pilot Purpose:** The Pilot uses an algorithm to make small, energy-saving adjustments to thermostat setpoints during summer and/or winter months in qualifying homes with Nest thermostats.

**Target Audience:** The Pilot targets residential customers who own Nest thermostats.

**Pilot Implementer:** Nest Labs

**Process and Associated Measures:** Nest algorithms use customer temperature setpoints and schedules, along with additional information gathered from Nest thermostats, to determine eligibility for the Seasonal Savings Pilot. Qualifying participants are given the ability to opt in to the Pilot through their Nest thermostat. An algorithm is then applied remotely over a period of three weeks, which adjusts temperature settings slightly during the winter and summer seasons.

## Direct-Mail Home Energy Assessment Pilot

**Program Dates:** The Direct-Mail Home Energy Assessment Pilot operated in CY 2017. Follow-up evaluation of Program results occurred in CY 2018.

**Program Purpose:** In CY 2016, the PSC determined that rural customers had historically been underserved by Focus on Energy programs and it allocated funding to a package of programs to enhance service in CY 2017 and CY 2018. Focus on Energy launched the Direct-Mail Home Energy Assessment Pilot as one component of the rural package to educate rural homeowners and increase their participation in Focus on Energy's residential program offerings.

**Target Audience:** Rural residential customers in Wisconsin (rural is designated by the customer's zip code).

**Program Implementer:** EnergySavvy

**Process and Associated Measures:** The Direct-Mail Home Energy Assessment Pilot was an educational awareness effort that was designed to reach rural customers by mailing them a home energy savings survey that assessed their homes' energy efficiency. In CY 2017, the Program Implementer sent 100,000 surveys (in batches of 50,000) to designated rural customers and, upon receipt of a completed survey, sent the customer a personalized home energy savings report. The report provided information about the home's energy consumption and recommendations to improve the home's efficiency using Focus on Energy residential program offerings. The Pilot itself did not provide incentives energy-saving measures and did not claim energy savings.

## *Descriptions of Nonresidential Programs*

The Evaluation Team assessed seven nonresidential programs and three nonresidential pilot programs during the CY 2018 evaluation. The nonresidential pilot operated as a subcomponent of another nonresidential program.

## Agriculture, Schools, and Government Program

**Program Dates:** The Agriculture, Schools and Government Program launched January 1, 2015.

**Program Purpose:** The Program offers prescriptive and custom incentives to customers installing energy-efficient equipment at agricultural, educational, and institutional facilities.

**Target Audience:** The Program targets all customers within the following groups, with the exception of individual customers that qualify as large energy users (average monthly demand exceeding 1,000 kW):

- Agriculture producers (producers of grain, livestock, milk, poultry, fruits, vegetables, bees, honey, fish, and shellfish) and green houses, grain elevators, and feed mills
- Educational entities (K–12 schools, two-year University of Wisconsin colleges, and four-year private colleges)
- Government entities (counties, cities, towns, villages, tribes, and state and federal agencies)
- Municipal wastewater treatment facilities

**Program Implementer:** Cooperative Educational Service Agency 10

**Process and Associated Measures:** In addition to the measures and incentives offered through other Focus on Energy nonresidential programs, the Program includes specialized offerings targeted to agricultural producers, educational facilities, and public buildings. The Program relies on dedicated Energy Advisors, assigned to different regions of the state, to work with customers and Trade Allies. The Program also hired a Trade Ally Liaison in CY 2018 to provide additional support to Trade Allies.

## Business Incentive Program

**Program Dates:** The Business Incentive Program launched April 1, 2012.

**Program Purpose:** The Program encourages energy efficiency by offering incentives for prescriptive and custom measures to nonresidential customers with electricity demand of 1,000 kW or less.

**Target Audience:** The Program targets nonresidential segments, including commercial spaces (such as grocery, retail, restaurant, financial, lodging, and healthcare facilities) and small- to medium-size industrial facilities. It includes customers who are not eligible for the Agriculture, Schools, and Government Program or Large Energy Users Program.

**Program Implementer:** Franklin Energy Services, LLC

**Process and Associated Measures:** The Program Implementer and Trade Allies recruit eligible customers, identify energy-saving opportunities, and lead customers through the incentive application process. Many technologies qualify for prescriptive incentives, including lighting, HVAC, commercial refrigeration, and compressed air. Customers may also receive custom incentives for more-complex energy efficiency projects.

**Communications Providers Initiative:** The Communications Providers Initiative launched during CY 2017. The Communications Providers Initiative is designed to drive infrastructure updates for

telephone, cable, broadband, and internet service providers in Wisconsin. Outreach activities primarily target providers that are associated with the Wisconsin State Telecommunications Association and The Internet and Television Association. The initiative strives to make connections with internet service providers and identify projects that will update infrastructure and improve system efficiency. The Program offers prescriptive and custom lighting, heating, and cooling measures for qualifying customers, with an emphasis on the installation of soft switches as one potential major opportunity. Custom measures receive an incentive of \$0.06 to \$0.09 per kilowatt-hour and \$150 to \$200 per kilowatt.

## Design Assistance Program

**Program Dates:** The Design Assistance Program launched January 1, 2013.

**Program Purpose:** The Program provides design professionals, builders, developers, and building owners energy-saving options for the design of new buildings. The Program also offers design teams and building owners incentives that can be used to reduce the up-front cost of high-efficiency measures that exceed Wisconsin energy code requirements.

**Target Audience:** This Program works with new construction and major renovation projects for buildings over 5,000 square feet. Possible building types include all commercial and industrial buildings as well as multifamily buildings with four or more units.

**Program Implementer:** The Weidt Group

**Process and Associated Measures:** Once accepted into the Program, a project receives a customized energy simulation modeling analysis to assist with making energy efficiency decisions along with information regarding possible owner incentives. Upon completion of the analysis, the Program provides incentives to the design team. After the building has been completed, Focus on Energy verifies the implementation of the energy efficiency measures then gives the building owner financial incentives.

Measures typically considered during the whole-building energy analysis include these:

- Improved wall assembly
- Improved roof assembly
- Improved window/glazing assembly
- HVAC system improvements
- Fan and pump improvements
- Automated daylighting controls
- Other lighting controls
- Lighting design to reduce lighting power densities
- Conditioning of outside air strategies
- Service water heating improvements

## Large Energy Users Program

**Program Dates:** The Large Energy Users Program launched April 1, 2012.

**Program Purpose:** The Program encourages the installation of energy-efficient technologies by offering incentives and services for large industrial, commercial, and institutional customers. These offerings include financial incentives for prescriptive and custom energy-efficient technologies, no-cost access to energy experts, training and tools to identify and evaluate energy efficiency opportunities, resources to develop and benchmark energy-management practices, and engineering reviews of proposed projects. Many technologies, including lighting, HVAC, commercial refrigeration, variable frequency drives (VFDs), and food service equipment, may qualify for prescriptive incentives.

**Target Audience:** The Program targets large industrial, commercial, and institutional business customers of participating Wisconsin electric and natural gas utilities; participants must have had a system-wide energy utility bill of at least \$60,000 in one month of the preceding year and energy use at one contiguous facility meeting one of the following criteria:

- Over 1,000 kW of electric demand in a single month in the past year
- Over 100,000 therms of natural gas consumption in a single month in the past year

**Program Implementer:** Leidos Engineering, LLC

**Process and Associated Measures:** Program Energy Advisors work directly with large industrial, commercial, and institutional business customers to identify and analyze opportunities for improving energy efficiency in customers' facilities and processes. The Energy Advisors provide technical expertise and ongoing education about large-scale energy efficiency measures and best practices. They also help customers develop energy teams and energy management plans, establish energy baselines and key performance indicators for facilities and end uses, and design custom incentive projects or hybrid projects with custom and prescriptive incentives. Hybrid projects follow a fixed methodology (usually defined with a workbook calculator or a technical reference manual [TRM] algorithm) and resulting energy savings depend on multiple project-specific inputs.

The Program offers the same measures and incentives offered through other Focus on Energy nonresidential programs. Customers also may propose additional energy efficiency projects through the custom incentive option. In CY 2017 two new Strategic Energy Management (SEM) offerings were launched as part of the Large Energy Users Program: SEM Industrial and SEM 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.

**Strategic Energy Management Pilot:** The SEM Pilot is a subcomponent of the Large Energy Users Program, which was offered from CY 2015 through CY 2018. The SEM Pilot maintains independent funding and energy-savings goals from the Large Energy Users Program, and was the basis for the SEM Industrial and SEM Healthcare offerings that began in CY 2017. The Pilot targets large industrial companies, offering a SEM advisor, financial incentives, technical training, and professional

development opportunities to customers that demonstrate a commitment to improving energy performance. The Pilot helps customers promote a SEM system in their facilities and develop a workforce of individuals in Wisconsin with experience in leading SEM initiatives.

## Midstream Commercial Kitchen Equipment Pilot

**Pilot Dates:** The Midstream Commercial Kitchen Equipment Pilot launched in CY 2017.

**Pilot Purpose:** The intent of the Pilot is to test the feasibility of incorporating the midstream delivery channel across multiple programs in the Focus on Energy portfolio.

**Target Audience:** Commercial kitchen equipment distributors in Wisconsin and their customers.

**Pilot Implementer:** Franklin Energy Services, LLC

**Process and Associated Measures:** Participating distributors pass POS discounts directly to customers who purchase qualifying ENERGY STAR commercial kitchen equipment, including dishwashers, fryers, hot food-holding cabinets, steam cookers, griddles, refrigerators, freezers, ice makers, rack ovens, combination ovens, coffee brewers, pre-rinse sprayers, and ventilation controls.

## Renewable Energy Competitive Incentive Program

**Program Dates:** The Renewable Energy Competitive Incentive Program launched April 1, 2012.

**Program Purpose:** The Program provides incentives for cost-effective renewable energy systems installed at eligible Wisconsin organizations through a competitive request for proposals process.

**Target Audience:** The Program targets all businesses within Focus on Energy's utility territory.

**Program Implementer:** Because the Renewable Energy Competitive Incentive Program crosses multiple sectors and applies to all nonresidential customers, the Program Administrator (APTIM) issues requests for proposals and awards funding to customers. A Program Implementer is assigned to a customer according to the Program for which the customer is eligible. The Program Implementer is responsible for processing the awarded project.

**Process and Associated Measures:** Through the Program, Focus on Energy solicits proposals from eligible business customers for six renewable energy technologies: solar photovoltaic, solar thermal, wind, geothermal, biogas, and biomass.

In CY 2018 the Program offered incentive amounts of up to \$0.50 per kilowatt-hour produced or up to \$1.00 per therm, not to exceed 50% of total project costs. Focus on Energy capped the maximum total incentives per customer (including energy efficiency and renewable energy incentives) at \$400,000.

## Midstream Commercial Lighting Initiative

**Pilot Dates:** The Midstream Commercial Lighting Initiative launched in CY 2018.

**Pilot Purpose:** The intent of the Pilot is to test the feasibility of incorporating the midstream delivery channel across multiple programs in the Focus on Energy portfolio.

**Target Audience:** Commercial lighting equipment distributors in Wisconsin and their customers.

**Pilot Implementer:** Franklin Energy Services, LLC

**Process and Associated Measures:** Participating distributors pass POS discounts directly to customers who purchase qualifying LED Measures.

## Digital Customer Engagement for Business Pilot

**Program Dates:** The Digital Customer Engagement for Business Pilot was scoped in CY 2017 and launched in CY 2018 in collaboration with Alliant Energy.

**Program Purpose:** The Pilot uses a digital customer engagement platform, Energy Edge, to engage small and medium-size business customers, educate them about their facility's energy use, and create energy efficiency Program opportunities.

**Target Audience:** Small and medium-size business customers in Alliant Energy's territory

**Program Implementer:** FirstFuel

**Process and Associated Measures:** The online platform offers nonresidential customers 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 log-in to see the platform, then 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.

## Small Business Program

**Program Dates:** Launched July 1, 2012.

**Program Purpose:** The Program encourages commercial and industrial customers to install energy-efficient products at their facilities by helping to offset the cost barriers to participation. The Program offers the highest incentives among Focus on Energy's business programs.

**Target Audience:** The Program targets commercial and industrial customers with an average monthly summer consumption of 40,000 kWh or less.

**Program Implementer:** Franklin Energy Services, LLC

**Process and Associated Measures:** With consultation from participating Trade Allies, customers can select any number of the energy-efficient products (not to exceed \$10,000 per site) from four categories: lighting, HVAC/plumbing, refrigeration, and compressed air systems. The Program can directly pay the customer the dollar amount of the products installed, or participating Trade Allies have

the option to receive incentive payments on behalf of the customer and pass along the savings through an instant discount at the time of invoicing.

**Community Small Business Offering:** Launched second half of CY 2017, this separate offering under the Small Business Program umbrella provided extensive, community-based outreach activities and additional incentives for rural customers. These incentives are 30% to 70% higher than those offered to nonrural customers. Registered Trade Allies that completed projects for eligible customers in a targeted community could receive up to \$2,000 in bonus incentives. The Program targets rural commercial and industrial customers with an average monthly summer consumption of 40,000 kWh or less. With consultation from a participating Trade Ally, customers can select any number of the energy-efficient products (not to exceed \$10,000 per site) from four categories: lighting, HVAC/plumbing, refrigeration, and compressed air systems. The Program can directly pay the customer the dollar amount of the products installed, or participating Trade Allies have the option to receive incentive payments on behalf of the customer and pass along the savings through an instant discount at the time of invoicing. The Program Implementer is Franklin Energy.

## Commercial Training Program

**Program Dates:** Launched CY 2012

**Program Purpose:** The Focus on Energy commercial Training Program, overseen 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 and serve the commercial, industrial, and school and government sectors.

**Target Audience:** The Program targets commercial energy, Trade Allies, contractors, facility managers, energy professionals, and energy sales representatives.

**Program Implementer:** APTIM

**Process and Associated Measures:** Participants enroll in training courses designed to increase their awareness and understanding of various energy saving measures and management tools, as well as energy efficient equipment sales. Multiple course offerings are held across the state each year, focusing on a diverse set of energy efficiency related topics.

## Appendix D. CY 2018 Statewide Total Energy Efficiency Savings and Participation

Table D-1. presents the CY 2018 program savings and participation for Focus on Energy, Northern States Power, and We Energies. Northern States Power and We Energies ran voluntary programs, with authorization from the PSC, using funds in addition to the funding they contribute to Focus on Energy.

Northern States Power and We Energies complemented Focus on Energy programs in CY 2018 by adding bonus incentives. Therefore, these programs' kilowatt, kilowatt-hour, and therms savings do not represent additive savings but instead are represented as Focus on Energy portfolio savings achieved by the projects that received the bonus incentives.

**Table D-1. CY 2018 Wisconsin Total Energy Efficiency Verified Gross Annual Savings and Participation**

Program	Participation	kW	kWh	therms
Focus on Energy	1,155,222	108,485	827,406,667	26,200,683
Northern States Power <sup>a</sup>	3,042	4,546	33,165,962	505,511
We Energies <sup>b</sup>	167	0	0	50,807

<sup>a</sup> Northern States Power offers the Community Conservation Program, which is designed to complement Focus on Energy programs by adding bonus incentives for both residential and business customers throughout the service territory. See Docket 4220-GF-123 for additional details. [http://apps.psc.wi.gov/vs2015/ERF\\_view/viewdoc.aspx?docid=363306](http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=363306)

<sup>b</sup> We Energies' Residential Assistance Natural Gas Program. See Docket 6630-GF-136 for additional details. [http://apps.psc.wi.gov/vs2015/ERF\\_view/viewdoc.aspx?docid=362066](http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=362066)



## Appendix E. Detailed Findings

This section contains detailed first-year annual gross savings and lifecycle savings for the nonresidential and residential segments as well as savings organized by program and measure category.

### Overview of Savings

Table E-1. lists the CY 2018 gross, verified gross, and verified net savings claimed basis prior to verification. Table E-2 lists the residential and nonresidential first-year annual savings.

**Table E-1. CY 2018 First-Year Annual Savings by Segment**

Savings Type	Unit	Residential	Nonresidential	Pilots	Rural	Total
Gross	MMBtu	1,430,753	3,721,918	332,155	153,679	5,638,506
	kWh	304,887,712	532,273,799	16,192,807	21,229,197	874,583,515
	kW	39,331	68,983	1,483	1,492	111,289
	therms	3,904,764	19,058,000	2,769,056	812,450	26,544,271
Verified Gross	MMBtu	1,334,112	3,629,900	360,854	118,639	5,443,504
	kWh	277,110,323	513,170,057	19,171,440	18,027,087	827,478,907
	kW	36,298	69,050	1,589	1,472	108,409
	therms	3,886,111	18,789,638	2,954,406	571,303	26,201,458
Verified Net	MMBtu	879,719	2,202,666	356,324	115,566	3,554,275
	kWh	163,136,379	317,458,433	18,485,467	17,469,817	516,550,096
	kW	21,846	43,040	1,488	1,405	67,780
	therms	3,230,979	11,194,976	2,932,520	559,589	17,918,064

Note: Totals may not match the sum of nonresidential and residential savings due to rounding. Totals include an extra 144 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 532,833 kWh net from a correction to CY 2016 Home Performance air conditioner savings.

Savings adjustments made in CY 2018 are included in CY 2018 savings figures, even if those savings were realized in previous years. See Appendix N for more details.

**Table E-2. CY 2018 First-Year Annual Savings Split Between Residential and Nonresidential**

Savings Type	Unit	Residential	Nonresidential	Total
Gross	MMBtu	1,583,387	4,055,119	5,638,506
	kWh	318,389,404	556,194,111	874,583,515
	kW	39,717	71,572	111,289
	therms	4,970,424	21,573,847	26,544,271
Verified Gross	MMBtu	1,454,030	3,989,474	5,443,504
	kWh	288,371,721	539,107,185	827,478,907
	kW	36,780	71,629	108,409
	therms	4,701,055	21,500,403	26,201,458
Verified Net	MMBtu	998,126	2,556,149	3,554,275
	kWh	174,332,026	342,218,070	516,550,096
	kW	22,320	45,460	67,780
	therms	4,033,050	13,885,014	17,918,064

Table E-3. lists the verified net annual savings achieved in each year of the CY 2015–CY 2018 quadrennial period.

**Table E-3. CY 2015, CY 2016, CY 2017, and CY 2018 First-Year Annual Verified Net Savings by Segment**

Calendar Year	Unit	Residential	Nonresidential	Pilots	Rural	Total
CY 2015	MMBtu	927,346	3,869,846	n/a	n/a	4,797,192
	kWh	206,530,139	351,708,289	n/a	n/a	558,238,428
	kW	24,312	48,869	n/a	n/a	73,180
	therms	2,226,649	26,698,171	n/a	n/a	28,924,820
CY 2016	MMBtu	808,349	2,658,146	24,137	n/a	3,490,631
	kWh	148,369,600	293,179,447	2,114,161	n/a	443,663,207
	kW	21,746	41,663	2,624	n/a	66,033
	therms	3,021,116	16,578,176	169,232	n/a	19,768,524
CY 2017	MMBtu	679,437	2,287,420	167,880	n/a	3,134,737
	kWh	127,922,119	342,364,018	5,534,332	n/a	475,820,469
	kW	16,756	47,230	991	n/a	64,977
	therms	2,429,672	11,192,738	1,489,966	n/a	15,112,376
CY 2018	MMBtu	879,719	2,202,666	356,324	115,566	3,554,275
	kWh	163,136,379	317,458,433	18,485,467	17,469,817	516,550,096
	kW	21,846	43,040	1,488	1,405	67,780
	therms	3,230,979	11,194,976	2,932,520	559,589	17,918,064
<b>Total</b>	<b>MMBtu</b>	<b>4,020,320</b>	<b>11,497,492</b>	<b>548,341</b>	<b>115,566</b>	<b>16,181,719</b>
	<b>kWh</b>	<b>823,732,947</b>	<b>1,361,633,095</b>	<b>26,133,960</b>	<b>17,469,817</b>	<b>2,228,969,819</b>
	<b>kW</b>	<b>106,407</b>	<b>188,551</b>	<b>5,103</b>	<b>1,405</b>	<b>301,467</b>
	<b>therms</b>	<b>12,097,432</b>	<b>68,511,272</b>	<b>4,591,718</b>	<b>559,589</b>	<b>85,760,011</b>

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

Totals include an extra 144 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 532,833 kWh net from a correction to CY 2016 Home Performance with ENERGY STAR Program air conditioner savings (Cadmus 2018).

Quadrennial net residential savings include additional savings from market effects, which account for the program’s long-term effect on the Wisconsin residential lighting market. Additional details can be found in the *Quadrennial Market Effects* section of the Retail Lighting and Appliance Program chapter within Volume II. Total quadrennial savings also include nonparticipant spillover and nonresidential Training Program spillover not counted in individual years. Some savings from pilots and rural programs reflect program activities in earlier years that are credited to the year in which they were evaluated. See Appendix E, Tables E-13, E-14, and E-15 for more details.

Table E-4 lists the lifecycle savings achieved by Focus on Energy in CY 2018. Lifecycle savings represent the savings a program can realize through measures over these measures’ effective useful life.

**Table E-4. CY 2018 Lifecycle Savings by Segment**

Savings Type	Unit	Residential	Nonresidential	Pilots	Rural	Total
Gross	MMBtu	24,334,458	55,215,190	3,656,783	1,672,041	84,878,472
	kWh	5,159,684,303	7,562,648,558	159,743,596	243,131,731	13,125,208,188
	kW	39,331	68,983	1,483	1,492	111,289
	therms	67,296,149	294,114,331	31,117,381	8,424,754	400,952,615
Verified Gross	MMBtu	22,728,347	54,370,366	3,716,892	1,309,942	82,125,547
	kWh	4,700,961,332	7,230,617,097	148,919,608	207,682,845	12,288,180,882
	kW	36,298	69,050	1,589	1,472	108,409
	therms	66,886,674	296,995,006	32,087,779	6,013,281	401,982,740
Verified Net	MMBtu	15,048,155	33,329,024	3,659,987	1,273,397	53,310,563
	kWh	2,761,577,271	4,527,872,955	140,846,381	200,528,240	7,630,824,848
	kW	21,846	43,040	1,488	1,405	67,780
	therms	56,256,535	178,799,219	31,794,187	5,891,946	272,741,888

Note: Totals may not match the sum of nonresidential and residential savings due to rounding. Totals include an extra 3,312 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 12,244,869 kWh net from a correction to CY 2016 Home Performance air conditioner savings.

**Table E-5. CY 2018 Lifecycle Savings Split between Residential and Nonresidential**

Savings Type	Unit	Residential	Nonresidential	Total
Gross	MMBtu	25,580,530	59,297,942	84,878,472
	kWh	5,285,474,083	7,839,734,105	13,125,208,188
	kW	39,717	71,572	111,289
	therms	75,464,921	325,487,694	400,952,615
Verified Gross	MMBtu	23,638,435	58,487,113	82,125,547
	kWh	4,802,375,984	7,485,804,898	12,288,180,882
	kW	36,780	71,629	108,409
	therms	72,527,277	329,455,464	401,982,740
Verified Net	MMBtu	15,940,369	37,370,194	53,310,563
	kWh	2,862,302,659	4,768,522,189	7,630,824,848
	kW	22,320	45,460	67,780
	therms	61,741,922	210,999,966	272,741,888

Note: Totals may not match the sum of nonresidential and residential savings due to rounding. Totals include an extra 3,312 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 12,244,869 kWh net from a correction to CY 2016 Home Performance air conditioner savings.

Table E-6. lists the verified gross lifecycle savings achieved by Focus on Energy in CY 2015, CY 2016, CY 2017, and CY 2018.

**Table E-6. CY 2015, CY 2016, CY 2017, and CY 2018 Verified Gross Lifecycle Savings by Segment**

Calendar Year	Unit	Residential	Nonresidential	Pilots	Rural	Total
CY 2015	MMBtu	15,832,924	61,140,436	n/a	n/a	76,973,360
	kWh	2,223,095,841	6,583,672,339	n/a	n/a	8,806,768,180
	kW	28,896	62,608	n/a	n/a	91,504
	therms	82,477,213	386,769,461	n/a	n/a	469,246,674
CY 2016	MMBtu	19,728,652	52,365,600	254,039	n/a	72,348,291
	kWh	3,199,626,956	6,291,666,334	23,641,640	n/a	9,514,934,930
	kW	29,612	59,101	3,604	n/a	92,316
	therms	88,115,245	308,984,348	1,733,736	n/a	398,833,329
CY 2017	MMBtu	23,537,736	45,551,206	185,023	n/a	69,273,965
	kWh	4,503,849,482	7,204,857,056	10,558,641	n/a	11,719,265,179
	kW	30,921	65,410	1,020	n/a	97,351
	therms	81,706,019	209,682,335	1,489,966	n/a	292,878,320
CY 2018	MMBtu	22,728,347	54,370,366	3,716,892	1,309,942	82,125,547
	kWh	4,700,961,332	7,230,617,097	148,919,608	207,682,845	12,288,180,882
	kW	36,298	69,050	1,589	1,472	108,409
	therms	66,886,674	296,995,006	32,087,779	6,013,281	401,982,740
<b>Total</b>	<b>MMBtu</b>	<b>81,827,660</b>	<b>213,427,608</b>	<b>4,155,953</b>	<b>1,309,942</b>	<b>300,721,163</b>
	<b>kWh</b>	<b>14,627,533,612</b>	<b>27,310,812,826</b>	<b>183,119,889</b>	<b>207,682,845</b>	<b>42,329,149,172</b>
	<b>kW</b>	<b>125,726</b>	<b>256,169</b>	<b>6,213</b>	<b>1,472</b>	<b>389,580</b>
	<b>therms</b>	<b>319,185,152</b>	<b>1,202,431,150</b>	<b>35,311,481</b>	<b>6,013,281</b>	<b>1,562,941,063</b>

Notes: Totals may not match the sum of residential and nonresidential savings due to rounding. Totals include an extra 3,312 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 12,244,869 kWh net from a correction to CY 2016 Home Performance air conditioner savings.

Summary of Savings by Program

Table E-7. summarizes the first-year annual savings by program.

**Table E-7. Summary of First-Year Annual Savings by Program, CY 2018<sup>a</sup>**

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
<b>Residential Programs</b>									
Multifamily Energy Savings	8,161,856	699	188,270	7,194,050	574	173,462	5,827,180	465	140,511
Multifamily New Construction	3,458,833	497	133,570	3,417,185	497	133,498	2,767,920	402	108,129
Appliance Recycling Program	12,564,565	1,470	0	10,087,846	1,228	0	5,389,308	654	0
Home Performance with ENERGY STAR	23,398,823	7,307	1,884,696	23,398,357	7,307	1,884,570	18,697,351	5,514	1,453,541
New Homes Construction	1,827,366	571	458,647	1,795,402	571	459,615	1,795,402	571	459,615
Retail Lighting and Appliance	232,879,804	26,461	346,327	208,677,039	23,817	338,886	107,748,877	12,144	260,069
Simple Energy Efficiency	16,757,539	1,566	584,957	16,718,646	1,557	585,484	16,718,646	1,557	585,484
Design Assistance - Residential	5,838,925	761	308,297	5,821,799	747	310,596	4,191,695	538	223,629
<b>Residential Total</b>	<b>304,887,712</b>	<b>39,331</b>	<b>3,904,764</b>	<b>277,110,323</b>	<b>36,298</b>	<b>3,886,111</b>	<b>163,136,379</b>	<b>21,846</b>	<b>3,230,979</b>
<b>Nonresidential Programs</b>									
Small Business	48,646,814	5,649	196,487	50,274,215	5,781	198,605	45,749,536	5,261	180,723
Renewable Energy Competitive Incentive	10,862,258	3,330	0	10,874,655	3,623	0	10,765,908	3,587	0
Design Assistance	31,392,554	4,404	1,307,271	31,300,475	4,325	1,317,021	22,536,342	3,114	948,255
Business Incentive	159,938,980	20,616	1,551,390	154,912,903	20,346	1,551,120	88,300,355	11,597	884,138
Agriculture, Schools, and Government	97,977,520	14,800	3,513,829	97,963,661	14,690	3,874,477	46,042,921	6,904	1,835,842
Large Energy Users	183,455,672	20,185	12,489,024	167,844,147	20,285	11,848,417	104,063,371	12,577	7,346,018
<b>Nonresidential Total</b>	<b>532,273,799</b>	<b>68,983</b>	<b>19,058,000</b>	<b>513,170,057</b>	<b>69,050</b>	<b>18,789,638</b>	<b>317,458,433</b>	<b>43,040</b>	<b>11,194,976</b>

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
<b>Pilot Programs</b>									
Low-E Storm Windows	9,125	15	16,692	10,154	11	5,842	2,945	3	1,694
Seasonal Savings	859,956	0	283,662	859,956	0	283,662	859,956	0	283,662
ENERGY STAR Retail Products Platform	0	0	0	708,459	89	1,282	708,459	89	1,282
Strategic Energy Management	14,343,497	1,344	2,443,021	16,599,730	1,353	2,637,573	16,599,730	1,353	2,637,573
Midstream Commercial Kitchen Equipment	547,081	36	25,681	560,007	48	26,047	178,642	15	8,309
Midstream Commercial and Industrial Lighting	433,149	88	0	433,134	88	0	135,735	27	0
<b>Pilot Total</b>	<b>16,192,807</b>	<b>1,483</b>	<b>2,769,056</b>	<b>19,171,440</b>	<b>1,589</b>	<b>2,954,406</b>	<b>18,485,467</b>	<b>1,488</b>	<b>2,932,520</b>
<b>Rural Programs</b>									
Connected Devices Kits	12,492,231	369	749,521	9,542,448	381	508,373	9,516,825	381	506,608
Rural Home Performance	140,381	1	15,785	140,381	1	15,785	107,462	1	8,825
Community Small Business Offering	6,894,063	922	42,698	7,124,693	944	42,698	6,625,964	878	39,709
Rural Communications Provider Initiative	1,702,524	200	4,446	1,219,566	146	4,446	1,219,566	146	4,446
<b>Rural Total</b>	<b>21,229,197</b>	<b>1,492</b>	<b>812,450</b>	<b>18,027,087</b>	<b>1,472</b>	<b>571,303</b>	<b>17,469,817</b>	<b>1,405</b>	<b>559,589</b>
<b>Total All Programs</b>	<b>874,583,515</b>	<b>111,289</b>	<b>26,544,271</b>	<b>827,478,907</b>	<b>108,409</b>	<b>26,201,458</b>	<b>516,550,096</b>	<b>67,780</b>	<b>17,918,064</b>

<sup>a</sup> Evaluated CY 2018 savings for pilot and rural programs may contain claimed savings from other years. For a list of these programs and their annual claimed savings please see Appendix N.

Note: Totals may not sum due to rounding. Totals include an extra 144 therms gross from CY 2017 adjustments registered in CY 2018, and an extra 532,833 kWh net from a correction to CY 2016 Home Performance air conditioner savings.

**Table E-8. Summary of Lifecycle Savings by Program, CY 2018**

Program Name	Gross		Verified Gross		Verified Net	
	kWh	therms	kWh	therms	kWh	therms
<b>Residential Programs</b>						
Multifamily Energy Savings	92,451,371	3,369,526	89,859,033	3,034,011	72,785,817	2,457,690
Multifamily New Construction	46,442,942	2,281,438	45,842,693	2,284,163	37,132,581	1,850,086
Appliance Recycling Program	125,645,650	0	100,878,456	0	53,893,080	0
Home Performance with ENERGY STAR	499,687,185	30,789,172	499,991,914	30,788,184	399,181,345	23,797,903
New Homes Construction	54,820,980	13,759,410	53,862,060	13,788,450	53,862,060	13,788,450
Retail Lighting and Appliance	3,991,738,066	3,616,279	3,563,832,255	3,541,862	1,830,630,505	2,645,065
Simple Energy Efficiency	232,119,608	7,314,384	230,255,500	7,261,922	230,255,500	7,261,922
Design Assistance - Residential	116,778,500	6,165,940	116,439,420	6,188,082	83,836,383	4,455,419
<b>Residential Total</b>	<b>5,159,684,303</b>	<b>67,296,149</b>	<b>4,700,961,332</b>	<b>66,886,674</b>	<b>2,761,577,271</b>	<b>56,256,535</b>
<b>Nonresidential Programs</b>						
Small Business	633,875,399	3,415,218	664,550,261	3,455,027	604,740,738	3,143,934
Renewable Energy Competitive Incentive	258,859,491	0	259,173,592	0	256,581,856	0
Design Assistance	627,851,080	26,145,420	626,028,044	26,239,307	450,740,191	18,892,301
Business Incentive	2,076,676,344	23,994,369	1,998,315,278	25,264,768	1,139,039,708	14,400,918
Agriculture, Schools, and Government	1,376,430,611	52,467,202	1,376,069,930	54,186,157	646,752,867	25,895,223
Large Energy Users	2,588,955,633	188,092,122	2,306,479,992	187,849,746	1,430,017,595	116,466,843
<b>Nonresidential Total</b>	<b>7,562,648,558</b>	<b>294,114,331</b>	<b>7,230,617,097</b>	<b>296,995,006</b>	<b>4,527,872,955</b>	<b>178,799,219</b>
<b>Pilot Programs</b>						
Low-E Storm Windows	137,709	250,380	203,086	116,844	58,895	33,885
Seasonal Savings	859,956	283,662	859,956	283,662	859,956	283,662
ENERGY STAR Retail Products Platform	0	0	8,250,189	16,842	8,250,189	16,842
Strategic Energy Management	147,358,953	30,279,874	128,009,201	31,361,132	128,009,201	31,361,132
Midstream Commercial Kitchen Equipment	5,808,989	303,464	6,019,351	309,298	1,920,173	98,666
Midstream Commercial and Industrial Lighting	5,577,990	0	5,577,825	0	1,747,967	0
<b>Pilot Total</b>	<b>159,743,596</b>	<b>31,117,381</b>	<b>148,919,608</b>	<b>32,087,779</b>	<b>140,846,381</b>	<b>31,794,187</b>

Program Name	Gross		Verified Gross		Verified Net	
	kWh	therms	kWh	therms	kWh	therms
<b>Rural Programs</b>						
Connected Devices Kits	123,304,243	7,495,210	90,613,549	5,083,734	90,357,319	5,066,082
Rural Home Performance	1,487,872	139,520	1,487,872	139,520	1,199,029	84,916
Community Small Business Offering	90,063,484	701,129	94,421,888	701,132	87,812,355	652,053
Rural Communications Provider Initiative	28,276,132	88,895	21,159,537	88,895	21,159,537	88,895
<b>Rural Total</b>	<b>243,131,731</b>	<b>8,424,754</b>	<b>207,682,845</b>	<b>6,013,281</b>	<b>200,528,240</b>	<b>5,891,946</b>
<b>Total All Programs</b>	<b>13,125,208,188</b>	<b>400,952,615</b>	<b>12,288,180,882</b>	<b>401,982,740</b>	<b>7,630,824,848</b>	<b>272,741,888</b>

*Summary of Savings by Measure*

Table E-9. summarizes CY 2018 residential savings by measure category.

**Table E-9. Summary of First-Year Annual Savings by Measure Category, Residential Sector**

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Agriculture - Energy Recovery	43,912	0.02%	9	0.02%	8,876	0.19%	\$7,824.75	0.02%
Agriculture - Variable Speed Drive	397,693	0.14%	33	0.09%	0	0.00%	\$20,652.60	0.06%
Boilers & Burners - Boiler	0	0.00%	0	0.00%	254,696	5.42%	\$388,516.00	1.15%
Boilers & Burners - Controls	74,039	0.03%	3	0.01%	8,161	0.17%	\$8,507.50	0.03%
Boilers & Burners - Insulation	62,554	0.02%	29	0.08%	19,175	0.41%	\$39,693.66	0.12%
Boilers & Burners - Tune-Up / Repair / Commissioning	0	0.00%	0	0.00%	555	0.01%	\$2,625.00	0.01%
Building Shell - Air Sealing	0	0.00%	0	0.00%	0	0.00%	\$0.00	0.00%
Building Shell - Insulation	0	0.00%	0	0.00%	0	0.00%	\$0.00	0.00%
Building Shell - Other	31,695	0.01%	0	0.00%	58,530	1.24%	\$50,909.00	0.15%
Building Shell - Window	30,328	0.01%	11	0.03%	6,618	0.14%	\$36,456.76	0.11%
Domestic Hot Water - Aeration	644,301	0.22%	44	0.12%	108,780	2.31%	\$49,235.74	0.15%
Domestic Hot Water - Insulation	2,182,031	0.76%	318	0.86%	250,497	5.33%	\$186,825.69	0.55%
Domestic Hot Water - Other	71,063	0.02%	9	0.03%	30,919	0.66%	\$38,943.24	0.12%
Domestic Hot Water - Showerhead	1,383,810	0.48%	59	0.16%	223,933	4.76%	\$223,926.69	0.66%
Domestic Hot Water - Water Heater	17,898	0.01%	-1	0.00%	15,820	0.34%	\$31,700.00	0.09%



Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
HVAC - Air Conditioner - Residential	31,189	0.01%	17	0.05%	0	0.00%	\$63,880.00	0.19%
HVAC - Chiller	426,174	0.15%	25	0.07%	0	0.00%	\$35,769.00	0.11%
HVAC - Controls	12,583,078	4.36%	740	2.01%	1,448,624	30.81%	\$5,022,624.83	14.90%
HVAC - Furnace	7,386,610	2.56%	1,486	4.04%	652,084	13.87%	\$2,654,325.00	7.87%
HVAC - Motor	394,569	0.14%	60	0.16%	0	0.00%	\$5,225.00	0.02%
HVAC - Other	3,705,590	1.29%	880	2.39%	393,241	8.36%	\$1,039,050.00	3.08%
HVAC - Packaged Terminal Unit (PTAC, PTHP)	474,243	0.16%	-3	-0.01%	0	0.00%	\$17,900.00	0.05%
HVAC - Rooftop Unit / Split System Air Conditioner	76,822	0.03%	119	0.32%	0	0.00%	\$152,350.00	0.45%
HVAC - Steam Trap	0	0.00%	0	0.00%	6,222	0.13%	\$1,800.00	0.01%
HVAC - Tune-Up / Repair / Commissioning	0	0.00%	0	0.00%	4,690	0.10%	\$58,611.00	0.17%
Laundry - Clothes Washer	40,739	0.01%	5	0.01%	0	0.00%	\$364,250.00	1.08%
Laundry - Dryer	560,960	0.19%	59	0.16%	2,745	0.06%	\$1,306,075.00	3.87%
Lighting - Delamping	3,371	0.00%	0	0.00%	0	0.00%	\$50.00	0.00%
Lighting - Light Emitting Diode	224,014,567	77.68%	25,576	69.54%	0	0.00%	\$12,907,575.71	38.28%
Motors & Drives - Motor	48,140	0.02%	9	0.02%	0	0.00%	\$11,600.00	0.03%
New Construction - Design	5,821,799	2.02%	747	2.03%	310,596	6.61%	\$715,897.92	2.12%
New Construction - Whole Building	1,795,402	0.62%	571	1.55%	459,615	9.78%	\$1,966,850.00	5.83%
Other - Bonus	0	0.00%	0	0.00%	0	0.00%	\$29,163.40	0.09%
Other - Other	744,993	0.26%	306	0.83%	423,305	9.00%	\$1,794,323.13	5.32%
Refrigeration - Other	10,087,846	3.50%	1,228	3.34%	0	0.00%	\$465,675.00	1.38%
Refrigeration - Refrigerator / Freezer - Residential	57,455	0.02%	6	0.02%	-1,463	-0.03%	\$233,815.00	0.69%
Renewable Energy - Geothermal	346,936	0.12%	70	0.19%	0	0.00%	\$44,200.00	0.13%
Renewable Energy - Photovoltaics	11,210,792	3.89%	3,908	10.63%	0	0.00%	\$1,722,338.90	5.11%
Training & Special - Other	366,370	0.13%	0	0.00%	0	0.00%	\$0.00	0.00%
Vending & Plug Loads - Controls	3,210,042	1.11%	424	1.15%	0	0.00%	\$1,206,760.62	3.58%
Vending & Plug Loads - Dehumidifier	0	0.00%	0	0.00%	0	0.00%	\$230,400.00	0.68%
Vending & Plug Loads - Filtration	15,509	0.01%	2	0.00%	0	0.00%	\$305,325.00	0.91%
Vending & Plug Loads - Other	2,606	0.00%	0	0.00%	0	0.00%	\$201,804.36	0.60%
Windows and Doors - Window	26,594	0.01%	28	0.08%	15,301	0.33%	\$72,077.99	0.21%

Table E-10. lists CY 2018 nonresidential savings by measure category.

**Table E-10. Summary of First-Year Annual Savings by Measure Category, Nonresidential Sector<sup>a</sup>**

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Aeration	3,865,672	0.72%	441	0.62%	9,620	0.04%	\$155,821.83	0.37%
Air Sealing	1,015	0.00%	0	0.00%	148,319	0.69%	\$66,336.37	0.16%
Biogas	2,542,292	0.47%	315	0.44%	0	0.00%	\$364,403.00	0.86%
Boiler	72,063	0.01%	9	0.01%	2,347,471	10.94%	\$1,831,120.54	4.32%
Bonus	0	0.00%	0	0.00%	0	0.00%	\$1,198,873.51	2.83%
Chiller	16,931,548	3.14%	3,231	4.51%	0	0.00%	\$1,196,238.13	2.82%
Compressor	7,214,296	1.34%	1,133	1.58%	0	0.00%	\$361,593.27	0.85%
Controls	30,941,849	5.74%	2,219	3.10%	1,117,340	5.21%	\$2,489,174.43	5.87%
Delamping	2,816,905	0.52%	590	0.82%	0	0.00%	\$80,395.10	0.19%
Design	31,300,475	5.81%	4,325	6.04%	1,317,021	6.14%	\$3,832,136.51	9.04%
Dishwasher, Commercial	546,020	0.10%	2	0.00%	3,424	0.02%	\$26,980.00	0.06%
Door	951	0.00%	3	0.00%	52,033	0.24%	\$26,410.80	0.06%
Dryer	516,273	0.10%	90	0.13%	58,131	0.27%	\$33,692.50	0.08%
Energy Recovery	1,693,568	0.31%	358	0.50%	3,701,309	17.26%	\$1,995,065.71	4.71%
Fan	2,724,049	0.51%	476	0.66%	22,972	0.11%	\$213,400.89	0.50%
Filtration	-199,488	-0.04%	-57	-0.08%	489,897	2.28%	\$337,012.70	0.80%
Fluorescent, Linear	573,843	0.11%	105	0.15%	0	0.00%	\$32,912.00	0.08%
Fryer	77,626	0.01%	16	0.02%	38,527	0.18%	\$21,380.00	0.05%
Furnace	258,337	0.05%	0	0.00%	113,704	0.53%	\$116,770.00	0.28%
Grain Dryer	3,992	0.00%	0	0.00%	7,271	0.03%	\$4,126.59	0.01%
Greenhouse	0	0.00%	0	0.00%	4,477	0.02%	\$1,168.00	0.00%
Griddle	20,224	0.00%	4	0.01%	0	0.00%	\$900.00	0.00%
Heat Exchanger	798,590	0.15%	5	0.01%	0	0.00%	\$50,786.71	0.12%
Hot Holding Cabinet	35,313	0.01%	8	0.01%	0	0.00%	\$2,080.00	0.00%
Ice Machine	21,681	0.00%	2	0.00%	0	0.00%	\$950.00	0.00%
Induction	46,399	0.01%	0	0.00%	0	0.00%	\$1,437.12	0.00%
Infrared Heater	0	0.00%	0	0.00%	87,143	0.41%	\$20,589.00	0.05%
Insulation	119,606	0.02%	27	0.04%	266,619	1.24%	\$177,710.93	0.42%
Irrigation	11,264	0.00%	0	0.00%	0	0.00%	\$2,925.00	0.01%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Light Emitting Diode	240,465,946	44.61%	35,731	49.89%	0	0.00%	\$15,215,459.74	35.90%
Livestock Waterer	575,847	0.11%	0	0.00%	0	0.00%	\$18,480.00	0.04%
Motor	9,588,122	1.78%	1,249	1.74%	0	0.00%	\$669,248.75	1.58%
Other	38,259,090	7.10%	4,515	6.30%	9,756,839	45.49%	\$5,406,570.65	12.76%
Oven	96,641	0.02%	22	0.03%	42,606	0.20%	\$23,460.00	0.06%
Packaged Terminal Unit (PTAC, PTHP)	807,651	0.15%	0	0.00%	0	0.00%	\$46,000.00	0.11%
Photovoltaics	8,332,363	1.55%	3,308	4.62%	0	0.00%	\$2,314,356.17	5.46%
Pre-Rinse Sprayer	1,633	0.00%	0	0.00%	26	0.00%	\$75.00	0.00%
Process Heat	6,297	0.00%	1	0.00%	0	0.00%	\$432.00	0.00%
Pump	442,454	0.08%	56	0.08%	0	0.00%	\$15,393.12	0.04%
Reconfigure Equipment	1,979,555	0.37%	363	0.51%	0	0.00%	\$74,822.41	0.18%
Refrigerated Case Door	2,305,495	0.43%	137	0.19%	43,488	0.20%	\$73,401.00	0.17%
Refrigerator / Freezer - Commercial	129,843	0.02%	15	0.02%	0	0.00%	\$32,830.00	0.08%
Rooftop Unit / Split System Air Conditioner	1,034,254	0.19%	846	1.18%	98,082	0.46%	\$281,687.62	0.66%
Scheduling	3,437,819	0.64%	94	0.13%	487,233	2.27%	\$276,790.20	0.65%
Scholarship	0	0.00%	0	0.00%	0	0.00%	\$13,857.50	0.03%
Showerhead	2,782	0.00%	0	0.00%	8,760	0.04%	\$2,904.00	0.01%
Specialty Pulp & Paper	1,461,227	0.27%	189	0.26%	0	0.00%	\$81,250.00	0.19%
Steam Trap	0	0.00%	0	0.00%	403,525	1.88%	\$67,035.00	0.16%
Steamer	117,594	0.02%	35	0.05%	10,441	0.05%	\$10,450.00	0.02%
Strip Curtain	61,936	0.01%	7	0.01%	0	0.00%	\$1,421.00	0.00%
Study	0	0.00%	0	0.00%	0	0.00%	\$353,789.41	0.83%
Supporting Equipment	1,124,437	0.21%	130	0.18%	0	0.00%	\$95,026.55	0.22%
Tune-up / Repair / Commissioning	14,223,669	2.64%	408	0.57%	554,843	2.59%	\$226,849.49	0.54%
Unit Heater	0	0.00%	0	0.00%	64,637	0.30%	\$28,840.00	0.07%
Variable Air Volume	1,063,151	0.20%	18	0.02%	71,498	0.33%	\$84,286.40	0.20%
Variable Speed Drive	110,479,427	20.50%	11,186	15.62%	0	0.00%	\$2,240,318.68	5.29%
Water Heater	105,472	0.02%	7	0.01%	30,858	0.14%	\$36,225.00	0.09%
Window	1,513	0.00%	0	0.00%	89,955	0.42%	\$51,721.50	0.12%

<sup>a</sup> Does not include adjustment measure records. As a result, this sum will not match with other CY 2018 totals.

Table E-11 lists CY 2018 nonresidential lifecycle savings by measure category.

**Table E-11. Summary of First-Year Lifecycle Savings by Measure Category, Residential Sector**

Measure Category	Verified Gross			
	kWh	kWh %	Therms	Therms %
Agriculture - Energy Recovery	658,088	0.01%	133,156	0.18%
Agriculture - Variable Speed Drive	6,312,141	0.13%	0	0.00%
Boilers & Burners - Boiler	0	0.00%	5,046,858	6.96%
Boilers & Burners - Controls	642,256	0.01%	71,262	0.10%
Boilers & Burners - Insulation	1,720,756	0.04%	355,106	0.49%
Boilers & Burners - Tune-Up / Repair / Commissioning	0	0.00%	1,110	0.00%
Building Shell - Air Sealing	0	0.00%	0	0.00%
Building Shell - Insulation	0	0.00%	0	0.00%
Building Shell - Other	328,258	0.01%	871,936	1.20%
Building Shell - Window	648,010	0.01%	132,041	0.18%
Domestic Hot Water - Aeration	6,456,328	0.13%	1,085,927	1.50%
Domestic Hot Water - Insulation	32,730,466	0.68%	3,757,462	5.18%
Domestic Hot Water - Other	1,065,946	0.02%	463,778	0.64%
Domestic Hot Water - Showerhead	13,838,102	0.29%	2,239,327	3.09%
Domestic Hot Water - Water Heater	238,274	0.00%	231,509	0.32%
HVAC - Air Conditioner - Residential	280,704	0.01%	0	0.00%
HVAC - Chiller	9,398,989	0.20%	0	0.00%
HVAC - Controls	125,830,776	2.62%	14,486,235	19.97%
HVAC - Furnace	147,624,988	3.07%	12,922,417	17.81%
HVAC - Motor	7,101,312	0.15%	0	0.00%
HVAC - Other	46,255,332	0.96%	1,929,354	2.66%
HVAC - Packaged Terminal Unit (PTAC, PTHP)	7,116,063	0.15%	0	0.00%
HVAC - Rooftop Unit / Split System Air Conditioner	1,177,096	0.02%	0	0.00%
HVAC - Steam Trap	0	0.00%	36,576	0.05%
HVAC - Tune-Up / Repair / Commissioning	0	0.00%	9,380	0.01%
Laundry - Clothes Washer	448,127	0.01%	0	0.00%
Laundry - Dryer	6,731,525	0.14%	32,938	0.05%
Lighting - Delamping	37,177	0.00%	0	0.00%
Lighting - Light Emitting Diode	3,789,060,344	78.90%	0	0.00%
Motors & Drives - Motor	866,520	0.02%	0	0.00%
New Construction - Design	116,439,420	2.42%	6,188,082	8.53%
New Construction - Whole Building	53,862,060	1.12%	13,788,450	19.01%
Other - Bonus	0	0.00%	0	0.00%
Other - Other	14,909,473	0.31%	8,467,161	11.67%
Refrigeration - Other	100,878,456	2.10%	0	0.00%
Refrigeration - Refrigerator / Freezer - Residential	632,009	0.01%	-16,096	-0.02%
Renewable Energy - Geothermal	5,204,040	0.11%	0	0.00%
Renewable Energy - Photovoltaics	280,269,288	5.84%	0	0.00%
Training & Special - Other	3,663,700	0.08%	0	0.00%
Vending & Plug Loads - Controls	19,260,255	0.40%	0	0.00%
Vending & Plug Loads - Dehumidifier	0	0.00%	0	0.00%
Vending & Plug Loads - Filtration	139,580	0.00%	0	0.00%
Vending & Plug Loads - Other	18,245	0.00%	0	0.00%
Windows and Doors - Window	531,878	0.01%	306,012	0.42%

Table E-12 lists CY 2018 nonresidential lifecycle savings by measure category.

**Table E-12. Summary of First-Year Lifecycle Savings by Measure Category, Nonresidential Sector<sup>a</sup>**

Measure Category	Verified Gross			
	kWh	kWh %	Therms	Therms %
Aeration	73,047,032	0.98%	80,828	0.02%
Air Sealing	21,717	0.00%	2,328,091	0.71%
Biogas	50,849,506	0.68%	0	0.00%
Boiler	704,749	0.01%	44,742,809	13.64%
Bonus	0	0.00%	0	0.00%
Chiller	300,232,920	4.01%	0	0.00%
Compressor	100,776,227	1.35%	0	0.00%
Controls	344,804,486	4.61%	15,959,779	4.87%
Delamping	28,261,305	0.38%	0	0.00%
Design	626,028,044	8.36%	26,239,307	8.00%
Dishwasher, Commercial	5,449,377	0.07%	34,621	0.01%
Door	18,531	0.00%	906,985	0.28%
Dryer	7,626,134	0.10%	805,756	0.25%
Energy Recovery	23,069,348	0.31%	55,933,224	17.05%
Fan	42,767,545	0.57%	323,105	0.10%
Filtration	-5,665,024	-0.08%	7,735,910	2.36%
Fluorescent, Linear	8,060,884	0.11%	0	0.00%
Fryer	925,450	0.01%	479,272	0.15%
Furnace	4,671,134	0.06%	2,057,446	0.63%
Grain Dryer	79,839	0.00%	134,387	0.04%
Greenhouse	0	0.00%	20,684	0.01%
Griddle	241,105	0.00%	0	0.00%
Heat Exchanger	11,977,406	0.16%	0	0.00%
Hot Holding Cabinet	420,204	0.01%	0	0.00%
Ice Machine	216,109	0.00%	0	0.00%
Induction	691,446	0.01%	0	0.00%
Infrared Heater	0	0.00%	1,305,372	0.40%
Insulation	2,973,222	0.04%	4,925,908	1.50%
Irrigation	168,949	0.00%	0	0.00%
Light Emitting Diode	3,197,234,536	42.72%	0	0.00%
Livestock Waterer	5,757,771	0.08%	0	0.00%
Motor	150,656,816	2.01%	0	0.00%
Other	486,543,668	6.50%	148,795,743	45.37%
Oven	1,155,273	0.02%	519,149	0.16%
Packaged Terminal Unit (PTAC, PTHP)	12,087,719	0.16%	0	0.00%
Photovoltaics	208,324,086	2.78%	0	0.00%
Pre-Rinse Sprayer	8,162	0.00%	130	0.00%
Process Heat	93,833	0.00%	0	0.00%
Pump	6,462,624	0.09%	0	0.00%
ReconFigure Equipment	29,176,299	0.39%	0	0.00%
Refrigerated Case Door	18,992,960	0.25%	686,984	0.21%
Refrigerator / Freezer - Commercial	1,552,612	0.02%	0	0.00%

Measure Category	Verified Gross			
	kWh	kWh %	Therms	Therms %
Rooftop Unit / Split System Air Conditioner	15,372,527	0.21%	1,494,675	0.46%
Scheduling	18,217,173	0.24%	2,733,584	0.83%
Scholarship	0	0.00%	0	0.00%
Showerhead	25,402	0.00%	78,844	0.02%
Specialty Pulp & Paper	21,343,182	0.29%	0	0.00%
Steam Trap	0	0.00%	2,424,759	0.74%
Steamer	1,410,452	0.02%	121,185	0.04%
Strip Curtain	246,128	0.00%	0	0.00%
Study	0	0.00%	0	0.00%
Supporting Equipment	22,580,351	0.30%	0	0.00%
Tune-up / Repair / Commissioning	29,266,376	0.39%	2,971,658	0.91%
Unit Heater	0	0.00%	951,313	0.29%
Variable Air Volume	15,528,743	0.21%	1,129,003	0.34%
Variable Speed Drive	1,612,367,462	21.54%	0	0.00%
Water Heater	1,112,934	0.01%	396,358	0.12%
Window	29,471	0.00%	1,667,572	0.51%

## Savings Claimed in CY 2018

The evaluation of a subset of pilot and rural programs was postponed for various reasons until CY 2018. For example, the evaluation of the Low-E Storm Windows Pilot was postponed until the measure had an approved workpaper. To ensure that all pilot and rural program savings were accounted for during this quadrennium, prior year savings are included in CY 2018 evaluation totals, as described below.

Low-E Storm Windows CY 2017 savings were evaluated in CY 2018 and are therefore included in CY 2018 claimed savings. Midstream Commercial Kitchen Equipment CY 2017 and CY 2018 savings were evaluated in CY 2018 and are therefore included in CY 2018 claimed savings. ENERGY STAR Retail Products Platform CY 2016, CY 2017, and CY 2018 savings were evaluated in CY 2018 and thus included in CY 2018 claimed savings. Strategic Energy Management CY 2016 total savings, some CY 2017 capital measure savings which were not evaluated in CY 2017, and CY 2018 total savings were evaluated in CY 2018 and thus are therefore included in CY 2018 claimed savings. Communication Providers Initiative CY 2017 and CY 2018 savings were evaluated in CY 2018 and are therefore included in CY 2018 claimed savings.

**Table E-13. Programs with Multiple Years of Savings Combined (ex ante gross first year savings)**

Savings Type	Program	CY 2015	CY 2016	CY 2017	CY 2018	Total Claimed in 2018
kWh	Low-E Storm Windows	n/a	n/a	9,125	n/a	9,125
	Midstream Commercial Kitchen Equipment	n/a	n/a	291,865	255,215	547,080
	ENERGY STAR Retail Products Platform	n/a	0	0	0	0
	Strategic Energy Management	n/a	1,156,830	661,968	12,524,699	14,343,497

Savings Type	Program	CY 2015	CY 2016	CY 2017	CY 2018	Total Claimed in 2018
	Rural Communications Provider Initiative	n/a	n/a	131,072	1,571,452	1,702,524
kW	Low-E Storm Windows	n/a	n/a	15	n/a	15
	Midstream Commercial Kitchen Equipment	n/a	n/a	19	17	36
	ENERGY STAR Retail Products Platform	n/a	0	0	0	0
	Strategic Energy Management	n/a	-3	109	1,238	1,344
	Rural Communications Provider Initiative	n/a	n/a	13	186	199
Therms	Low-E Storm Windows	n/a	n/a	16,692	n/a	16,692
	Midstream Commercial Kitchen Equipment	n/a	n/a	6,554	19,127	25,681
	ENERGY STAR Retail Products Platform	n/a	0	0	0	0
	Strategic Energy Management	n/a	1,196,367	414,285	832,369	2,443,021
	Rural Communications Provider Initiative	n/a	n/a	1,859	2,587	4,446
MMBtu	Low-E Storm Windows	n/a	n/a	1,700	n/a	1,700
	Midstream Commercial Kitchen Equipment	n/a	n/a	1,651	2,783	4,434
	ENERGY STAR Retail Products Platform	n/a	0	0	0	0
	Strategic Energy Management	n/a	123,584	43,687	125,971	293,242
	Rural Communications Provider Initiative	n/a	n/a	633	5,620	6,253

**Table E-14. Programs with Multiple Years of Savings Combined (verified gross first year savings)**

Savings Type	Program	CY 2015	CY 2016	CY 2017	CY 2018	Total Claimed in 2018
kWh	Low-E Storm Windows	n/a	n/a	10,154	n/a	10,154
	Midstream Commercial Kitchen Equipment	n/a	n/a	267,972	292,034	560,006
	ENERGY STAR Retail Products Platform	n/a	104,475	299,828	304,156	708,459
	Strategic Energy Management	n/a	1,117,926	766,929	14,714,875	16,599,730
	Rural Communications Provider Initiative	n/a	n/a	68,604	1,150,962	1,219,566
kW	Low-E Storm Windows	n/a	n/a	11	n/a	11
	Midstream Commercial Kitchen Equipment	n/a	n/a	23	26	49
	ENERGY STAR Retail Products Platform	n/a	11	42	36	89
	Strategic Energy Management	n/a	-2	118	1,238	1,354
	Rural Communications Provider Initiative	n/a	n/a	8	138	146

Savings Type	Program	CY 2015	CY 2016	CY 2017	CY 2018	Total Claimed in 2018
Therms	Low-E Storm Windows	n/a	n/a	5,842	n/a	5,842
	Midstream Commercial Kitchen Equipment	n/a	n/a	6,531	19,516	26,047
	ENERGY STAR Retail Products Platform	n/a	590	420	271	1,282
	Strategic Energy Management	n/a	1,244,337	411,217	982,019	2,637,573
	Rural Communications Provider Initiative	n/a	n/a	1,859	2,587	4,446
MMBtu	Low-E Storm Windows	n/a	n/a	619	n/a	619
	Midstream Commercial Kitchen Equipment	n/a	n/a	1,567	2,948	4,515
	ENERGY STAR Retail Products Platform	n/a	416	1,065	1,065	2,545
	Strategic Energy Management	n/a	128,248	43,738	148,409	320,396
	Rural Communications Provider Initiative	n/a	n/a	420	4,186	4,606

**Table E-15. Programs with Multiple Years of Savings Combined (verified net first year savings)**

Savings Type	Program	CY 2015	CY 2016	CY 2017	CY 2018	Total Claimed in 2018
kWh	Low-E Storm Windows	n/a	n/a	2,945	n/a	2,945
	Midstream Commercial Kitchen Equipment	n/a	n/a	85,483	93,159	178,642
	ENERGY STAR Retail Products Platform	n/a	104,475	299,828	304,156	708,459
	Strategic Energy Management	n/a	1,117,926	766,929	14,714,875	16,599,730
	Rural Communications Provider Initiative	n/a	n/a	68,604	1,150,962	1,219,566
kW	Low-E Storm Windows	n/a	n/a	3	n/a	3
	Midstream Commercial Kitchen Equipment	n/a	n/a	7	8	15
	ENERGY STAR Retail Products Platform	n/a	11	42	36	89
	Strategic Energy Management	n/a	-2	118	1,238	1,354
	Rural Communications Provider Initiative	n/a	n/a	8	138	146
Therms	Low-E Storm Windows	n/a	n/a	1,694	n/a	1,694
	Midstream Commercial Kitchen Equipment	n/a	n/a	2,083	6,226	8,309
	ENERGY STAR Retail Products Platform	n/a	590	420	271	1,282
	Strategic Energy Management	n/a	1,244,337	411,217	982,019	2,637,573
	Rural Communications Provider Initiative	n/a	n/a	1,859	2,587	4,446
MMBtu	Low-E Storm Windows	n/a	n/a	179	n/a	179
	Midstream Commercial Kitchen Equipment	n/a	n/a	500	940	1,440
	ENERGY STAR Retail Products Platform	n/a	416	1,065	1,065	2,545
	Strategic Energy Management	n/a	128,248	43,738	148,409	320,395
	Rural Communications Provider Initiative	n/a	n/a	420	4,186	4,606



## Appendix F. Cost-Effectiveness and Emissions Methodology and Analysis

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

Because maintaining consistency between planning and evaluation approaches is critical to understand program performance compared with expectations, the Evaluation Team used the same calculator to evaluate the cost-effectiveness of the Focus on Energy programs in CY 2018. Its findings are presented in this section.

The PSC considers the modified TRC test to be the primary test in assessing the cost-effectiveness of both individual programs and the entire Focus on Energy portfolio of programs.<sup>8</sup> The PSC also directs that three additional tests be conducted for advisory purposes. These are an expanded TRC test that also includes net economic benefits, the utility administrator cost test (UAT), and the ratepayer impact measure test (RIM).

Net-to-gross (NTG) ratios can be a significant driver in the results of the TRC, UAT, and RIM tests. NTG ratios are applied to adjust the impacts of the programs so they reflect only the gains resulting from the programs. Therefore, NTG ratios take into account energy savings that would have been achieved without the efficiency programs as well as participant spillover (that is, when NTG is less than 1, savings are removed; when NTG is greater than 1, savings are added). In all cases, the savings are multiplied by NTG.

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

### Test Descriptions

The Evaluation Team—as well as the Program Administrator in developing its calculator—uses methods adapted from the California Standard Practice Manual, the conventional standard of cost-effectiveness analysis for energy efficiency programs in the United States.<sup>9</sup> Four tests—the modified TRC test, the expanded TRC test, the UAT, and the RIM test—are described in the next sections.

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<sup>8</sup> The use of the modified TRC test as the primary cost-effectiveness test is directed by the PSC. Public Service Commission of Wisconsin. September 3, 2014. *Quadrennial Planning Process II – Scope*. Order PSC Docket 5-FE-100, REF#:215245. [http://psc.wi.gov/apps35/ERF\\_view/viewdoc.aspx?docid=215245](http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=215245)

<sup>9</sup> California Public Utilities Commission. July 2002. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. [http://www.calmac.org/events/SPM\\_9\\_20\\_02.pdf](http://www.calmac.org/events/SPM_9_20_02.pdf)

### Modified Total Resource Cost Test

The TRC test is the most commonly applied test for evaluating the cost-effectiveness of energy efficiency and renewable resource programs around the country. Applications range across states and utility jurisdictions, from the standard TRC test to the Societal Cost Test, which expands the test inputs to account for a more holistic societal perspective. Modifications to the standard TRC test often include reducing the discount rate or including various environmental and non-energy benefits. The test includes total participant and Program Administrator costs. The test also includes some non-energy benefits (such as emission reduction benefits).

The modified TRC test used for the CY 2018 evaluation determines if programs are cost-effective from a regulatory perspective (as directed by the PSC) and is intended to measure the overall impacts of program benefits and costs on the state of Wisconsin. The test compares all benefits and costs that can be measured with a high degree of confidence, including any net avoided emissions that are regulated and that have either well-defined market or commission-established values. The test’s purpose here is to determine if the total costs incurred by residents, businesses, and Focus on Energy for operating the programs are outweighed by the total benefits they receive.

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

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

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

Where:

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

### Expanded Total Resource Cost Test with Net Economic Benefits

The Evaluation Team investigated the impact of expanding the TRC to include net economic benefits for the CY 2018 programs. The analysis of economic benefits is conducted every two years, and the Evaluation Team issues the results separately from the evaluation reports.

The benefit/cost equation used for the expanded TRC test with net economic benefits is:

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

### Utility Administrator/Program Administrator Cost Test

The Evaluation Team also assessed the portfolio’s cost-effectiveness using the UAT, which measures the net benefits and costs of the programs as a resource option from the perspective of the Focus on Energy Program Administrator. In Wisconsin, the UAT effectively represents the collective perspectives of the participating utilities that hire and fund the Program Administrator.

The UAT, previously called the Revenue Requirements Test, effectively estimates the impacts on utility revenue requirements (the costs of providing service) by comparing the benefits of avoided utility costs from avoided energy consumption to the combined costs of operating the program, such as incentive payments, administrative costs, and delivery costs. A positive benefit/cost ratio, therefore, indicates that the program improves an energy system’s overall efficiency.

For this evaluation, the UAT’s benefit/cost value indicates whether the combined revenue requirements from all participating utilities increase or decrease as a result of the Focus on Energy programs. The net benefits determined with the UAT indicate the estimated dollar value of the change in the combined revenue requirements from all participating utilities. The NTG ratio impacts only the benefit side of the UAT because none of the costs would have occurred absent the effort and, therefore, all are kept in the test (not subtracted from denominator).

The benefit/cost equation used for the UAT is:

$$UAT \frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy * NTG]}{[Participant\ Incentives + Administrative\ Costs + Delivery\ Costs]}$$

## Ratepayer Impact Measure Test

Generally, the RIM test indicates the isolated and marginal effect on utility energy rates from changes in revenues and operating costs caused by energy efficiency and renewable resource programs, all else being equal. It does not, however, provide a comprehensive picture of ratepayer impacts. The RIM test’s estimated effects are theoretical and assume annual rate cases that may, in fact, not take place. Furthermore, the RIM test does not account for non-energy benefits enjoyed by ratepayers, nor does it clearly distinguish the difference between rate and total bill impacts.

From the RIM test perspective, the relatively expansive view of program costs, particularly the inclusion of lost revenues—which are foregone revenues as opposed to new costs—from avoided energy consumption, leads most energy efficiency and renewable energy programs to not be cost-effective. Exceptions include demand response programs or programs targeted to the highest marginal cost hours (when marginal costs are greater than rates). In simple terms, the RIM test benefit/cost value is the ratio of avoided utility costs and the combination of participant incentives, administrative costs, and lost utility revenue.

The benefit/cost equation used for the RIM test is:

$$RIM \frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy * NTG]}{[Participant\ Incentives + Administrative\ Costs + Lost\ Revenue * NTG]}$$

For this evaluation, a RIM test benefit/cost value less than 1 indicates that Focus on Energy will induce theoretical upward pressure on rates because the decrease in utility revenues caused by its programs is greater than the avoided utility costs (net benefits are negative) and *vice versa*. Conversely, a value greater than 1 indicates that Focus on Energy will induce theoretical downward pressure on rates because the decrease in revenues is less than the avoided utility costs.

Results from the RIM test are better understood within the context of UAT results. The most common combination of results involves a UAT benefit/cost value greater than 1 and a RIM test benefit/cost value less than 1. Passing the UAT means that revenue requirements (revenue needed to operate the utility business and deliver energy services) will decrease as a result of the programs; in other words, the utilities are running more efficiently because of their programs.

However, if the programs do not pass the RIM test, it means the improvement in efficiency and the associated decrease in revenue requirements were not sufficient to offset the lost revenues. As a result, the programs will put upward pressure on rates. Rates are roughly estimated as in this formula:

$$\frac{\text{revenue requirement}}{\text{sales (kWh or therms)}}$$

The numerator (revenue requirement) decreases, but so does the denominator (sales). If the denominator decreases more than the numerator, the ratio of the two will increase. In this scenario, although all *rates* may theoretically increase, the energy *bills* for participants will decrease and the energy *bills* for nonparticipants will increase. The decrease in revenue requirement means that the decrease in participant bills will exceed the increase in nonparticipant bills such that the average bills across the two customer groups will decrease.

In essence, the RIM test is not a cost-effectiveness (efficiency) test in an economic sense but, rather, an analysis of the distributional (equity) impacts on energy bills.<sup>10</sup> Because Focus on Energy programs are designed to meet a statutory requirement to make program benefits available to all ratepayers, the RIM test results for Focus are influenced by its programs' success in meeting that requirement, its ability to meet that requirement within existing resources, and its customers' individual willingness to participate.

The RIM test assumes that a true-up will occur every year through rate cases. The test as applied could be considered the worst-case scenario. The RIM test also does not consider any societal or system benefits that accrue to *all* customers.

## Interpreting Test Results

No single benefit/cost test can provide a comprehensive understanding of program performance or impacts in isolation. The results of tests that measure overall program cost-effectiveness, such as the modified TRC test, should be reviewed along with the results of other tests such as the UAT. Such a multi-perspective approach warrants a clear understanding of the tradeoffs among the tests.

Because of changes in avoided electric energy and natural gas costs and in emissions allowance prices for the current quadrennial (CY 2015–CY 2018), the cost-effectiveness results reported here are not directly comparable with results from the previous quadrennial cycle (CY 2011–CY 2014).

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<sup>10</sup> The RIM test assumes annual rate cases that may not take place. If there is not an annual rate adjustment, there is a transfer payment to participants from utility shareholders rather than from nonparticipants.

### Energy Avoided Costs

The PSC established the methodology to estimate electric energy avoided costs in PSC Order, docket 5-GF-191 (PSC REF#:166932).<sup>11</sup> The source for electric energy avoided costs in this CY 2018 evaluation comes from the annualized forecast avoided cost model developed by the Evaluation Team. This model relied on the Midcontinent Independent Transmission System Operator’s locational marginal pricing for nodes in Wisconsin, and forecasts for 2019, 2024, and 2029.<sup>12</sup> The PSC established the natural gas avoided costs in PSC Order, docket 5-FE-100 (PSC REF#:232431).<sup>13</sup> These electric and gas costs are based on Henry Hub price forecasts from the U.S. Energy Information Administration CY 2014 Annual Energy Outlook.<sup>14</sup>

The forecast model decreases the verified gross energy savings by the conventional attribution factor of NTG to derive net savings. The net savings are then increased by the line loss factor of 8% to account for avoided distribution losses. Table F-1 shows the assumptions for the CY 2015, CY 2016, CY 2017, and CY 2018 evaluation avoided cost used for the cost-effectiveness tests.

**Table F-1. Avoided Costs**

Avoided Cost	CY 2015	CY 2016	CY 2017	CY 2018
Electric Energy (\$/kWh) <sup>a</sup>	\$0.02914–\$0.06871	\$0.03525–\$0.06871	\$0.04136–\$0.06871	\$0.04747–\$0.06871
Electric Capacity (\$/kW year)	130.26	130.26	130.26	130.26
Gas (\$/therms) <sup>b</sup>	\$0.625–\$1.278	\$0.691–\$1.278	\$0.735–\$1.278	\$0.802–\$1.278
Avoided Cost Inflation	0%	0%	0%	0%
Real Discount Rate	2%	2%	2%	2%
Line Loss	8%	8%	8%	8%

<sup>a</sup> The CY 2015–CY 2018 cost-effectiveness analyses used a time series that grows from \$0.02914 to \$0.06871 over 14 years in the forecast model.

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

### Emissions Benefits

The modified TRC benefit/cost calculations include the benefit of avoiding three air pollutants that are regulated under the Clean Air Act. These are carbon dioxide, sulfur dioxide, and nitrogen oxide.

<sup>11</sup> Public Service Commission of Wisconsin. June 18, 2012. *Quadrennial Planning Process II – Scope*. Order PSC Docket 5-GF-191, REF#:166932. [http://psc.wi.gov/apps35/ERF\\_view/viewdoc.aspx?docid=166932](http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=166932)

<sup>12</sup> Midcontinent Independent Transmission System Operator, Inc. Last updated 2019. “Day-Ahead Locational Marginal Pricing” <https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/>

<sup>13</sup> Public Service Commission of Wisconsin. February 25, 2015. *Quadrennial Planning Process II – Scope*. Order PSC Docket 5-FE-100, REF#:232431. [http://psc.wi.gov/apps35/ERF\\_view/viewdoc.aspx?docid=232431](http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=232431)

<sup>14</sup> U.S. Energy Information Administration. May 7, 2014. *Annual Energy Outlook 2014*. <https://www.eia.gov/outlooks/archive/aeo14/>

Determining the emissions benefits requires three key parameters: lifecycle net energy savings, emissions factors, and the dollar value of the displaced emissions.

Emissions factors are the rate at which the criteria pollutants are emitted per unit of energy and are most often expressed in tons of pollutant per energy unit—electric is in tons/megawatt hour (MWh), and gas is in tons/thousand therms (MThm). The product of the emissions factor and the net energy savings is the total weight of air pollutant offset or avoided by the program. The product of the total tonnage of pollutant saved and the dollar value of the reduced emissions per ton is, therefore, the avoided emissions benefit, as shown in this equation:

$$\text{Value of Avoided Emissions} = [\text{Net Saved Energy} \times \text{Emissions Factor} \times \text{Value of Emissions Allowance}]$$

The natural gas emissions factor has remained constant since the CY 2011 evaluation report and is derived from a best-practice greenhouse gas inventory method developed by the California Energy Commission. For CY 2018, the Evaluation Team assessed the emissions factors used in CY 2016 and CY 2017 using a tool developed by the EPA to calculate avoided emissions from renewable energy and energy efficiency programs (the tool is officially called AVERT, or the AVoided Emissions and geneRation Tool). AVERT is a spreadsheet-based model that uses historical hourly generation and emissions data to determine the individual power plants that are likely to be displaced by energy efficiency or renewable energy during each hour of the year. The Evaluation Team used the model to compare the electricity generation avoided by the Focus on Energy programs during each hour of the year with the hourly generation information to determine the quantity of emissions displaced. It then calculated an emissions factor based on the tons of emissions displaced by each MWh of generation avoided. The calculated emissions factor was similar to that used in the CY 2017 and CY 2018 evaluations and so was held constant in CY 2018 to provide stability across the quad.

Table F-2. lists the emissions factors and allowance prices.

**Table F-2. Emissions Factors and Allowance Price**

Service Fuel Type	Carbon Dioxide	Nitrogen Oxide	Sulfur Dioxide
Electric Emissions Factor (Tons/MWh)	0.8855	0.0007	0.0015
Gas Emissions Factor (Tons/MThm)	5.85	n/a	n/a
Allowance Price (\$/Ton)	\$15	\$7.50	\$2

The Evaluation Team obtained nitrogen oxide and sulfur dioxide emissions allowance prices from near the end of CY 2016 from the EPA’s Cross State Air Pollution Rule.<sup>15</sup> Markets for nitrogen oxide and sulfur dioxide allowances continue to be volatile, making it difficult to forecast nitrogen oxide and sulfur dioxide allowance prices. However, given the generally lower prices in CY 2016, CY 2017 and CY 2018, the Evaluation Team kept the lowered avoided emissions values for sulfur dioxide and nitrogen oxide from CY 2016 to maintain a conservative estimate of the value of avoided emissions. The Evaluation Team used the carbon dioxide emissions price in the PSC’s Order, docket 5-FE-100 Ref#: 279739, which

<sup>15</sup> U.S. Environmental Protection Agency. December 14, 2017. “Cross-State Air Pollution Rule.” <https://www.epa.gov/csapr>

states, “For purposes of evaluating the Focus program during the CY 2015–CY 2018 quadrennial, the value of avoided carbon emissions shall be \$15 per ton.”<sup>16</sup> Table F-3. lists the emissions benefits for all programs by residential and nonresidential segment.

**Table F-3. Total Program Emissions Benefits by Segment**

Program Year	Residential	Nonresidential	Pilots	Rural	Total
CY 2015 Emissions Benefits	\$25,236,521	\$85,344,610	N/A	N/A	\$110,581,131
CY 2016 Emissions Benefits	\$33,488,565	\$70,614,708	N/A	N/A	\$104,103,273
CY 2017 Emissions Benefits	\$27,784,615	\$72,107,782	N/A <sup>b</sup>	N/A	\$99,892,397
CY 2018 Emissions Benefits	\$34,598,669	\$67,349,281	\$4,915,161	\$2,838,264	\$109,701,374

Note: Reported emissions impacts are based upon portfolio level modeling and are not measure- or project-level specific.

<sup>b</sup> CY 2017 emissions benefits from Pilots is included in the CY 2017 Residential and Nonresidential emissions benefits.

### Program Costs

The CY 2018 program costs were provided to the Evaluation Team from Focus on Energy’s contract fiscal agent, the accounting firm Wipfli. The program costs represent all costs associated with running the efficiency programs (including administration and delivery costs). Note that incentive costs are not included as TRC costs because they are deemed transfer payments, which is consistent with industry guidelines defining the TRC test. Incentive costs are however used for other costs tests such as the UAT.

### Incremental Costs

The gross incremental costs are the additional costs incurred as a result of purchasing efficient equipment over and above a baseline nonqualified product. The Evaluation Team derived the gross incremental cost values used in this CY 2018 evaluation from the incremental cost study conducted by the Program Administrator, Program Implementers, and Evaluation Team. This established up-to-date incremental costs for all measures based on the best available data, including historical Focus on Energy program data and independent research from other state programs. The gross incremental costs, like the energy savings values used in the cost-effectiveness tests, required the application of attribution factors to account for freeridership. Similar to the previous quadrennial’s evaluation effort, the Evaluation Team assigned actual project cost values from the program tracking databases to the renewable energy projects.

### Cost-Effectiveness Results by Test

Table F-4 presents the inputs and results from the modified TRC test for the Focus on Energy CY 2018 energy efficiency and renewable resource program portfolio. Application of the modified TRC test showed that net statewide benefits to residents, businesses, and Focus on Energy from the CY 2018 programs were \$616,598,020 overall. The benefits from the residential programs were 2.37 times greater than the costs, while the benefits from the nonresidential programs outweighed the costs by a factor of 4.95.

<sup>16</sup> Public Service Commission of Wisconsin. September 3, 2014. *Quadrennial Planning Process II – Scope*. Order PSC Docket 5-FE-100, REF#:279739. [http://psc.wi.gov/apps35/ERF\\_view/viewdoc.aspx?docid=279739](http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=279739)  
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**Table F-4. CY 2018 Sector-Level and Overall Results, Modified Total Resource Cost Test**

	Residential	Nonresidential	Total
Administrative Costs	\$1,080,112	\$2,358,264	\$3,438,377
Delivery Costs	\$18,006,106	\$29,234,737	\$47,240,843
Incremental Measure Costs	\$96,141,415	\$84,727,293	\$180,868,708
<b>Total TRC Costs</b>	<b>\$115,227,633</b>	<b>\$116,320,295</b>	<b>\$231,547,927</b>
Electric Benefits	\$185,409,704	\$343,231,080	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$209,803,790
Emissions Benefits	\$36,265,683	\$73,435,691	\$109,701,374
<b>Total TRC Benefits</b>	<b>\$272,736,367</b>	<b>\$575,409,580</b>	<b>\$848,145,948</b>
<b>TRC Benefits Minus Costs</b>	<b>\$157,508,735</b>	<b>\$459,089,286</b>	<b>\$616,598,020</b>
<b>TRC Benefit/Cost Ratio</b>	<b>2.37</b>	<b>4.95</b>	<b>3.66</b>

Table F-5 presents the inputs and results from the expanded TRC test for the Focus on Energy CY 2018 energy efficiency and renewable resource program portfolio. The expanded TRC test includes economic benefits from the portfolio. As the economic benefits for 2018 have not been estimated yet, the table used the economic benefits estimated for 2016 as a stand-in.

**Table F-5. CY 2018 Overall Results, Expanded Total Resource Cost Test**

	Total
Administrative Costs	\$3,438,377
Delivery Costs	\$47,240,843
Incremental Measure Costs	\$180,868,708
<b>Total TRC Costs</b>	<b>\$231,547,927</b>
Electric Benefits	\$528,640,783
Gas Benefits	\$209,803,790
Emissions Benefits	\$109,701,374
Economic Benefits	\$347,613,194
<b>Total TRC Benefits</b>	<b>\$1,195,759,142</b>
<b>TRC Benefits Minus Costs</b>	<b>\$964,211,215</b>
<b>TRC Benefit/Cost Ratio</b>	<b>5.16</b>

Table F-6 presents the inputs and results from the UAT for the CY 2018 Focus on Energy portfolio. The benefits from the residential programs were 4.45 times greater than the costs, while the benefits from the nonresidential programs outweighed the costs by a factor of 6.84.

**Table F-6. CY 2018 Overall Results, Utility Administrator Cost Test**

	Residential	Nonresidential	Total
Incentive Costs	\$34,067,781	\$41,824,552	\$75,892,333
Administrative Costs	\$1,080,112	\$2,358,264	\$3,438,377
Delivery Costs	\$18,006,106	\$29,234,737	\$47,240,843
<b>Total UAT Costs</b>	<b>\$53,153,999</b>	<b>\$73,417,554</b>	<b>\$126,571,553</b>
Electric Benefits	\$185,409,704	\$343,231,080	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$209,803,790
<b>Total UAT Benefits</b>	<b>\$236,470,684</b>	<b>\$501,973,889</b>	<b>\$738,444,573</b>
<b>UAT Benefits Minus Costs</b>	<b>\$183,316,685</b>	<b>\$428,556,335</b>	<b>\$611,873,021</b>
<b>UAT Benefit/Cost Ratio</b>	<b>4.45</b>	<b>6.84</b>	<b>5.83</b>



Table F-7 shows the inputs and results from the RIM test for CY 2018 energy efficiency and renewable resource programs. As expected, estimated benefit/cost value from the RIM test is near 1. When interpreted within the context of the UAT test results, these findings indicate that although annual Focus on Energy activities will probably induce theoretical upward pressure on future energy rates, total ratepayer energy costs will go down.

**Table F-7. CY 2018 Sector-Level and Overall Results, Ratepayer Impact Measure Test**

	Residential	Nonresidential	Total
Incentive Costs	\$34,067,781	\$41,824,552	\$75,892,333
Electric Lost Revenues	\$281,880,683	\$284,938,905	\$566,819,588
Gas Lost Revenues	\$32,923,514	\$61,272,694	\$94,196,207
Admin Costs	\$1,080,112	\$2,358,264	\$3,438,377
Delivery Costs	\$18,006,106	\$29,234,737	\$47,240,843
<b>Total RIM Costs</b>	<b>\$367,958,196</b>	<b>\$419,629,153</b>	<b>\$787,587,348</b>
Electric Benefits	\$185,409,704	\$343,231,080	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$209,803,790
<b>Total RIM Benefits</b>	<b>\$236,470,684</b>	<b>\$501,973,889</b>	<b>\$738,444,573</b>
<b>RIM Benefits Minus Costs</b>	<b>(\$131,487,511)</b>	<b>\$82,344,737</b>	<b>(\$49,142,775)</b>
<b>RIM Benefit/Cost Ratio<sup>a</sup></b>	<b>0.64</b>	<b>1.20</b>	<b>0.94</b>

<sup>a</sup> For the CY 2018 cost-effectiveness analysis, the lost revenue portion of the RIM test assumes a fixed utility rate that does not escalate over time, while the avoided energy costs are escalated on a yearly basis resulting in greater benefits than costs for the nonresidential portfolio.

## Cost-Effectiveness Results by Program

Table F-8 and Table F-9 provide the sector-level and overall results of the cost-effectiveness analysis shown by core efficiency programs, pilots, and renewables. In CY 2018, cost-effectiveness is presented in more detail because of the presence of new pilot and rural programs. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs.

**Table F-8. CY 2018 Overall Cost-Effectiveness Analysis with Portfolio Breakout**

Focus on Energy Benefits and Costs		Portfolio Breakout	Core Efficiency	Pilots	Rural	Renewables
Incentives	\$75,892,333		\$59,172,374	\$4,382,328	\$7,886,441	\$4,451,190
Modified TRC Benefits	\$848,145,948		\$740,848,989	\$42,603,163	\$19,729,752	\$44,964,045
Modified TRC Costs	\$231,547,927		\$179,118,048	\$7,875,201	\$13,509,232	\$31,045,446
Portfolio TRC Ratio	<b>3.66</b>	Alone	<b>4.14</b>	5.41	1.46	1.45
		With Core		<b>4.19</b>	3.95	3.74
		With Core and Pilots (All Efficiency)			<b>4.01</b>	3.80
		With Core, Pilots, and Rural				<b>3.66</b>

**Table F-9. CY 2018 Overall with Renewables Separate Cost-Effectiveness Analysis,  
Modified Total Resource Cost Test**

	Residential	Nonresidential	Renewables	Total
Incentive Costs	\$32,815,940	\$38,625,204	\$4,451,190	\$75,892,333
Administrative Costs	\$1,059,552	\$2,349,744	\$29,081	\$3,438,377
Delivery Costs	\$17,364,577	\$28,947,144	\$929,121	\$47,240,843
Incremental Measure Costs	\$85,424,612	\$65,356,852	\$30,087,244	\$180,868,708
<b>Total Non-Incentive Costs</b>	<b>\$103,848,741</b>	<b>\$96,653,740</b>	<b>\$31,045,446</b>	<b>\$231,547,927</b>
Electric Benefits	\$175,589,231	\$313,012,742	\$40,038,810	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$0	\$209,803,790
Emissions Benefits	\$35,061,955	\$69,714,184	\$4,925,235	\$109,701,374
<b>Total TRC Benefits</b>	<b>\$261,712,167</b>	<b>\$541,469,736</b>	<b>\$44,964,045</b>	<b>\$848,145,948</b>
<b>TRC Benefits Minus Costs</b>	<b>\$157,863,425</b>	<b>\$444,815,997</b>	<b>\$13,918,598</b>	<b>\$616,598,020</b>
<b>TRC Ratio</b>	<b>2.52</b>	<b>5.60</b>	<b>1.45</b>	<b>3.66</b>

**Table F-10. CY 2018 Overall with Renewables Separate Cost-Effectiveness Analysis,  
Utility Administrator Cost Test**

	Residential	Nonresidential	Renewables	Total
Incentive Costs	\$32,815,940	\$38,625,204	\$4,451,190	\$75,892,333
Administrative Costs	\$1,059,552	\$2,349,744	\$29,081	\$3,438,377
Delivery Costs	\$17,364,577	\$28,947,144	\$929,121	\$47,240,843
<b>Total Non-Incentive Costs</b>	<b>\$51,240,069</b>	<b>\$69,922,092</b>	<b>\$5,409,392</b>	<b>\$126,571,553</b>
Electric Benefits	\$175,589,231	\$313,012,742	\$40,038,810	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$0	\$209,803,790
<b>Total UAT Benefits</b>	<b>\$226,650,211</b>	<b>\$471,755,552</b>	<b>\$40,038,810</b>	<b>\$738,444,573</b>
<b>UAT Benefits Minus Costs</b>	<b>\$175,410,142</b>	<b>\$401,833,460</b>	<b>\$34,629,418</b>	<b>\$611,873,021</b>
<b>UAT Ratio</b>	<b>4.42</b>	<b>6.75</b>	<b>7.40</b>	<b>5.83</b>

**Table F-11. CY 2018 Overall with Renewables Separate Cost-Effectiveness Analysis,  
Ratepayer Impact Measure Test**

	Residential	Nonresidential	Renewables	Total
Incentive Costs	\$32,815,940	\$38,625,204	\$4,451,190	\$75,892,333
Electric Lost Revenues	\$281,880,683	\$255,687,919	\$29,250,987	\$566,819,588
Gas Lost Revenues	\$32,923,514	\$61,272,694	\$0	\$94,196,207
Admin Costs	\$1,059,552	\$2,349,744	\$29,081	\$3,438,377
Delivery Costs	\$17,364,577	\$28,947,144	\$929,121	\$47,240,843
<b>Total RIM Costs</b>	<b>\$366,044,266</b>	<b>\$386,882,704</b>	<b>\$34,660,379</b>	<b>\$787,587,348</b>
Electric Benefits	\$175,589,231	\$313,012,742	\$40,038,810	\$528,640,783
Gas Benefits	\$51,060,980	\$158,742,810	\$0	\$209,803,790
<b>Total RIM Benefits</b>	<b>\$226,650,211</b>	<b>\$471,755,552</b>	<b>\$40,038,810</b>	<b>\$738,444,573</b>
<b>RIM Benefits Minus Costs</b>	<b>(\$139,394,054)</b>	<b>\$84,872,848</b>	<b>\$5,378,432</b>	<b>(\$49,142,775)</b>
<b>RIM B/C Ratio</b>	<b>0.62</b>	<b>1.22</b>	<b>1.16</b>	<b>0.94</b>

Table F-12 provides the residential program cost-effectiveness analysis. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs. The program values provided are exclusive of pilot, and rural programs and sub-programs.

**Table F-12. CY 2018 Residential Programs Cost-Effectiveness Analysis**

	Multifamily		Appliance Recycling	Home Performance with ENERGY STAR	New Homes	Retail Lighting and Appliance	Simple Energy Efficiency	Design Assistance Residential	Renewable Rewards Residential
	Multifamily Energy Savings	Multifamily New Construction							
Incentive Costs	\$766,693	\$467,972	\$465,220	\$6,596,675	\$1,966,850	\$10,543,539	\$1,991,876	\$709,405	\$1,251,841
Administrative Costs	\$202,773	\$70,951	\$0	\$206,428	\$157,571	\$314,326	\$0	\$0	\$20,560
Delivery Costs	\$1,048,914	\$355,061	\$1,608,904	\$4,149,070	\$774,396	\$3,808,798	\$1,742,849	\$290,665	\$641,529
Incremental Measure Costs	\$1,378,568	\$775,564	\$611,406	\$32,396,901	\$15,836,482	\$22,928,942	\$1,991,876	\$1,603,335	\$10,716,803
<b>Total Non-Incentive Costs</b>	<b>\$2,630,255</b>	<b>\$1,201,576</b>	<b>\$2,220,310</b>	<b>\$36,752,400</b>	<b>\$16,768,448</b>	<b>\$27,052,066</b>	<b>\$3,734,725</b>	<b>\$1,894,000</b>	<b>\$11,378,891</b>
Electric Benefits	\$4,060,046	\$2,653,474	\$3,599,329	\$15,794,198	\$4,326,010	\$119,237,465	\$14,638,169	\$5,526,139	\$9,820,473
Gas Benefits	\$1,959,579	\$1,431,756	\$0	\$21,734,631	\$10,768,049	\$1,998,382	\$5,526,764	\$3,492,460	\$0
Emissions Benefits	\$972,626	\$573,732	\$656,272	\$4,210,636	\$1,466,460	\$20,997,527	\$3,261,229	\$1,256,459	\$1,203,728
<b>Total TRC Benefits</b>	<b>\$6,992,251</b>	<b>\$4,658,963</b>	<b>\$4,255,601</b>	<b>\$41,739,465</b>	<b>\$16,560,519</b>	<b>\$142,233,373</b>	<b>\$23,426,162</b>	<b>\$10,275,058</b>	<b>\$11,024,201</b>
<b>TRC Benefits Minus Costs</b>	<b>\$4,361,996</b>	<b>\$3,457,386</b>	<b>\$2,035,291</b>	<b>\$4,987,065</b>	<b>(\$207,929)</b>	<b>\$115,181,307</b>	<b>\$19,691,437</b>	<b>\$8,381,058</b>	<b>(\$354,691)</b>
<b>TRC Ratio</b>	<b>2.66</b>	<b>3.88</b>	<b>1.92</b>	<b>1.14</b>	<b>0.99</b>	<b>5.26</b>	<b>6.27</b>	<b>5.43</b>	<b>0.97</b>

Table F-13 provides nonresidential program cost-effectiveness analysis. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs. The program values provided are exclusive of pilot, and rural programs and sub-programs.

**Table F-13. CY 2018 Nonresidential Programs Cost-Effectiveness Analysis**

	Small Business	Renewable Energy Competitive Incentive	Design Assistance Nonresidential	Business Incentive	Agriculture, Schools, and Government	Large Energy Users	Emerging Technology	Renewable Rewards Business
Incentive Costs	\$5,032,740	\$2,684,552	\$3,830,189	\$8,394,863	\$8,441,694	\$9,964,658	\$0	\$514,797
Administrative Costs	\$65,348	\$6,935	\$0	\$269,194	\$646,560	\$911,347	\$277,318	\$1,586
Delivery Costs	\$2,057,919	\$122,463	\$2,318,057	\$7,000,426	\$4,515,658	\$6,072,690	\$751,048	\$165,129
Incremental Measure Costs	\$7,773,173	\$13,325,634	\$10,705,734	\$16,004,054	\$7,166,940	\$20,328,799	\$0	\$6,044,807
<b>Total Non-Incentive Costs</b>	<b>\$9,896,441</b>	<b>\$13,455,033</b>	<b>\$13,023,791</b>	<b>\$23,273,674</b>	<b>\$12,329,159</b>	<b>\$27,312,836</b>	<b>\$1,028,367</b>	<b>\$6,211,522</b>
Electric Benefits	\$39,466,467	\$22,197,208	\$30,191,028	\$78,563,183	\$45,767,228	\$99,551,696	\$0	\$8,021,129
Gas Benefits	\$2,465,132	\$0	\$14,809,067	\$10,462,908	\$21,461,395	\$84,341,719	\$0	\$0
Emissions Benefits	\$7,274,204	\$2,741,194	\$6,383,419	\$14,580,412	\$9,691,744	\$25,697,994	\$0	\$980,313
<b>Total TRC Benefits</b>	<b>\$49,205,803</b>	<b>\$24,938,402</b>	<b>\$51,383,515</b>	<b>\$103,606,504</b>	<b>\$76,920,367</b>	<b>\$209,591,409</b>	<b>\$0</b>	<b>\$9,001,442</b>
<b>TRC Benefits Minus Costs</b>	<b>\$39,309,363</b>	<b>\$11,483,369</b>	<b>\$38,359,723</b>	<b>\$80,332,830</b>	<b>\$64,591,208</b>	<b>\$182,278,573</b>	<b>(\$1,028,367)</b>	<b>\$2,789,920</b>
<b>TRC Ratio</b>	<b>4.97</b>	<b>1.85</b>	<b>3.95</b>	<b>4.45</b>	<b>6.24</b>	<b>7.67</b>	<b>N/A</b>	<b>1.45</b>

Table F-14 provides results of the pilot program cost-effectiveness analysis. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs. Table F-15 provides results of the rural cost-effectiveness analysis.

**Table F-14. CY 2018 Pilots Cost-Effectiveness Analysis**

	Seasonal Savings	ENERGY STAR Retail Products Platform	Strategic Energy Management	Midstream Commercial Kitchen Equipment	Midstream Commercial and Industrial Lighting
Incentive Costs	\$0	\$2,690,835	\$1,608,048	\$62,670	\$20,774
Administrative Costs	\$0	\$99,648	\$53,967	\$0	\$0
Delivery Costs	\$145,642	\$1,269,447	\$3,173,109	\$84,674	\$31,390
Incremental Measure Costs	\$0	\$1,085,262	\$1,612,080	\$266,785	\$23,558
<b>Total Non-Incentive Costs</b>	<b>\$145,642</b>	<b>\$2,454,356</b>	<b>\$4,839,156</b>	<b>\$351,460</b>	<b>\$54,947</b>
Electric Benefits	\$40,819	\$552,782	\$11,971,014	\$120,218	\$133,119
Gas Benefits	\$227,497	\$12,785	\$24,555,047	\$74,721	\$0
Emissions Benefits	\$36,321	\$99,934	\$4,727,530	\$30,721	\$20,655
<b>Total TRC Benefits</b>	<b>\$304,637</b>	<b>\$665,501</b>	<b>\$41,253,591</b>	<b>\$225,660</b>	<b>\$153,774</b>
<b>TRC Benefits Minus Costs</b>	<b>\$158,994</b>	<b>(\$1,788,856)</b>	<b>\$36,414,436</b>	<b>(\$125,800)</b>	<b>\$98,827</b>
<b>TRC Ratio</b>	<b>2.09</b>	<b>0.27</b>	<b>8.52</b>	<b>0.64</b>	<b>2.80</b>

**Table F-15. CY 2018 Rural Cost-Effectiveness Analysis**

	Connected Devices Kits	Rural Home Performance	Community Small Business Offering	Communications Providers Initiative
Incentive Costs	\$6,541,280	\$140,945	\$1,026,994	\$177,223
Administrative Costs	\$0	\$7,854	\$63,472	\$62,536
Delivery Costs	\$1,621,695	\$519,497	\$1,311,978	\$1,630,194
Incremental Measure Costs	\$6,700,169	\$116,108	\$1,100,909	\$374,820
<b>Total Non-Incentive Costs</b>	<b>\$8,321,864</b>	<b>\$643,459</b>	<b>\$2,476,360</b>	<b>\$2,067,550</b>
Electric Benefits	\$5,095,837	\$64,963	\$5,919,095	\$1,329,694
Gas Benefits	\$3,823,034	\$86,044	\$504,451	\$68,369
Emissions Benefits	\$1,507,675	\$23,085	\$1,071,418	\$236,087
<b>Total TRC Benefits</b>	<b>\$10,426,546</b>	<b>\$174,092</b>	<b>\$7,494,964</b>	<b>\$1,634,150</b>
<b>TRC Benefits Minus Costs</b>	<b>\$2,104,682</b>	<b>(\$469,367)</b>	<b>\$5,018,604</b>	<b>(\$433,401)</b>
<b>TRC Ratio</b>	<b>1.25</b>	<b>0.27</b>	<b>3.03</b>	<b>0.79</b>

## Cost-Effectiveness Results for Renewables

Table F-16. lists the CY 2015, CY 2016, CY 2017, and CY 2018 cost-effectiveness results, with renewables separate and with renewables included.

**Table F-16. Cost-Effectiveness Results for Focus on Energy Portfolio**

Calendar Year	Residential	Nonresidential	Renewables	Total
CY 2015: Modified TRC Test Result with Renewables	3.12	3.63	n/a	<b>3.51</b>
CY 2015: Modified TRC Test Result Renewables Separate	3.33	3.93	1.18	<b>3.51</b>
CY 2016: Modified TRC Test Result with Renewables	2.75	3.13	n/a	<b>3.00</b>
CY 2016: Modified TRC Test Result Renewables Separate	2.93	3.36	1.09	<b>3.00</b>
CY 2017: Modified TRC Test Result with Renewables	3.13	4.60	n/a	<b>4.07</b>
CY 2017: Modified TRC Test Result Renewables Separate	3.39	4.89	1.37	<b>4.07</b>
CY 2018: Modified TRC Test Result with Renewables	2.37	4.95	n/a	<b>3.66</b>
CY 2018: Modified TRC Test Result Renewables Separate	2.52	5.60	1.45	<b>3.66</b>

## Appendix G. Summary of Confidence and Precision

Focus on Energy gives significant consideration to evaluation design to ensure that its programs achieve the most accurate and reliable results possible under the available evaluation budget. The evaluation uses statistical confidence and precision standards as a key driver in determining the scale and scope of the evaluation design for each program for which the target for net savings over the CY 2015–CY 2018 quadrennial is 90% confidence and 10% precision.

The Evaluation Team calculated the precision of final net first-year and lifetime energy savings estimates (MMBtu) at 90% confidence for each program in the Wisconsin Focus on Energy portfolio. The precision reflects the uncertainty in the savings estimates because of measurement error, regression error, and sampling error. Measurement error refers to the uncertainty around engineering parameters derived from simulation or professional judgment, regression error refers to uncertainty around estimates derived from regression analysis, and sampling error refers to uncertainty introduced by estimating population parameters based on a sample.

After calculating standard errors, the Evaluation Team calculated the precision of the final estimates using the following formula:

$$\text{relative precision} = \frac{\text{z-statistic} * SE}{\text{total net savings}}$$

Where:

- z-statistic = Critical value at a specific confidence level
- SE = Standard error of the total net savings estimate
- total net savings = Total net savings estimated based on the evaluation results

Below, the Evaluation Team provides details on how it calculated total net savings estimates and their standard errors.

### *Introduction to Statistical Uncertainty*

The Evaluation Team collected data from surveys, billing histories, meters, and secondary sources including the Focus on Energy TRM to estimate net savings for each program and the portfolio. Statistical uncertainty is inherent in all activities for which samples or models are used to estimate a property of a population. Using sampled data is often preferred to save on costs and time associated with studying an entire population and because random samples of the population provide sufficiently accurate and precise results. The strength of an estimate is related to the amount of uncertainty or error around it, which is determined based on the statistical properties of sampled data and how they are used to make inferences about a population.

Statistical uncertainty comprises two parts: the confidence and the precision of the estimate. Confidence intervals show the range of values within which one expects the unknown population parameter to fall. Confidence refers to the probability that the true value of the metric of interest (such as kilowatt-hours saved) will fall within some level of precision. A statement of precision without a

statement of confidence is misleading. For example, if energy savings is estimated as 24 kWh with precision of ±5 kWh at 90% confidence, the interpretation is that one is 90% confident that the true energy savings is between 19 kWh and 29 kWh. Narrower confidence intervals indicate that the savings estimate is very precise, and wider confidence intervals indicate that the variability in the data is large and that more information would be required to produce a more precise estimate.

For the Focus on Energy evaluation, the general standard for uncertainty is to achieve evaluation results with 90% confidence and 10% precision over the CY 2015–CY 2018 quadrennial. Evaluation activities are defined and prioritized to align with this standard. This standard is in line with nationwide best practices for the evaluation of energy efficiency programs, as documented in the EPA’s *National Action Plan for Energy Efficiency* and elsewhere.<sup>17</sup>

## Combining Net Uncertainty with Gross Uncertainty

When two estimates are based on different evaluation activities and combined to produce a final estimate, the uncertainty from each estimate must be considered in calculating the uncertainty of the final estimate. For example, if one set of data collected from surveys, billing analyses, metering, and/or TRM review is used to estimate gross savings, and another set of data collected from a separate survey is used to estimate spillover, freeridership, and NTG ratios, and then that NTG ratio is applied to the gross savings to estimate net savings, the standard error of total net savings should be based on the standard error of gross savings and the NTG ratio. Details are provided below, specific to each set of programs.

When the Evaluation Team estimated NTG ratios using survey data collected from an independent simple random sample of participants, it used a ratio estimator and its standard error formula to quantify the uncertainty in the NTG ratios where net savings are represented by  $y_i$ , *ex post* savings are represented by  $x_i$ , and the standard error of the NTG ratio estimate is represented by  $SE_{NTG}$ , in the following formulas:

$$NTG\ Ratio = \frac{\sum_{sample} y_i}{\sum_{sample} x_i}$$

$$SE_{NTG} = \sqrt{\sum_{i=1}^n \frac{(y_i - NTG\ Ratio * x_i)^2}{\bar{x}^2 * n(n - 1)}}$$

The Evaluation Team then multiplied the NTG ratio to the total *ex post* gross savings to estimate total net savings and used the formula for the standard error of the product of two independent random variables to calculate precision, as shown in this formula:

$$SE_{total\ net\ savings} = \sqrt{NTG^2 * SE_{total\ ex\ post\ gross\ savings}^2 + total\ ex\ post\ gross\ savings^2 * SE_{NTG}^2 + SE_{NTG}^2 * SE_{total\ ex\ post\ gross\ savings}^2}$$

<sup>17</sup> U.S. Environmental Protection Agency. Accessed April 2018. “Energy and the Environment. National Action Plan for Energy Efficiency.” <https://www.epa.gov/energy/national-action-plan-energy-efficiency>



The Evaluation Team used this method for all programs unless otherwise noted.

## Nonresidential Programs

The Evaluation Team selected a sample of projects within each nonresidential program to estimate *ex post* verified gross savings. It used a probability proportional to size sample design to increase the likelihood of selecting projects with the highest *ex ante* MMBtu savings. It then assessed *ex post* verified gross savings for sampled projects and calculated program level realization rates.

The Evaluation Team applied the realization rates to the population total *ex ante* savings within each program to estimate the population total *ex post* gross savings. It calculated realization rates and standard errors using the formulas presented in the Uniform Methods Project (UMP) sampling chapter where the weights ( $w_i$ ) are proportional to the sampling probabilities (contribution to savings), *ex ante* savings are represented by  $x_i$ , and *ex post* savings are represented by  $y_i$ .<sup>18</sup>

$$RR = \frac{\sum_{sample} w_i y_i}{\sum_{sample} w_i x_i}$$

$$total\ ex\ post\ gross\ savings = RR * \sum_{population} w_i x_i$$

$$SE_{total\ ex\ post\ gross\ savings} = \sqrt{\sum_{i=1}^n w_i (w_i - 1) (y_i - RR * x_i)^2}$$

The Team estimated nonresidential NTG ratios using survey data collected from an independent simple random sample of participants and then multiplied these ratios with the total *ex post* gross savings to estimate total net savings for each program. It used a ratio estimator and standard error formula described above to quantify the uncertainty in the NTG ratios.

Table G-1. presents the precision of total net first and cumulative year MMBtu savings estimates at 90% confidence for each nonresidential program.<sup>19</sup> The sources of uncertainty in all nonresidential savings estimates were due to estimating realization rate and NTG values based on samples.

<sup>18</sup> National Renewable Energy Laboratory. April 2013. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. "Chapter 11: Sample Design Cross-Cutting Protocols." Prepared by Cadmus. <http://energy.gov/sites/prod/files/2013/11/f5/53827-11.pdf>

<sup>19</sup> In estimating precision around cumulative savings, the Evaluation Team corrected an error in the precision CY 2015 precision equation and updated CY 2015 precision estimates, provided in Table G-1..

**Table G-1. Nonresidential Net First-Year MMBtu Energy Savings Precision**

Nonresidential Programs	Precision at 90% Confidence				
	CY 2015	CY 2016	CY 2017	CY 2018	Cumulative
Agriculture, Schools and Government	15%	16%	16%	16%	9%
Business Incentive	38%	54%	36%	24%	20%
Chain Stores and Franchises	27%	27%	n/a	n/a	27%
Design Assistance <sup>a</sup>	31%	12%	34%	23%	12%
Large Energy Users	14%	21%	26%	23%	10%
Small Business	9%	12%	7%	6%	4%
Renewable Energy Competitive Incentive	n/a	n/a	10%	9%	2%

<sup>a</sup> The Design Assistance program included both residential and commercial projects. The Evaluation Team combined them for the purposes of verification and calculating precision.

### Residential Programs

The Evaluation Team used various methods to evaluate the residential programs. It applied the methods described above for the nonresidential programs to the Multifamily Direct Install and Multifamily Energy Savings programs.<sup>20</sup> Methods for the remaining programs are described below. Table G-2. presents the precision of total net savings estimates and the sources of uncertainty for each residential program, by program year as well as cumulative.

**Table G-2. Residential Net First-Year MMBtu Energy Savings Precision (90% Confidence)**

Residential Programs	Precision at 90% Confidence					Sources of Uncertainty
	CY 2015	CY 2016	CY 2017	CY 2018	Cumulative	
Appliance Recycling	52%	n/a	28%	26%	23%	UEC Model, Part Use, and NTG ratio
Multifamily Direct Install	7%	1%	5%	n/a	3%	Realization rate and NTG ratio
Multifamily Energy Savings	19%	12%	19%	23%	9%	Realization rate and NTG ratio
Multifamily New Construction	n/a	n/a	32%	22%	18%	Realization rate and NTG ratio
Retail Lighting and Appliances	n/a	17%	48%	43%	14%	ISR and NTG ratio
Home Performance with ENERGY STAR®— Whole Home Standard Track, Electric	15%	42%	16%	16%	12%	PRISM model
Home Performance with ENERGY STAR®— Whole Home Standard Track, Gas	7%	26%	9%	9%	6%	PRISM model
Home Performance with ENERGY STAR® - Whole Home Income Qualified, Electric	38%	38%	28%	28%	22%	PRISM model

<sup>20</sup> In estimating precision around cumulative savings for the Multifamily Direct Install and Multifamily Energy Savings Programs, the Evaluation Team corrected an error in the precision CY 2015 precision equation and updated CY 2015 precision estimates, provided in Table G-2..

Residential Programs	Precision at 90% Confidence					Sources of Uncertainty
	CY 2015	CY 2016	CY 2017	CY 2018	Cumulative	
Home Performance with ENERGY STAR®— Whole Home Income Qualified, Gas	18%	18%	15%	15%	10%	PRISM model
Home Performance with ENERGY STAR®— HVAC Path	n/a	n/a	6%	6% <sup>a</sup>	6% <sup>a</sup>	Pilot Implementer survey and Program data
Home Performance with ENERGY STAR® - Renewables	n/a	n/a	9%	9% <sup>a</sup>	9% <sup>a</sup>	Realization Rate and NTR ratio
New Homes Program	n/a	n/a	n/a	n/a	n/a	Stipulated
Simple Energy Efficiency	2%	6%	6%	32%	10%	Survey estimated ISRs

<sup>a</sup> CY 2017 and cumulative precision are based on CY 2017 results, as no additional surveys were completed in CY 2018.

## Retail Lighting and Appliance Program

The following describes the method the Evaluation Team used to calculate standard errors around gross and NTG savings for the Retail Lighting and Appliance Program.

### Gross Savings

The Evaluation Team estimated first-year savings for the Retail Lighting and Appliance Program according to the method described in the Retail Lighting and Appliance Program chapter. Precision around gross program savings was entirely driven by LED lighting in-services rates and the lighting cross-sector-sales proportion, as the Evaluation Team applied deemed savings to advanced power strips and smart thermostats.

### In-Service Rate

The Evaluation Team estimated first-year in-service rates (ISRs) in CY 2018 by applying a four-year trajectory ISR to the surveyed ISR. The Team calculated the standard error for the surveyed ISRs using the formula for a proportion:

$$ISR_1 = \frac{\# \text{ installed}}{\# \text{ reported}}$$

$$SE_1 = \sqrt{\frac{ISR_1 * (1 - ISR_1)}{n}}$$

The Evaluation Team calculated a six-year projected ISRs (net present value ISR) for LEDs according to the method recommended in the UMP,<sup>21</sup> which assumes that each year, participants install 24% of their storage bulbs from the previous year, for up to six years after participants received their bulbs. The

<sup>21</sup> National Renewable Energy Laboratory. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. “Chapter 21: Residential Lighting Evaluation Protocol.” Prepared by Apex Analytics, LLC. February 2015. <http://energy.gov/sites/prod/files/2015/02/f19/UMChapter21-residential-lighting-evaluation-protocol.pdf>

Evaluation Team calculated the standard error of the net present value ISR by first rewriting the formula in the UMP as follows:

$$ISR_{NPV} = f(\text{rate}, \% \text{installed}) + ISR_1 * (f(\text{rate}, \% \text{installed}) - 1)$$

Where:

$$\begin{aligned} ISR_{NPV} &= \text{Net Present Value ISR} \\ \text{rate} &= \text{Discount rate (2\%)} \\ \% \text{installed} &= \text{Percentage of storage bulbs installed (24\%)} \end{aligned}$$

The UMP did not provide standard errors or sample sizes used to estimate the percentage of storage bulbs installed each year. Instead, the Evaluation Team assumed that the function of the discount rate and percentage of installed storage bulbs achieved 10% precision at 90% confidence and calculated the standard error around the estimate as:

$$SE_f = \frac{10\% * f(\text{rate}, \% \text{installed})}{z\text{-statistic}}$$

The Evaluation Team calculated the standard error around the net present value ISR as follows:

$$SE_{NPV} = \sqrt{SE_f^2 + SE_{ISR_1}^2 * (f(\text{rate}, \% \text{installed}) - 1)^2 + SE_f^2 * ISR_1^2 + SE_{ISR_1}^2 * SE_f^2}$$

### **Cross-Sector Sales Proportion**

The Evaluation Team calculated the proportion of lighting cross-sector sales by taking the average of the CY 2014 and CY 2015 cross-sector sales proportions. For each proportion, the Evaluation Team calculated the following standard errors:

$$CSS = \frac{\# \text{ small business customers with CFL or LED purchases from participating retailers}}{\# \text{ CFLs and LEDs purchased from participating retailers}}$$

$$SE_{CSS_{CY}} = \sqrt{\frac{CSS * (1 - CSS)}{n}}$$

To combine the uncertainties from both CY 2014 and CY 2015 cross-sector sales proportions, the Evaluation Team calculated the square root of the sum of squared standard errors of each respective sales proportion:

$$SE_{CSS} = \frac{1}{2} \sqrt{SE_{CSS_{CY2014}}^2 + SE_{CSS_{CY2015}}^2}$$

### **Gross Savings Results**

The Evaluation Team calculated final gross savings by adding residential and commercial gross savings, weighted by the cross-sector sales proportion.

The standard error around final gross savings incorporates uncertainties from the ISR and cross-sector sales proportion as follows.

$$SE_{gross} = \sqrt{SE_{NPV}^2 * (kWh_{Res} + CSS * (kWh_{Com} - kWh_{Res}))^2 + (kWh_{Com} - kWh_{Res})^2 * SE_{CSS}^2 * ISR_{NPV}^2 + SE_{NPV}^2 * SE_{CSS}^2}$$

Where:

$kWh_{Res}$  = Total lighting savings calculated based on residential inputs for delta watts, hours of use, and waste heat factor.

$kWh_{Com}$  = Total lighting savings calculated based on commercial inputs for delta watts, hours of use, and waste heat factor.

### Net-to-Gross Savings

The Evaluation Team estimated NTG ratios for LEDs using four separate methods as described in the Retail Lighting and Appliance Program chapter. It applied the weighted average of the resulting NTG ratio estimates as its final LED NTG ratio, weighted by the precision around each estimate.

The Evaluation Team calculated the standard errors around the final LED NTG ratio as follows:

$$SE_{NTG} = \sqrt{\left(\frac{1}{\sum_{m=1}^4 w_m}\right)^2 * \sum_{m=1}^4 SE_{NTG}^2 * w_m^2}$$

Where:

$w_m$  =  $1/(\text{precision of NTG method } m)$

$NTG_m$  = Net-to-Gross ratio resulting from NTG method  $m$

The uncertainty around final NTG savings incorporates both the uncertainty around NTG ratios and uncertainty around gross savings. The Evaluation Team combined these uncertainties and calculated the standard error around NTG savings as follows:

$$SE_{kWh_{net}} = \sqrt{SE_{\Delta kWh}^2 * NTG^2 + SE_{NTG}^2 * \Delta kWh + SE_{\Delta kWh}^2 * SE_{NTG}^2}$$

### Home Performance with ENERGY STAR® Program—Whole Home Path

The Evaluation Team used PRinceton Scorekeeping Method (PRISM) models to estimate savings for the Home Performance with ENERGY STAR Program Whole Home Path. The PRISM modeling approach has been used often in billing analysis since first introduced in the 1980s—and is the standard approach for billing analysis used by the Evaluation Team, because the method obtains weather-normalized usage and savings estimates at the customer level. With customer-level weather-normalized usage, obtaining savings for various subsets and subgroups is straightforward. The Evaluation Team calculated the precision of each estimate based on the PRISM regression standard errors of the estimated changes in usage, then it pooled standard errors within participants and nonparticipants to calculate precision for the final adjusted gross savings.

## Home Performance with ENERGY STAR® Program—HVAC Path

The Evaluation Team used a standard market practice analysis to estimate savings for the Home Performance with ENERGY STAR Program HVAC path. It used D+R sales data to estimate the proportion of HVAC equipment in each AFUE category. The D+R survey reported proportions based on over 9,000 sampled units. The Evaluation Team calculated the corresponding precision of these estimates, which is close to 0%. It combined the D+R AFUE proportions with those observed in the program tracking database to estimate a Wisconsin-specific distribution of nonprogram HVAC AFUE in the marketplace and then multiplied this result with the energy consumption estimates calculated using an engineering algorithm with inputs from the TRM.

The TRM values are not reported with error bounds, thus the Evaluation Team was not able to calculate the uncertainty in the energy consumption estimates. To estimate savings, the Team calculated the difference between the market baseline and the Program energy consumption estimates. Because the Team could not account for uncertainty in the engineering algorithm inputs from the TRM, it did not calculate the precision of net savings for this Program.

## Simple Energy Efficiency Program

The Evaluation Team estimated both measure-level and Program total savings from the kits distributed through the Simple Energy Efficiency Program. Uncertainty around these savings came from the measure ISRs, which the Evaluation Team estimated using surveys collected from a sample of customers who received one of the six distributed kit types. Because survey respondents answered installation questions about all the measures included in their kits, estimated ISRs within each kit type were correlated. To account for this correlation, the Evaluation Team first estimated standard errors around total savings within a kit type as follows:

$$SE_h = \sqrt{\sum_i X_{hi}^2 Var(ISR_{hi}) + 2 \sum_{i>j} X_{hi} X_{hj} \rho_{hi,hj} S_{hi} S_{hj}}$$

Where:

- $SE_h$  = Standard error for total savings in kit type  $h$
- $X_{hi}$  = Total savings for measure  $i$  from kit type  $h$  assuming 100% ISR
- $X_{hj}$  = Total savings for measure  $j$  from kit type  $h$  assuming 100% ISR
- $Var(ISR_{hi})$  = The variance of the ISR measure  $i$  from kit type  $h$ , calculated as  $Var(ISR_{hi}) = ISR_{hi}(1 - ISR_{hi})/n_{hi}$ , where  $n_{hi}$  is the number of survey respondents
- $\rho_{hi,hj}$  = The correlation coefficient between responses to measure  $i$  and measure  $j$  in kit type  $h$
- $S_{hi}$  = The standard deviation of the ISR measure  $i$  from kit type  $h$ , estimated as the square root of its variance
- $S_{hj}$  = The standard deviation of the ISR measure  $j$  from kit type  $h$ , estimated as the square root of its variance

The Evaluation Team combined kit-type uncertainty to estimate standard errors around program total savings as follows:

$$SE(\text{Program Total Savings}) = \sqrt{\sum_h SE_h^2}$$

The Evaluation Team assumed a NTG ratio of 1.0 for this program, so total net savings are equal to total gross savings.

## Appliance Recycling Program

The Evaluation Team estimated average annual unit energy consumption (UEC) using a dataset of metered refrigerators and freezers from prior studies conducted by the Evaluation Team. The standard error for the UEC is calculated using this formula for a population mean:

$$SE_{UEC} = \sqrt{\frac{\sum(\text{Mean UEC} - UEC_i)^2}{n}}$$

Gross savings are a product of the average UEC and the part-use factor. The Evaluation Team collected survey responses from participants to estimate the part-use factor.

$$SE_{PF} = \sqrt{\frac{PF * (1 - PF)}{n}}$$

Therefore, the standard error for gross savings accounts for the uncertainty around the UEC and part-use factor estimates pooling the standard errors and was calculated as:

$$SE_{kWh_{gross}} = \sqrt{SE_{UEC}^2 * PF^2 + SE_{PF}^2 * UEC}$$

The Evaluation Team used participant survey responses to calculate freeridership and secondary market impacts. The standard error was calculated as:

$$SD_{NTGR} = \sqrt{\frac{\sum(\text{Mean FR kWh} - FR kWh_i)^2}{n - 1}}$$

And

$$SE_{NTGR} = \sqrt{\frac{SD_{NTGR}}{n}}$$

Finally, the standard error for net savings combines the standard error of gross savings and NTG ratio:

$$SE_{kWh_{net}} = \sqrt{SE_{gross}^2 * NTGR^2 + SE_{NTGR}^2 * Gross kWh}$$

## Appendix H. Measure Analysis

This appendix describes the analyses of measures offered in Focus on Energy programs during CY 2018. It includes the methodologies the Evaluation Team followed and describes the results applied to the CY 2018 program evaluations.

### Retail Lighting and Appliance Program

#### Lighting

In CY 2018, the Evaluation Team estimated LED per-bulb savings using the lumen equivalence methodology to determine baseline wattages and other inputs from the TRM.

#### Unit Energy Savings Input Details

The Evaluation Team used the values shown in Table H-1. to calculate verified gross savings. The Team used items under the heading Unit Savings Inputs to calculate savings for individual bulbs and applied items under the heading Total Savings Inputs to aggregated savings.

**Table H-1. CY 2018 Lighting Verified Gross Inputs**

Input	Description	Residential Value	Nonresidential Value	Units	Source
<b>Unit Savings Inputs</b>					
HOU	Hours of use: daily average use LEDs	2.20	10.20	Hours/day	2018 TRM
ISR <sub>LED</sub>	In-service rate: percentage of LEDs installed	87%	87%	%	Wisconsin CY 2017 in-home audits of 120 homes. Net present value ISR accounts for bulbs installed from storage.
ΔWatts	Delta watts: difference in wattage between the efficient and baseline bulb	varies	varies	W	Wisconsin CY 2018 lumen equivalence analysis
CF	Coincidence factor: summer peak coincidence factor	0.069	0.770	-	2018 TRM
365	Days per year: conversion to annualize the daily hours of use	365	365	Days/year	2018 TRM
<b>Total Savings Inputs</b>					
Cross-Sector Sales	Cross-sector sales: percentage of bulbs sales allocated to the residential and nonresidential sector	93.4%	6.6%	%	Wisconsin CY 2015 cross-sector sale analysis
EUL <sub>LED</sub>	Effective useful life: average life of a LED bulb	20.0	20.0	Years	2018 TRM, MMIDs 3553–3556 and 3112

The verified inputs include 6.6% cross-sector sales because to determine verified savings, the Team calculated residential and nonresidential savings independently then weighted the savings for each residential and nonresidential measure using this percentage. The verified savings in Table H-2. show the residential, nonresidential, and weighted savings.



**Table H-2. CY 2018 Verified Gross Unit Savings<sup>a</sup>**

Measure	Residential		Nonresidential		Residential/ Nonresidential Weighted <sup>b</sup>	
	kWh	kW	kWh	kW	kWh	kW
LED, Reflector	33	0.003	154	0.032	41	0.005
LED, Omnidirectional, 310–749 Lumens	18	0.002	85	0.018	23	0.003
LED, Omnidirectional, 750–1,049 Lumens	24	0.002	110	0.023	29	0.003
LED, Omnidirectional, 1,050–1,489 Lumens	29	0.003	135	0.028	36	0.004
LED, Omnidirectional, 1,490–2,600 Lumens	40	0.003	183	0.038	49	0.006

<sup>a</sup> No natural gas savings are claimed for the Program.

<sup>b</sup> Residential and nonresidential unit savings are weighted by the evaluated cross-sector sales percentage.

Table H-3. provides baseline and efficient wattages and the corresponding delta watts values for the *ex ante* and verified savings.

**Table H-3. Ex Ante and Verified Delta Watts Comparison**

Measure	Ex Ante Baseline	Average Evaluated Baseline	Bulb Wattage		Delta Watts	
			Ex Ante	Average	Ex Ante	Average Evaluated
LED, Reflector	65	57	12	10	53	47
LED, Omnidirectional, 310–749 Lumens	29	32	7	6	22	26
LED, Omnidirectional, 750–1,049 Lumens	43	43	11	9	32	34
LED, Omnidirectional, 1,050–1,489 Lumens	53	53	13	12	40	41
LED, Omnidirectional, 1,490–2,600 Lumens	72	72	17	15	55	57

*Delta Watts Lumens Bins*

This section provides details related to lumens bins, which the Evaluation Team used for calculating verified delta watts inputs. The lumen bins for specialty bulbs shown in Table H-4, Table H-5, and Table H-6. are derived from the U.S. Department of Energy (DOE) UMP (National Renewable Energy Laboratory 2015).

**Table H-4. Globe Lumen Bins**

Bin	Baseline (Energy Independence and Security Act–Impacted Bulbs)
250–349	25
350–499	29
500–574	43
575–649	53
650–1,099	72
1,100–1,300	72

**Table H-5 Decorative Shape (Candles) Lumen Bins**

Bin	Baseline (Energy Independence and Security Act–Impacted Bulbs)
70–89	10
90–149	15
150–299	25
300–499	29
500–699	43

**Table H-6. Energy Independence and Security Act–Exempt Lumen Bins**

Bin	Baseline (Energy Independence and Security Act–Exempt Bulbs)
0–309	25
310–449	25
450–799	40
800–1099	60
1,100–1,599	75
1,600–1,999	100
2,000–2,600	150
2,601–3,300	150
3,301–4,815	200

This table include three-way, post lamps, and other similar bulbs.

### *Appliance Recycling Program*

In CY 2018, the Evaluation Team estimated the per-unit savings estimates for recycled refrigerators and freezers analysis using the same meter data and multivariate regression models as in the CY 2013–CY 2017 evaluations.

### *Regression Models*

Table H-7. shows the model specification the Team used to estimate the annual energy consumption of refrigerators recycled in CY 2018 along with the model’s estimated coefficients.

**Table H-7. Refrigerator Unit Energy Consumption Regression Model Estimates  
(Dependent Variable = Average Daily kWh, R-squared = 0.30)**

Independent Variables	Coefficient	p-Value
Intercept	0.80	0.134
Age (years)	0.02	0.035
Dummy: Manufactured Pre-1990	1.04	0.000
Size (square feet)	0.06	0.021
Dummy: Single Door	-1.75	0.000
Dummy: Side-by-Side	1.12	0.000
Dummy: Primary	0.56	0.003
Interaction: Unconditioned Space x Heating Degree Days (HDDs)	-0.04	0.000
Interaction: Unconditioned Space x Cooling Degree Days (CDDs)	0.03	0.239

Table H-8. details the final model specifications the Team used to estimate the energy consumption of participating freezers recycled, along with the results.

**Table H-8. Freezer Unit Energy Consumption Regression Model Estimates  
(Dependent Variable = Average Daily kWh, R-squared = 0.38)**

Independent Variables	Coefficient	p-Value
Intercept	-0.95	0.236
Age (years)	0.05	0.010
Dummy: Manufactured Pre-1990	0.54	0.202
Size (square feet)	0.12	0.001
Dummy: Chest Freezer	0.30	0.273
Interaction: Unconditioned Space x HDDs	-0.03	0.035
Interaction: Unconditioned Space x CDDs	0.08	0.026

## Extrapolation

After estimating the final regression models, the Evaluation Team analyzed the corresponding characteristics (independent variables) for participating appliances as they were captured in the Program Administrator’s Program database.<sup>22</sup> Table H-9. summarizes Program averages or proportions for each independent variable.

<sup>22</sup> These data were not available in SPECTRUM. The Evaluation Team requested and received these data from ARCA in February 2019.

**Table H-9. CY 2018 Participant Mean Explanatory Variables**

Appliance	Independent Variables	Participant Population Mean Value
Refrigerator	Age (years)	21.93
	Dummy: Manufactured Pre-1990	0.17
	Size (square feet)	18.67
	Dummy: Single Door	0.03
	Dummy: Side-by-Side	0.13
	Dummy: Primary	0.38
	Interaction: Unconditioned Space x HDDs <sup>a</sup>	7.11
	Interaction: Unconditioned Space x CDDs <sup>a</sup>	0.5
Freezer	Age (years)	24.68
	Dummy: Manufactured Pre-1990	0.29
	Size (square feet)	16.50
	Dummy: Chest Freezer	0.31
	Interaction: Unconditioned Space x HDDs <sup>a</sup>	8.13
	Interaction: Unconditioned Space x CDDs <sup>a</sup>	0.58

<sup>a</sup> CDDs and HDDs derive from the weighted average from typical meteorological year data for weather stations that the Evaluation Team mapped to participating appliance zip codes. Typical meteorological year data uses median daily values for a variety of weather data collected from 1991–2005.

Using the values from Table H-7., Table H-8., and Table H-9., the Evaluation Team estimated the *ex post* annual UEC of the average refrigerator and freezer participating in the Program. Table H-10. shows the estimated *ex post* estimates.

**Table H-10. Average UEC by Appliance Type**

Appliance	<i>Ex Post</i> Annual UEC (kWh/year)	Relative Precision (90% Confidence)
Refrigerators	809	±13%
Freezers	606	±26%

### Methodology for Estimating Strategic Energy Management Program Energy Savings

The Evaluation Team used regression analysis to estimate electric and natural gas savings for nine facilities that participated in the CY 2018 SEM Pilot. For each facility, the Team reviewed the Program Implementer’s regression models and savings estimates and evaluated facility energy savings using independent models developed by the Evaluation Team. Where sites completed projects under the Large Energy Users Program, those savings were subtracted from the regression analysis savings estimate in order to isolate the SEM Pilot savings, so that those savings were not double counted.

The Program Implementer reported savings based on engineering algorithms for individual projects rather than their regression models. This resulted in realization rates greater than 100% at most sites because the regression model approach captured savings from behavioral and O&M activities that the

Implementer did not report savings for because engineering analyses were not possible. This differs from CY 2017, where the Program Implementer reported savings based on the regression models rather than engineering algorithms for individual projects.

The next sections describe these activities in detail.

## Strategic Energy Management Facility-Specific Summaries

The following sections describe the final model selected for each facility fuel types.

### Participant 1

Participant 1 is a plastic fabrication company in Wisconsin . The consumption for large, medium, and small plastics is modeled using different variables for each size.

#### Savings Summary

As shown in Table H-11, the Evaluation Team verified 2,830,157 kWh savings at Participant 1. This resulted in a realization rate of 2,830% for electricity. This site did not claim natural gas savings, and the Team did not evaluate natural gas savings.

**Table H-11. Participant 1 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	100,000	2,830,157	0	2,830,157	6%	2,830%
Natural gas (therms)	0	0	0	0	0	0

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s cumulative sum (CUSUM) models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For electricity, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-12), indicating that savings were not statistically different.

**Table H-12. Participant 1 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	2,159,490	2,830,157	Yes
Natural gas (therms)	n/a	n/a	n/a

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the monthly level. The Program Implementer’s final model is presented in Table H-13.

**Table H-13. Program Implementer Participant 1 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	15,464.18	7,629.49	2.03	8.23E-02
Production Variable 1	164.75	47.82	3.45	1.08E-02
Production Variable 2	108.80	33.15	3.28	1.35E-02
Production Variable 3	115.30	24.41	4.72	2.15E-03
CDD - 32	362.45	41.34	8.77	5.06E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.972.

The Program Implementer’s model had an adjusted R-squared over 0.9 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2018, to December 31, 2018. This period begins one year after the end of the baseline period. The Program Implementer did not exclude any data from the analysis. The Program Implementer’s final CUSUM savings from this period was 2,159,490 kWh.

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data, so the Team had two of the same production variables that the Program Implementer included in its model. The Evaluation Team did not exclude any data from the analysis. The Team’s final model is presented in Table H-14. The Evaluation Team’s CUSUM savings from this period was 2,830,157 kWh.

**Table H-14. Evaluation Team Participant 1 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P Value
Intercept	(2,392,862.76)	908,257.30	(2.63)	3.88E-02
Production Variable 1	9,010.40	2,521.07	3.57	1.17E-02
Production Variable 3	8,030.11	1,322.09	6.07	9.05E-04
Average Daily Temp.	25,751.73	5,661.00	4.55	3.90E-03
HDD - 30	65,118.85	17,461.15	3.73	9.74E-03
CDD - 58	(50,691.85)	18,494.15	(2.74)	3.37E-02

<sup>a</sup> Adjusted R<sup>2</sup> of 0.901

The Evaluation Team’s model is similar to the Program Implementer’s model, with an adjusted R-squared of 0.901. The differences are in the base temperatures used to calculate CDD (32°F versus 58°F) and the Team’s model included HDD and average daily temperature indicators. The Evaluation Team’s model also did not find Production Variable 2 to be a significant predictor of consumption after accounting for weather. The main driver of the model differences are due to a difference in the source of weather data used.

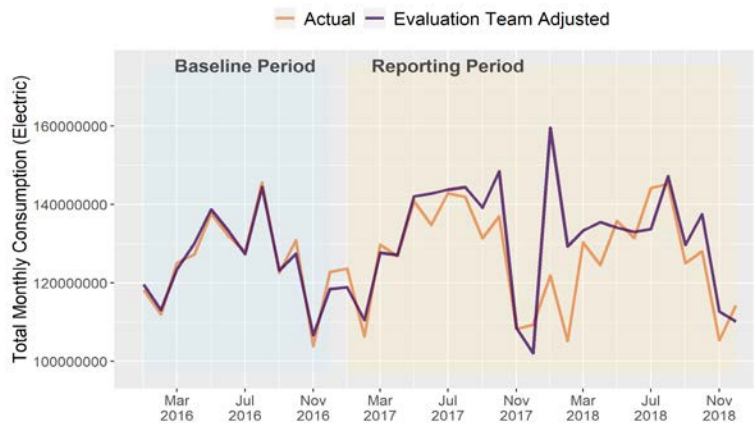
As shown in Table H-15, the Evaluation Team’s final model CUSUM estimates savings of 2,830,157 kWh, resulting in a 131% difference from the implementer’s CUSUM savings. The final CUSUM savings had a standard error of 1,043,301 kWh at 90% confidence with a lower bound of 1,114,079 kWh and an upper bound of 4,546,235 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-15. Participant 1 Electric Savings Summary**

Program Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
2,159,490	2,830,157	1,043,301	1,114,079	4,546,235	131%

Figure H-1 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-1. Evaluation Team Participant 1 Electric Model**



As shown in Table H-16, the facility had 2,830,157 kWh in evaluated CUSUM savings. The facility did not claim any savings through the Large Energy Users Program, and all CUSUM savings are due to SEM.

**Table H-16. Participant 1 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
2,830,157	0	2,830,157

*Natural Gas Savings*

This site did not claim natural gas savings, and the Team did not evaluate natural gas savings.

## Participant 2

Participant 2 is a company in Wisconsin that manufactures products mainly for residential use.

### Savings Summary

As shown in Table H-17, the Evaluation Team verified -447,973 kWh savings and 3,722 therms savings at Participant 2. This resulted in realizations rates of -227% for electricity and 74% for natural gas.

**Table H-17. Participant 2 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	197,445	(102,062)	345,910	(447,973)	(4%)	(227%)
Natural gas (therms)	5,063	3,722	0	3,722	7%	74%

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For both electricity and natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-18), indicating that savings were not statistically different.

**Table H-18. Participant 2 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	(75,089)	(102,062)	Yes
Natural gas (therms)	3,739	3,722	Yes

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

### Electricity Savings

The Program Implementer designated the baseline period as January 1, 2017, to December 31, 2017. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the daily level. The Program Implementer’s final model is presented in Table H-19.



**Table H-19. Program Implementer Participant 2 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	17,277.57	553.01	31.24	3.60E-104
Sqrt(Production)	413.61	11.81	35.02	1.58E-117
CDD - 50	165.91	11.32	14.65	2.14E-38
HDD - 50	30.29	7.55	4.01	7.37E-05
Saturday	1,084.51	550.08	1.97	4.94E-02
Sunday	(3,162.88)	561.93	(5.63)	3.68E-08
High Hours	(3,941.19)	381.70	(10.33)	4.82E-22
Holiday	(6,191.16)	485.29	(12.76)	5.70E-31

<sup>a</sup> Adjusted R<sup>2</sup> of 0.978.

The Program Implementer’s model had an adjusted R-squared over 0.9 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2018, to December 31, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded one date from the analysis, outlined in Table H-20. The Program Implementer’s final CUSUM savings from this period was -75,089 kWh.

**Table H-20. Program Implementer Participant 2 Electric Model Excluded Date**

Period	Date	Reason for Data Deletion
Reporting	7/18/2018	Bad weather data reading

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data, so the Team had the same production variables that the Program Implementer included in its model. The Evaluation Team did not exclude any data from the analysis. The Team’s final model is presented in Table H-21. The Evaluation Team’s CUSUM savings from this period was -102,062 kWh.

**Table H-21. Evaluation Team Participant 2 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	13,575.78	524.75	25.87	8.77531E-84
HDD - 33	28.28	12.04	2.35	0.019399802
CDD - 55	186.77	13.63	13.70	1.27355E-34
Closed	(4,667.03)	696.55	(6.70)	8.15335E-11
Saturday	5,188.96	556.89	9.32	1.27178E-18
Preheat	970.40	562.03	1.73	0.085104908
Production	(8.02)	0.77	(10.45)	1.74006E-22

<sup>a</sup> Adjusted R<sup>2</sup> of 0.974

The Evaluation Team’s model is similar to the Program Implementer’s model. The differences are in the base temperatures used to calculate CDD and HDD (50°F versus 55°F and 50°F versus 33°F, respectively). Other differences include the Evaluation Team using the non-transformed production variable, including indicators for when the factory is closed and when site preheating is in place (in the day before the

factory opens). The Evaluation Team also excludes the Sundays, holidays, and high hours indicators, though holidays are captured in the Team’s closed indicator. The Evaluation Team’s model-adjusted R-squared of 0.974 indicated that slightly less of the variability in the data is explained by the Team’s model compared to the Program Implementer’s. The Evaluation Team prefers this model, as using an untransformed production variable alleviates some of the effects of heteroskedasticity found. The preheat indicator also allows for greater robustness for holidays that occur on weekends and for the often-closed Monday that follows these holidays.

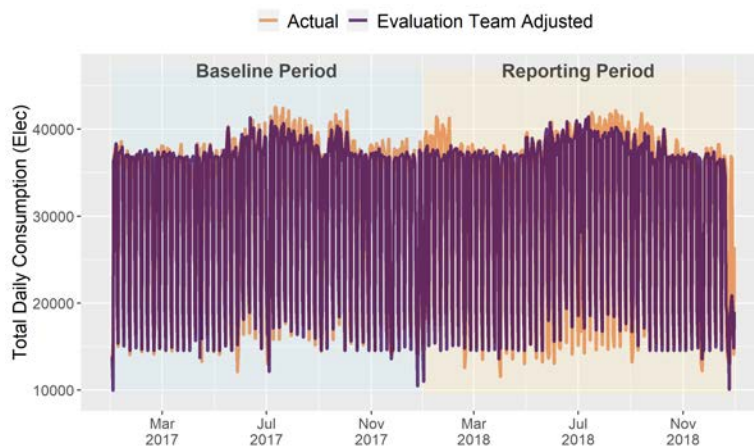
As shown in Table H-22, the Evaluation Team’s final model CUSUM estimates savings of -102,062 kWh, resulting in a 136% difference. The CUSUM savings had a standard error of 42,851 kWh at 90% confidence with a lower bound of -172,546 kWh and an upper bound of -31,578 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-22. Participant 2 Electric Savings Summary**

Program Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
(75,088)	(102,062)	42,851	(172,546)	(31,578)	136%

Figure H-2 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-2. Evaluation Team Participant 2 Electric Model**



As shown in Table H-23, the facility had an increase in consumption of 102,062 kWh in evaluated savings per CUSUM estimation. The facility claimed 345,910 kWh of prorated savings through the Large Energy Users Program, which has been subtracted from the evaluated CUSUM savings to obtain evaluated SEM

Pilot savings of -447,973 kWh (indicating an increase in consumption). The cause of the increase in consumption is not clear.

**Table H-23. Participant 2 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
(102,062)	345,910	(447,973)

*Natural Gas Savings*

The Program Implementer designated the baseline period as January 1, 2017, to December 31, 2017. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the daily level. The Program Implementer’s final model is presented in Table H-24.

**Table H-24. Program Implementer Participant 2 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	41.77342081	3.297987915	12.66633532	1.5367E-30
Production Subset	0.822729241	0.050528461	16.28249153	8.42695E-45
HDD - 60	4.471763865	0.081291476	55.00901281	1.2504E-174
Saturday	(24.21452823)	4.71503319	(5.135600801)	4.67244E-07

<sup>a</sup> Adjusted R<sup>2</sup> of 0.912.

The Program Implementer’s model had an adjusted R-squared over 0.9 and all the variables had low p-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2018, to December 31, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded some dates from the analysis, outlined in Table H-25. The Program Implementer’s final CUSUM savings from this period was 3,739 therms.

**Table H-25. Program Implementer Participant 2 Natural Gas Model Excluded Dates**

Period	Date	Reason for Data Deletion
Reporting	7/18/2018	Bad weather data reading
Baseline	11/10/2017 - 11/19/2017	Not valid meter readings

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data; however, the Evaluation Team chose to model consumption using total production rather than the production subset the Program Implementer used. The Evaluation Team excluded the same days as the Program Implementer for bad meter readings, but included July 18, 2018 due to differing weather sources. The Team’s final model is presented in Table H-26. The Evaluation Team’s CUSUM savings from this period was 3,722 therms.

**Table H-26. Evaluation Team Participant 2 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	22.94	4.07	5.64	3.54E-08
HDD - 57	4.67	0.10	45.55	1.06E-148
CDD - 63	(1.57)	0.49	(3.20)	1.50E-03
Closed	(20.61)	12.10	(1.70)	8.95E-02
Preheat	32.13	5.40	5.95	6.59E-09
Production	(0.057)	0.01	(4.51)	8.75E-06
Sqrt(Production)	4.44	0.60	7.36	1.37E-12

<sup>a</sup> Adjusted R<sup>2</sup> of 0.897.

The Evaluation Team’s model differs substantially from the Program Implementer’s model in base variables. The Team used HDDs and CDDs as opposed to solely HDDs (in addition to a different HDD base), and included the closed and preheat indicators included in the electric models. The Team also used production, instead of the subset used by the Program Implementer, and also used a square root transformation of that variable. The Team model’s adjusted R-squared of 0.897 is slightly lower than the Program Implementer’s adjusted R-squared of 0.912. However, the Team’s model’s variables all have very low p-values, indicating that they predict consumption and that the theoretical justification for including the closed and preheat indicators is strong. Including both production and the square root transformation alleviates heteroskedasticity, and the Evaluation Team decided not to use the subset production variable due to the high correlation among all production variables.

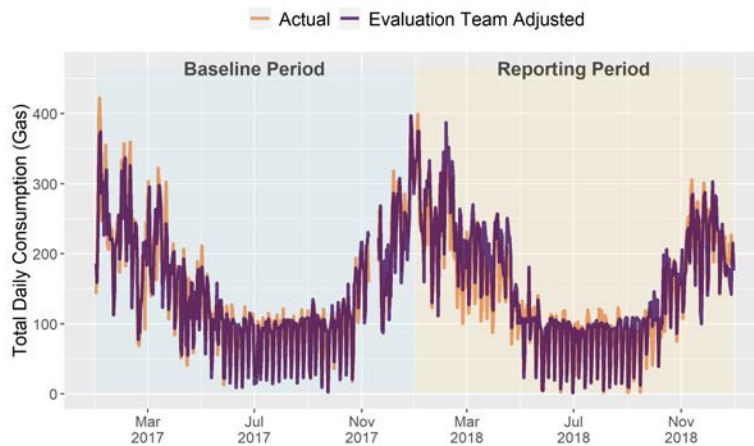
As shown in Table H-27, the Evaluation Team’s final model CUSUM estimates savings of 3,722 therms, resulting in a 100% difference. The CUSUM savings had a standard error of 765 therms at 90% confidence with a lower bound of 2,462 therms and an upper bound of 4,981 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-27. Participant 2 Natural Gas Savings Summary**

Program Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
3,739	3,722	765	2,462	4,981	100%

Figure H-3 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings can be seen when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-3. Evaluation Team Participant 2 Natural Gas Model**



As shown in Table H-28, the facility had 3,722 therms in evaluated savings through the SEM Pilot via CUSUM estimation. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-28. Participant 2 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
3,722	0	3,722

### Participant 3

Participant 3 is a powder metallurgy company in Wisconsin.

#### Savings Summary

As shown in Table H-29, the Evaluation Team verified 1,058,353 kWh savings at Participant 3. This resulted in a realization rate of 676% for electricity. The Program Implementer claimed no natural gas savings; however, the Team verified 19,311 therms of natural gas savings.

**Table H-29. Participant 3 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	156,511	1,058,353	0	1,058,353	4%	676%
Natural gas (therms)	0	19,311	0	19,311	27%	n/a

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did claim savings based on the Program Implementer’s CUSUM savings. For both electricity and natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-30), indicating that savings were not statistically different.

**Table H-30. Participant 3 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	1,058,354	1,058,353	Yes
Natural gas (therms)	19,333	19,311	Yes

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 1, 2015, to December 31, 2015. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the monthly level. The Program Implementer’s final model is presented in Table H-31.

**Table H-31. Program Implementer Participant 3 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	45,314.1462685	3,895.7445425	11.6317037	3.9144170E-07
Production Variable 1	0.2487063	0.0362899	6.8533191	4.4403983E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.807.

The Program Implementer’s model had an adjusted R-squared of 0.807 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2017, to December 31, 2018. This period begins one year after the end of the baseline period. The Program Implementer did not exclude any dates from the analysis, outlined below. The Program Implementer’s CUSUM savings for CY 2018 were 1,058,353 kWh.

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data, so the Team had the same production variables that the Program Implementer included in its model. The Evaluation Team did not exclude any data from the analysis. The Team’s final model is presented in Table H-32. The Evaluation Team’s CUSUM savings from this period was 1,058,353 kWh.

**Table H-32. Evaluation Team Participant 3 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	45,314.14627	3,895.744543	11.63170372	3.91442E-07
Normalized Production	0.248706272	0.036289901	6.853319105	4.4404E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.807

The Evaluation Team’s model is exactly the same as the Program Implementer’s model.

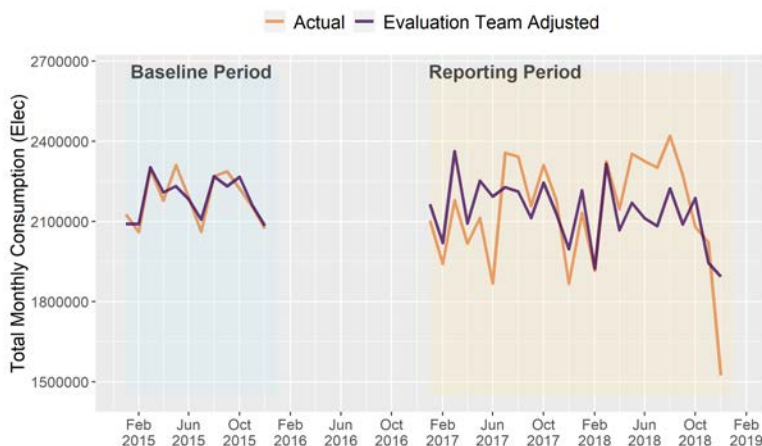
As shown in Table H-33, the Evaluation Team’s final model CUSUM estimates savings of 1,058,353 kWh is the same as the Implementation Team’s CUSUM savings. The CUSUM savings had a standard error of 390,489 kWh at 90% confidence with a lower bound of 1,700,651 kWh and an upper bound of 416,055 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-33. Participant 3 Electric Savings Summary**

Program Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
1,058,354	1,058,353	390,489	1,700,651	416,055	100%

Figure H-4 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings can be seen when predicted consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-4. Evaluation Team Participant 3 Electric Model**



As shown in Table H-34, the Team verified 1,058,353 kWh in savings through the SEM Pilot via CUSUM estimation. The facility claimed no prorated savings through the Large Energy Users Program; thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-34. Participant 3 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
1,058,353	0	1,058,353



*Natural Gas Savings*

The Program Implementer designated the baseline period as January 1, 2015, to December 31, 2015. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the monthly level. The Program Implementer’s final model is presented in Table H-35.

**Table H-35. Program Implementer Participant 3 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	140.96308	20.77599	6.78490	4.82957E-05
Normalized Daily Temp. – 61	5.98526	0.86476	6.92132	4.08697E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.810.

The Program Implementer’s model had an adjusted R-squared of 0.810 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2017, to December 31, 2018. This period begins one year after the end of the baseline period. The Program Implementer did not exclude any dates from the analysis. The Program Implementer’s CUSUM savings for CY 2018 were 19,333 therms.

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data. The Program Implementer included production in its model while the Evaluation Team did not. The Evaluation Team did not exclude any data from the analysis. The Team’s final model is presented in Table H-36. The Evaluation Team’s CUSUM savings from this period was 19,311 therms.

**Table H-36. Evaluation Team Participant 3 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	141.6108	20.55182	6.890427	4.24E-05
HDD – 59	6.563359	0.940386	6.979429	3.81E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.813

The Evaluation Team’s model is slightly different than the Program Implementer’s model. Where the Program Implementer included normalized weather, the Evaluation Team included an HDD indicator. The Evaluation Team’s model had an adjusted R-squared value of 0.813, a slight improvement from the Program Implementer’s model.

As shown in Table H-37, the Evaluation Team’s final model CUSUM estimates savings of 19,311 therms, resulting in a 100% difference. The CUSUM savings had a standard error of 12,980 therms at 90% confidence with a lower bound of -2,040 therms and an upper bound of 40,661 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

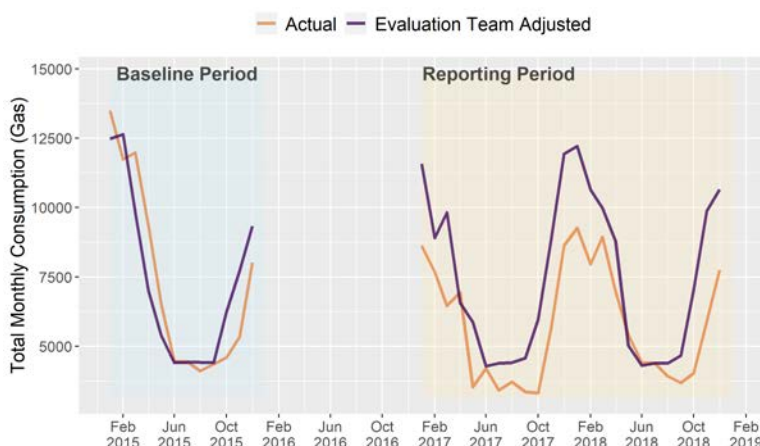
**Table H-37. Participant 3 Natural Gas Savings Summary**

Program Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
19,333	19,311	12,980	(2,040)	40,661	100%



Figure H-5 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-5. Evaluation Team Participant 3 Natural Gas Model**



As shown in Table H-38, the Team verified 19,311 therms in savings through the SEM Pilot via CUSUM estimation. The facility claimed no prorated savings through the Large Energy Users Program; thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-38. Participant 3 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
19,311	0	19,311

## Participant 4

Participant 4 is a milk solids processing company in Wisconsin.

### Savings Summary

As shown in Table H-39, the Evaluation Team verified -6,439 kWh savings and 117,619 therms savings at Participant 4. This resulted in realizations rates of -3% for electricity and 95% for natural gas.

**Table H-39. Participant 4 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	211,449	(6,439)	0	(6,439)	0%	(3%)
Natural gas (therms)	123,500	117,619	0	117,619	6%	95%

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For both electricity and natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-40), indicating that savings were not statistically different.

**Table H-40. Participant 4 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	23,775	(6,439)	Yes
Natural gas (therms)	107,288	117,619	Yes

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-41.

**Table H-41. Program Implementer Participant 4 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	125,777.51	8,130.77	15.47	1.25E-19
Production Variable 1	0.14	0.05	2.70	9.77E-03
Production Variable 2	0.07	0.03	2.59	1.30E-02
Production Variable 3	0.077	0.02	4.31	8.70E-05
Production Variable 4	0.041	0.01	3.43	1.31E-03
CDD – 58	269.321	38.83	6.94	1.27E-08
Production Variable 5 + 6	0.029	0.01	4.12	1.62E-04

<sup>a</sup> Adjusted R<sup>2</sup> of 0.851.

The Program Implementer’s model had an adjusted R-squared of 0.851 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model, though there may still be some unexplained factors. The performance period for this site was defined as January 1,

2017, to December 24, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded multiple dates from the analysis, shown in Table H-42. The Program Implementer’s final CUSUM from this period was 23,775 kWh.

**Table H-42. Program Implementer Participant 4 Electric Model Excluded Dates**

Period	Date	Reason for Data Deletion
Reporting	7/30/2018	Unavailable data due to upgrade of production system
Reporting	8/6/2018	Unavailable data due to upgrade of production system
Reporting	8/13/2018	Unavailable data due to upgrade of production system
Reporting	8/20/2018	Unavailable data due to upgrade of production system
Reporting	8/27/2018	Unavailable data due to upgrade of production system
Reporting	9/3/2018	Unavailable data due to upgrade of production system
Reporting	9/10/2018	Unavailable data due to upgrade of production system
Reporting	9/17/2018	Unavailable data due to upgrade of production system

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data, so the Team had the same production variables that the Program Implementer included in its model. The Evaluation Team excluded the same data that the Program Implementer excluded. The Team’s final model is presented in Table H-43. The Evaluation Team’s CUSUM savings from this period was -6,439 kWh.

**Table H-43. Evaluation Team Participant 4 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	(2,326,372)	843,311.8	(2.75861)	0.008425
HDD - 67	5,238.484	1,809.233	2.895417	0.005875
CDD - 68	(5,455.77)	2,072.994	(2.63183)	0.011667
Average Daily Temp.	36,718.16	12,619.91	2.909543	0.005658
Production Variable 1	0.110532	0.05124	2.157147	0.036497
Production Variable 2	0.079539	0.02836	2.804645	0.00747
Production Variable 5 + 6	0.026518	0.00735	3.607887	0.000785
Production Variable 3	0.067365	0.018717	3.599161	0.000805
Production Variable 4	0.040667	0.01323	3.073792	0.003623

<sup>a</sup> Adjusted R<sup>2</sup> of 0.839.

The Evaluation Team’s model is similar to the Program Implementer’s model. The differences are in the base temperatures used to calculate CDD (58°F versus 68°F) and the Team’s inclusion of HDD and average daily temperature. The Evaluation Team’s model-adjusted R-squared of 0.839 indicated that slightly less of the variability in the data is explained by the Team’s model compared to the Program Implementer’s. The model differences occur due a difference in the weather data sources, which led to the inclusion of more weather variables in the Evaluation Team’s model than in the Program Implementer’s model.

As shown in Table H-44, the Evaluation Team’s final model CUSUM estimates savings of -6,439 kWh, resulting in a -73% difference. The CUSUM savings had a standard error of 219,410 kWh at 90% confidence with a lower bound of -367,338 kWh and an upper bound of 354,459 kWh. The Program

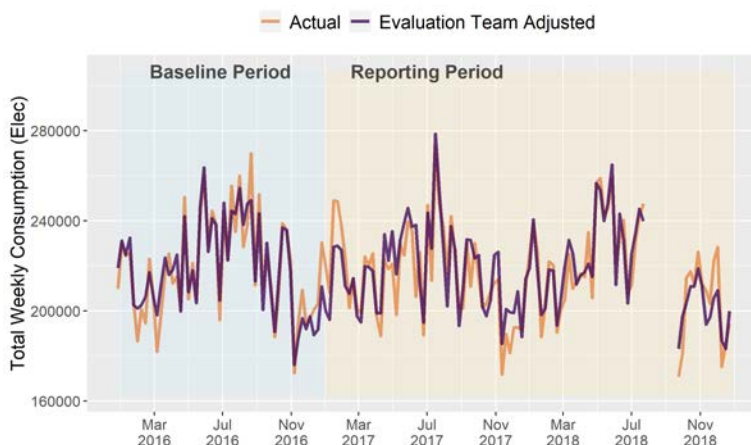
Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence. The cause of the increase in electric consumption is unclear from the data provided.

**Table H-44. Participant 4 Electric Savings Summary**

Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
23,775	(6,439)	219,410	(367,338)	354,459	(73%)

Figure H-6. shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-6. Evaluation Team Participant 4 Electric Model**



As shown in Table H-45, the facility had -6,439 kWh in evaluated savings through the SEM Pilot via CUSUM estimation. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-45. Participant 4 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
(6,439)	0	(6,439)

*Natural Gas Savings*

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production and consumption data at the weekly level. The Program Implementer’s final model is presented in Table H-46.

**Table H-46. Program Implementer Participant 4 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	15,943.01	2,468.38	6.46	5.92E-08
Production Variable 5	0.010	1.60E-03	6.27	1.13E-07
Production Variable 6	0.018	3.73E-03	4.81	1.65E-05
Production Variable 3	0.017	4.51E-03	3.82	4.02E-04
Production Variable 4	0.011	1.95E-03	5.60	1.13E-06
HDD – 75	20.704	2.12	9.77	8.54E-13

<sup>a</sup> Adjusted R<sup>2</sup> of 0.831.

The Program Implementer’s model had an adjusted R-squared of 0.831 and all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model, though there may still be some unexplained factors. The performance period for this site was defined as January 1, 2017, to December 24, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded multiple dates from the analysis, outlined in Table H-47. The Program Implementer’s final CUSUM savings from this period was 107,288 therms.

**Table H-47. Program Implementer Participant 4 Natural Gas Model Excluded Dates**

Period	Date	Reason for Data Deletion
Reporting	7/30/2018	Unavailable data due to upgrade of production system
Reporting	8/6/2018	Unavailable data due to upgrade of production system
Reporting	8/13/2018	Unavailable data due to upgrade of production system
Reporting	8/20/2018	Unavailable data due to upgrade of production system
Reporting	8/27/2018	Unavailable data due to upgrade of production system
Reporting	9/3/2018	Unavailable data due to upgrade of production system
Reporting	9/10/2018	Unavailable data due to upgrade of production system
Reporting	9/17/2018	Unavailable data due to upgrade of production system

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data; however, the Evaluation Team tested production variables and indicators that the Program Implementer did not include in its model. The Evaluation Team excluded the same data that the Program Implementer excluded. The Team’s final model is presented in Table H-48. The Evaluation Team’s CUSUM savings from this period was 117,619 therms

**Table H-48. Evaluation Team Participant 4 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	16,854.74	2,425.637	6.948583	1.21E-08
HDD - 75	21.34112	2.178263	9.797309	9.84E-13
Production Variable 5	0.009402	0.001567	6.001529	3.11E-07
Production Variable 6	0.01761	0.003633	4.847352	1.53E-05
Production Variable 2	0.012111	0.005745	2.107854	0.040646
Production Variable 3	0.018483	0.004445	4.15812	0.000142
Production Variable 4	0.008476	0.00217	3.905467	0.000313

<sup>a</sup> Adjusted R<sup>2</sup> of 0.840.

The sole difference between models was the Evaluation Team’s inclusion of Production Variable 2, which has a low p-value, indicating significance. The Evaluation Team’s model-adjusted R-squared of 0.840 indicated that slightly more of the variability in the data is explained by the Team’s model compared to the Program Implementer’s.

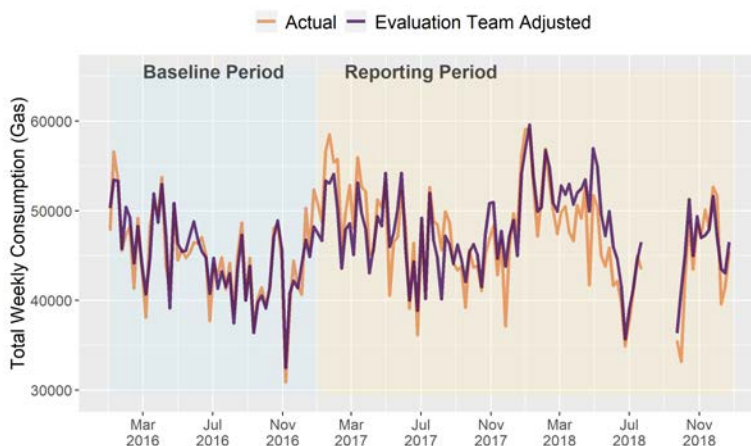
As shown in Table H-49, the Evaluation Team’s final model CUSUM estimates savings of 117,619 therms, resulting in a 110% difference. The CUSUM savings had a standard error of 41,468 therms at 90% confidence with a lower bound of 49,415 therms and an upper bound of 185,824 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-49. Participant 4 Natural Gas Savings Summary**

Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
107,288	117,619	41,468	49,415	185,824	110%

Figure H-7 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-7. Evaluation Team Participant 4 Natural Gas Model**



As shown in Table H-50, the facility had 117,619 therms in evaluated savings through the SEM Pilot via CUSUM estimation. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-50. Participant 4 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
117,619	0	117,619

## Participant 5

Participant 5 is a household equipment manufacturing company in Wisconsin.

### Savings Summary

As shown in Table H-51, the Evaluation Team verified 1,571,126 kWh savings and 33,663 therms savings at Participant 5. This site reported 82,451 kWh savings and 2,166 therms savings from Large Energy Users Program capital projects. Evaluated savings absent Large Energy Users Program savings are 1,571,126 kWh and 33,663 therms. The Program Implementer did not claim any natural gas or electric savings; thus, realization rates are not applicable.

**Table H-51. Participant 5 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	0	1,653,578	82,451	1,571,126	16%	n/a
Natural gas (therms)	0	35,829	2,166	33,663	4%	n/a

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For electricity, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-52), indicating that savings were not statistically different. For natural gas, the Program Implementer’s CUSUM savings were *not* within the 90% confidence interval, indicating that savings were statistically different.

**Table H-52. Participant 5 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	1,674,016	1,653,578	Yes
Natural gas (therms)	(3,005)	35,829	No

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 26, 2015, to May 16, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-53.

**Table H-53. Program Implementer Participant 5 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	149,349.29	6,030.77	24.76	1.57E-32
Production	5.78	0.77	7.51	4.07E-10
CDD - 58	296.56	37.43	7.92	8.22E-11

<sup>a</sup> Adjusted R<sup>2</sup> of 0.687.

The Program Implementer’s model had an adjusted R-squared of 0.687 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use, though there may still be some large unexplained factors. The performance period for this site was defined as January 2, 2017, to December 31, 2018. This period begins just over six months after the end of the baseline period. The Program Implementer excluded multiple dates from the analysis, outlined in Table H-54. The Program Implementer’s final CUSUM from this period was 1,674,016 kWh.

**Table H-54. Program Implementer Participant 5 Electric Model Excluded Dates**

Period	Date	Reason for Data Deletion
Baseline	4/6/2015	Holidays - Easter
Baseline	5/25/2015	Holidays - Memorial day
Baseline	7/6/2015	Holidays - July 4th weekend
Baseline	8/24/2015	Outlier data - outside third standard deviation
Baseline	11/16/2015	Outlier data - outside third standard deviation
Baseline	11/23/2015	Holidays - Thanksgiving break
Baseline	12/21/2015	Holidays - Christmas break
Baseline	12/28/2015	Holidays - Christmas break

The Program Implementer provided the Evaluation Team with raw energy consumption and production data, so the Team had the same production variables that the Program Implementer included in its model. The Evaluation Team excluded two dates, outlined in Table H-55.

**Table H-55. Evaluation Team Participant 5 Electric Model Excluded Dates**

Period	Date	Reason for Data Deletion
Baseline	12/28/2015	Outlier data
Reporting	12/31/2018	Outlier data - may not have included full weekly data

The Team’s final model is presented in Table H-56. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 1,653,578 kWh.



**Table H-56. Evaluation Team Participant 5 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	133,183.5	3,815.577	34.9052	1.78E-42
HDD - 31	70.78333	27.90017	2.537022	0.01371
CDD - 56	286.172	33.53377	8.533847	4.71E-12
Closed	(21,552.4)	4,532.386	(4.75521)	1.22E-05
Production	7.506483	0.497752	15.08077	2.05E-22

<sup>a</sup> Adjusted R<sup>2</sup> of 0.862.

The Evaluation Team’s model has significant differences from the Program Implementer model. The differences are in the base temperatures used to calculate CDD (58°F versus 56°F) and the Team’s inclusion of an HDD indicator and a closed indicator (for whether the week included a NERC holiday with the addition of Labor Day). The Evaluation Team’s model-adjusted R-squared of 0.862 indicated that much more of the variability in the data is explained by the Team’s model.

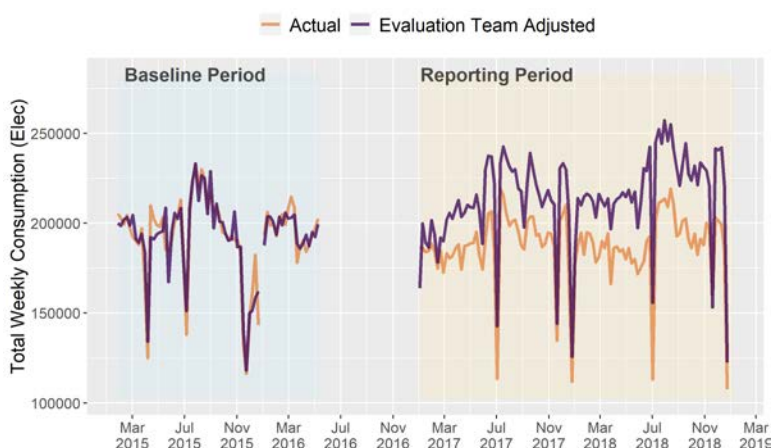
As shown in Table H-57, the Evaluation Team’s final model CUSUM estimates savings of 1,653,578 kWh, resulting in a 99% difference. The CUSUM savings had a standard error of 196,047 kWh at 90% confidence with a lower bound of 1,331,108 kWh and an upper bound of 1,976,047 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-57. Participant 5 Electric Savings Summary**

Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
1,674,106	1,653,578	196,047	1,331,108	1,976,047	99%

Figure H-8 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-8. Evaluation Team Participant 5 Electric Model**



As shown in Table H-58, the facility had 1,653,578 kWh in evaluated CUSUM savings. The facility claimed 82,451 kWh of prorated savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 1,571,107 kWh of evaluated SEM Pilot savings.

**Table H-58. Participant 5 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
1,653,578	82,451	1,571,107

*Natural Gas Savings*

The Program Implementer designated the baseline period as January 12, 2015, to May 23, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-59.

**Table H-59. Program Implementer Participant 5 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	0	n/a	n/a	n/a
Production	0.05	0.00	10.81	3.04E-16
HDD - 62	8.69	0.22	39.86	6.68E-48

<sup>a</sup> Adjusted R<sup>2</sup> of 0.974.

The Program Implementer’s model had an adjusted R-squared of 0.974 and all the variables had low p-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 2, 2017, to December 31, 2018. This period begins just over six months after the end of the baseline period. The Program Implementer excluded multiple dates from the analysis, outlined in Table H-60. The Program Implementer’s final CUSUM from this period was -3,005 therms.

**Table H-60. Program Implementer Participant 5 Natural Gas Model Excluded Dates**

Period	Date	Reason for Data Deletion
Baseline	7/6/2015	Holidays - July 4th weekend
Baseline	8/24/2015	Outlier data - outside third standard deviation
Baseline	12/28/2015	Holidays - Christmas break
Baseline	1/11/2016	Outlier data - outside third standard deviation

The Program Implementer provided the Evaluation Team with raw energy consumption and production data, and the Evaluation Team tested indicators that the Program Implementer did not include in its model. The Evaluation Team excluded one date, as shown in Table H-61.

**Table H-61. Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
35,829	2,166	33,633

## Participant 6

Participant 6 is a packaging manufacturing company in Wisconsin.

### Savings Summary

As shown in Table H-62, the Evaluation Team verified 196,341 kWh savings and 34,618 therms savings at Participant 6. This site reported 109,085 kWh savings and 25,254 therms savings from Large Energy Users Program capital projects. Evaluated savings absent Large Energy Users Program savings are 196,341 kWh and 34,618 therms. This resulted in realizations rates of 88% for electricity and 509% for natural gas.

**Table H-62. Participant 6 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	222,731	305,425	109,085	196,341	3%	88%
Natural gas (therms)	6,800	59,873	25,254	34,618	10%	509%

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For electricity, the Program Implementer’s CUSUM savings were *not* within the 90% confidence interval (Table H-63), indicating that savings *were* statistically different. For natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval, indicating that savings were not statistically different.

**Table H-63. Participant 6 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	656,585	305,425	No
Natural gas (therms)	80,225	59,873	Yes

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided data at the weekly level. The Program Implementer’s final model is presented in Table H-64.

**Table H-64. Program Implementer Participant 6 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	95,904.4448837	8,867.7048239	10.8150245	1.8307550E-14
Production Variable 1	3.1269808	0.7354712	4.2516698	9.7381300E-05
Production Variable 2	4.2443297	1.0333537	4.1073347	1.5495964E-04
Production Variable 3	2.7162680	0.9986638	2.7199023	9.0654457E-03

<sup>a</sup> Adjusted R<sup>2</sup> of 0.695.

The Program Implementer’s model had an adjusted R-squared of 0.695 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use, though there may still be some large unexplained factors. The performance period for this site was defined as January 2, 2017, to November 12, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer included all data in their analysis. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 656,585 kWh.

The Program Implementer provided the Evaluation Team with raw energy consumption and production data not included in their model, so the Team was able to test more production variables. The Evaluation Team included all data in its analysis. The Team’s final model is presented in Table H-65. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 305,425 kWh.

**Table H-65. Evaluation Team Participant 6 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	12,022.54	711.8314	16.88959	2.18E-47
HDD - 38	45.58057	13.52495	3.37011	0.000834
CDD - 38	26.18427	8.946252	2.926843	0.003645
Closed	(3,933.36)	980.8032	(4.01035)	7.39E-05
Production Variable 1	0.341807	0.184147	1.856167	0.064258
Production Variable 7	33.35027	13.61355	2.449784	0.014777
Production Variable 4	78.96046	10.80687	7.306509	1.82E-12
Production Variable 2	2.704635	0.29815	9.071402	8.18E-18
Production Variable 3	1.98078	0.351947	5.628056	3.7E-08
Production Variable 5	0.958731	0.378327	2.534132	0.011702
Production Variable 6	3.533388	0.614364	5.751296	1.91E-08

<sup>a</sup> Adjusted R<sup>2</sup> of 0.729.

The Evaluation Team’s model has significant differences from the Program Implementer model. The Evaluation Team included HDD and CDD indicators, as well as a closed indicator for NERC holidays when the facility is likely to be closed. In addition, the Evaluation Team included production variables not present in the Program Implementer’s model. The Evaluation Team’s model-adjusted R-squared of 0.729 indicated that much more of the variability in the data is explained by the Team’s model. All variables are significant at the 90% level, and only Production Variable 1 is not significant at the 95% level.

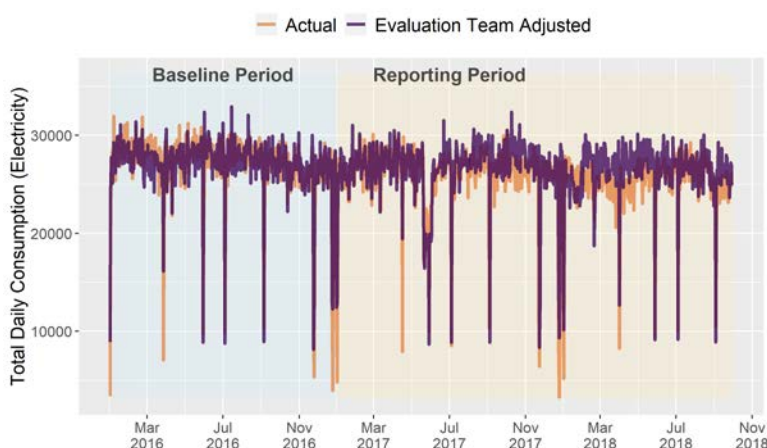
As shown in Table H-66, the Evaluation Team’s final model CUSUM estimates savings of 305,425 kWh, resulting in a 47% difference. The CUSUM savings had a standard error of 104,056 kWh at 90% confidence with a lower bound of 134,269 kWh and an upper bound of 476,582 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-66. Participant 6 Electric Savings Summary**

Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
656,585	305,425	104,056	134,269	476,582	47%

Figure H-9 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-9. Evaluation Team Participant 6 Electric Model**



As shown in Table H-67, the facility had 305,425 kWh in evaluated savings through the SEM Pilot via CUSUM estimation. The facility claimed 109,085 kWh of prorated savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 196,339 kWh of evaluated SEM Pilot savings.

**Table H-67. Participant 6 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
305,424	109,085	196,339

**Natural Gas Savings**

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided data at the monthly level. The Program Implementer’s final model is presented in Table H-68.

**Table H-68. Program Implementer Participant 6 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	1,100.15282	67.97988	16.18351	1.681788E-08
Normalized - 62	19.73364	2.92912	6.73704	5.123675E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.801.

The Program Implementer’s model had an adjusted R-squared of 0.801 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use. The performance period for this site was defined as January 2, 2017, to November 12, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer included all data in their analysis. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 80,225 therms.

The Evaluation Team received and incorporated production data from the Program Implementer into its analysis. The Evaluation Team included all dates in its analysis. The Team’s final model is presented in Table H-69. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 59,873 therms.

**Table H-69. Evaluation Team Participant 6 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	63.95612669	142.2022999	0.449754517	0.663524045
HDD - 47	35.92827295	1.474929108	24.35932191	1.58539E-09
Production Variable 8	0.277425332	0.035319052	7.854835266	2.56144E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.982.

The Evaluation Team’s model is significantly different from the Program Implementer’s model. While the Program Implementer uses normalized temperature in their analysis, the Evaluation Team uses only HDD with a base temperature of 47°F. The Evaluation Team also included a production variable where the Program Implementer omits it. The Evaluation Team’s model-adjusted R-squared of 0.982 indicated that much more of the variability in the data is explained by the Team’s model compared to the Program Implementer’s.

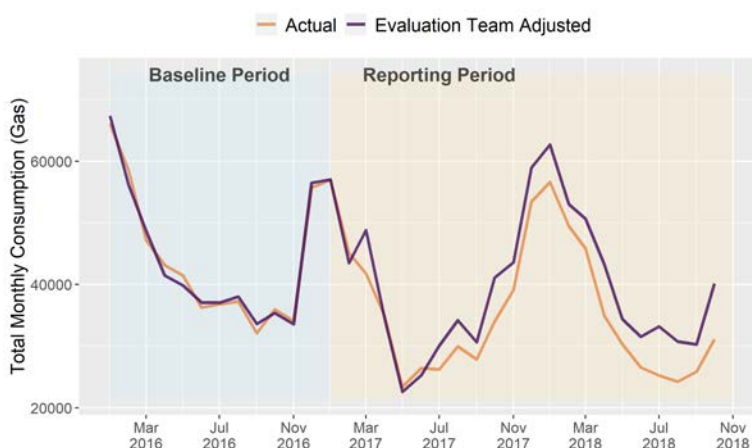
As shown in Table H-70, the Evaluation Team’s final model CUSUM estimates savings of 59,873 therms, resulting in a 75% difference. The CUSUM savings had a standard error of 15,751 therms at 90% confidence with a lower bound of 33,965 therms and an upper bound of 85,780 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-70. Participant 6 Natural Gas Savings Summary**

Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
80,225	59,873	15,751	33,965	85,780	75%

Figure H-10 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

Figure H-10. Evaluation Team Participant 6 Natural Gas Model



As shown in Table H-71, the facility had 59,873 therms in CUSUM savings. The facility had 25,224 therms of savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 34,649 therms of evaluated SEM Pilot savings.

Table H-71. Participant 6 Natural Gas Capital Projects Summary

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
59,873	25,224	34,649

## Participant 7

Participant 7 is a printing facility in Wisconsin.

### Savings Summary

As shown in Table H-72, the Evaluation Team verified 1,634,941 kWh savings and 97 therms savings at Participant 7. This site reported 517,732 kWh savings and no therm savings from Large Energy Users Program capital projects. This resulted in realization rates of 1,139% for electricity and 15% for natural gas.

Table H-72. Participant 7 Reported and Verified Savings Summary

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	143,563	2,152,673	517,732	1,634,941	4%	1,139%
Natural gas (therms)	663	97	0	97	0%	15%

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.



The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For both electricity and natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-73), indicating that savings were not statistically different.

**Table H-73. Participant 7 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	2,282,997	2,152,673	Yes
Natural gas (therms)	20,576	97	Yes

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 4, 2016, to December 22, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the daily level. The Program Implementer’s final model is presented in Table H-74.

**Table H-74. Program Implementer Participant 7 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	91,867.99	1,343.14	68.40	1.75E-203
Production Variable 1	0.05	0.00	18.41	2.82E-53
CDD - 35	647.73	17.76	36.47	9.18E-121

<sup>a</sup> Adjusted R<sup>2</sup> of 0.841.

The Program Implementer’s model had an adjusted R-squared of 0.841 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use, and that the model captures the largest determinants of energy usage. The performance period for this site was defined as January 1, 2017, to December 31, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer excluded some dates in their analysis, outlined in Table H-75. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 2,282,997 kWh.

**Table H-75. Program Implementer Participant 7 Electric Model Excluded Dates**

Period	Date	Reason for Excluding
Baseline	3/27/2016	Holidays - Easter
Baseline	3/28/2016	Holidays - Easter
Baseline	5/30/2016	Holidays - Memorial day
Baseline	5/31/2016	Holidays - Memorial day
Baseline	7/4/2016	Holidays - July 4th weekend
Baseline	7/5/2016	Holidays - July 4th weekend
Baseline	7/10/2016	Outlier data - outside third standard deviation
Baseline	8/26/2016	Outlier data - outside third standard deviation
Baseline	9/5/2016	Holidays - Labor day

Period	Date	Reason for Excluding
Baseline	9/9/2016	Outlier data - outside third standard deviation
Baseline	11/24/2016	Holidays - Thanksgiving break
Baseline	12/24/2016	Holidays - Christmas break
Baseline	12/25/2016	Holidays - Christmas break
Baseline	12/26/2016	Holidays - Christmas break
Baseline	12/31/2016	Holidays - New Year's Eve break

The Program Implementer provided the Evaluation Team with raw energy consumption and production data. The Evaluation Team included all data in its analysis. The Team's final model is presented in Table H-76. The Evaluation Team's CUSUM savings from the CY 2018 portion of the reporting period was 2,152,673 kWh.

**Table H-76. Evaluation Team Participant 7 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	94,754.91	1,464.888	64.68407	1.4E-199
CDD - 41	721.457	21.50678	33.54557	1.5E-112
Closed	(32,103.8)	2,282.705	(14.0639)	4.49E-36
Production Variable 1	0.048956	0.003214	15.23073	9.8E-41

<sup>a</sup> Adjusted R<sup>2</sup> of 0.851.

The Evaluation Team's model has significant differences from the Program Implementer model. The Evaluation Team included a closed indicator for NERC holidays when the facility is likely to be closed. The Evaluation Team's model-adjusted R-squared of 0.851 indicated that more of the variability in the data is explained by the Team's model.

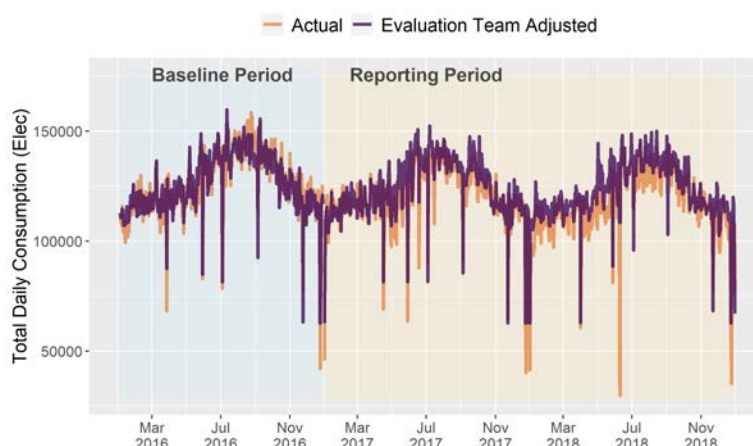
As shown in Table H-77, the Evaluation Team's final model CUSUM estimates savings of 2,152,673 kWh, resulting in a 94% difference. The CUSUM savings had a standard error of 279,154 kWh at 90% confidence with a lower bound of 1,693,506 kWh and an upper bound of 2,611,840 kWh. The Program Implementer's CUSUM savings were within the Evaluation Team's confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-77. Participant 7 Electric Savings Summary**

Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
2,282,997	2,152,673	279,154	1,693,506	2,611,840	94%

Figure H-11 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-11. Evaluation Team Participant 7 Electric Model**



As shown in Table H-78, the facility had 2,152,673 kWh in CUSUM savings. The facility had 517,732 kWh of claimed savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 1,634,941 kWh of evaluated SEM Pilot savings.

**Table H-78. Participant 7 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
2,152,673	517,732	1,634,941

*Natural Gas Savings*

The Program Implementer designated the baseline period as January 4, 2016, to December 22, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the daily level. The Program Implementer’s final model is presented in Table H-79.

**Table H-79. Program Implementer Participant 7 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	1,705.15	91.49	18.64	0.00
Production Variable 1	0.002	0.00	11.04	0.00
HDD - 58	66.89	1.09	61.10	1.83E-189

<sup>a</sup> Adjusted R<sup>2</sup> of 0.913.

The Program Implementer’s model had an adjusted R-squared of 0.913 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use, and that the model captures the largest determinants of energy usage. The performance period for this site was defined as January 1, 2017, to December 31, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer excluded some dates in their analysis, outlined in Table H-80. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 20,576 therms.

**Table H-80. Program Implementer Participant 7 Natural Gas Model Excluded Dates**

Period	Date	Reason for Excluding
Baseline	3/27/2016	Holidays - Easter
Baseline	3/28/2016	Holidays - Easter
Baseline	7/4/2016	Holidays - July 4th weekend
Baseline	11/24/2016	Holidays - Thanksgiving break
Baseline	12/18/2016	Outlier data - outside third standard deviation
Baseline	12/24/2016	Holidays - Christmas break
Baseline	12/25/2016	Holidays - Christmas break
Baseline	12/31/2016	Holidays - New Year Eve break

The Program Implementer provided the Evaluation Team with raw energy consumption and production data. The Evaluation Team included all data in its analysis. The Team’s final model is presented in Table H-81. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 97 therms.

**Table H-81. Evaluation Team Participant 7 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	1,666.598	97.38337	17.11379	2.11E-48
HDD - 63	66.56857	1.191397	55.87439	7.1E-179
Closed	(957.324)	145.1176	(6.59689)	1.51E-10
Production Variable 1	0.002091	0.000205	10.22109	1.09E-21

<sup>a</sup> Adjusted R<sup>2</sup> of 0.901.

The Evaluation Team’s model is similar to the Program Implementer’s model. The differences include a different base for calculating HDD (58°F versus 63°F) and the Team’s inclusion of a closed indicator for NERC holidays, Easter Sundays, New Year’s Eves, and Christmas Eves. The Evaluation Team’s model-adjusted R-squared of 0.901 indicated that slightly less variability in the data is explained by the Team’s model compared to the Program Implementer’s. This could be because the Evaluation Team included data that the Program Implementer excluded.

As shown in Table H-82, the Evaluation Team’s final model CUSUM estimates savings of 97 therms, resulting in a 0% difference. The CUSUM savings had a standard error of 17,696 therms at 90% confidence with a lower bound of -29,011 therms and an upper bound of 29,205 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

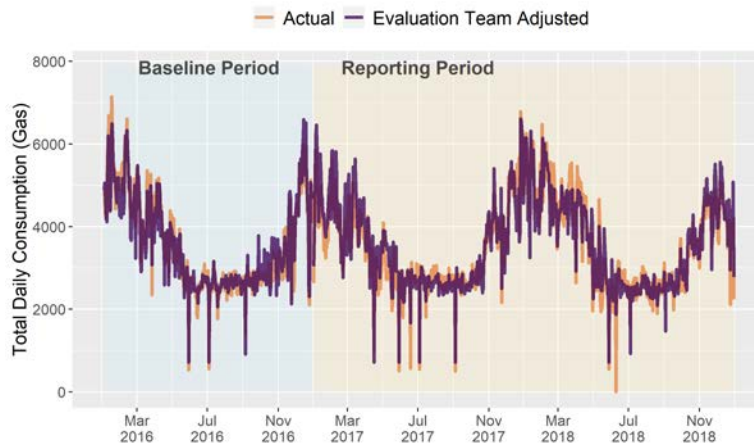
**Table H-82. Participant 7 Gas Savings Summary**

Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
97	97	17,696	(29,011)	29,205	0%

Figure H-12 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance

period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-12. Evaluation Team Participant 7 Natural Gas Model**



As shown in Table H-83, the facility had 97 therms in CUSUM savings. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-83. Participant 7 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
97	0	97

## Participant 8

Participant 8 is a dairy processing facility in Wisconsin.

### *Savings Summary*

As shown in Table H-84, the Evaluation Team verified 848,103 kWh savings and 127,242 therms savings at Participant 8. This site did not report electric or natural gas savings in the SEM Pilot or from Large Energy Users Program capital projects, so realization rates are not applicable.

**Table H-84. Participant 8 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	0	848,103	0	848,103	2%	n/a
Natural gas (therms)	0	127,242	0	127,242	2%	n/a

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For electricity, the Program Implementer’s CUSUM savings were within the 90% confidence interval (Table H-85), indicating that savings were not statistically different. For natural gas, the Program Implementer’s CUSUM savings were *not* within the 90% confidence interval, indicating that savings were statistically different.

**Table H-85. Participant 8 CUSUM Savings Summary**

	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	702,387	848,103	Yes
Natural gas (therms)	55,956	127,242	No

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 4, 2016, to December 19, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-86.

**Table H-86. Program Implementer Participant 8 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	443,923.7483615	37,809.2338996	11.7411463	3.7753870E-15
Production Variable 1	0.0189815	0.0017100	11.1000279	2.4260335E-14
Production Variable 2	0.0267874	0.0099638	2.6884887	1.0097700E-02
Production Variable 3	0.0439403	0.0149280	2.9434904	5.1649141E-03
CDD - 53	710.8265187	44.9061218	15.8291674	8.8163219E-20

<sup>a</sup> Adjusted R<sup>2</sup> of 0.924.

The Program Implementer’s model had an adjusted R-squared of 0.924 and all the variables had low *p*-values. This indicates that the variables included are significant determinants of energy use, and that the model captures the largest determinants of energy usage. The performance period for this site was

defined as January 2, 2017, to December 17, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer excluded some dates in their analysis, outlined in Table H-87. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 702,387 kWh.

**Table H-87. Program Implementer Participant 8 Electric Model Excluded Dates**

Period	Date	Reason for Data Deletion
Baseline	3/21/2016	Outlier data - outside third standard deviation
Baseline	9/19/2016	Outlier data - outside third standard deviation
Reporting	12/26/2016	Holidays - Christmas break
Reporting	1/2/2017	Holidays - New Year’s Eve break
Reporting	6/5/2017	Outlier data - outside third standard deviation
Reporting	7/3/2017	Holidays - July 4th weekend
Reporting	12/25/2017	Holidays - Christmas break
Reporting	4/30/2018	Outlier data - outside third standard deviation

The Program Implementer provided the Evaluation Team with raw energy consumption and production data. The Evaluation Team excluded data in its analysis, outlined in Table H-88.

**Table H-88. Program Implementer Participant 8 Electric Model Excluded Dates**

Period	Date	Reason for Data Deletion
Reporting	6/5/2017	Outlier
Reporting	7/3/2017	Outlier
Reporting	12/25/2017	Outlier

The Team’s final model is presented in Table H-89. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 848,103 kWh.

**Table H-89. Evaluation Team Participant 8 Electric Model<sup>a</sup>**

Variable	Estimate	Standard Error	T-Statistic	P-Value
Intercept	(3,302,753.71)	826,856.3474	(3.994350071)	0.000243204
HDD - 65	8,184.708123	1,820.919424	4.494821691	5.01024E-05
CDD - 67	(8,454.109318)	2,396.800727	(3.527247477)	0.000995761
Production Variable 1	0.018846487	0.002256042	8.353783762	1.25941E-10
Production Variable 2	0.032004458	0.013499517	2.370785339	0.022195651
Production Variable 3	0.06216991	0.020115626	3.09062761	0.003458418
Average Daily Temp.	57395.16884	12635.48655	4.542379006	4.29878E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.886.

The Evaluation Team’s model is similar to the Program Implementer model, with additional weather indicators. The Evaluation Team included an HDD indicator and an average daily temperature indicator, as well as an CDD base that differs from the Program Implementer’s (53°F versus 67°F). The Evaluation Team’s model-adjusted R-squared of 0.886 indicated that less of the variability in the data is explained

by the Team’s model. This is likely due to the fact that the Evaluation Team included data that the Program Implementer excludes.

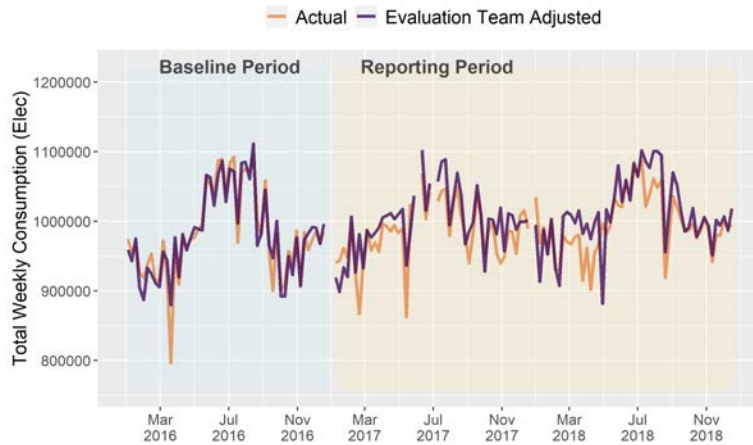
As shown in Table H-90, the Evaluation Team’s final model CUSUM estimates savings of 848,103 kWh, resulting in a 121% difference. The CUSUM savings had a standard error of 664,914 kWh at 90% confidence with a lower bound of -245,583 kWh and an upper bound of 1,941,789 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

**Table H-90. Participant 8 Electric Savings Summary**

Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
702,387	848,103	664,914	(245,583)	1,941,789	121%

Figure H-13 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-13. Evaluation Team Participant 8 Electric Model**



As shown in Table H-91, the facility had 848,103 kWh in CUSUM savings. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-91. Participant 8 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
848,103	0	848,103



*Natural Gas Savings*

The Program Implementer designated the baseline period as January 4, 2016, to December 19, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-92.

**Table H-92. Program Implementer Participant 8 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	0	n/a	n/a	n/a
Production Variable 1	0.000293945	1.39632E-05	21.05146952	2.98319E-25
Production Variable 2	0.001003302	0.000173569	5.780420075	6.17134E-07
Production Variable 3	0.001639786	0.000245026	6.692287042	2.64056E-08
Production Variable 4	0.000304169	4.82653E-05	6.302027223	1.01947E-07
HDD - 61	5.978043022	0.359240587	16.64077847	4.30989E-21

<sup>a</sup> Adjusted R<sup>2</sup> of 0.978.

The Program Implementer’s model had an adjusted R-squared of 0.978 and all the variables had low p-values. This indicates that the model captures the largest drivers of energy usage. The performance period for this site was defined as January 2, 2017, to December 17, 2018. This period begins almost immediately after the end of the baseline period. The Program Implementer excluded some dates in their analysis, outlined in Table H-93. The Program Implementer’s final CUSUM from the CY 2018 portion of the reporting period was 55,956 therms.

**Table H-93. Program Implementer Participant 8 Natural Gas Model Excluded Dates**

Period	Date	Reason for Data Deletion
Reporting	12/26/2016	Holidays - Christmas break
Reporting	12/25/2017	Holidays - Christmas break
Reporting	4/30/2018	Outlier data - outside third standard deviation

The Program Implementer provided the Evaluation Team with raw energy consumption and production data. The Evaluation Team included all data in its analysis. The Team’s final model is presented in Table H-94. The Evaluation Team’s CUSUM savings from the CY 2018 portion of the reporting period was 127,242 therms.

**Table H-94. Evaluation Team Participant 8 Natural Gas Model<sup>a</sup>**

Variable	Estimate	Standard Error	t-Statistic	p-Value
Intercept	3,058.055	633.9673	4.82368	1.88E-05
HDD - 1	(104.478)	26.81562	(3.89616)	0.000345
CDD - 63	7.506407	2.665941	2.81567	0.007382
Production Variable 1	0.00027	2.84E-05	9.49713	5.12E-12
Production Variable 2	0.001117	0.00018	6.213261	1.96E-07
Production Variable 3	0.002109	0.000271	7.790851	1.1E-09
Production Variable 4	0.000258	4.84E-05	5.329565	3.63E-06
Average Daily Temp.	(48.0172)	3.66218	(13.1116)	1.93E-16

<sup>a</sup> Adjusted R<sup>2</sup> of 0.919.

The Evaluation Team’s model is similar to the Program Implementer’s model. The differences include a different base for calculating HDD (61°F versus 1°F) and the Team’s inclusion of a CDD indicator and an average daily temperature indicator. The Evaluation Team’s model-adjusted R-squared of 0.919 indicated that less variability in the data is explained by the Team’s model compared to the Program Implementer’s. This could be because the Evaluation Team included data that the Program Implementer did not include.

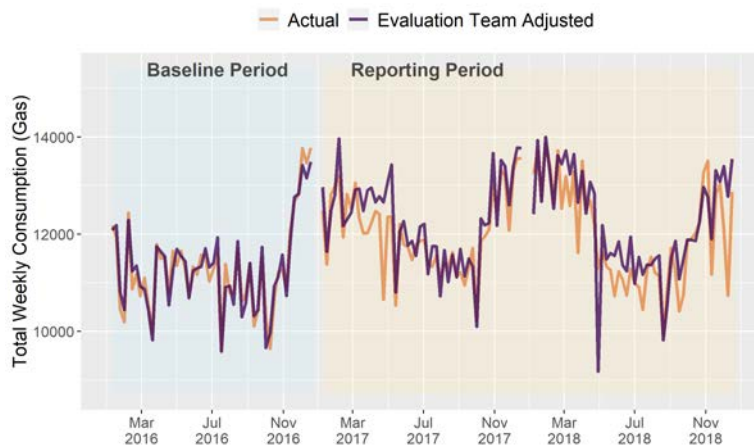
As shown in Table H-95, the Evaluation Team’s final model CUSUM estimates savings of 127,242 therms, resulting in a 227% difference. The CUSUM savings had a standard error of 8,834 therms at 90% confidence with a lower bound of 112,711 therms and an upper bound of 141,722 therms. The Program Implementer’s CUSUM savings were not within the Evaluation Team’s confidence interval, meaning that these values were statistically different within 90% confidence.

**Table H-95. Participant 8 Natural Gas Savings Summary**

Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
	Savings	Standard Error	Lower Bound	Upper Bound	
55,956	127,242	8,834	112,711	141,722	227%

Figure H-14 shows the predicted and actual consumption. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-14. Evaluation Team Participant 8 Natural Gas Model**



As shown in Table H-96, the facility had 127,242 therms in CUSUM savings. The facility claimed no savings through the Large Energy Users Program. Thus, the evaluated CUSUM savings are the evaluated SEM Pilot savings.

**Table H-96. Participant 8 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
127,242	0	127,242

## Participant 9

Participant 9 is a manufacturer of steel products in Wisconsin.

### Savings Summary

As shown in Table H-97, the Evaluation Team verified 2,080,690 kWh of electric savings at Participant 9. This resulted in a realization rate of 159% for electricity. The Program Implementer claimed no natural gas savings; however, the Team evaluated 144,917 therms of natural gas savings.

**Table H-97. Participant 9 Reported and Verified Savings Summary**

	SEM Pilot Claimed Savings <sup>a</sup> (A)	Evaluation CUSUM Savings (B)	Large Energy Users Program Capital Projects Prorated Savings (C)	Evaluation SEM Pilot Savings (D) = (B-C)	Evaluation Savings as a Percentage of Consumption (E)	Realization Rate (D/A)
Electricity (kWh)	1,311,420	2,729,932	649,241	2,080,690	1%	159%
Natural gas (therms)	0	454,551	309,634	144,917	8%	n/a

<sup>a</sup> The SEM Pilot claimed savings are not based on the Program Implementer’s CUSUM models and are instead based on bottom-up engineering algorithms for individual projects.

The Evaluation Team also compared its CUSUM savings with the Program Implementer’s CUSUM savings, though the SEM Pilot did not claim savings based on the Program Implementer’s CUSUM savings. For this site, there were three models per fuel type, as each production process was separately metered. For electricity, the Program Implementer’s CUSUM savings were within the 90% confidence interval for all three production lines (Table H-98), indicating that savings were not statistically different. For natural gas, the Program Implementer’s CUSUM savings were within the 90% confidence interval for Production Line 1, indicating that savings were not statistically different; however, the Program Implementer’s CUSUM savings for Production Line 2 and Production Line 3 were *not* within the 90% confidence interval, indicating that savings *were* statistically different.

**Table H-98. Participant 9 CUSUM Savings Summary**

Fuel Type	Process	Program Implementer CUSUM Savings	Evaluation CUSUM Savings	Program Implementer CUSUM Savings Within 90% Confidence Interval around Evaluation CUSUM Savings?
Electricity (kWh)	Production Line 1	2,425,110	2,160,790	Yes
	Production Line 2	(770,315)	(1,350,343)	Yes
	Production Line 3	1,854,032	1,919,485	Yes
Natural Gas (therms)	Production Line 1	(73,700)	(76,068)	Yes
	Production Line 2	320,624	219,135	No
	Production Line 3	173,826	311,483	No

Below is a detailed comparison of the Program Implementer’s and Evaluation Team’s electric and natural gas CUSUM models.

*Electricity Savings*

The Program Implementer designated the baseline period as January 1, 2017, to December 31, 2017. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-99.

**Table H-99. Program Implementer Participant 9 Electric Models**

Production Line	Variable	Estimate	Standard Error	t-Statistic	p-Value
Production Line 1 <sup>a</sup>	Intercept	587,401.7910420	82,451.2573444	7.1242308	4.2600717E-09
	Production Variable 1	398.3450109	6.8716821	57.9690689	8.2565644E-47
Production Line 2 <sup>b</sup>	Intercept	365,293.4517970	30,024.1522837	12.1666533	1.4682901E-16
	Production Variable 2	68.1740034	2.8367950	24.0320515	3.9885650E-29
Production Line 3 <sup>c</sup>	Intercept	188,808.8558697	17,070.6460024	11.0604400	5.0873194E-14
	Production Variable 3	5.1272595	1.9526844	2.6257491	1.2010800E-02
	Production Variable 4	14.8697947	4.4403455	3.3487923	1.7221026E-03
	Production Variable 5	21.8078737	8.3648264	2.6070922	1.2586673E-02
	CDD - 65	347.3565783	83.4243736	4.1637301	1.5205046E-04

<sup>a</sup> Adjusted R<sup>2</sup> of 0.985.

<sup>b</sup> Adjusted R<sup>2</sup> of 0.919.

<sup>c</sup> Adjusted R<sup>2</sup> of 0.668.

The Program Implementer’s models had adjusted R-squared values of 0.985, 0.919, and 0.668 for production lines 1, 2, and 3, respectively. For all models, all variables had low p-values. This indicates that the largest drivers of energy are being captured in those models. The performance period for this site was defined as January 1, 2017, to December 30, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded some dates from the analysis, outlined in Table H-100. The Program Implementer’s total CUSUM savings for CY 2018 were 3,508,825 kWh.

**Table H-100. Program Implementer Participant 9 Electric Model Excluded Dates**

Model	Period	Date	Reason for Excluding
Production Line 1	Baseline	6/12/2016	Outlier data - outside third standard deviation
Production Line 2	Reporting	12/24/2017	Holidays - Christmas break
Production Line 3	Baseline	1/3/2016	Holidays - Post New Year's Eve start-up
	Baseline	11/13/2016	Outlier data - outside third standard deviation
	Baseline	11/20/2016	Outlier data - outside third standard deviation
	Baseline	11/27/2016	Holidays - Thanksgiving break
	Baseline	12/25/2016	Holidays - Christmas break

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data, so the Team had many of the same production variables that the Program Implementer included in their models. The Evaluation Team excluded the dates outlined in Table H-101 by production line.

**Table H-101. Evaluation Team Participant 9 Electric Model Excluded Dates**

Model	Period	Date	Reason for Excluding
Production Line 1	n/a	n/a	No data excluded
Production Line 2	Reporting	12/31/2017	Outlier data - outside third standard deviation
Production Line 3	n/a	n/a	Data removed by Program Implementer captured in Evaluation Team's model by using an indicator variable for same dates as outlined in Table H-100.

The Team's final model is presented in Table H-102. The Evaluation Team's CUSUM savings from this period was 2,729,932 kWh.

**Table H-102. Evaluation Team Participant 9 Electric Models**

Production Line	Variable	Estimate	Standard Error	t-Statistic	p-Value
Production Line 1 <sup>a</sup>	Intercept	467,157.1221	90,349.75459	5.170541129	3.94201E-06
	Production Variable 1	406.9697662	7.601008746	53.5415469	1.71484E-46
Production Line 2 <sup>b</sup>	Intercept	446,672.7	49,921.3	8.9475384	7.06E-12
	HDD - 78	(230.3949)	83.848	(2.74777)	0.0083739
	Closed	(124,415.3)	46328	(2.685532)	0.009856
	Production Variable 2	65.55641	4.13221	15.864751	6.13E-21
Production Line 3 <sup>c</sup>	Intercept	1,765,934	762,041	2.3173728	0.0249869
	HDD - 35	(6,959.374)	3,182.02	(2.187095)	0.0338573
	CDD - 36	7,154.005	3,114.14	2.2972656	0.0262039
	Production Variable 5	61.32283	15.5249	3.9499583	0.0002664
	Production Variable 4	35.72149	5.77549	6.1850109	1.528E-07
	Average Daily Temp.	(48,169.03)	21,499.7	(2.240447)	0.0299336
	Remove Indicator	(89,697.34)	14,061.8	(6.378801)	7.816E-08

<sup>a</sup> Adjusted R<sup>2</sup> of 0.982.

<sup>b</sup> Adjusted R<sup>2</sup> of 0.917.

<sup>c</sup> Adjusted R<sup>2</sup> of 0.854.

For Production Line 1, the Program Implementer’s model and the Evaluation Team’s model have the same independent variables, with the Evaluation Team’s model having an adjusted R-squared of 0.982. Differences are likely a result of the Team’s inclusion of data that the Program Implementer excluded.

For Production Line 2, the Evaluation Team included an HDD indicator as well as an indicator for holidays that the site was likely to be closed. The Evaluation Team’s model had an adjusted R-squared value of 0.917, indicating that the model captures slightly less variability than the Program Implementer’s model. Differences are likely a result of the Team’s inclusion of data that the Program Implementer excluded.

For Production Line 3, the Evaluation Team included an HDD indicator and an indicator to identify dates removed from the Program Implementer’s model, in addition to the variables that the Program Implementer included. This resulted in an adjusted R-squared value of 0.854, indicating that this model captures more of the variability in the data. Differences are likely a result of the Team’s inclusion of data that the Program Implementer excluded.

As shown in Table H-103, the Evaluation Team’s total model CUSUM estimates savings of 2,729,932 kWh, resulting in a 78% difference. For Production Line 1, the CUSUM savings were 2,160,790 kWh with a standard error of 3,765,685 kWh at 90% confidence. These savings have a lower bound of -4,033,762 kWh and an upper bound of 8,355,342 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

For Production Line 2, the CUSUM savings were -1,350,344 kWh with a standard error of 1,640,210 kWh at 90% confidence. These savings have a lower bound of -4,048,249 kWh and an upper bound of 1,347,561 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

For Production Line 3, the CUSUM savings were 1,919,485 kWh with a standard error of 1,582,905 kWh at 90% confidence. These savings have a lower bound of -684,161 kWh and an upper bound of 4,523,132 kWh. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

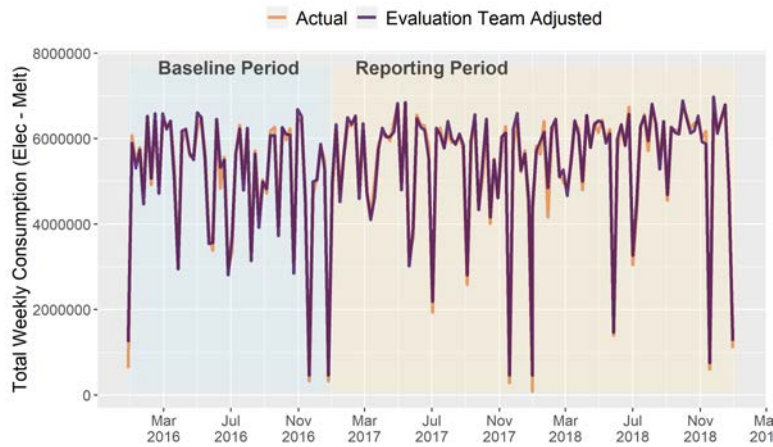
**Table H-103. Participant 9 Electric Savings Summary**

Production Line	Implementer CUSUM Savings (kWh)	Evaluated CUSUM Savings (kWh)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
		Savings	Standard Error	Lower Bound	Upper Bound	
Production Line 1	2,425,110	2,160,790	3,765,685	(4,033,762)	8,355,342	89%
Production Line 2	(770,315)	(1,350,344)	1,640,210	(4,048,249)	1,347,561	175%
Production Line 3	1,854,032	1,919,485	1,582,905	(684,161)	4,523,132	104%
<b>Total</b>	<b>3,508,825</b>	<b>2,729,932</b>	-	-	-	<b>78%</b>

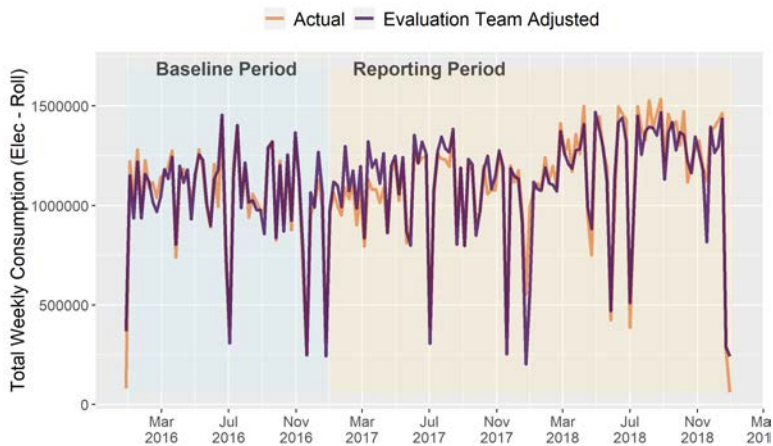
Figure H-15, Figure H-16, and Figure H-17 show the predicted and actual consumption for production lines 1 through 3, respectively. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow

background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

**Figure H-15. Evaluation Team Participant 9 Electric Model – Production Line 1**

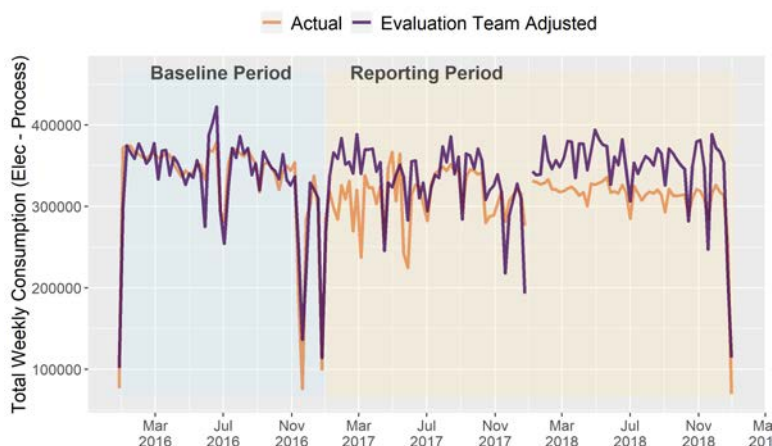


**Figure H-16. Evaluation Team Participant 9 Electric Model – Production Line 2**





**Figure H-17. Evaluation Team Participant 9 Electric Model – Production Line 3**



As shown in Table H-104, the Team verified 2,729,932 kWh in CUSUM savings. The facility claimed 649,241 kWh of prorated savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 2,080,690 kWh of evaluated SEM Pilot savings.

**Table H-104. Participant 9 Electric Capital Projects Summary**

Evaluated CUSUM Savings (kWh)	Prorated Large Energy Users Program Savings (kWh)	Evaluated SEM Pilot Savings (kWh)
2,729,932	649,241	2,080,690

*Natural Gas Savings*

The Program Implementer designated the baseline period as January 1, 2016, to December 31, 2016. The Evaluation Team found this baseline to be well-defined. The facility provided raw production data at the weekly level. The Program Implementer’s final model is presented in Table H-105..

**Table H-105. Program Implementer Participant 9 Natural Gas Models**

Production Line	Variable	Estimate	Standard Error	t-Statistic	p-Value
Production Line 1 <sup>a</sup>	Intercept	1,188.3888631	178.0687395	6.6737647	2.5564614E-08
	Production Variable 1	0.1645213	0.0139463	11.7968065	1.1899677E-15
	HDD - 65	2.0942295	0.4372120	4.7899634	1.7049155E-05
Production Line 2 <sup>b</sup>	Intercept	956.2186141	213.0668175	4.4878814	4.7892825E-05
	Production Variable 2	1.1115124	0.0198976	55.8615688	6.3284930E-44
Production Line 3 <sup>c</sup>	Intercept	2,320.1690024	448.0138966	5.1787880	4.8129339E-06
	Production Variable 3	0.3207453	0.0727757	4.4073115	6.2225767E-05
	Production Variable 4	1.5976895	0.1622242	9.8486497	6.5959829E-13
	HDD - 65	13.2923597	0.6260595	21.2317840	2.0886397E-25

<sup>a</sup> Adjusted R<sup>2</sup> of 0.765.

<sup>b</sup> Adjusted R<sup>2</sup> of 0.985.

<sup>c</sup> Adjusted R<sup>2</sup> of 0.956.



The Program Implementer’s models had adjusted R-squared values of 0.765, 0.985, and 0.956 for production lines 1, 2, and 3 respectively. For all models, all the variables had low *p*-values. This indicates that the largest drivers of energy are being captured in their model. The performance period for this site was defined as January 1, 2017, to December 30, 2018. This period begins immediately after the end of the baseline period. The Program Implementer excluded some dates from the analysis, outlined in Table H-106.. The Program Implementer’s total CUSUM savings for CY 2018 were 420,751 therms.

**Table H-106. Program Implementer Participant 9 Natural Gas Model Excluded Dates**

Model	Period	Date	Reason for Excluding
Production Line 1	Baseline	7/3/2016	Holidays - July 4th weekend
	Baseline	8/21/2016	Outlier data - outside third standard deviation
Production Line 2	Baseline	2/21/2016	Outlier data - outside third standard deviation
	Baseline	6/16/2016	Outlier data - outside third standard deviation
	Baseline	9/25/2016	Outlier data - outside third standard deviation
	Baseline	10/23/2016	Outlier data - outside third standard deviation
Production Line 3	Baseline	5/29/2016	Holidays - Memorial day
	Baseline	12/4/2016	Outlier data - outside third standard deviation
	Reporting	1/8/2017	Outlier data - outside third standard deviation

The Program Implementer provided the Evaluation Team with the raw energy consumption and production data. The Evaluation Team included production in their model while the Program Implementer did not. The Evaluation Team excluded the dates outlined in Table H-107 by production line.

**Table H-107. Evaluation Team Participant 9 Natural Gas Model Excluded Dates**

Model	Period	Date	Reason for Excluding
Production Line 1	Reporting	6/11/2017	Outlier data - outside third standard deviation
	Reporting	12/31/2017	Outlier data - outside third standard deviation
	Reporting	6/17/2018	Outlier data - outside third standard deviation
	Reporting	6/24/2018	Outlier data - outside third standard deviation
	Reporting	8/5/2018	Outlier data - outside third standard deviation
Production Line 2	n/a	n/a	No data excluded
Production Line 3	Reporting	12/31/2017	Outlier data - outside third standard deviation

The Team’s final model is presented in Table H-108. The Evaluation Team’s CUSUM savings from this period was 454,550 therms.

**Table H-108. Evaluation Team Participant 9 Natural Gas Model**

Production Line	Variable	Estimate	Standard Error	t-Statistic	p-Value
Production Line 1 <sup>a</sup>	Intercept	(1,043,188)	303,480	(3.437414)	0.0012392
	HDD - 76	1,965.432	570.66	3.4441383	0.0012149
	CDD - 77	(4,953.61)	1,635.81	(3.028232)	0.0039866
	Closed	(620.5016)	243.125	(2.552195)	0.0140147
	Production Variable 1	0.140607	0.0198	7.0998151	5.769E-09
	Average Daily Temp.	13,742.96	3,994.06	3.4408493	0.0012267
Production Line 2 <sup>b</sup>	Intercept	2,030.617	294.097	6.9045721	8.463E-09
	Closed	(1,392.056)	297.656	(4.676729)	2.246E-05
	Production Variable 2	1.02109	0.02655	38.456991	8.35E-39
Production Line 3 <sup>c</sup>	Intercept	14,741.89	4,361.92	3.3796788	0.0015081
	HDD - 38	(35.74163)	17.3997	(2.054153)	0.045797
	CDD - 42	38.71423	16.6067	2.3312426	0.0242788
	Closed	609.355	430.859	1.4142782	0.1641622
	Production Variable 3	0.350065	0.08432	4.1517214	0.000145
	Production Variable 4	2.022532	0.20303	9.9615114	5.867E-13
	Average Daily Temp.	(317.1278)	107.921	(2.938522)	0.0051866
	Remove Indicator	1,805.807	419.838	4.3012004	9.023E-05

<sup>a</sup> Adjusted R<sup>2</sup> of 0.778.

<sup>b</sup> Adjusted R<sup>2</sup> of 0.983.

<sup>c</sup> Adjusted R<sup>2</sup> of 0.958.

The Evaluation Team’s models, for each site, are slightly different than the Program Implementer’s models. For Production Line 1, the Evaluation Team included indicators for CDD, average daily temperature, and holidays when the site was likely to be closed. The Evaluation Team’s model also uses a different base for calculating HDD. This model resulted in an adjusted R-squared value of 0.778. Differences are also likely a result of the differences in data removal between the two models.

For Production Line 2, the models are similar. The Evaluation Team included a closed indicator for holidays when it is likely the site is not operating, in addition to the production variable that the Program Implementer included. This resulted in an adjusted R-squared value of 0.983, indicating that the Evaluation Team’s model captures very slightly less variability than the Program Implementer’s model. Differences are likely a result of the Team’s inclusion of data that the Program Implementer excluded.

For Production Line 3, the Evaluation Team included the same production variables that the Program Implementer included. The HDD base that the Evaluation Team included differs from the Program Implementer’s, and the Evaluating Team also included indicators for CDD and average daily temperature in its model. In addition, the Evaluation Team included an indicator for holidays when the site is likely to be closed and an indicator for outliers. This model resulted in an adjusted R-squared value of 0.958. Differences are likely a result of the Team’s inclusion of data that the Program Implementer excluded.

As shown in Table H-109, the Evaluation Team’s total model CUSUM estimates savings of 454,551 therms, resulting in a 108% difference. For Production Line 1, CUSUM savings were -

76,068 therms with a standard error of 593,071 therms at 90% confidence. These savings have a lower bound of -1,051,583 therms and an upper bound of 899,447 therms. The Program Implementer’s CUSUM savings were within the Evaluation Team’s confidence interval, meaning that these values were not statistically different within 90% confidence.

For Production Line 2, the CUSUM savings were 219,136 therms with a standard error of 10,434 therms at 90% confidence. These savings have a lower bound of 201,973 therms and an upper bound of 236,299 therms. The Program Implementer’s CUSUM savings were not within the Evaluation Team’s confidence interval, meaning that these values were statistically different within 90% confidence.

For Production Line 3, the CUSUM savings were 311,483 therms and had a standard error of 13,347 therms at 90% confidence. These savings have a lower bound of 289,529 therms and an upper bound of 333,437 therms. The Program Implementer’s CUSUM savings were not within the Evaluation Team’s confidence interval, meaning that these values were statistically different within 90% confidence.

**Table H-109. Participant 9 Natural Gas Savings Summary**

Production Line	Program Implementer CUSUM Savings (therms)	Evaluated CUSUM Savings (therms)				Evaluated CUSUM Savings / Program Implementer CUSUM Savings
		Savings	Standard Error	Lower Bound	Upper Bound	
Production Line 1	(73,701)	(76,068)	593,071	(1,051,583)	899,447	103%
Production Line 2	320,625	219,136	10,434	201,973	236,299	68%
Production Line 3	173,827	311,483	13,347	289,529	333,437	179%
<b>Total</b>	<b>420,750</b>	<b>454,551</b>	-	-	-	<b>108%</b>

Figure H-18, Figure H-19, and Figure H-20 shows the predicted and actual consumption for production lines 1 through 3, respectively. During the baseline period (light blue background), predicted consumption closely follows actual consumption. During the performance period (light yellow background), savings occur when predicted baseline consumption (Evaluation Team Adjusted) is greater than actual consumption.

As shown in Table H-110, the Team verified 454,551 therms in CUSUM savings. The facility claimed 309,634 therms of prorated savings through the Large Energy Users Program. The Large Energy Users Program savings were subtracted from the evaluated CUSUM savings to obtain 144,917 therms of evaluated SEM Pilot savings.

**Table H-110. Participant 9 Natural Gas Capital Projects Summary**

Evaluated CUSUM Savings (therms)	Prorated Large Energy Users Program Savings (therms)	Evaluated SEM Pilot Savings (therms)
454,551	309,634	144,917

Figure H-18. Evaluation Team Participant 9 Natural Gas Model – Production Line 1

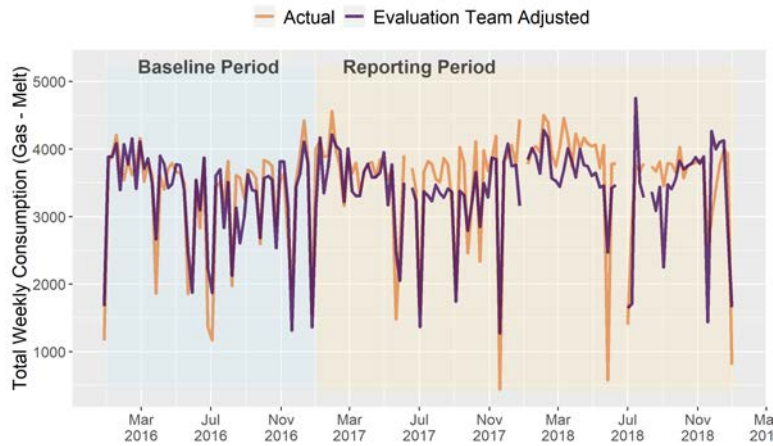


Figure H-19. Evaluation Team Participant 9 Natural Gas Model – Production Line 2

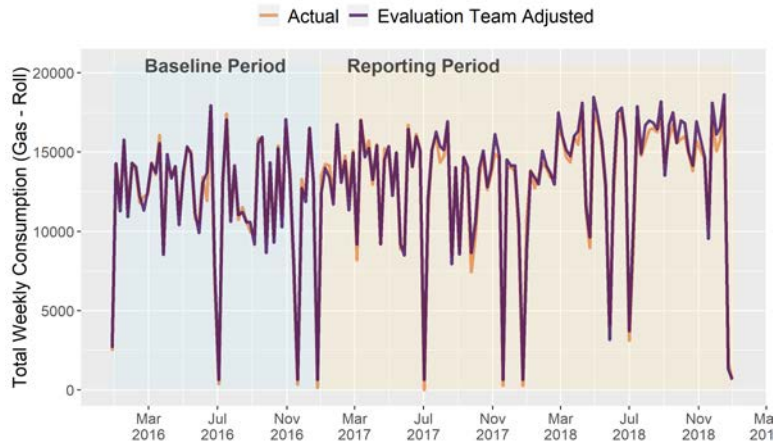
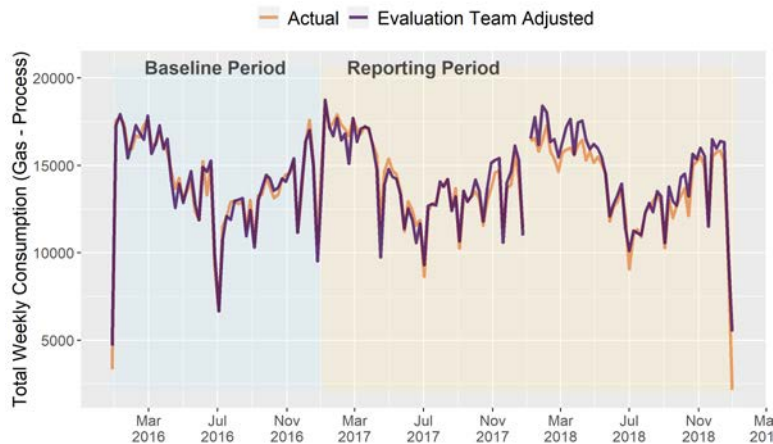


Figure H-20. Evaluation Team Participant 9 Natural Gas Model – Production Line 3



## Appendix I. Net Savings Analysis

For the CY 2018 evaluation of Focus on Energy's programs, the Evaluation Team applied NTG adjustments drawn mostly from primary research. This appendix presents four general approaches used to assess net savings—national sales data modeling, self-report NTG, UEC comparison (RPP), and sales lift (low-E storm windows)—and how they were applied to each program.

### *Net Savings Overview*

As described in Volume II, the evaluation of a program involves reviewing the reported gross savings to ensure that the measures installed have remained installed and are working as intended. The Evaluation Team then applies any adjustments found during the review to calculate the verified gross savings.

Net savings are the final savings attributed to a program, as determined by an independent evaluator. This means that the program is directly responsible for the savings, and the savings would not have been achieved in the absence of that program. In deriving this value, evaluators account for—and deduct—reported savings that are associated with freeriders (participants who would have undertaken the same action and achieved the same savings in the absence of a program) and account for—and add—spillover savings (savings that are the result of a program's influence but for which no incentive was paid and for which no program has recorded savings).

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers' perceptions of their energy usage and, in some cases, motivate customers to take efficiency actions outside of Focus on Energy programs. This is generally called nonparticipant spillover (NPSO)—energy savings caused by, but not rebated through, Focus on Energy's energy efficiency and renewable resource programs. To understand whether Focus on Energy's general and program marketing efforts generated energy efficiency improvements outside of the company's incentive programs, the Evaluation Team collected spillover data through the general population survey, conducted with randomly selected residential and nonresidential customers.

Net savings represent the total savings achieved from the investment of ratepayer dollars into the program. These net savings are the primary benefits factored into the benefit/cost analysis used to design programs and ensure that they are operating in a manner that returns a net positive benefit to ratepayers. Focus on Energy also uses net savings to track the progress toward the savings targets established for Focus on Energy by the PSC.

This appendix discusses the specific approaches the Evaluation Team used to derive the net savings for the CY 2018 Focus on Energy programs. Of particular note: beginning in CY 2013, the Evaluation Team began the process of moving away from estimating net savings exclusively from survey results to approaches driven by sales data or an experimental design. One example of a data-driven approach is national sales data modeling, which measures the lift in retail sales resulting from program influence.

Focus on Energy’s long-term goals are to use these data-driven approaches as broadly as possible and to limit reliance on self-reporting methods. The Evaluation Work Group approved the use of these approaches and supports increasing their use when evaluators can obtain reliable data with reasonable cost and effort.

The Evaluation Team conducted various NTG analysis methods to assess the performance of measures offered throughout the portfolio. In some cases, the Evaluation Team combined methods to determine savings-weighted average program NTG ratios. Table I-1. shows the evaluation method(s) used to determine net savings for each program for the CY 2018 evaluation.

**Table I-1. CY 2018 Net Savings Methodology by Program**

CY 2018 Programs	Net Savings Methodologies
<b>Residential</b>	
Multifamily Energy Savings	CY 2015 and CY 2016 Self-Report
Multifamily New Construction	CY 2015 and CY 2016 Self-Report for Multifamily Energy Savings Program
Home Performance with ENERGY STAR (Whole Home)	CY 2017 Billing Analysis
Home Performance with ENERGY STAR (HVAC Standard Track)	CY 2017 Standard Market Practice and CY 2015 Self-Report
Home Performance with ENERGY STAR (HVAC Income-Qualified Track)	Stipulated NTG = 1.0
New Homes Construction	Stipulated NTG = 1.0
Retail Lighting and Appliance Program	National Sales Data Modeling and CY 2018 Self-Report
Simple Energy Efficiency	Stipulated NTG = 1.0
Appliance Recycling Program	CY 2017 Self-Report
Design Assistance - Residential	CY 2015–CY 2017 Self-Report
<b>Nonresidential</b>	
Agriculture, Schools, and Government	CY 2018 Self-Report
Business Incentive Program	CY 2018 Self-Report
Small Business	CY 2018 Self-Report
Large Energy Users	CY 2018 Self-Report
Renewable Energy Competitive Incentive Program	CY 2015–CY 2017 Self-Report
Design Assistance	CY 2015–CY 2017 Self-Report
Training Program	CY 2015–CY 2018 Self-Report
<b>Pilots</b>	
Seasonal Savings	Stipulated NTG = 1.0
Strategic Energy Management	Stipulated NTG = 1.0
Energy Star Retail Products Platform	Sales Data Modeling
Low-E Storm Windows	Sales Data Modeling
Midstream Commercial Kitchen Equipment	CY 2017 and CY 2018 End User Self-Report
Midstream Commercial Lighting Initiative	Stipulated NTG = 0.31 Based on Two Other Focus on Energy Midstream Programs

CY 2018 Programs	Net Savings Methodologies
<b>Rural</b>	
Connected Devices Kits Program	Stipulated NTG = 1.0 and CY 2018 Self-Report
Communications Providers Initiative	Stipulated NTG = 1.0
Community Small Business Offering	CY 2018 Self-Report
Rural Home Performance	CY 2017 Billing Analysis, CY 2017 Standard Market Practice, and CY 2015 Self-Report

The Evaluation Team launched a new strategy to collect these data for CY 2017 directly from distributors and manufacturers.

## National Sales Data Modeling

The Evaluation Team estimated the CY 2018 NTG for LEDs for the Retail Lighting and Appliance Program using a national sales data model; this was the same approach the Team used in CY 2017. The underlying theory behind the national lighting sales data NTG model is that states that have strong upstream lighting program activity—compared with those with little to no program activity—should have higher market share (via sales) of efficient lighting. The model relied on full-category lighting sales data to estimate market lift as a function of program activity, while also controlling for other factors (such as household and demographic characteristics) that might impact efficient-lighting sales. Based on this modeling, the Evaluation Team determined a comprehensive NTG estimate that captured freeridership, participant spillover, and nonparticipant spillover (NPSO).

## Study Objectives

The primary objective of the model is to quantify the relationship between program intensity (program spending per household) and LED sales (the percentage of light bulb purchases that are LEDs), which the model then used to estimate an NTG ratio for the Retail Lighting and Appliance Program. This is the third year that Focus on Energy used the sales data modeling approach for estimating lighting NTG. While the CY 2015 model<sup>23</sup> included all efficient lighting technologies (CFLs and LEDs), the CY 2016 model<sup>24</sup> and current model for CY 2017 focus on sales and market shares of LEDs exclusively. This reflects the increasing dominance of LEDs as the preferred energy-efficient lighting technology (primarily driven by rapidly decreasing costs, new yielded ENERGY STAR specifications,<sup>25</sup> and improved performance over CFLs).

In addition to estimating NTG, the data provide helpful insights into what other factors drive LED purchases and opportunities for benchmarking Wisconsin lighting efficiency shares and program spending against other states. This memo presents these additional analyses as well.

<sup>23</sup> Apex Analytics. January 2016. *Wisconsin Focus on Energy Lighting Sales Data Modeling Results*.

<sup>24</sup> Apex Analytics. January 2017. *Wisconsin Focus on Energy Lighting Sales Data Modeling Results*.

<sup>25</sup> The full ENERGY STAR Lamp 2.0 specification is available online:  
[https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Lamps%20V1%201\\_Specification.pdf](https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Lamps%20V1%201_Specification.pdf)



## Data Sources

The Evaluation Team leveraged a variety of data sources for the analysis, though it relied primarily on sales data prepared by the Consortium for Retail Energy Efficiency Data (CREED).<sup>26</sup> CREED is a consortium of Program Administrators, retailers, and manufacturers working together to collect the data necessary for better planning and evaluation of energy efficiency programs. LightTracker is CREED's first initiative, focused on acquiring full-category lighting data including incandescent, halogen, CFL, and LED bulb types, for all distribution channels in the entire United States. As a consortium, CREED speaks as one voice for Program Administrators nationwide as they request, collect, and report on the sales data needed by the energy efficiency community.

The sales data were generated primarily from two sources: POS state sales data (representing grocery, drug, dollar, discount, mass merchandiser, and selected club stores) and National Consumer Panel (panel) state sales data (representing home improvement, hardware, online, and selected club stores). The Evaluation Team also purchased raw datasets from third-party vendors and through a CREED initiative. The Team then cleaned and processed all data for analysis.<sup>27</sup> Besides the sales data made available through LightTracker, the model inputs are a combination of program data collected by the Evaluation Team and household and demographic data collected through various publicly available websites. A list of data sources for the primary model input data follows:

- National bulb sales
  - POS data (grocery, drug, dollar, discount, mass merchandiser, and selected club stores)
  - Panel data (home improvement, hardware, online, and selected club stores)
- U.S. Census Bureau import data (CFL and LED imports)
- DSM Insights, an E Source database of utility program data
- ENERGY STAR Lighting Program data (utility lighting program budgets)
- ENERGY STAR shipment data (released by the EPA)
- North American Electrical Manufacturers Association shipment data
- American Community Survey (ACS) data (household characteristics and demographic data)

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<sup>26</sup> CREED. July 26, 2018. *Consortium for Retail Energy Efficiency Data*. [creedlighttracker.com](http://creedlighttracker.com)

<sup>27</sup> The information contained herein is based in part on data reported by IRI through its Advantage service for, and as interpreted solely by LightTracker, Inc. Any opinions expressed herein reflect the judgment of LightTracker Inc. and are subject to change. IRI disclaims liability of any kind arising from the use of this information.

Data presented include LightTracker calculations based in part on data reported by Nielsen through its Strategic Planner and Homescan Services for the lighting category for the 52-week period ending approximately on December 31, 2017, for the available state level markets and Expanded All Outlets Combined and Total Market Channels. Copyright 2017, Nielsen.



- Retailer square footage per state (based on the two primary retailer channel data sources)
- General population surveys, lighting saturation studies, and other secondary data collection made publicly available through evaluation reports

## *Lighting Sales*

The LightTracker POS dataset includes lighting sales data for grocery, drug, dollar, club, and mass market distribution channels. These data represent actual sales that are scanned at the cash register for participating retailers.

The National Consumer Panel (NCP) represents a panel of approximately 100,000 residential households that have been provided with a handheld scanner for their homes and instructed to scan every purchase they make that has a bar code. For Wisconsin, the NCP collected data from approximately 1,400 households in CY 2017. The use of a scanner avoids potential recall bias, which is prevalent in self-report methods that ask about lighting purchases. IRI's analysis of scanner sales patterns estimates that approximately 60% of the homes are in full compliance and scan all purchases; NCP removes from the analysis any homes in which all products were not scanned.

Although the dataset included detailed records of lighting data purchases, the Evaluation Team required a considerable effort to ensure data integrity and inclusion of all the necessary bulb attributes. For example, not all records were populated with some of the more critical variables such as bulb type, style, and wattage or the data had clearly erroneous values (such as 60-watt LEDs).

After thorough review and quality control of the dataset, the Evaluation Team reclassified, standardized, and populated missing records, created additional variables, and performed general enhancements to the data. To populate missing records, validate existing records, and include additional bulb attributes, the Evaluation Team created a proprietary universal product code (UPC) database with approximately 36,000 bulbs from five sources:

- Manufacturer product databases provided to LightTracker
- Product catalogs downloaded from manufacturer websites via Python-based web scraping
- Product offerings downloaded from retailer websites
- Automated lookups of online UPC databases (such as [www.upcitemdb.com](http://www.upcitemdb.com))
- ENERGY STAR databases available online (such as <https://www.energystar.gov/productfinder/product/certified-light-bulbs>)

LightTracker then merged the bulb database with the POS/Panel data, populating fields based on a hierarchy of data sources believed to be most reliable. Prioritization was typically based in the following order: manufacturer specifications, UPC lookups, original data provider (IRI and Nielsen) database values. The Team also conducted manual web lookups on individual bulbs to determine final assignments.

In addition, the Team investigated the bulb assignment and the quantity of bulbs per package by examining the average price per unit and identifying outliers in terms of per bulb prices. This process

helped identify misclassification of certain bulb types (such as bulbs that were flagged as low-cost LEDs but were actually LED nightlights, so they belonged in the “Other” category), as well as bulb counts that represented box shipments (such as a package identified as having 36 bulbs was really a six-pack of LEDs that was shipped with six packages per box). The sales model is restricted to screw-based bulbs, so any bulbs classified as type “Other” were not included in the model.

The final model comprised 42 states, accounting for the smaller states that lacked sufficient sample size from the panel data or had incomplete program data available. The lighting dataset included these key aspects:

- CY 2017 sales volume and pricing for CFLs, LEDs, halogens, and incandescent bulbs for all channels combined, broken out by the POS and non-POS channels
- Data reporting by state (with 48 states included in both POS and non-POS) and bulb type
- Inclusion of all bulb styles (A-lamps, reflectors, globes, and candelabras)

As detailed below, the dependent variable of the model used the percentage of LED sales, rather than total LED sales, to normalize for states with greater or lesser bulb sales (LED or standard) because of differences in number of households, number of sockets, existing saturation, and other factors that drive lighting sales.

### *Program Activity*

To research lighting program activity in the 48 states, the Evaluation Team used internal resources and conducted a literature review of publicly available reports found on the internet or provided by Program Administrators or their evaluators.<sup>28</sup> The Evaluation Team contacted local utilities in areas where reports with relevant information were not available. Additionally, the Evaluation Team accessed DSM Insights, an E Source product that provides a detailed breakdown of program-level spending, including incentives, marketing, and delivery, for more than 100 Program Administrators around the country.<sup>29</sup>

The Evaluation Team collected these program data:

- Total number of claimed LED (and, where applicable, CFL) upstream program bulbs reported by each program
- Upstream LED incentives
- Total upstream program budget

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<sup>28</sup> In particular, the Evaluation Team began by searching the ENERGY STAR Summary of Lighting Programs website (accessed February 2018: ENERGY STAR Summary of Lighting Programs) and referenced the Database of State Incentives for Renewables & Efficiency (accessed February 2018: [dsireusa.org](http://dsireusa.org)).

<sup>29</sup> E Source. Accessed April 1, 2018. “DSM Insights.” [esource.com/dsminsights](http://esource.com/dsminsights)

The Evaluation Team used actual program expenditures and, where these data were unavailable, ENERGY STAR reported expenditures<sup>30</sup> as a proxy.<sup>31</sup> The Evaluation Team aggregated data from each utility by state and assigned a modeling flag to each state based on the source of and confidence in the data provided across all major utilities and Program Administrators:

- 0 = any state with no program activity
- 1 = states in which all program activity data points were collected from every Program Administrator (including municipalities and cooperatives)
- 2 = states that had some Program Administrator data and some ENERGY STAR data (usually overall program expenditures)
- 3 = the remaining states where all data points were derived from ENERGY STAR

The Evaluation Team could iterate through the model using states with the most-accurate data (with flags of 0 or 1) and then open the model up to include additional states (with flags of 2 or 3). After accounting for the states with incomplete program data, the final model included 42 states (detailed below).

To determine Retail Lighting and Appliance Program activity in Wisconsin, the Evaluation Team used the SPECTRUM database as a key input in developing a CY 2017 efficient lighting NTG estimate. This dataset listed the incentives, the number and type of Program-supported bulbs sold in each utility service area, and the overall Program expenditures (summarized in Table I-2).

**Table I-2. CY 2017 Focus on Energy Program Statistics**

Program Expenses	LED Quantity	LED Incentives
\$11,287,100	4,732,792	\$8,598,330

### *Presence and Absence of Retailers (Channel Variables)*

The Evaluation Team conducted secondary internet research to determine the number and total square footage of store locations in each state for five primary energy-efficient bulb retailers—The Home Depot, Lowe’s, Walmart, Costco, and Menards. The Team used these data as explanatory variables in the model because these retailers sell a large quantity of energy-efficient bulbs and the percentage of efficient bulb sales could differ in states with more or fewer retail locations. The non-POS data (derived from the NCP) does include purchases made through online retailers.

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<sup>30</sup> ENERGY STAR. 2017. “ENERGY STAR Summary of Lighting Programs: September 2017 Update.” [energystar.gov/ia/partners/downloads/2017%20ENERGY%20STAR%20Summary%20of%20Lighting%20Programs.pdfs](http://energystar.gov/ia/partners/downloads/2017%20ENERGY%20STAR%20Summary%20of%20Lighting%20Programs.pdf)

<sup>31</sup> Note that because the ENERGY STAR report included only expenditure ranges, the Evaluation Team used the midpoints of the ranges to represent the expenditures.

## State-Level Household and Demographic Characteristics

The Evaluation Team gathered state-level demographic data from the American Community Survey, including annual state-level data for the population, total number of households, household tenure (own versus rent), home age, education, income, and average number of rooms in the home. As explained below, the Team then combined these data with other possible explanatory variables, including political index, average cost of living, and average electric retail rates.

## Modeling Methods

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

The general form of the model is specified below, followed by a more detailed discussion of the data sources for each variable. The Evaluation Team considered the comprehensive set of variables listed below; the final model, presented in Table I-3, lists the variables ultimately selected for inclusion based on their statistical significance and ability to improve the model specification (see the *Multivariate Regression Model* section under *Key Findings* for more information).

$$LED\ Market\ Share_i = \beta_0 + \beta_1 * Program\ Spending\ per\ HH + \beta_2 * Program\ Age + \beta_3 * \sum_1^3 Channel\ Variables + \beta_4 * \sum_1^4 Demographic\ Variables$$

Where:

- LED Market Share<sub>i</sub>* = Proportion of total LED sales in state 'i'. Equal to LED sales/total bulb sales
- $\beta_0$  = The model intercept
- $\beta_1$  = The primary coefficient of interest. This represents the marginal effect of program intensity or the expected increase in the market share of LEDs for each \$1 in additional program spending per household.
- $\beta_2$  = Another coefficient of interest. This represents the marginal effect in additional program years since inception.
- Program Spending per HH<sub>i</sub>* = The number of CY 2017 retail lighting program dollars per household in state 'i'. Equal to total retail lighting program expenditures in state 'i' (incentive and non-incentive) divided by the number of households in state 'i'.<sup>32</sup>
- Program Age* = The number of years state 'i' has been running an upstream lighting program

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<sup>32</sup> The Evaluation Team attempted to collect LED program spending nationwide but was able to collect this data for only 24 states. For the model, the Evaluation Team used total program spending to include more states.

- $\beta_3$  and  $\beta_4$  = Array of regression coefficients for the channel variables and demographic variables.
- Channel Variables* = Numeric variables summarizing state-level retailer characteristics (Table I-3 lists additional detail)
- Demographic Variables* = Numeric variables that summarize state-level population, housing, and economic attributes (additional detail is provided in Table I-3)
- $\epsilon_i$  = Error term

**Table I-3. Program Intensity, Channel, and Demographic Variable Descriptions**

Type of Variable	Description
<b>Program Intensity Variables</b>	
Program Spending per Household	Total upstream program budget in state 'i' divided by the number of households in state 'i'.
SQRT (Program Spending per Household)	The square root of the program spending per household.
Program Age	The number of years Program Administrators in state 'i' have operated upstream lighting programs (CFL or LED).
<b>Channel Variables</b>	
Sqft NonPOS per HH <sub>i</sub>	The average non-POS retail square footage per household in state 'i.' Equal to non-POS square footage divided by the number of households in state 'i'.
Percentage Sqft NonPOS <sub>i</sub>	The percentage of total retail square footage belonging to non-POS retailers in state 'i.' Equal to non-POS square footage divided by (POS sqft + non-POS sqft).
Sqft POS per HH <sub>i</sub>	The average POS retail square footage per household in state 'i.' Equal to POS square footage divided by the number of households in state 'i'.
<b>Demographic Variables</b>	
Political Index <sub>i</sub>	A state-level partisan voter index developed by Gallup <sup>a</sup> using presidential election voting results as a state-level partisan proxy. A higher than 1.0 value represents greater Democratic influence and a value less than 1.0 indicates greater Republican influence.
Average Electricity Cost <sub>i</sub>	The state-level average residential retail rate of electricity sourced directly from the Energy Information Agency. <sup>b</sup>
Cost of Living <sub>i</sub>	State-level cost of living indices developed by the Missouri Economic Research and Information Center. <sup>c</sup>
Percentage of Renters Paying Utilities <sub>i</sub>	All state-level demographic and household variables were derived from the most current U.S. Census <i>American Community Survey</i> . <sup>d</sup>
Median Income <sub>i</sub>	
Percentage Owner Occupied <sub>i</sub>	
Percentage of Population with College Degree <sub>i</sub>	

<sup>a</sup> Gallup. Accessed March 1, 2018. "State of the States." [news.gallup.com/poll/125066/state-states.aspx](https://news.gallup.com/poll/125066/state-states.aspx)

<sup>b</sup> U.S. Electricity Information Association. Accessed March 20, 2018. "Electricity." [eia.gov/electricity/data/state/](https://eia.gov/electricity/data/state/)

<sup>c</sup> Missouri Economic Research and Information Center. Accessed March 15, 2018. "Cost of Living Data Series 2018 Annual Average." [missourieconomy.org/indicators/cost\\_of\\_living/](https://missourieconomy.org/indicators/cost_of_living/)

<sup>d</sup> U.S. Census Bureau. Accessed March 15, 2018. "American Fact Finder." [factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t](https://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t)

*Correlation of the Independent (Explanatory) Variables*

Table I-4 shows the correlation between the dependent variable (LED market share) and 11 potential channel and demographic/household variables, along with the two program intensity variables (program age and program spending per household). Nine of the variables are positively correlated with LED market share and three, in red, are negatively correlated. Correlation coefficients can range from -1.0 to 1.0, and the magnitude of the absolute value indicates the degree of correlation. This means that program spending and program age are the variables most closely correlated with LED market share (higher LED market shares typically occurring in states with more program spending and longer-running programs).

**Table I-4. Independent Variable Correlation Table**

Possible Explanatory Variable	LED Market Share
Program Spending per Household	0.79
Sqft NonPOS per HH	-0.16
Sqft POS per HH	-0.55
Percent Sqft NonPOS	0.46
Political Index	0.55
Median Income	0.40
Average Electricity Price	0.51
Cost of Living	0.47
Percentage of Renters Paying Utilities	-0.67
Percentage Owner Occupied	0.02
Percentage of Population with College Degr	0.48
Program Age	0.73

Table I-5 is a correlation matrix among the potential independent variables. Although political index and cost of living are both positively correlated with LED market share, they are also highly correlated with one another (correlation coefficient = 0.78). When multiple independent variables that are correlated with one another are included in a model specification, a regression model will have difficulty precisely estimating the effect of either term. This issue is compounded by the relatively low number of observations in the dataset.

Because of the complexity of the relationships and numerous options of these channel, demographic, and household characteristic variables, the Evaluation Team developed and tested different model options. In general, the models provided similar results, with program spending and program age being the two most significant predictors of LED market share. As discussed in more detail in the *Key Findings* section, the Team ultimately selected the model used in the previous evaluation year for consistency so any differences in NTG reflect changes in the data, not the model.

Table I-5. Covariance Table of Potential Independent Variables

	Program Spending per HH	Sqft NonPOS per HH	Sqft POS per HH	Percent Sqft NonPOS	Political Index	Median Income	Average Electricity Price	Cost of Living	% of Renters Paying	% Owner Occupied	% of Population with	Program Age
Program Spending per Household	1.00											
Sqft NonPOS per HH	-0.42	1.00										
Sqft POS per HH	-0.58	0.26	1.00									
Percent Sqft NonPOS	0.46	0.14	-0.89	1.00								
Political Index	0.57	-0.26	-0.77	0.69	1.00							
Median Income	0.32	0.05	-0.69	0.75	0.69	1.00						
Average Electricity Price	0.52	-0.22	-0.63	0.59	0.61	0.63	1.00					
Cost of Living	0.51	-0.32	-0.80	0.73	0.78	0.73	0.77	1.00				
Percentage of Renters Paying Utilities	-0.63	0.24	0.44	-0.34	-0.43	-0.37	-0.58	-0.48	1.00			
Percentage Owner Occupied	-0.01	0.22	0.34	-0.30	0.26	-0.26	0.20	-0.47	-0.15	1.00		
Percentage of Population with College Degree	0.47	-0.07	-0.67	0.70	0.70	0.91	0.64	0.67	-0.48	-0.19	1.00	
Program Age	0.59	-0.21	-0.66	0.65	0.65	0.56	0.69	0.72	-0.49	-0.31	0.56	1.00

*Model Weighting*

Another key consideration in the modeling is the weighting of states within the model. Since each state is one observation in the model, the Evaluation Team accounted for larger states having larger sample sizes in the panel data and, therefore, more of an impact on the lighting market, by applying a weighting factor derived by using either number of households or total bulb sales.

The Team deemed that using analytic weights in the model was appropriate because the dataset consisted of a series of purchase transactions that had been condensed into an observed mean.<sup>33</sup> The following model regression model estimates using analytic weights, where each state’s average market share is based on n observations:

$$LED\ Market\ Share_i = \beta_0 + \beta_1 * Program\ Spending\ per\ HH_i$$

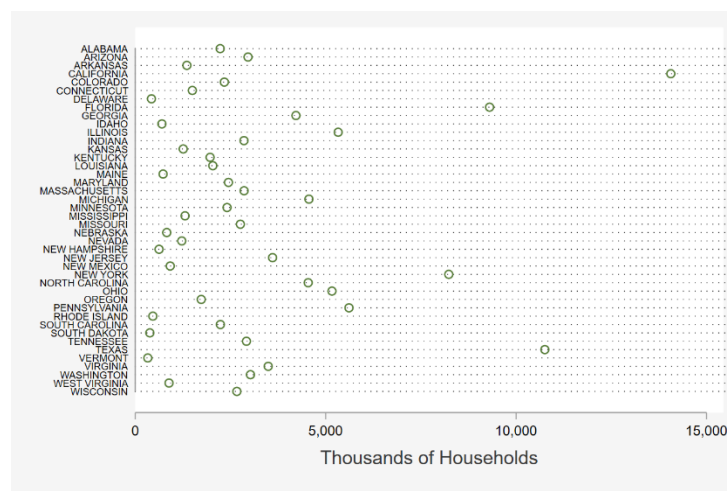
This is analogous to estimating using this model:

$$LED\ Market\ Share_i * \sqrt{n_i} = \beta_0 * \sqrt{n_i} + \beta_1 * Program\ Spending\ per\ HH_i * \sqrt{n_i}$$

The square root term means that the weights are proportional to the inverse of the variance.

Because the Evaluation Team’s analysis dataset comprised multiple data streams, the definition of an observation was inconsistent, so a proxy was needed for the weighting variable. The sample size in the panel data was generally proportional to state population, and large states also represented a larger share of the overall U.S. lighting market than smaller states. This also meant the Team was generally more confident in the non-POS lamp shares for larger states compared with that of smaller states. This is because the average lighting share value in large states was based on more measurements than small states, which therefore should make the market share estimate more precise. Figure I-1. shows the distribution of households for each of the 42 states in the model.

**Figure I-1. Number of Households by State**



<sup>33</sup> Stata. Accessed March 15, 2018. “State 15 Help for Weight.” [stata.com/help.cgi?weight](http://stata.com/help.cgi?weight)

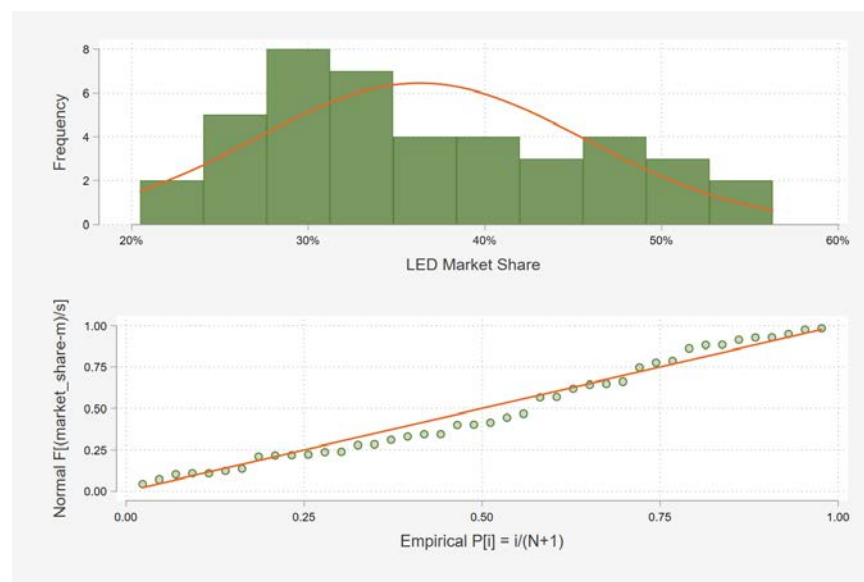


## Model Functional Form

Another critical decision in the modeling process is the selection of the functional form of the model. A key input in this decision is the distribution of the dependent variable. Figure I-2. contains a histogram and a standardized normal probability plot for the LED market share of the 42 states in the analysis dataset, which indicate that the data are approximately normally distributed.<sup>34</sup>

LED market share cannot be less than 0% or greater than 100%. The Team looked at functional forms that impose these limits to produce the top half of an S-curve. Since the LED market share values only range from 20% to 56%, and so much of that variation is explained by program intensity, the Team elected to estimate the model using ordinary least squares regression; this did not result in any unrealistic predictions (such as less than 0% or greater than 100%).

**Figure I-2. Histogram and Standardized Normal Probability Plot**



The Evaluation Team also explored transformations of independent variables, including the square root of spending as the program intensity variable. Figure I-3. shows that the square root model tapers LED market share as the square root of spending (“sqrt” in the figure) increases. This likely reflects diminishing returns in terms of market share as program spending increases and graphically provides a good fit for the data.

## NTG Estimates

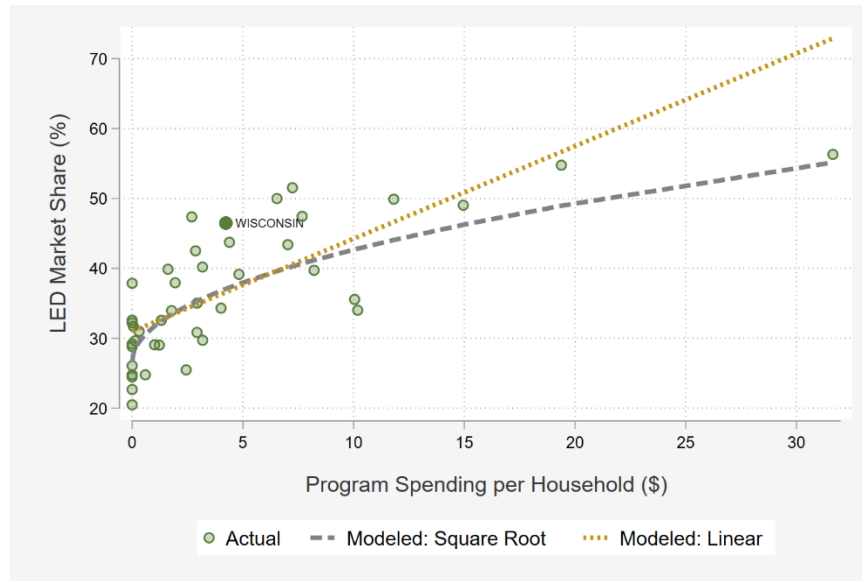
Using the results of the regression models, efficient bulb sales data, and program tracking databases, the Evaluation Team estimated NTG ratios for LEDs sold in CY 2017. The Team first used the model to predict the share of efficient bulbs with and without a program (determining the counterfactual of no

<sup>34</sup> The Team also ran a Shapiro-Wilk test for normality, where the null hypothesis is that the data are normally distributed. The p-value of this test was 0.15 at the 95% confidence, so there is no reason to reject the hypothesis that LED market share is normally distributed.

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. The Evaluation Team then multiplied the change in share by the total number of bulbs—for all bulb types—sold in CY 2017, as determined by the sales data analysis described above. This value represents the net impact of the program (the total lift in the number of LEDs sold), which the Team then divided by the total number of program bulbs sold (the gross number of bulbs) to determine NTG:

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

**Figure I-3. Linear vs. Nonlinear Modeling**



### Key Findings

The primary objective of this model was to determine the impacts of program spending on the market share of LEDs to derive state-level NTG estimates. A secondary, but no less important, objective was to relate these national lighting sales and program activity data to an assessment of some of the key factors driving LED market share specifically in Wisconsin. By accessing national lighting sales data and researching the largest known compilation of state program activity (incentives, overall expenditures, and bulb volumes), the Evaluation Team could analyze and summarize lighting program activity in a way that has not been possible before.

The following sections present the findings from analyzing descriptive data statistics and applying the multivariate regression model.

*Analysis of the Combined Dataset (Descriptive Statistics)*

Some of the key attributes the Evaluation Team developed were these:

- **Market share distribution.** LED market share distribution for the United States, for Wisconsin versus the U.S., across each of 42 states, and across retail channels.
- **Program intensity.** LED lighting market share relative to overall program expenditures per household (binned by three tiers of magnitude of spending)
- **Program incentives.** Average LED lighting program incentives per bulb
- **ENERGY STAR market share distribution.** LED market share distribution in Wisconsin compared with that of states that do not have an upstream lighting program

Figure I-4. shows market share of the four bulb types (incandescent, halogen, CFL, and LED) across three years. LEDs continue to gain substantial market share, rising from 19% to 35%, but have mostly displaced sales of CFLs. Shares of inefficient lighting (incandescent bulbs and halogens) still represent over half (59%) of the market.

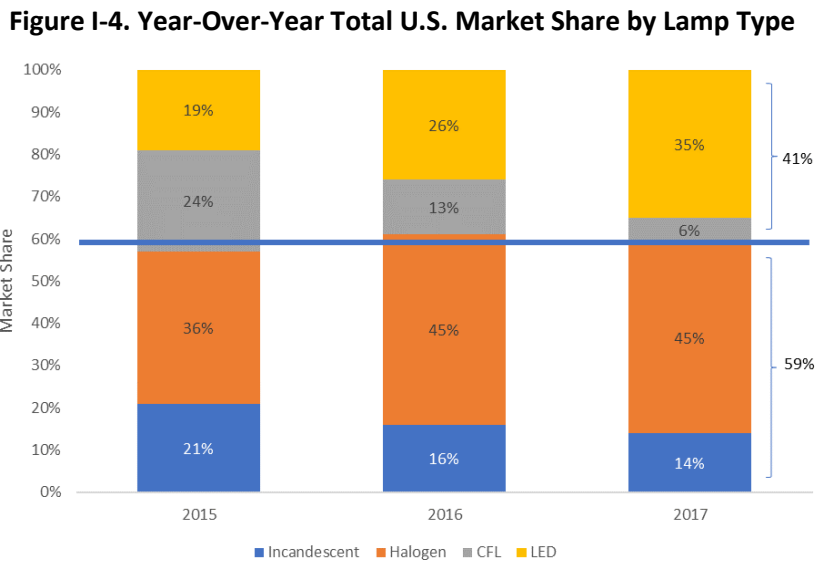


Figure I-5. compares the data above to Wisconsin market shares. LED market share in Wisconsin has risen at a faster rate than in the United States over the last three years, from 19% in CY 2015 to 46% in CY 2017. In CY 2015, Wisconsin had higher CFL market share than the U.S. However, in CY 2017, Wisconsin’s CFL market share has largely converged with that of the U.S.

**Figure I-5. Wisconsin and Total U.S. Year-Over-Year Market Share by Bulb Type**

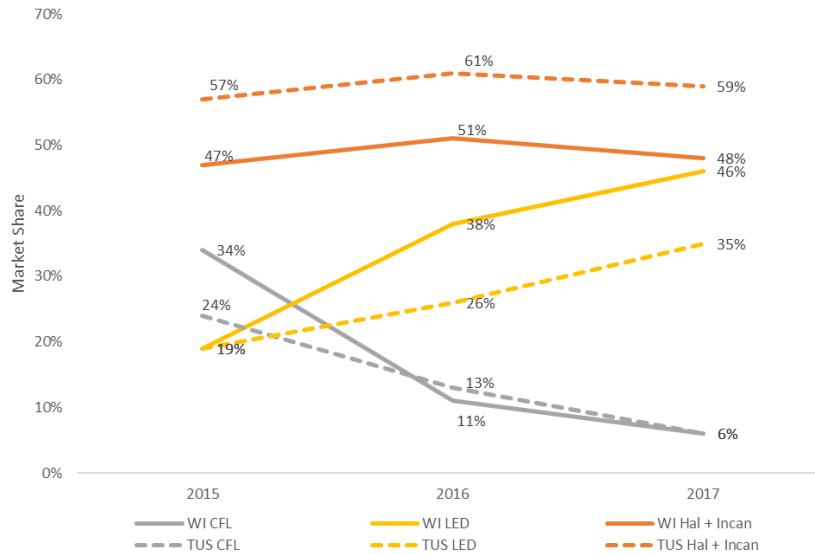
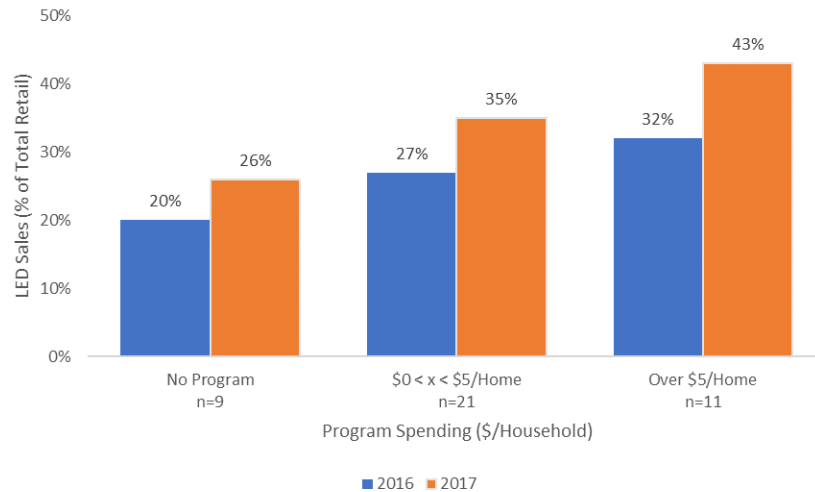


Figure I-6. shows the state-level LED share as a function of program spending. As clearly demonstrated in this graphic, LED share increases as program spending increases. In the program activity dataset of 42 states, nine states did not run an upstream lighting program and, on average, 26% of bulb sales are LEDs in these “no program” states. Wisconsin fell into the moderate program activity category, spending less than \$5 per household (\$4.23/home) in the upstream lighting program, with 35% of total CY 2017 bulbs sales being LEDs for these moderate program states. In CY 2016, states that did not run programs had an LED market share of 20% and in CY 2017, an LED market share of 26% which is on level with where moderate program states were in CY 2016.

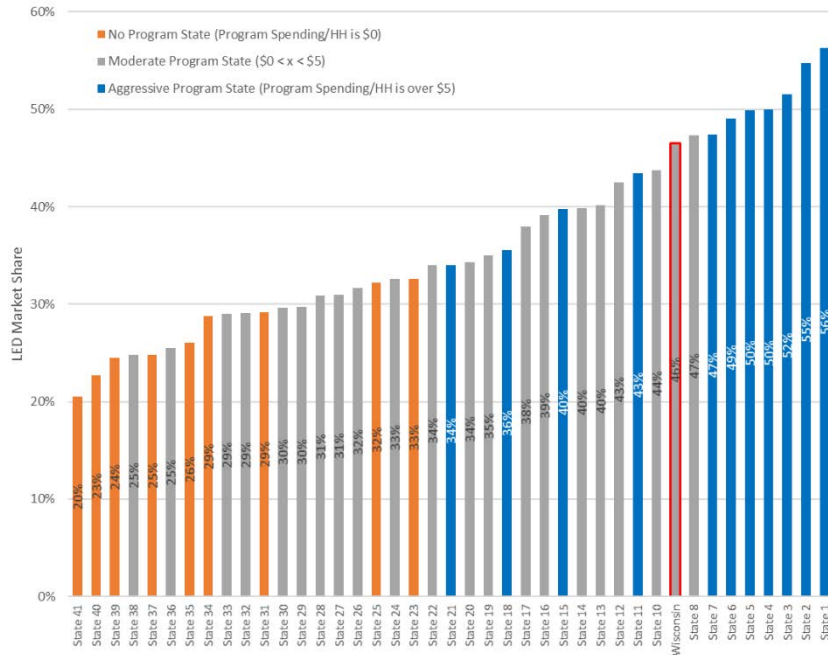
**Figure I-6. Relationship Between Program Spending and LED Sales (CY 2017)**



Similarly, Figure I-7. shows how LED sales in Wisconsin compare with LED sales in the 42 modeled states. States highlighted in blue represent states with aggressive programs, spending more than \$5 per

household. States with gray bars spent an average greater than \$0 and less than \$5 per household. Wisconsin is in the moderate program state category in terms of program spending. Orange bars represent states that did not offer a lighting program.

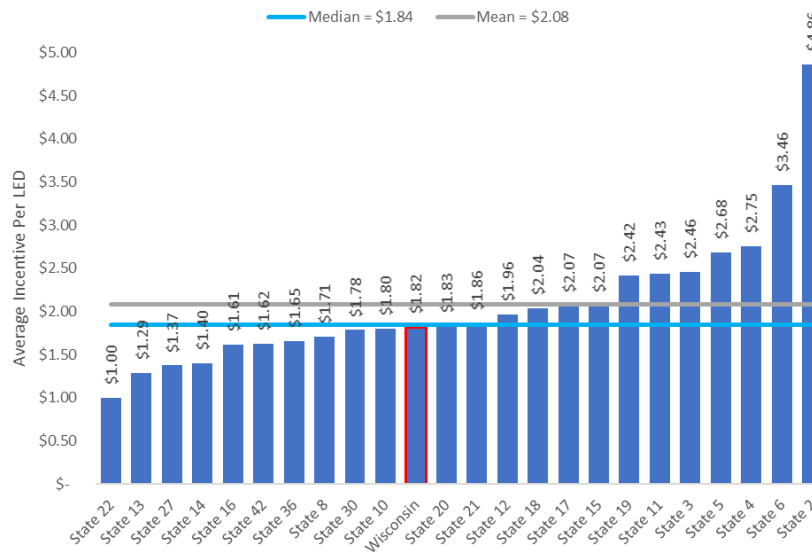
**Figure I-7. LED Sales Distribution Across States (CY 2017)**



The Evaluation Team also compared the average incentive offered per LED across states in which LED incentive information was collected. A simple calculation of incentive dollars divided by bulb units yielded average incentives per state. As shown in Figure I-8., in the 24 states that had sufficient data, LED incentives ranged from approximately \$1 to \$5 per LED bulb, with most of these states offering approximately \$2 per LED (the average LED incentive was \$2.08).

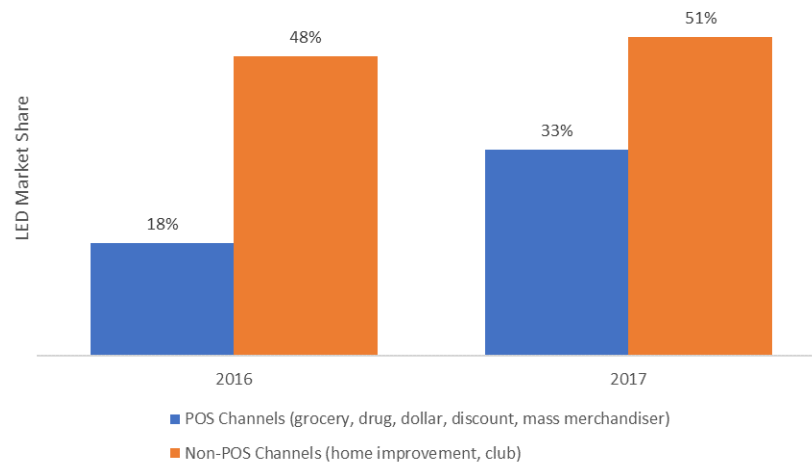
While Wisconsin ranks slightly below the overall averages of incentives per bulb, offering \$1.82 per LED in its upstream lighting program, it is very close to the median. Removing the influence of outliers (such as states with an incentive greater than \$3 per bulb) would bring Wisconsin’s average LED incentive closer to the average across the sampled states.

**Figure I-8. Average Upstream Lighting Incentive Per LED**



Analysis of the sales data model showed that sales of LEDs had greater market share in the non-POS retail channels than the POS retail channels, as shown in Figure I-9.<sup>35</sup> In CY 2017, half (51%) of the lighting purchases made in the non-POS channel were LEDs, compared with only 33% market share for LEDs in the POS channel. LED market share has increased in both retail channels since CY 2016, and the gap between POS and non-POS is narrowing.

**Figure I-9. Wisconsin LED Market Share by Retail Channel (CY 2017)**

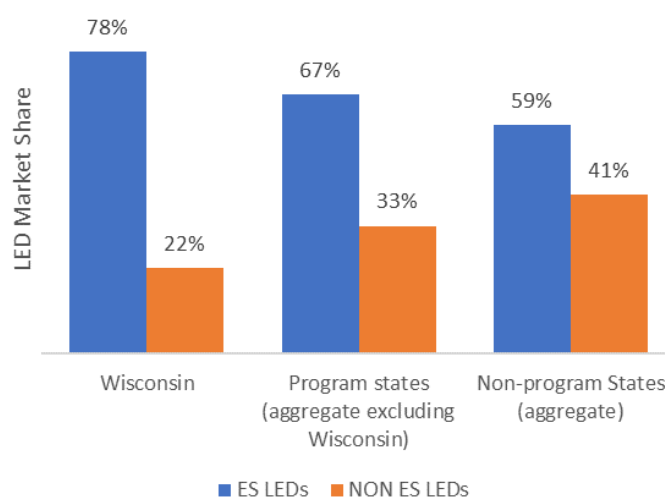


<sup>35</sup> In total, however, 70% of bulbs were purchased in the non-POS channels, whereas only 30% were purchased in the POS channels.

The Evaluation Team looked at ENERGY STAR LED distribution when there was sufficient resolution.<sup>36</sup> As shown in Figure I-10., 78% of LED purchases from POS channels in Wisconsin were ENERGY STAR LEDs, whereas only 67% of LED purchases in program states (excluding Wisconsin) were ENERGY STAR LEDs. States that did not run programs had the lowest share of ENERGY STAR LEDs of the three groups (59%).

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

**Figure I-10. ENERGY STAR LED Wisconsin Share (CY 2017 POS Channels)**



### *Multivariate Regression Model*

The regression coefficients for the program intensity variables, and subsequent estimates of the NTG ratio, proved relatively stable across a number of model specifications. Table I-6. displays the relevant statistics and outcomes from the selected model. The Team opted to use the same model specification that was used in CY 2016, which produced a similar overall model adjusted R-Square as the previous model. Using a consistent measurement for year to year allows for better comparison of results across years.

<sup>36</sup> Because the ENERGY STAR website does not include the UPCs of qualifying lamps, the Team had to identify ENERGY STAR qualified lamps through a lookup of make and model. In total, the Evaluation Team was successful at attributing 98% of LED sales with an ENERGY STAR attribute (that is, whether an LED was designated ENERGY STAR or whether an LED was not designated ENERGY STAR). The Team could not identify the remaining 2% of LEDs, which are excluded in Figure I-10.. In addition, the Team conducted this analysis only using the POS data, as the panel data did not contain sufficient sample size to stratify by ENERGY STAR designation. Lastly, the “no program” states with sufficient sales data for inclusion into the aggregate are Alabama, Louisiana, Mississippi, Tennessee, and Virginia.

**Table I-6. Model Summary Statistics (n=42 States)**

Independent Variables	Model Coefficient	P-Value of Coefficient
Intercept	-0.4109	0.314
Program Spending per Household (Sqrt)	0.0490	0.000
Political Index	0.0063	0.126
Median Income	0.0000	0.146
Political Index * Median Income	-0.0000001	0.125
Non-POS Square Feet per Household	0.0138	0.141
Program Age	0.0020	0.186
<b>Model Adjusted R-Squared</b>		<b>0.667</b>

For these model details, if an independent variable was included in the model, the regression coefficient and its associated p-value are included in the table. The Evaluation Team also considered a simpler model with just the intensity (square root of spending and program age) and channel (non-POS square footage per household) terms where all coefficients were significant at alpha = 0.1. The resulting NTG ratios were very similar to the model shown in Table I-6..

However, there are a few potential limitations to the model that are worth noting. While the R-squared value of 0.667 is considered a good fit, it is possible that the model still omitted variables that might better explain LED market share. For example, the political index may be picking up other effects that the Evaluation Team has not explicitly identified. In addition, the use of comparison states in the baseline will not reflect any potential interstate influence on nonprogram states. In other words, if the Focus on Energy Retail Lighting and Appliance Program, combined with the millions of dollars spent on lighting in other program states, has impacted the retailer sales of lamps in nonprogram (or even moderate-program) states, that would increase the baseline/comparison-area sales. As a result, the program spending coefficient would be too low, and the resulting NTG would be a conservative estimate.

The positive and significant coefficient for program age indicates that prior program activity does positively influence current year efficient market share. This may reflect a number of factors, including momentum in terms of customer awareness, education, and preference for efficient lighting, as well as retailer knowledge and promotion of efficient lighting. Program age might also be thought of as a simplistic proxy for market effects, meaning the portion of efficient lighting sales from potentially permanent changes in the market are a result of ongoing program activity.

The NTG calculations are shown in Table I-7.. The Evaluation Team determined NTG using a modeled to modeled calculation as opposed to a modeled to actual calculation. This means the Evaluation Team compared the counterfactual scenario (which can only be modeled) with a *modeled* energy-efficient market share rather than with the actual energy-efficient market share for Wisconsin in the dataset.<sup>37</sup>

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<sup>37</sup> The ratio of modeled to actual LED market share per sales is 91%. The model predicts 41.7% LED market share for 2017 in Wisconsin, whereas the national dataset reports Wisconsin with 46% LED market share. Putting



In assessing NTG, the Evaluation Team presented one way for treating the program spending counterfactual: by setting it to zero. However, the Evaluation Team presents two options for treating the program age counterfactual:

- Programs have never existed (program age is set to 0).
- Programs did not exist in CY 2017 (subtract one year from the program age).

Table I-7. shows the two options for treating the program age counterfactual and calculates NTG ratios for each option. The NTG ratio is 71.6% if including current and past program influence (setting past programs to zero in the counterfactual scenario); if examining the influence of the current program and assuming that influences up to one year prior would have continued if the current program was terminated, the NTG ratio is 51.0%.

**Table I-7. Wisconsin NTG Calculations**

Calculation Term	Current and Past Influence	Current Program Spending and Age Influence
Total Wisconsin Bulbs CY 2017 (A)	26,629,056	26,629,056
Program \$ per Household Actual (B)	\$4.23	\$4.23
Program \$ 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 Qty Modeled (H = A * G)	11,093,649	11,093,649
LED Qty 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
<b>NTG Ratio Modeled (L = J / K)</b>	<b>71.6%</b>	<b>51.0%</b>
<b>Market Effects (M = Difference of NTG Ratio of Columns)</b>	<b>20.7%</b>	<b>n/a</b>
<b>Market Effects Lamps (N = M * K)</b>	<b>978,035</b>	<b>n/a</b>

this into sales, the model predicts 11,104,316 LEDs sold in Wisconsin, and the national dataset reports that 12,249,366 LEDs were sold in Wisconsin in 2017.

For the Focus on Energy Retail Lighting and Appliance Program scenario, the Evaluation Team included Program and manufacturer incentives, consistent with the demand elasticity modeling approach. As noted in the 2015 evaluation report, “Program incentives did not account for the entire markdown in hard-to-reach and grocery retailers. The Evaluation Team assumed that manufacturers would probably not have provided the additional incentives, which effectively doubled the markdown, absent the Program. Therefore, the Evaluation Team attributed the entire markdown to the Program.”

## *Incorporating of Market Effects*

As noted in the CY 2016 analysis, the Evaluation Team recommends including past program influence (market effects) when calculating program savings and adding it in at the end of the program quadrennial. The Team recommends this for the following reasons:

- **The Program is meant to have long-term market effects impacts that are likely being reflected in the program age variable.** The Program incentives, and marketing and outreach, has been designed to impact customer awareness and demand for energy-efficient lighting, as well as retailer stocking and promotion of efficient lighting. Program age can be thought of as a proxy for these effects, measuring long-term trends that result from multiple years of running programs. These effects, therefore, should reflect positively, rather than negatively, in the NTG estimate.
- **The savings are new savings realized in CY 2017.** The change in market share attributable to prior program activities was realized in CY 2017 (prior program activities helped bump up the current market share). This represents increased sales of LEDs in CY 2017 that were not counted in prior years (they were not being double-counted), and if they are 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 timing of expenditures and savings is already modified for the Retail Lighting and Appliance Program.** The gross savings analysis for the Retail Lighting and Appliance Program already accounts for the future installation of Program lamps in the current Program year (although the first-year ISR is less than 100%, an installation trajectory is used to model and claim discounted savings for lamps that are installed in future years). Rather than accelerating future savings, as is done with the ISR, claiming impacts from prior expenditures is effectively using a lagged impact savings analysis. Savings that accrue today from programs in previous years, along with the savings from current programs, together comprise a reasonable estimate of energy efficiency program impacts over the long term.

## *Applying Market Effects*

To apply these market effects, the Evaluation Team recommends calculating the energy savings, incremental cost, expected useful life, and any other cost-effectiveness inputs for the year in which the market effects occurred and then adding these benefits and costs back in at the end of the program quadrennial. This is particularly important because the LED market is extremely dynamic and these parameters can vary from year to year. As shown above, the additional lamps due to market effects for CY 2017 is 978,035, and the Team recommends applying the final average gross savings and incremental cost to this total. Combined with the CY 2016 estimate (827,583), this would be a total of 1,805,618 for the current quadrennial cycle.<sup>38</sup> The Team recommends a similar calculation be done for CY 2018, using the appropriate inputs in place for each specific calendar year (the CY 2017 market effects lamps would

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<sup>38</sup> In CY 2015, the first year of the current quadrennial cycle, the program was only beginning to ramp up LED support, providing incentives for only 511,182 LEDs, compared with 3.4 million in CY 2016 and 4.7 million in CY 2017. The Evaluation Team, therefore, first examined market effects in CY 2016.

use the gross savings and incremental cost in place for CY 2017, and any market effects lamps determined for CY 2018 would use the gross savings and incremental cost for CY 2018). Summing the totals for each year will determine the total additional market-effects savings and costs over the quadrennial that can be applied to quadrennial impact and cost-effectiveness analysis.

### *Self-Report Net-To-Gross Methodology*

Two components—freeridership and spillover—constitute NTG. True freeriders are customers who would have purchased a measure without a program’s influence. Spillover is the additional savings obtained by customers investing in additional energy-efficient measures or activities because of their program participation.

This section presents the self-report approaches the Evaluation Team used to determine NTG for residential and nonresidential programs. In summary, the Team conducted participant surveys and used self-reported findings to calculate NTG ratios. It then applied these results to measure categories and programs for which adequate baseline data were unavailable. In some cases, the Evaluation Team combined the measure-level results from the standard market practice and the self-report methods to determine weighted average program NTG ratios.

### *Survey Design*

When assessing NTG for programs where participating customer surveys were conducted in the CY 2018 evaluation, the Evaluation Team asked a series of freeridership and spillover questions. These programs are listed above in Table I-1..

The Evaluation Team designed the freeridership questions to elicit as accurately as possible the impact of particular programs on the respondent’s decision to purchase high-efficiency equipment. Programs can influence customer decisions in a variety of ways: participants may decide to purchase an energy-efficient measure sooner than planned, to purchase a higher efficiency measure than planned, or to purchase more units than planned without the program. To understand the influence of the program, the survey asked questions about what decision-makers might have done in its absence.

Direct questions such as, “Would you have installed measure X without the program incentive?” tend to result in exaggerated *yes* responses. Participants often provide answers they believe surveyors seek, so such a question becomes the equivalent of asking: “Would you have done the right thing on your own?” Effectively avoiding such bias involves asking a question in several different ways and checking for consistent responses.

Basing freeridership estimates on a series of questions, rather than a single question, helped the Evaluation Team recognize and minimize response biases. Not all questions were weighted equally. For example, respondents who would not have installed the measure(s) to the same level of efficiency without the program were automatically 0% freeriders. If nonresidential program participants would not have installed the measure(s) within two years without the program, they were automatically 0% freeriders. The Team assigned other questions included in the freeridership analysis partial weights for responses that were indicative of a non-freerider.

The survey questions addressed five core dimensions of freeridership for residential programs and six core freeridership dimensions for nonresidential programs, all listed below:

- Would participants have installed measures without the program?
- Were participants planning on ordering or installing the measures before learning about the program?
- Would participants have installed the measures at the same efficiency levels without the program incentive?
- Would participants have installed the same quantity of measures without the program?
- In the program’s absence, would participants have installed the measures at a different time?
- Was the purchase of the measures in the organization’s most recent capital budget (nonresidential only)?

Specific freeridership questions used for the programs are presented in their analysis sections in this appendix.

## Freeridership Methodology

The Evaluation Team used a probability matrix to assign a single score to each participant, using his or her responses to targeted survey questions.<sup>39</sup> The Evaluation Team applied freeridership scores to question response patterns in the probability matrix and calculated confidence and precision estimates to the distribution of these scores.

This matrix approach provides these key benefits:

- Derivation of a partial freeridership score, based on the likelihood of a respondent taking similar actions in the program’s absence
- Use of a rules-based approach for consistency among multiple respondents
- Ability to change weightings in a what if exercise, testing the response set’s stability

The Evaluation Team’s method offered the advantage of partial freeridership. Experience has shown that program participants do not fall neatly into freerider and non-freerider categories. For example, the Team assigned partial freeridership scores to participants who had plans to install a measure; although the program exerted some influence over their decisions, these respondents were also influenced by other market characteristics outside of the program. Further, the Team could assign partial credit to “don’t know” and “refused” responses, rather than removing respondents entirely from the analysis.

The Evaluation Team converted each participant survey response into freeridership matrix terminology, combined each participant’s converted responses to assign a score from the matrix, and aggregated all

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<sup>39</sup> Khawaja, M. S. 2007 edition. *The NAPEE Handbook on DSM Evaluation*. p. 5-1.

participants into an average freeridership score for the entire program category, ultimately assessing freeridership at three different levels.

## Response Conversion to Matrix Terminology

The Evaluation Team independently evaluated each response, assessed it for freeridership, and converted it into one of these values:

- Yes (indicative of freeridership)
- No (indicative of non-freeridership)
- Partial (partially indicative of freeridership)

## Participant Freeridership Scoring

Following conversion of survey responses into matrix terminology, the Team created a freeridership matrix for each program. The Team’s process for determining a freeridership score is as follows:

- Customers were categorized as 0% freeriders in these instances:
  - They had no plans to install the measure in the absence of the program’s incentives and would not have installed the measure within a year for residential programs and within two years for nonresidential programs.
  - They had specific plans to install the measure before learning about the program but would not have done so without program incentives.
  - In the absence of program incentives, the customer would not have purchased or installed equipment to the same level of efficiency.
- Customers were categorized as 100% freeriders if they would have installed the measure without the program or if they had installed the measure before learning about the program.
- Customers received a partial freeridership score (ranging from 12% to 75%) if they had plans to install the measure and their decision was influenced by the program. (This influence may have been installation timing, the number of measures installed, or the efficiency levels of measures installed.) For customers who were highly likely to install a measure and for whom the program had less influence over their decision, the Team applied a higher freeridership percentage.

## Measure Category Freeridership Scoring

After assigning a freeridership score to every survey respondent, the Evaluation Team calculated a savings-weighted average freerider score for the measure category. For each program, the respondents’ freerider scores were individually weighted by estimated savings of equipment installed using the following calculation:

$$\text{SavingsWeightedFreeridership} = \frac{\sum[\text{Respondent Freerider Score}] * [\text{Measure Energy Savings}]}{\sum[\text{All Respondents Measure Energy Savings}]}$$

## Spillover Methodology

Spillover refers to additional savings generated by program participants following their participation but not captured by program records. Spillover occurs when participants choose to purchase energy-

efficient measures or adopt energy-efficient practices because of a program’s influence but do not receive program incentives from a utility or another organization.

The Evaluation Team measured spillover by asking a sample of participants who purchased and received an incentive for a particular measure if they installed another efficient measure or undertook another energy efficiency activity because of the program. Respondents were asked to rate the program’s (and incentive’s) relative influence (either *very important*, *somewhat important*, *not too important*, or *not at all important*) on their decisions to pursue additional savings.

## Participant Spillover Analysis

The Evaluation Team used a top-down approach to calculate spillover savings. Analysis began with a subset comprising only the survey respondents who indicated they had installed additional energy-saving measures after participating in the program. The Evaluation Team screened out any respondents who received an incentive for these additional measures. It also removed respondents if they indicated the program had little influence on their decisions to purchase additional measures, thus retaining only those respondents who rated the program as *very important*.

The Evaluation Team applied evaluated and deemed savings to the spillover measures respondents said they had installed as a result of their program participation.

The Team calculated spillover percentage per program category by dividing the sum of additional spillover savings reported by respondents for a given program category by total gross savings achieved by all respondents in the program category:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

## Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the program-level freeridership results to achieve the NTG ratio, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

Table I-8. summarizes the self-report CY 2018 participant freeridership, spillover, and NTG results by program.

**Table I-8. CY 2018 Self-Report Participant Freeridership, Spillover and NTG by Program**

Program	n	Freeridership <sup>1</sup>	Spillover	NTG
Retail Lighting and Appliances – Smart Thermostats	1,061	32%	0%	68%
Retail Lighting and Appliances – Advanced Power Strip	30	47%	0%	53%
Simple Energy Efficiency – Smart Thermostats	123	9%	4%	95%
Agriculture, Schools, and Government	70	55%	2%	47%
Business Incentive	140	44%	1%	57%
Small Business	70	10%	1%	91%
Community Small Business Offering	32	8%	1%	93%
Large Energy Users	65	38%	0%	62%
Commercial Kitchen Equipment Pilot	43	69%	1%	32%

<sup>1</sup>Weighted by gross evaluated energy savings.

The Design Assistance Program and the Renewable Energy Competitive Incentive Program did not include participant surveys in CY 2018. The Evaluation Team calculated the overall program NTG for CY 2018 using the CY 2015, CY 2016, and CY 2017 net savings data (sum of net savings from CY 2015, CY 2016, and CY 2017 divided by the sum of the gross savings from CY 2015, CY 2016, and CY 2017), which were based on participant surveys. Table I-9. summarizes the overall CY 2018 NTG for these programs.

**Table I-9. CY 2018 Net-to-Gross for Design Assistance and Renewable Energy Competitive Incentive Programs**

Program	CY 2015, CY 2016 & CY 2017 Total First-Year Gross Verified Savings (MMBtu)	CY 2015, CY 2016 & CY 2017 Total First-Year Net Verified Savings (MMBtu)	CY 2018 NTG
Design Assistance Program	758,403	545,654	72%
Renewable Energy Competitive Incentive Program	154,468	153,461	99%

The Multifamily Energy Savings Program did not include participant surveys in CY 2017 and CY 2018. The Evaluation Team calculated the overall program NTG for CY 2018 using the CY 2015 and CY 2016 net savings data (sum of net savings from CY 2015 and CY 2016 divided by the sum of the gross savings from CY 2015 and CY 2016), which were based on participant surveys. Table I-10. summarizes the overall CY 2018 NTG for Multifamily Energy Savings Program.

**Table I-10. CY 2018 NTG for Multifamily Energy Savings Program**

Program	CY 2015 & CY 2016 Total First-Year Gross Verified Savings (MMBtu)	CY 2015 & CY 2016 Total First-Year Net Verified Savings (MMBtu)	CY 2018 NTG
Multifamily Energy Savings Program	151,516	122,033	81%

## *Retail Lighting and Appliance Program—Smart Thermostat: Self-Report, NTG Methodology, and Findings*

### Freeridership Survey Questions

For Retail Lighting and Appliance Program smart thermostats, the participant survey’s freeridership section included the following five questions (asked in the survey format):

- E1. Before you heard about the rebate through Focus on Energy’s Retail Lighting and Appliance Program, had you already been planning to purchase a smart thermostat? (A smart thermostat can be controlled by Wi-Fi connected devices and can sense when rooms are occupied, in addition to standard programming features.)
- E2. Without the incentive through the Retail Lighting and Appliance Program, would you have still purchased and installed the exact same smart thermostat?
- E3. Without the incentive through the Retail Lighting and Appliance Program, would you still have installed a different thermostat, or would you have decided to install nothing?
- E4. [IF ANSWERED WOULD HAVE INSTALLED DIFFERENT THERMOSTAT TO E3] When you say you would have installed a different thermostat, would you have installed a smart thermostat? (As a reminder, a smart thermostat can be controlled by Wi-Fi connected devices and can sense when rooms are occupied, in addition to standard programming features.)
- E5. When would you have installed the [SMART] thermostat?

### Convert Responses to Matrix Terminology

Table I-11. illustrates how the Evaluation Team translated initial Retail Lighting and Appliance Program smart thermostat survey responses into yes, no, or partial values, indicative of freeridership.



**Table I-11. Retail Lighting and Appliance Program – Smart Thermostat: Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

E1. Before you heard about the rebate through Focus on Energy’s Retail Lighting and Appliance Program, had you already been planning to purchase a smart thermostat?	E2. Without the incentive through the Retail Lighting and Appliance Program, would you have still purchased and installed the exact same smart thermostat?	E3. Without the incentive through the Retail Lighting and Appliance Program, would you still have installed a different thermostat, or would you have decided to install nothing?	E4. When you say you would have installed a different thermostat, would you have installed a smart thermostat?	E5. When would you have installed the [SMART] thermostat?
Yes (Yes)	Yes (Yes)	I would have installed a different thermostat (Yes)	Yes (Yes)	At the same time (Yes)
No (No)	No (No)	I would have installed nothing (No)	No (No)	Within the same year (Partial)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	One to two years out (No)
				More than two years out (No)
				Never (No)
				Don't Know (Partial)

## Retail Lighting and Appliance Program Smart Thermostat Participant Freeridership Scoring

Each freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the five questions shown in Table I-12..

**Table I-12. Retail Lighting and Appliance Program Smart Thermostat Freeridership Scoring Legend**

Q#	Decrement
E1	50% decrement for No, 25% decrement for Partial
E2	50% decrement for No, 25% decrement for Partial
E3	100% decrement for No, 25% decrement for Partial
E4	100% decrement for No, 25% decrement for Partial
E5	100% decrement for No, 25% decrement for Partial

## Retail Lighting and Appliance Program Smart Thermostat Freeridership Findings

Table I-13. details the unique response combinations from participants answering the freeridership battery of questions (with actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for Retail Lighting and Appliance Program smart thermostats based on the distribution of scores within the matrix.

**Table I-13. Retail Lighting and Appliance Program Smart Thermostat Frequency of Freeridership Scoring Combinations**

E1. Before you heard about the rebate through Focus on Energy's Retail Lighting and Appliance Program, had you already been planning to purchase a smart thermostat?	E2. Without the incentive through the Retail Lighting and Appliance Program, would you have still purchased and installed the exact same smart thermostat?	E3. Without the incentive through the Retail Lighting and Appliance Program, would you still have installed a different thermostat, or would you have decided to install nothing?	E4. When you say you would have installed a different thermostat, would you have installed a smart thermostat? (As a reminder, a smart thermostat can be controlled by Wi-Fi connected devices and can sense when rooms are occupied, in addition to standard programming features.)	E5. When would you have installed the [SMART] thermostat?	Freerider Score	Frequency
Yes	Yes	x	x	Yes	100%	200
Yes	Yes	x	x	Partial	75%	120
Yes	Yes	x	x	No	0%	39
Yes	No	Yes	Yes	Yes	50%	30
Yes	No	Yes	Yes	Partial	25%	45
Yes	No	Yes	Yes	No	0%	13
Yes	No	Yes	No	x	0%	22
Yes	No	Partial	x	x	25%	24
Yes	No	No	x	x	0%	124
No	No	Yes	Yes	Yes	12.5%	5
No	No	Yes	Yes	Partial	0%	10
No	No	Yes	Yes	No	0%	6
No	No	Yes	No	x	0%	35
No	No	Partial	x	x	0%	25
No	No	No	x	x	0%	303
No	Yes	x	x	Yes	50%	25
No	Yes	x	x	Partial	25%	18
No	Yes	x	x	No	0%	17

## Retail Lighting and Appliance Program Smart Thermostat Participant Spillover Analysis

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Retail Lighting and Appliance Program. The Team applied evaluated and deemed savings to the spillover measures customers said they had installed as a result of their Program participation (Table I-14.).

**Table I-14. Retail Lighting and Appliance Program Smart Thermostat Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
Central air conditioner	6	2.32
Clothes dryer	1	0.53
Clothes washer	19	10.8
Dishwasher	7	0.8
Freezer	1	0.12
Gas boiler	2	30.20
Gas furnace	9	38.96
Gas storage water heater	3	7.46
Gas tankless water heater	4	16.86
Heat pump water heater	1	3.36
Heat pump, other	1	3.17
Insulation, attic and ceiling	13 projects	193.73
Insulation, wall	6 projects	63.37
Refrigerator	15	12.22
Windows	10 projects	138.54

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded an 11% spillover estimate, when rounded to the nearest whole percentage point, for the Retail Lighting and Appliance Program smart thermostat respondents (Table I-15.).

**Table I-15. Retail Lighting and Appliance Program Smart Thermostat Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	522.44
Program Savings	4,827.81
<b>Spillover Estimate</b>	<b>11%</b>

## Retail Lighting and Appliance Program Smart Thermostat Net-to-Gross Analysis

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratio using the following calculation:

$$NTG = 1 - Freeridership + Spillover$$

**Table I-16. Retail Lighting and Appliance Program Smart Thermostat NTG Estimate**

n	Freeridership	Spillover	NTG
1,061	32%	11%	79%

## Retail Lighting and Appliance Program – Advanced Power Strip - Self-Report NTG Methodology and Findings

### Freeridership Survey Questions

For Retail Lighting and Appliance Program advanced power strips, the participant survey’s freeridership section included the following three questions (asked in the survey format):

- C1. Without the reduced purchase price from the Focus on Energy Retail Lighting and Appliance Program, would you have still purchased the exact same advanced power strip?
- C2. Would you have still purchased the advanced power strip at the same time?
- C3. When would you have installed the advanced power strip you purchased?

### Convert Responses to Matrix Terminology

Table I-17. illustrates how the Evaluation Team translated initial Retail Lighting and Appliance Program advance power strip survey responses into yes, no, or partial values, indicative of freeridership.

**Table I-17. Retail Lighting and Appliance Program – Advanced Power Strip: Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

C1. Without the reduced purchase price from the Focus on Energy Retail Lighting and Appliance Program, would you have still purchased the exact same advanced power strip?	C2. Would you have still purchased the advanced power strip at the same time?	C3. When would you have installed the advanced power strip you purchased?
Yes (Yes)	Yes (Yes)	Within one year of original participation date (Yes)
No (No)	No (No)	In one to two years from original participation date (No)
Don't Know (Partial)	Don't Know (Partial)	More than two years from original participation date (No)
		Don't Know (Partial)

## Retail Lighting and Appliance Program Advanced Power Strip Participant Freeridership Scoring

Each freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the three questions shown in Table I-18..

**Table I-18. Retail Lighting and Appliance Program Advanced Power Strip Freeridership Scoring Legend**

Q#	Decrement
C1	100% decrement for No, 25% decrement for Partial
C2	0% decrement for No, 0% decrement for Partial
C3	100% decrement for No, 25% decrement for Partial

## Retail Lighting and Appliance Program Advanced Power Strip Freeridership Findings

Table I-19. shows the unique response combinations from participants answering the freeridership battery of questions (with actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for Retail Lighting and Appliance Program advanced power strips based on the distribution of scores within the matrix.

**Table I-19. Retail Lighting and Appliance Program Advanced Power Strip Frequency of Freeridership Scoring Combinations**

C1. Without the reduced purchase price from the Focus on Energy Retail Lighting and Appliance Program, would you have still purchased the exact same advanced power strip?	C2. Would you have still purchased the advanced power strip at the same time?	C3. When would you have installed the advanced power strip you purchased?	Freerider Score	Frequency
Yes	Yes	x	100%	8
Yes	No	x	100%	1
No	x	x	0%	21

## Retail Lighting and Appliance Program Advanced Power Strip Participant Spillover Analysis

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in Retail Lighting and Appliance Program. The Team applied evaluated and deemed savings to the spillover measures customers said they had installed as a result of their Program participation (Table I-20.).

**Table I-20. Retail Lighting and Appliance Program Advanced Power Strip Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
Clothes washer	1	0.57
Dishwasher	1	0.11
Gas furnace	1	4.87
Windows	1	33.57

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 2% spillover estimate, when rounded to the nearest whole percentage point, for the Retail Lighting and Appliance Program advanced power strip respondents (Table I-21.).

**Table I-21. Retail Lighting and Appliance Program Advanced Power Strip Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	39.11
Program Savings	1,956.73
<b>Spillover Estimate</b>	<b>2%</b>

### Retail Lighting and Appliance Program Advanced Power Strip Net-to-Gross Analysis

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratio, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-22. Retail Lighting and Appliance Program Advanced Power Strip NTG Estimate**

n	Freeridership	Spillover	NTG
30	30%	2%	72%

### ENERGY STAR Retail Product Platform

RPP unit-level sales data are tracked in SPECTRUM. Retailers upload sales data directly to a portal maintained by the Program Implementer, who uploads shipment data and reviews the data imported by the retail partner before uploading it to SPECTRUM.

The UEC values represent the baseline consumption for a given product; the unit energy savings (UES) values are the difference between the baseline UEC and the UEC for basic or advanced-tier Program-qualified products. UECs have a variety of sources, depending on the product, including using a TRM or

the Database of Energy Efficiency Resources as a secondary source, primary product analysis undertaken by the Program Implementer, or applying the reported UEC for each product.

Given that many of these savings or UEC sources rely on model-specific information, the Evaluation Team was not able to replicate the UECs for baseline or qualified products. The primary limitation to this level of verification is the national structure of the RPP Program and the confidentiality restrictions retailers place on the data evaluators can access in the portal. The portal does not include any characteristics for each model number, other than the tier, that could be used as inputs to savings equations. Similarly, SPECTRUM does not report quantities of specific model numbers sold.

However, the Program Administrator provided the list of equations and sources for UEC and UES calculations for the Evaluation Team to verify the sources and assumptions, shown in Table I-23.. UES was calculated as the difference between the baseline UEC and the efficient unit UEC. These sources have been reviewed and accepted in other recent RPP evaluations<sup>40</sup>.

**Table I-23. RPP UEC Sources and Formulas by Product**

Product	UEC Calculation Method	Baseline Electric UEC	UEC Formula
Refrigerators	Reported UEC Used Directly	$= A * (Adjusted\ Volume) + B$  Where, A and B can be found in the DOE Standard and are based on model characteristics	$= (Reported\ Annual\ Energy\ Consumption)$
Freezers	Reported UEC Used Directly	$= A * (Adjusted\ Volume) + B$  Where: A and B can be found in the DOE Standard and are based on model characteristics	$= (Reported\ Annual\ Energy\ Consumption)$
Clothes Washers	Reported UEC Used Directly	$= (AnnualCycles) * (RepresentativeCapacity) / (BaselineIMEF)$  Where: AnnualCycles = 295 can be found in the DOE Standard, RepresentativeCapacity is based on model characteristics and BaselineIMEF is can be found in the DOE Standard	$= (AnnualCycles) * (RepresentativeCapacity) / (ReportedIMEF)$  Where: AnnualCycles = 295 can be found in the DOE Standard and RepresentativeCapacity is based on model characteristics

<sup>40</sup> EMI Consulting. January 18, 2019. *Pacific Gas & Electric ENERGY STAR Retail Products Platform Program Pilot Early Evaluation Final Report*.  
<https://pda.energydataweb.com/api/view/2128/PGE%20ESRPP%20Eval%20Report%20v5%20optimized.pdf>



Product	UEC Calculation Method	Baseline Electric UEC	UEC Formula
Clothes Dryers	NYS TRM	$= \text{AnnualCycles} * (\text{LoadWeight} * \text{PercentGas} / \text{BaselineCEF}) + \text{AnnualCycles} * (\text{LoadWeight} * \text{PercentElectric} / \text{BaselineCEF})$ <p>Where:  <i>Annual Cycles</i> = 283 can be found in the DOE Standard  <i>BaselineCEF</i> values are based on product characteristics and can be found in the DOE Standard  <i>LoadWeight</i>, <i>PercentGas</i>, and <i>PercentElectric</i> can be found in the NYS TRM and are based on model characteristics</p>	$= \text{AnnualCycles} * (\text{LoadWeight} * \text{PercentGas} / \text{ReportedCEF}) + \text{AnnualCycles} * (\text{LoadWeight} * \text{PercentElectric} / \text{ReportedCEF})$ <p>Where:  <i>AnnualCycles</i> = 283 can be found in the DOE Standard  <i>LoadWeight</i>, <i>PercentGas</i>, and <i>PercentElectric</i> can be found in the NYS TRM and are based on model characteristics</p>
Room Air Conditioners	ENERGY STAR RPP Product Analysis	$= (\text{ActiveUsage}) * (\text{RepresentativeCapacity}) / (\text{BaselineCEER}) / 1000$ <p>Where:  <i>ActiveUsage</i> = 750  <i>RepresentativeCapacity</i> is based on model characteristics  <i>BaselineCEER</i> is the DOE Standard level and is based on model characteristics</p>	$\text{BasicTierUEC} = (\text{ActiveUsage}) * (\text{RepresentativeCapacity}) / (\text{ENERGYSTARCEER}) / 1000$ $\text{AdvancedTierUEC} = \text{BasicTierUEC} * (1 - 0.05)$ <p>Where:  <i>ActiveUsage</i> = 750  <i>ENERGYSTARCEER</i> = the ENERGY STAR level  <i>RepresentativeCapacity</i> is based on model characteristics  <i>BaselineCEER</i> is the DOE Standard level and is based on model characteristics</p>
Room Air Cleaners	Reported UEC Used Directly	$= (\text{ReportedCADR}) / (\text{BaselineEfficiency}) * (\text{OnHours}) * 365.25 / 1000$ <p>Where:  <i>OnHours</i> = 16  <i>BaselineEfficiency</i> = 1</p>	$= (\text{ReportedCADR}) / (\text{ReportedCADR}/\text{Watt}) * (\text{OnHours}) * 365.25 / 1000$ <p>Where:  <i>OnHours</i> = 16</p>
Sound Bars	Reported UEC Used Directly	= 69	$= (\text{On Hours}) * (\text{Input Power}) + (\text{Idle Hours}) * (\text{Idle Power}) + (\text{Sleep Mode Hours}) * (\text{Sleep Mode Power})$ <p>Where:  <i>On Hours</i> = 1580  <i>Idle Hours</i> = 730  <i>Sleep Hours</i> = 6450</p>

The Evaluation Team also verified the quantities reported in SPECTRUM by comparing these with the quantities reported in the Focus on Energy–specific evaluation reports available through the national data portal. The Team also successfully verified all units reported in SPECTRUM.

The Evaluation Team then took the weighted average savings for all qualified models sold in a given product category during the Program period and multiplied this average value by the market lift to determine overall savings for that category. The total energy savings and demand reductions are the product of the sales increase and the UES or demand reduction.

### *Market Lift*

The Evaluation Team used a pre-post baseline comparison to measure the market lift of the program. Program theory predicts that Program support will lead to permanent shifts in the market as retailers shift stocking patterns toward more efficient products or new standards are introduced to the market. This would lead to persistent increases in sales of efficient products after direct incentives were no longer applied to specific products. To the degree that sales of less efficient products are displaced, this generates market lift.

To measure this persistent impact—and resulting savings—the Evaluation Team modeled average monthly UES counting savings for products that received support at any point in time. This captures natural market savings from sales of a given product before receiving Program support as well as savings during the Program period.

Average monthly UES was calculated as:

$$\frac{\sum_{it}(EffQuantity_{it} * UES_i)}{BaseQuantity_t + EffQuantity_t}$$

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 efficient product *i*.
- BaseQuantity = Number of all baseline 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.

Nonqualified sales were not included by retailer in the evaluation reports from the data portal because the retailer and brand were confidential for nonqualified products. However, the data portal included an additional report that tracked the share of qualified products by month, retailer, product, and tier. With the share of qualified units by month and the total number of qualified units sold by month from the evaluation reports the Team could calculate the total quantity sold by month for each retailer and product by dividing the quantity of qualified units by the qualified share.

Each of the five participating retailers provided twelve months of full category pre-Program sales data by model number for each product category. The retailer data reported sales of each model number by month as well as the qualified status of each model number in that month.

Table I-24. shows the Program start dates for each product category and retailer. Best Buy, Home Depot, and Sears began participation in RPP April 2016. Nationwide joined in CY 2017 and Lowe’s in CY 2018. Washers and dehumidifier were not initially included in the Program with washers being added in CY 2017 and dehumidifiers in CY 2018.

**Table I-24. 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

Note, the status for the same product could change over time, based on Program budget (in which case status could alternate between qualified and qualified-incentive) or changes in standards for qualified products.

The Evaluation Team used the pre-data from each participating retailer to establish baseline models of average monthly UES for each retailer and product. The pre-periods varied between retailers (one retailer joined the Program in CY 2017 and another in CY 2018).

Model specification was selected using leave-one-out cross validation with only the pre-period observations used to train the model. The model selection procedure chooses the set of explanatory variables that has the smallest prediction errors when predicting out of sample.

The Team allowed the model selection procedure to consider seasonal effects via monthly indicator variables. Pooling the data for each product-specific model allowed the model procedure to test for monthly effects across multiple retailers, assuming seasonal effects are not retailer-specific<sup>41</sup>.

In addition to seasonal effects, the models tested whether an overall intercept or a retailer-specific intercept for each product was a better predictor in the model.

Finally, the Team included a time trend. The time trend tested whether there was any pre-existing trends in UES over time (increasing or decreasing), or whether there were pre-existing retailer-specific trends.

The Team then used these baseline models to forecast the average monthly UES for each retailer and product into the Program period with upper and lower 95% confidence interval. Because the model

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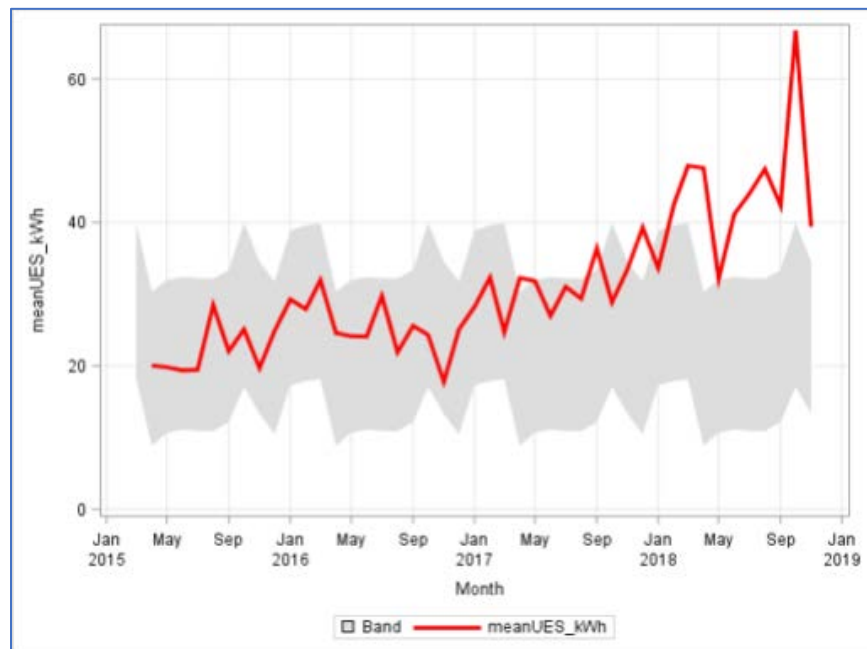
<sup>41</sup> With only one year of pre-program data for each retailer, it was not possible to consider retailer-specific seasonal patterns because each season occurs only once during the pre-period.

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.

The Program generates savings when the actual monthly average UES was above the confidence interval of the forecast UES. Figure I-11. shows an example with dryer UES at Retailer 4 stores. The forecast vs actual UES derived from dryer sales at stores during the baseline period (April 2015 through April 2016). The shaded gray area represents the confidence interval around the model forecast. There is no clear upward trend in UES during the pre-period and average monthly UES are generally expected to fall between 10 kWh and 30 kWh per-unit, with some predictable seasonal variation.

The red line is the actual monthly UES. The figure shows that actual UES begins an upward trend starting in January 2017. During CY 2017 there are three months where the actual monthly UES is greater than the confidence interval (above the gray area)—in April, September, and December 2017—and is greater than the confidence interval through nearly all of CY 2018, indicating there was a statistically significant change in monthly UES.

**Figure I-11. Forecast vs Actual Monthly UES of Dryers at Retailer 4 Stores**



When month  $t$  is during the Program period within a participating retailer, Team calculated monthly net savings as:

$$(Actual\ UES_t - Forecast\ UES_t) * Eff\ Quantity_t$$

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.
- Actual UES = Actual mean UES in month  $t$
- Forecast UES = Forecast mean UES in month  $t$ .

The Team calculated reported savings using the reported UES values (derived from UEC calculations outlined in Table I- 1) multiplied by the reported unit quantity.

For each product category ( $i$ ) in calendar year ( $t$ ), verified net market lift is equal to:

$$\frac{\sum_{it}(Net\ Savings)}{\sum_{it}(Reported\ UES_{it} * Reported\ Quantity_{it})}$$

Verified savings credited to the Program for product category ( $i$ ) in calendar year ( $t$ ), were calculated as:  $Net\ Market\ Lift\ \%_{it} * Reported\ UES_{it} * Verified\ Quantity_{it}$

*Business Incentive; Small Business; Community Small Business Offering; Agriculture, Schools, and Government; and Large Energy User Programs' Self-Report NTG Methodology and Findings*

## Freeridership Survey Questions

The freeridership sections of the participant survey for the following programs included two separate sets of questions, which addressed the six core freeridership dimensions:

- Business Incentive Program
- Small Business Program
- Community Small Business Offering
- Agriculture, Schools and Government Program
- Large Energy User Program

For these programs, one set of freeridership questions was asked of participants who said they were the decision makers. A second set was asked of participants whose contractor helped them make decisions. Participants were asked only one of the two sets of questions.

The two sets of freeridership questions were directly comparable—the difference was that one was oriented toward counterfactual behavior without the Program incentive and one toward counterfactual behavior if there was no involvement from the contractors.

The freeridership questions oriented toward the Program incentive participants received (asked in the survey format) were these:

- G1. First, did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?
- G2. Prior to learning about the incentive, was the purchase of the [MEASURE[s]] included in your organization's capital budget?
- G3. Had your organization ALREADY ordered or purchased the [MEASURE[s]] BEFORE your organization heard about the [PROGRAM] incentive?
- G4. Would you have purchased and installed the same [MEASURE[s]] without the incentive?
- G5. Would you have installed something without the incentive?
- G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?
- G7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the incentive, would you have installed the same amount of [MEASURE1[s]]?
- G8. Without the [INCENTIVE FOR MEASURE], would you have installed the [MEASURE[s]]?
- G9. When you say you would not have installed the same [MEASURE1 OR C\_MEASURE1][s] without the incentive, would you have installed anything at all?
- G10. Without the incentive, would you have installed something that was just as energy-efficient as the [MEASURE[s]] you installed?
- G11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] Without the incentive, would you have installed the same amount of [MEASURE[s]]?
- G12. And, would you have installed the same [MEASURE1[s]]?

The freeridership questions oriented toward the involvement of the contractor (as asked in the survey format) were these:

- H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE][s]?
- H2. Did your organization have specific plans to install the [MEASURE][s] before you began working with your contractor?
- H3. [Ask if question H1 is Yes] Before you began working with your contractor, was the purchase of the [MEASURE][s] included in your organization's capital budget?
- H4. Would you have purchased and installed the same [MEASURE][s] without the assistance from your contractor?
- H5. [Ask if question H4 is Don't Know or Refused] Would you have installed something without the involvement of your contractor?
- H6. [Ask if H5 is Yes] When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE1 OR C\_MEASURE1][s] you installed?

- H7. [Ask if QTY>1 and question H4 is Yes or H5 is Yes] And without the assistance from your contractor, would you have installed the same amount of [MEASURE]?
- H8. Without the assistance from your contractor, would you have installed the [MEASURE][s]?
- H9. [Ask if question H4 is No or if H5 is No] When you say you would not have installed the same [MEASURE][s] without the assistance from your contractor, would you have installed anything at all?
- H10. [Ask if question H9 is Yes] Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE][s] you installed?
- H11. [Ask if QTY>1 and H11 is Yes] And without the contractor, would you have installed the same amount of [MEASURE][s]?
- H12. [Ask if H9 is Yes] And, when would you have installed the same [MEASURE][s]?

## Convert Responses to Matrix Terminology

Table I-25. shows how the initial participant received incentive-focused survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of freeridership (in parentheses). Table I-26. shows how initial contractor-focused survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of freeridership (in parentheses).

**Table I-25. Incentive—Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

G1. First, did your organization have specific plans to install the [MEASURE1 OR C_MEASURE1] [s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE[s]] included in your organization's capital budget?	G3. Had your organization ALREADY ordered or purchased the [MEASURE[s]] BEFORE your organization heard about the Program incentive?	G4. Would you have purchased and installed the same [MEASURE[s]] without the incentive?	G5. Would you have installed something without the incentive?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	G7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the incentive, would you have installed the same amount of [MEASURE[s]]?	G8. Without the [INCENTIVE FOR MEASURE1 OR C_MEASURE1], would you have installed the [[MEASURE[s]]]?	G9. When you say you would not have installed the same [MEASURE[s]] without the incentive, would you have installed anything at all?	G10. Without the incentive, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	G11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] Without the incentive, would you have installed the same amount of [MEASURE1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE1 OR C_MEASURE1][s]?
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes (Yes)	Within the same year? (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes, the same amount (Yes)	Within the same year? (Yes)
No (No)	No (No)	No (No)	No (No)	No, would not have installed anything (No)	No (No)	No (No)	Within one to two years? (Partial)	No, would not have installed anything at all (No)	No (No)	No, would have installed less (No)	Within one to two years? (Partial)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (Partial)	Don't Know (Partial)	No, would have installed more (Yes)	Within three to five years? (No)
Refused (Partial)	Refused (Partial)	Refused (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	In more than five years? (No)	Refused (Partial)	Refused (Partial)	Don't Know (Partial)	In more than five years? (No)
							Don't Know (Partial)			Refused (Partial)	Don't Know (Partial)
							Refused (Partial)				Refused (Partial)



**Table I-26. Contractor—Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE][s] ?	H2. Did your organization have specific plans to install the [MEASURE][s] before you began working with your contractor?	H3. [Ask if question H2 is Yes] Before you began working with your contractor, was the purchase of the [MEASURE][s] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE][s] without the assistance from your contractor?	H5. [Ask if question H4 is Don't Know or Refused] Would you have installed something without the involvement of your contractor?	H6. [Ask if H5 is Yes] When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE1 OR C_MEASURE1][s] you installed?	H7. [Ask if QTY>1 and question H4 is Yes or H5 is Yes] And without the assistance from your contractor, would you have installed the same amount of [MEASURE]?	H8. Without the assistance from your contractor, would you have installed the [MEASURE][s]?	H9. [Ask if question H4 is No or if H5 is No] When you say you would not have installed the same [MEASURE][s] without the assistance from your contractor, would you have installed anything at all?	H10. [Ask if question H9 is Yes] Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE][s] you installed?	H11. [Ask if QTY>1 and H11 is Yes] And without the contractor, would you have installed the same amount of [MEASURE][s]?	H12. [Ask if H9 is Yes] And, when would you have installed the same [MEASURE][s]?
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes, the same amount (Yes)	Within the same year? (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes, the same amount (Yes)	Within the same year? (Yes)
No (No)	No (No)	No (No)	No (No)	No, would NOT have installed anything (No)	No (No)	No, would have installed less (No)	Within one to two years? (Partial)	No, would not have installed anything at all (No)	No (No)	No, would have installed less (No)	Within one to two years? (Partial)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	o, would have installed more (Yes)	Within three to five years? (No)	Don't Know (Partial)	Don't Know (Partial)	o, would have installed more (Yes)	Within three to five years? (No)
Refused (Partial)	Refused (Partial)	Refused (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Don't Know (Partial)	In more than five years? (No)	Refused (Partial)	Refused (Partial)	Don't Know (Partial)	In more than five years? (No)
						Refused (Partial)	Don't Know (Partial)			Refused (Partial)	Don't Know (Partial)
							Refused (Partial)				Refused (Partial)

## Participant Freeridership Scoring

For each incentive focused path, the freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the 12 incentive questions, as shown in Table I-27..

**Table I-27. Incentive—Freeridership Scoring Legend**

Q#	Decrement
G1	50% decrement for No, 25% decrement for Partial
G2	50% decrement for No, 25% decrement for Partial
G3	100% if Yes, 0% decrement for No level, Partial level not needed
G4	25% decrement for No, 0% decrement for Partial
G5	25% decrement for No, 100% decrement for Partial
G6	100% decrement for No, 25% decrement for Partial
G7	50% decrement for No, 25% decrement for Partial
G8	100% decrement for No, 25% decrement for Partial
G9	100% decrement for No, 25% decrement for Partial
G10	100% decrement for No, 25% decrement for Partial
G11	50% decrement for No, 25% decrement for Partial
G12	100% decrement for No, 25% decrement for Partial

For each contractor focused path, the freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the 12 questions for the contractor path, as shown in Table I-27..

**Table I-28. Contractor—Freeridership Scoring Legend**

Q#	Decrement
H1	100% f Yes, 0% decrement for No level, Partial level not needed
H2	50% decrement for No, 25% decrement for Partial
H3	50% decrement for No, 25% decrement for Partial
H4	25% decrement for No, 0% decrement for Partial
H5	25% decrement for No, 100% decrement for Partial
H6	100% decrement for No, 25% decrement for Partial
H7	50% decrement for No, 25% decrement for Partial
H8	100% decrement for No, 25% decrement for Partial
H9	100% decrement for No, 25% decrement for Partial
H10	100% decrement for No, 25% decrement for Partial
H11	50% decrement for No, 25% decrement for Partial
H12	100% decrement for No, 25% decrement for Partial

## Business Incentive Program Findings

### Freeridership Analysis

Table I-29. and Table I-30. show the unique response combinations from participants answering the Business Incentive Program freeridership incentive and contractor freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Program based on the distribution of scores within the matrix.

Table I-29. Incentive - Business Incentive Program Frequency of Freeridership Scoring Combinations

G1. First, did your organization have specific plans to install the [MEASURE CATEGORY1 OR C_MEASURE1][s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE CATEGORY1 OR C_MEASURE1][s] included in your property's capital budget?	G3. Had your property ALREADY ordered or purchased the [MEASURE CATEGORY1 OR C_MEASURE1][s] BEFORE your property heard about the Business Incentive Program incentive?	G4. Would you have purchased and installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy?	G5. Would you have installed something without the incentive and information or education from Focus on Energy?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G8. Without the [INCENTIVE FOR MEASURE CATEGORY1 OR C_MEASURE1] and information or education from Focus on Energy, would you have installed the [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G9. When you say you would not have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy, would you have installed anything at all?	G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s]?	Freerider Score	Count
Yes	Yes	Yes	x	x	x	x	x	x	x	x	x	100%	3
Yes	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	100%	2
Yes	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	75%	1
Yes	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	Yes	No	No	x	x	x	x	No	x	x	x	0%	1
Yes	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	6
Yes	No	x	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	No	x	No	x	x	x	x	No	x	x	x	0%	2
Partial	x	x	Partial	Partial	x	x	x	x	x	x	x	0%	1
No	x	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	2
No	x	x	Yes	x	x	No	No	x	x	x	x	0%	1
No	x	x	Partial	Yes	Yes	Yes	Partial	x	x	x	x	25%	1
No	x	x	No	x	x	x	x	No	x	x	x	0%	4

Table I-30. Contractor - Business Incentive Program Frequency of Freeridership Scoring Combinations

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE[s]] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE[s]] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE [s]] without the assistance from your contractor ?	H5. Would you have installed something without the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY ]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE[s]]?	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE[s]] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of [[MEASURE[S]] ?	H12. And, would you have installed the same [MEASURE] [s]?	Freerider Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	100%	11
No	Yes	Yes	Yes	x	x	Yes	Yes	x	x	x	x	100%	12
No	Yes	Yes	Yes	x	x	Yes	Partial	x	x	x	x	75%	3
No	Yes	Yes	Yes	x	x	Partial	Yes	x	x	x	x	100%	1
No	Yes	Yes	Yes	x	x	No	Yes	x	x	x	x	50%	1
No	Yes	Yes	Yes	x	x	No	No	x	x	x	x	0%	1
No	Yes	Yes	Partial	Yes	Yes	Yes	Yes	x	x	x	x	100%	1
No	Yes	Yes	Partial	Yes	Yes	Partial	Partial	x	x	x	x	75%	2
No	Yes	Yes	No	x	x	x	x	Yes	Yes	Yes	Yes	75%	3
No	Yes	Yes	No	x	x	x	x	Yes	Yes	Yes	Partial	50%	2
No	Yes	Yes	No	x	x	x	x	Yes	Yes	No	Yes	75%	1
No	Yes	Yes	No	x	x	x	x	Yes	Yes	No	Yes	25%	1
No	Yes	Yes	No	x	x	x	x	Yes	Partial	Yes	Partial	25%	1
No	Yes	Yes	No	x	x	x	x	Yes	No	x	x	0%	4
No	Yes	Yes	No	x	x	x	x	No	x	x	x	0%	4
No	Yes	Partial	Yes	x	x	Yes	Yes	x	x	x	x	75%	1
No	Yes	Partial	No	x	x	x	x	Yes	No	x	x	0%	1
No	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	50%	4
No	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	25%	2
No	Yes	No	Yes	x	x	No	Partial	x	x	x	x	0%	1
No	Yes	No	Yes	x	x	No	No	x	x	x	x	0%	1
No	Yes	No	Partial	Yes	Yes	Yes	Yes	x	x	x	x	50%	1
No	Yes	No	Partial	Yes	Partial	Yes	Yes	x	x	x	x	25%	1

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE[s]] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE[s]] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE [s]] without the assistance from your contractor ?	H5. Would you have installed something without the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY ]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE[s]]?	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE[s]] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of [[MEASURE[S]] ?	H12. And, would you have installed the same [MEASURE] [s]?	Freerider Score	Frequency
No	Yes	No	Partial	Partial	x	x	x	x	x	x	x	25%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	No	No	0%	2
No	Yes	No	No	x	x	x	x	Yes	Partial	Yes	Yes	12.5%	1
No	Yes	No	No	x	x	x	x	Yes	Partial	Partial	Yes	12.5%	1
No	Yes	No	No	x	x	x	x	Yes	Partial	No	Partial	0%	1
No	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	4
No	Yes	No	No	x	x	x	x	No	x	x	x	0%	1
No	Partial	x	No	x	x	x	x	No	x	x	x	0%	1
No	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
No	No	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	No	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	No	x	Yes	x	x	No	Yes	x	x	x	x	12.5%	1
No	No	x	Yes	x	x	No	Partial	x	x	x	x	0%	1
No	No	x	Partial	Yes	Yes	Yes	Yes	x	x	x	x	50%	1
No	No	x	Partial	Yes	Partial	Partial	Yes	x	x	x	x	25%	1
No	No	x	Partial	No	x	x	x	No	x	x	x	0%	2
No	No	x	No	x	x	x	x	Yes	Yes	Yes	Yes	25%	1
No	No	x	No	x	x	x	x	Yes	Yes	Yes	Partial	12.5%	1
No	No	x	No	x	x	x	x	Yes	Yes	Partial	Yes	25%	1
No	No	x	No	x	x	x	x	Yes	Partial	Yes	Yes	12.5%	1
No	No	x	No	x	x	x	x	Yes	Partial	No	Yes	0%	1
No	No	x	No	x	x	x	x	Yes	No	x	x	0%	10
No	No	x	No	x	x	x	x	Partial	No	x	x	0%	1
No	No	x	No	x	x	x	x	No	x	x	x	0%	17

### Participant Spillover Analysis

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Business Incentive Program. The Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table I-31..

**Table I-31. Business Incentive Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	274	5,470.20

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, when rounded to the nearest whole percentage, for the Business Incentive Program respondents (Table I-32.).

**Table I-32. Business Incentive Program Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	5,470.20
Program Savings	517,170.80
<b>Spillover Estimate</b>	<b>1%</b>

### Net-to-Gross Analysis

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table I-33.:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-33. Business Incentive Program NTG Estimates**

Analysis Category	n	Freeridership	Spillover	NTG	Percentage of Total Survey Sample Savings
Incentive	26	55%	1%	46%	75%
Contractor	114	13%	1%	88%	25%
<b>Overall</b>	<b>140</b>	<b>44%<sup>a</sup></b>	<b>1%<sup>1</sup></b>	<b>57%<sup>1</sup></b>	<b>100%</b>

<sup>a</sup> Weighted by gross evaluated energy savings.

## Small Business Program Findings

### Freeridership Analysis

Table I-34. and Table I-35. show the unique response combinations from participants answering the Business Incentive Program freeridership incentive and contractor freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Program based on the distribution of scores within the matrix.

Table I-34. Incentive – Small Business Program Frequency of Freeridership Scoring Combinations

G1. First, did your organization have specific plans to install the [MEASURE CATEGORY1 OR C_MEASURE1][s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE CATEGORY1 OR C_MEASURE1][s] included in your property's capital budget?	G3. Had your property ALREADY ordered or purchased the [MEASURE CATEGORY1 OR C_MEASURE1][s] BEFORE your property heard about the Small Business Program incentive?	G4. Would you have purchased and installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy?	G5. Would you have installed something without the incentive and information or education from Focus on Energy?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G8. Without the [INCENTIVE FOR MEASURE CATEGORY1 OR C_MEASURE1] and information or education from Focus on Energy, would you have installed the [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G9. When you say you would not have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy, would you have installed anything at all?	G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s]?	Freerider Score	Count
Yes	Yes	Yes	x	x	x	x	x	x	x	x	x	100%	2
Yes	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	75%	2
Yes	Yes	No	No	x	x	x	x	Yes	Yes	No	Partial	12.5%	1
Yes	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
Yes	No	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	2
Yes	No	x	Yes	x	x	No	Partial	x	x	x	x	0%	1
Yes	No	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
Yes	No	x	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	No	x	No	x	x	x	x	No	x	x	x	0%	2
Partial	x	x	Partial	Partial	x	x	x	x	x	x	x	0%	1
No	x	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	x	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	x	x	No	x	x	x	x	Yes	Yes	Yes	Partial	12.5%	1
No	x	x	No	x	x	x	x	Yes	No	x	x	0%	1
No	x	x	No	x	x	x	x	No	x	x	x	0%	4

**Table I-35. Contractor – Small Business Program Frequency of Freeridership Scoring Combinations**

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE[s]] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE[s]] included in your organization’s capital budget?	H4. Would you have purchased and installed the same [MEASURE [s]] without the assistance from your contractor ?	H5. Would you have installed something the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY ]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE[s]] ...[READ LIST AND RECORD ONE RESPONSE]	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE[s]] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H12. And, would you have installed the same [MEASURE] [s]. . .	Freerider Score	Frequency
No	Yes	Yes	Yes	x	x	Yes	Yes	x	x	x	x	100%	1
No	Yes	Yes	Partial	Yes	Yes	Yes	Yes	x	x	x	x	100%	1
No	Yes	Yes	Partial	No	x	x	x	No	x	x	x	0%	1
No	Yes	Yes	No	x	x	x	x	Yes	Yes	No	Partial	12.5%	1
No	Yes	Yes	No	x	x	x	x	Yes	No	x	x	0%	3
No	Yes	Yes	No	x	x	x	x	No	x	x	x	0%	1
No	Yes	Partial	Partial	Yes	No	x	x	x	x	x	x	0%	1
No	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
No	Yes	No	Yes	x	x	Yes	No	x	x	x	x	0%	2
No	Yes	No	Partial	Yes	Yes	Yes	Partial	x	x	x	x	25%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	Yes	Yes	25%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	2
No	Yes	No	No	x	x	x	x	No	x	x	x	0%	3
No	Partial	x	Partial	Partial	x	x	x	x	x	x	x	50%	1
No	Partial	x	No	x	x	x	x	Yes	Yes	No	Yes	12.5%	1
No	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	2
No	No	x	Yes	x	x	Partial	Partial	x	x	x	x	12.5%	1
No	No	x	Partial	Yes	Yes	No	Partial	x	x	x	x	0%	1
No	No	x	No	x	x	x	x	Yes	Yes	Yes	Yes	25%	1
No	No	x	No	x	x	x	x	Yes	Yes	Yes	Partial	12.5%	2
No	No	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	No	x	No	x	x	x	x	Yes	No	x	x	0%	4
No	No	x	No	x	x	x	x	No	x	x	x	0%	15



*Participant Spillover Analysis*

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Small Business Program. The Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table I-36..

**Table I-36. Small Business Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
Commercial Washer	6	449.36
Window Air Conditioner	1	1.23

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, when rounded to the nearest whole percentage, for the Small Business Program respondents (Table I-37.).

**Table I-37. Small Business Program Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	450.58
Program Savings	51,628.86
<b>Spillover Estimate</b>	<b>1%</b>

*Net-to-Gross Analysis*

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table I-38..

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-38. Small Business Program NTG Estimates**

Analysis Category	n	Freeridership	Spillover	NTG	Percentage of Total Survey Sample Savings
Incentive	21	19%	1%	82%	27%
Contractor	49	7%	1%	94%	73%
<b>Overall</b>	<b>70</b>	<b>10%<sup>a</sup></b>	<b>1%<sup>a</sup></b>	<b>91%<sup>a</sup></b>	<b>100%</b>

<sup>a</sup> Weighted by gross evaluated energy savings.

## Community Small Business Offering Findings

### *Freeridership Analysis*

Table I-39. and Table I-40. show the unique response combinations from participants answering the Community Small Business Offering freeridership incentive and contractor freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Program based on the distribution of scores within the matrix.

**Table I-39. Incentive – Community Small Business Offering Frequency of Freeridership Scoring Combinations**

G1. First, did your organization have specific plans to install the [MEASURE CATEGORY1 OR C_MEASURE1][s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE CATEGORY1 OR C_MEASURE1][s] included in your property's capital budget?	G3. Had your property ALREADY ordered or purchased the [MEASURE CATEGORY1 OR C_MEASURE1][s] BEFORE your property heard about the Community Small Business Offering incentive?	G4. Would you have purchased and installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy?	G5. Would you have installed something without the incentive and information or education from Focus on Energy?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G8. Without the [INCENTIVE FOR MEASURE CATEGORY1 OR C_MEASURE1] and information or education from Focus on Energy, would you have installed the [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G9. When you say you would not have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy, would you have installed anything at all?	G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s]?	Freerider Score	Count
Yes	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	75%	1
Yes	No	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
Yes	No	x	Yes	x	x	No	Yes	x	x	x	x	12.5%	1
Yes	No	x	No	x	x	x	x	No	x	x	x	0%	1
No	x	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	x	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	x	x	No	x	x	x	x	No	x	x	x	0%	5

**Table I-40. Contractor – Community Small Business Offering Frequency of Freeridership Scoring Combinations**

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE[s]] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE[s]] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE [s]] without the assistance from your contractor ?	H5. Would you have installed something without the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY ]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE[s]] ...[READ LIST AND RECORD ONE RESPONSE]	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE[s]] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE[s]] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H12. And, would you have installed the same [MEASURE][s] ?	Freerider Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	100%	2
No	Yes	Yes	Yes	x	x	Yes	Yes	x	x	x	x	100%	1
No	Yes	Yes	No	x	x	x	x	Yes	No	x	x	0%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	Yes	Yes	25%	1
No	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	1
No	Yes	No	No	x	x	x	x	Partial	No	x	x	0%	1
No	Yes	No	No	x	x	x	x	No	x	x	x	0%	2
No	Partial	x	Partial	Yes	Yes	Yes	No	x	x	x	x	0%	1
No	No	x	Partial	No	x	x	x	No	x	x	x	0%	1
No	No	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	No	x	No	x	x	x	x	Yes	No	x	x	0%	4
No	No	x	No	x	x	x	x	Partial	Partial	Partial	Partial	0%	1
No	No	x	No	x	x	x	x	No	x	x	x	0%	4

*Participant Spillover Analysis*

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Community Small Business Offering. The Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table I-41..

**Table I-41. Community Small Business Offering Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	122	186.35
Water Heat Equipment	1	21.39

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, when rounded to the nearest whole percentage, for the Community Small Business Offering respondents (Table I-42.).

**Table I-42. Community Small Business Offering Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	207.73
Program Savings	21,260.37
<b>Spillover Estimate</b>	<b>1%</b>

*Net-to-Gross Analysis*

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table I-43.:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-43. Community Small Business Offering NTG Estimates**

Analysis Category	n	Freeridership	Spillover	NTG	Percentage of Total Survey Sample Savings
Incentive	11	9%	1%	92%	47%
Contractor	21	7%	1%	94%	53%
<b>Overall</b>	<b>32</b>	<b>8%<sup>a</sup></b>	<b>1%<sup>a</sup></b>	<b>93%<sup>a</sup></b>	<b>100%</b>

<sup>a</sup> Weighted by gross evaluated energy savings.

## Agriculture, Schools, and Government Program Findings

### *Freeridership Analysis*

Table I-44. and Table I-45 show the unique response combinations from participants answering the Agriculture, Schools, and Government Program freeridership incentive and contractor freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Program based on the distribution of scores within the matrix.

Table I-44. Incentive – Agriculture, Schools, and Government Program Frequency of Freeridership Scoring Combinations

G1. First, did your organization have specific plans to install the [MEASURE CATEGORY1 OR C_MEASURE1][s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE CATEGORY1 OR C_MEASURE1][s] included in your property's capital budget?	G3. Had your property ALREADY ordered or purchased the [MEASURE CATEGORY1 OR C_MEASURE1][s] BEFORE your [COMPANY CATEGORY IN SURVEY] heard about the Agriculture, Schools, and Government Program incentive?	G4. Would you have purchased and installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy?	G5. Would you have installed something without the incentive and information or education from Focus on Energy?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G8. Without the [INCENTIVE FOR MEASURE CATEGORY1 OR C_MEASURE1] and information or education from Focus on Energy, would you have installed the [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G9. When you say you would not have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy, would you have installed anything at all?	G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s]?	Freerider Score	Frequency
Yes	Yes	Yes	x	x	x	x	x	x	x	x	x	100%	1
Yes	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	100%	3
Yes	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	75%	2
Yes	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
Yes	No	x	Yes	x	x	No	Yes	x	x	x	x	12.5%	1
No	x	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
No	x	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	x	x	Partial	No	x	x	x	Yes	No	x	x	0%	1
No	x	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	x	x	No	x	x	x	x	No	x	x	x	0%	1

Table I-45. Contractor – Agriculture, Schools, and Government Program Frequency of Freeridership Scoring Combinations

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE(s)] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE(s)] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE (s)] without the assistance from your contractor ?	H5. Would you have installed something without the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY ]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE(s)] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE[s] ] ...[READ LIST AND RECORD ONE RESPONSE]	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE(s)] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE(s)] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H12. And, would you have installed the same [MEASURE(s)] ?	Freerider Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	100%	6
No	Yes	Yes	Yes	x	x	Yes	Yes	x	x	x	x	100%	7
No	Yes	Yes	Partial	Yes	Yes	Yes	Partial	x	x	x	x	75%	1
No	Yes	Yes	No	x	x	x	x	Yes	Yes	Yes	Yes	75%	2
No	Yes	Yes	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	Yes	Yes	No	x	x	x	x	Yes	No	x	x	0%	2
No	Yes	Partial	Partial	Yes	Yes	No	Partial	x	x	x	x	12.5%	1
No	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	50%	2
No	Yes	No	Partial	Yes	Yes	Yes	Partial	x	x	x	x	25%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	Yes	No	No	x	x	x	x	Yes	Partial	No	No	0%	1
No	Yes	No	No	x	x	x	x	No	x	x	x	0%	3
No	Partial	x	Yes	x	x	Yes	Yes	x	x	x	x	75%	1
No	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	3
No	No	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	2
No	No	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	No	x	Yes	x	x	No	Yes	x	x	x	x	12.5%	1
No	No	x	Partial	Yes	Yes	Yes	Partial	x	x	x	x	25%	1
No	No	x	Partial	No	x	x	x	No	x	x	x	0%	1
No	No	x	No	x	x	x	x	Yes	Yes	Yes	No	0%	1
No	No	x	No	x	x	x	x	Yes	Partial	Yes	Yes	12.5%	1
No	No	x	No	x	x	x	x	Yes	No	x	x	0%	5
No	No	x	No	x	x	x	x	Partial	Partial	No	No	0%	1
No	No	x	No	x	x	x	x	No	x	x	x	0%	10



*Participant Spillover Analysis*

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 Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table I-46..

**Table I-46. Agriculture, Schools, and Government Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	54	168.22
Condensing Units	2	177.32
Variable Speed Drive	9	8,235.89

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 2% spillover estimate, when rounded to the nearest whole percentage, for the Agriculture, Schools, and Government Program respondents (Table I-47.).

**Table I-47. Agriculture, Schools, and Government Program Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	85,81.42
Program Savings	453,218.58
<b>Spillover Estimate</b>	<b>2%</b>

*Net-to-Gross Analysis*

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table I-48.:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-48. Agriculture, Schools, and Government Program NTG Estimates**

Analysis Category	n	Freeridership	Spillover	NTG	Percentage of Total Survey Sample Savings
Incentive	14	60%	2%	42%	22%
Contractor	56	54%	2%	48%	78%
<b>Overall</b>	<b>70</b>	<b>55%<sup>a</sup></b>	<b>2%<sup>a</sup></b>	<b>47%<sup>a</sup></b>	<b>100%</b>

<sup>a</sup> Weighted by gross evaluated energy savings.

## Large Energy Users Program Findings

### *Freeridership Analysis*

Table I-49. and Table I-50. show the unique response combinations from participants answering the Large Energy Users Program freeridership incentive and contractor freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Program based on the distribution of scores within the matrix.

**Table I-49. Incentive – Large Energy Users Program Frequency of Freeridership Scoring Combinations**

G1. First, did your organization have specific plans to install the [MEASURE CATEGORY1 OR C_MEASURE1][s] before learning about the incentive?	G2. Prior to learning about the incentive, was the purchase of the [MEASURE CATEGORY1 OR C_MEASURE1][s] included in your property's capital budget?	G3. Had your property ALREADY ordered or purchased the [MEASURE CATEGORY1 OR C_MEASURE1][s] BEFORE your [COMPANY CATEGORY IN SURVEY] heard about the Large Energy Users Program incentive?	G4. Would you have purchased and installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy?	G5. Would you have installed something without the incentive and information or education from Focus on Energy?	G6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G8. Without the [INCENTIVE FOR MEASURE CATEGORY1 OR C_MEASURE1] and information or education from Focus on Energy, would you have installed the [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G9. When you say you would not have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s] without the incentive and information or education from Focus on Energy, would you have installed anything at all?	G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the [MEASURE CATEGORY1 OR C_MEASURE1][s] you installed?	G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of [MEASURE CATEGORY1 OR C_MEASURE1][s]?	G12. And, would you have installed the same [MEASURE CATEGORY1 OR C_MEASURE1][s]?	Freerider Score	Count
Yes	Yes	Yes	x	x	x	x	x	x	x	x	x	100%	1
Yes	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	100%	3
Yes	Yes	No	Yes	x	x	No	Partial	x	x	x	x	25%	2
Yes	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	Yes	No	No	x	x	x	x	No	x	x	x	0%	3
Yes	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	2
Yes	No	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
Yes	No	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
Yes	No	x	Partial	No	x	x	x	x	x	x	x	0%	1
Yes	No	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
Yes	No	x	No	x	x	x	x	Yes	No	x	x	0%	1
Yes	No	x	No	x	x	x	x	No	x	x	x	0%	1
Partial	x	x	Yes	x	x	Yes	Yes	x	x	x	x	75%	1
Partial	x	x	Partial	No	x	x	x	x	x	x	x	0%	1
No	x	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	2
No	x	x	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	x	x	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	x	x	No	x	x	x	x	Yes	No	x	x	0%	4
No	x	x	No	x	x	x	x	No	x	x	x	0%	3

**Table I-50. Contractor – Large Energy Users Program Frequency of Freeridership Scoring Combinations**

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE]?	H2. Just to make sure I understand, did your organization have specific plans to install the [MEASURE(s)] before you began working with your contractor?	H3. Before you began working with your contractor, was the purchase of the [MEASURE(s)] included in your organization's capital budget?	H4. Would you have purchased and installed the same [MEASURE(s)] without the assistance from your contractor?	H5. Would you have installed something without the involvement of your contractor? [DO NOT READ LIST UNLESS NECESSARY]	H6. When you say you would have installed something, would you have installed something that was just as energy efficient as the [MEASURE(s)] you installed?	H7. [ASK FOR MEASURE WITH ACTUAL UNIT GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H8. Without the assistance from your contractor, would you have installed the [MEASURE(s)] ...[READ LIST AND RECORD ONE RESPONSE]	[ASK H9 TO H13 IF H4=2 OR H5= 2] H9. When you say you would not have installed the same [MEASURE(s)] without the assistance from your contractor, would you have installed anything at all?	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE(s)] you installed?	H11. [ASK FOR MEASURE WITH ACTUAL UNITS GREATER THAN 1] And without the assistance from your contractor, would you have installed the same number of:	H12. And, would you have installed the same [MEASURE(s)]?	Freerider Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	100%	4
No	Yes	Yes	Yes	x	x	Yes	Yes	x	x	x	x	100%	1
No	Yes	Yes	Yes	x	x	Yes	No	x	x	x	x	0%	1
No	Yes	Yes	Yes	x	x	Partial	Yes	x	x	x	x	75%	1
No	Yes	Yes	Partial	No	x	x	x	No	x	x	x	0%	1
No	Yes	Yes	No	x	x	x	x	Yes	Partial	Partial	Yes	25%	1
No	Yes	Yes	No	x	x	x	x	Yes	No	x	x	0%	2
No	Yes	Yes	No	x	x	x	x	No	x	x	x	0%	1
No	Yes	Partial	Partial	Yes	No	x	x	x	x	x	x	0%	1
No	Yes	Partial	No	x	x	x	x	Yes	Yes	Yes	Yes	50%	1
No	Yes	No	Yes	x	x	Yes	Yes	x	x	x	x	50%	4
No	Yes	No	Yes	x	x	Yes	Partial	x	x	x	x	25%	1
No	Yes	No	No	x	x	x	x	Yes	Yes	Yes	Partial	12.5%	1
No	Yes	No	No	x	x	x	x	Yes	No	x	x	0%	1
No	Partial	x	No	x	x	x	x	Yes	Partial	Partial	Partial	0%	1
No	No	x	Yes	x	x	Yes	Yes	x	x	x	x	50%	1
No	No	x	No	x	x	x	x	Yes	Yes	Yes	Yes	25%	1
No	No	x	No	x	x	x	x	Yes	Yes	No	No	0%	1
No	No	x	No	x	x	x	x	Yes	No	x	x	0%	1
No	No	x	No	x	x	x	x	No	x	x	x	0%	8 <sup>a</sup>

<sup>a</sup> One participant reported they had already installed the equipment before working with their contractor but also said they had not purchased the equipment before working with their contractor. The Evaluation Team considered all the respondent's answers to the freeridership questions when estimating a freeridership score for their project. The participant reported they did not have specific plans to install the equipment before they began working with their contractor and they wouldn't have purchased anything at all without the assistance from your contractor and information or education from Focus on Energy.

*Participant Spillover Analysis*

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 Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table I-51..

**Table I-51. Large Energy Users Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	60	99.01

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 0% spillover estimate, when rounded to the nearest whole percentage, for the Large Energy Users Program respondents (Table I-52.).

**Table I-52. Large Energy Users Program Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	99.01
Program Savings	2,484,652.52
<b>Spillover Estimate</b>	<b>0%</b>

*Net-to-Gross Analysis*

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table I-53.:

$$NTG = 1 - Freeridership + Spillover$$

**Table I-53. Large Energy Users Program NTG Estimates**

Analysis Category	n	Freeridership	Spillover	NTG	Percentage of Total Survey Sample Savings
Incentive	31	39%	0%	61%	28%
Contractor	34	38%	0%	92%	72%
<b>Overall</b>	<b>65</b>	<b>38%<sup>a</sup></b>	<b>0%<sup>a</sup></b>	<b>62%<sup>a</sup></b>	<b>100%</b>

<sup>a</sup> Weighted by gross evaluated energy savings.

## *Business Midstream Kitchen Equipment Pilot: Self-Report, NTG Methodology, and Findings*

### Freeridership Survey Questions

For the Business Midstream Kitchen Equipment Pilot, the participant survey's freeridership section included the following seven questions (asked in the survey format):

- C1. Did you have specific plans to purchase this [MEASURE1] before learning about the Focus on Energy instant discount?
- C2. Prior to learning about the instant discount, did you budget for the purchase of the [MEASURE1], in a capital budget or other financial plan?
- C3. Had you already ordered or purchased the [MEASURE 1] before you heard about the Focus on Energy instant discount?
- C4. Would you have purchased and installed the same [MEASURE1] without the instant discount and information or education from Focus on Energy and/or distributor sales personnel you worked with?
- C5. Would you have purchased something without the incentive and information or education from Focus on Energy / distributor sales personnel?
- C6. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the same number of [MEASURE1]s?
- C7. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the [MEASURE1]?

### Convert Responses to Matrix Terminology

Table I-54. illustrates how the Evaluation Team translated initial Business Midstream Kitchen Equipment Pilot survey responses into yes, no, or partial values, indicative of freeridership.

**Table I-54. Business Midstream Kitchen Equipment Pilot: Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

C1. Did you have specific plans to purchase this [MEASURE1] before learning about the Focus on Energy instant discount?	C2. Prior to learning about the instant discount, did you budget for the purchase of the [MEASURE1], in a capital budget or other financial plan?	C3. Had you already ordered or purchased the [MEASURE 1] before you heard about the Focus on Energy instant discount?	C4. Would you have purchased and installed the same [MEASURE1] without the instant discount and information or education from Focus on Energy and/or distributor sales personnel you worked with?	C5. Would you have purchased something without the incentive and information or education from Focus on Energy / distributor sales personnel?	C6. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the same number of [MEASURE1]s?	C7. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the [MEASURE1]
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, the same number (Yes)	At the same time (Yes)
No (No)	No (No)	No (No)	No (No)	No (No)	No, would have purchased fewer (Partial)	Within the same year (Partial)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	No, would have purchased more (No)	One to two years out (No)
					Don't Know (Partial))	More than two years out (No)
						Never (No)
						Don't Know (Partial)

### Business Midstream Kitchen Equipment Pilot Participant Freeridership Scoring

Each freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the seven questions shown in Table I-55..

**Table I-55. Business Midstream Kitchen Equipment Pilot Freeridership Scoring Legend**

Q#	Decrement
C1	50% decrement for No, 25% decrement for Partial
C2	50% decrement for No, 25% decrement for Partial
C3	100% if Yes, 0% decrement for No level, Partial level not needed
C4	25% decrement for No, 0% decrement for Partial
C5	100% decrement for No, 50% decrement for Partial
C6	50% decrement for No, 25% decrement for Partial
C7	100% decrement for No, 25% decrement for Partial

### Business Midstream Kitchen Equipment Pilot Freeridership Findings

Table I-56. details the unique response combinations from participants answering the freeridership battery of questions (with actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for the Business Midstream Kitchen Equipment Pilot based on the distribution of scores within the matrix.



**Table I-56. Business Midstream Kitchen Equipment Pilot Frequency of Freeridership Scoring Combinations**

C1. Did you have specific plans to purchase this [MEASURE1] before learning about the Focus on Energy instant discount?	C2. Prior to learning about the instant discount, did you budget for the purchase of the [MEASURE1], in a capital budget or other financial plan?	C3. Had you already ordered or purchased the [MEASURE 1] before you heard about the Focus on Energy instant discount?	C4. Would you have purchased and installed the same [MEASURE1] without the instant discount and information or education from Focus on Energy and/or distributor sales personnel you worked with?	C5. Would you have purchased something without the incentive and information or education from Focus on Energy / distributor sales personnel?	C6. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the same number of [MEASURE1]s?	C7. Without the instant discount and information or education from Focus on Energy / distributor sales personnel, would you have purchased the [MEASURE1]	Freerider Score	Frequency
Yes	Yes	Yes	x	x	x	x	100%	14
Yes	Yes	No	Yes	x	x	Yes	100%	6
Yes	Yes	No	Partial	Yes	Yes	Yes	100%	1
Yes	Yes	No	Partial	Yes	Yes	Partial	75%	1
Yes	Yes	No	No	Partial	x	x	25%	1
Yes	Partial	x	Yes	x	x	Yes	75%	1
Yes	Partial	x	Partial	Partial	x	x	25%	1
Yes	No	x	Yes	x	x	Yes	50%	4
Yes	No	x	Yes	x	x	Partial	25%	2
Yes	No	x	Partial	Yes	Yes	Partial	25%	1
Yes	No	x	No	Yes	Yes	Yes	25%	1
Partial	x	x	Partial	Partial	x	x	25%	2
No	x	x	Yes	x	x	Yes	50%	3
No	x	x	Yes	x	x	Partial	25%	3
No	x	x	No	No	x	x	0%	2

### Business Midstream Kitchen Equipment Pilot Participant Spillover Analysis

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Business Midstream Kitchen Equipment Pilot. The Team applied evaluated and deemed savings to the spillover measures customers said they had installed as a result of their participation in the Pilot (Table I-57.).

**Table I-57. Business Midstream Kitchen Equipment Pilot Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	100	147.97

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded an 1% spillover estimate, when rounded to the nearest whole percentage point, for the Business Midstream Kitchen Equipment Pilot respondents (Table I-58.).

**Table I-58. Business Midstream Kitchen Equipment Pilot Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	147.97
Program Savings	10,034.90
<b>Spillover Estimate</b>	<b>1%</b>

### Business Midstream Kitchen Equipment Pilot Net-to-Gross Analysis

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratio using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-59. Business Midstream Kitchen Equipment Pilot NTG Estimate**

n	Freeridership	Spillover	NTG
43	69%	1%	32%

## *Connected Devices Kits—Smart Thermostat: Self-Report, NTG Methodology, and Findings*

### Freeridership Survey Questions

For Connected Devices Kits Program smart thermostats, the participant survey’s freeridership section included the following eight questions (asked in the survey format):

- H1. Before you heard about the program, had you already been planning to purchase a smart thermostat?
- H2. If you had not received a reduced-price [Field-Thermostat\_Name] smart thermostat through the program, would you have still installed the exact same [Field-Thermostat\_Name] smart thermostat?
- H3. Would you still have installed a different thermostat or would you have decided to install nothing?
- H4. When you say you would have installed a thermostat in the absence of the program, would you have installed a smart thermostat?
- H5. And, thinking about timing, in the absence of the program, would you have installed the thermostat...?
- H6. [IF ANSWERED WOULD HAVE INSTALLED NOTHING TO H3] So just to confirm, you would not have installed a thermostat at all without the program. Is that correct?
- H7. Without the program, would you have installed a thermostat, but one that does not have the Wi-Fi or occupancy sensor capabilities of a smart thermostat?
- H8. And, with respect to timing, would you have installed the thermostat...?

### Convert Responses to Matrix Terminology

Table I-60. illustrates how the Evaluation Team translated initial Connected Devices Kits Program smart thermostat survey responses into yes, no, or partial values, indicative of freeridership.

**Table I-60. Connected Devices Kits Program – Smart Thermostat: Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

H1. Before you heard about the program, had you already been planning to purchase a smart thermostat?	H2. If you had not received a reduced-price [Field-Thermostat_Name] smart thermostat through the program, would you have still installed the exact same [Field-Thermostat_Name] smart thermostat?	H3. Would you still have installed a different thermostat or would you have decided to install nothing?	H4. When you say you would have installed a thermostat in the absence of the program, would you have installed a smart thermostat?	H5. And, thinking about timing, in the absence of the program, would you have installed the thermostat...	H6. So just to confirm, you would not have installed a thermostat at all without the program. Is that correct?	H7. Without the program, would you have installed a thermostat, but one that does not have the Wi-Fi or occupancy sensor capabilities of a smart thermostat?	H8. And, with respect to timing, would you have installed the thermostat...
Yes (Yes)	Yes (Yes)	I would have installed a different thermostat (Yes)	Yes (Yes)	At the same time (Yes)	Yes (Yes)	Yes (Yes)	At the same time (Yes)
No (No)	No (No)	I would have installed nothing (No)	No (No)	Within the same year (Partial)	No (No)	No (No)	Within the same year (Partial)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	One to two years out (No)	Don't Know (Partial)	Don't Know (Partial)	One to two years out (No)
				More than two years out (No)			More than two years out (No)
				Never (No)			Never (No)
				Don't Know (Partial)			Don't Know (Partial)

## Connected Devices Kits Program Smart Thermostat Participant Freeridership Scoring

Each freeridership score started with 100%, which the Evaluation Team decremented based on the participant’s responses to the five questions shown in Table I-61..

**Table I-61. Connected Devices Kits Program Smart Thermostat Freeridership Scoring Legend**

Q#	Decrement
H1	50% decrement for No, 25% decrement for Partial
H2	50% decrement for No, 25% decrement for Partial
H3	0% decrement for No, Partial level not needed
H4	100% decrement for No, 25% decrement for Partial
H5	100% decrement for No, 25% decrement for Partial
H6	100% decrement for No, 25% decrement for Partial
H7	100% decrement for No, 25% decrement for Partial
H8	100% decrement for No, 25% decrement for Partial

## Connected Devices Kits Program Smart Thermostat Freeridership Findings

Table I-62. details the unique response combinations from participants answering the freeridership battery of questions (with actual responses mapped to yes, no, or partial, as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. The Evaluation Team calculated a freeridership score for Connected Devices Kits Program smart thermostats based on the distribution of scores within the matrix.

**Table I-62. Connected Devices Kits Program Smart Thermostat Frequency of Freeridership Scoring Combinations**

H1. Before you heard about the program, had you already been planning to purchase a smart thermostat?	H2. If you had not received a reduced-price [Field- Thermostat_Name] smart thermostat through the program, would you have still installed the exact same [Field- Thermostat_Name] smart thermostat?	H3. Would you still have installed a different thermostat or would you have decided to install nothing?	H4. When you say you would have installed a thermostat in the absence of the program, would you have installed a smart thermostat?	H5. And, thinking about timing, in the absence of the program, would you have installed the thermostat...	H6. So just to confirm, you would not have installed a thermostat at all without the program. Is that correct?	H7. Without the program, would you have installed a thermostat, but one that does not have the Wi-Fi or occupancy sensor capabilities of a smart thermostat?	H8. And, with respect to timing, would you have installed the thermostat...	Freerider Score	Frequency
Yes	Yes	x	x	Yes	x	x	x	100%	1
Yes	Yes	x	x	Partial	x	x	x	75%	8
Yes	Yes	x	x	No	x	x	x	0%	7
Yes	Partial	Yes	Yes	Partial	x	x	x	50%	5
Yes	Partial	Yes	Yes	No	x	x	x	0%	6
Yes	Partial	Yes	No	x	x	x	x	0%	1
Yes	No	Yes	Yes	Partial	x	x	x	25%	5
Yes	No	Yes	Yes	No	x	x	x	0%	8
Yes	Partial	No	x	x	No	x	x	0%	6
Yes	No	No	x	x	No	x	x	0%	10
No	No	Yes	Yes	Partial	x	x	x	0%	1
No	No	Yes	No	x	x	x	x	0%	1
No	No	No	x	x	No	x	x	0%	51
No	Partial	No	x	x	No	x	x	0%	11
No	Yes	x	x	Yes	x	x	x	50%	1
No	Yes	x	x	No	x	x	x	0%	1

### Connected Devices Kits Program Smart Thermostat Participant Spillover Analysis

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Connected Devices Kits Program. The Team applied evaluated and deemed savings to the spillover measures customers said they had installed as a result of their Program participation (Table I-63).

**Table I-63. Connected Devices Kits Program Smart Thermostat Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total MMBtu Savings Estimate
Clothes washer	1	0.57
Dishwasher	1	0.11
Gas tankless water heater	1	4.21
Insulation, attic and ceiling	2 projects	11.19
Insulation, wall	1 projects	1.15
Smart power strip	2	0.58

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded an 4% spillover estimate, when rounded to the nearest whole percentage point, for the Connected Devices Kits Program smart thermostat respondents (Table I-64.).

**Table I-64. Connected Devices Kits Program Smart Thermostat Participant Spillover Percentage Estimate**

Variable	Total MMBtu Savings Estimate
Spillover Savings	17.80
Program Savings	494.15
<b>Spillover Estimate</b>	<b>4%</b>

### Connected Devices Kits Program Smart Thermostat Net-to-Gross Analysis

The Evaluation Team combined the spillover information with the freeridership results to achieve the NTG ratio (Table I-65.) using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table I-65. Connected Devices Kits Program Smart Thermostat NTG Estimate**

n	Freeridership	Spillover	NTG
123	9%	4%	95%

### Low-E Storm Windows

The Evaluation Team estimated sales lift for low-E storm windows by comparing weekly sales data from participating and comparison area retail locations. The Pilot ran in the early fall during the prime season for storm window sales in CY 2017 with two participating retailer chains. The Pilot ran in Milwaukee area stores with Madison area store locations for the same retailers serving as a comparison area.

The Team received weekly sales data over a nine-week period during CY 2017 as well as weekly sales over the same period in CY 2016, prior to the launch of the pilot. The data contained:

- Retailer name
- Location
- Product company
- Glass material (low-E or otherwise)
- Sales quantities

Using a difference-in-difference approach to measure the sales lift from the pre-Program period (CY 2016) and the pilot period (CY 2017) and between pilot area and comparison area stores, the Team used the following equation to model weekly sales of low-E windows:

$$Q_{it} = \sum_{\pi} (\beta_{\pi} Store Location_{\pi,i}) * (Retailer_{\theta,i}) + \beta_1 * Retailer_i * Post + \beta_2 * Retailer_i * Post * Treat + \varepsilon_i$$

Where:

- Q = Quantity of windows sold during the month
- Retailer = Retailer Name
- Store Location = Cross section indicator for each unique store location
- Post = Dummy variable equal to 1 during the pilot period and 0 during the pre-period
- Treat = Dummy variable equal to 1 if the store location participated in the pilot and 0 otherwise
- $\varepsilon_{it}$  = Cross-sectional random-error term

The cross section estimates for each unique retailer and store location represent the average weekly sales of low-E windows at that store during the pre-period. The  $\beta_1$  coefficient represents the difference in average weekly sales between the pre-period and pilot periods at comparison area stores and the  $\beta_2$  coefficient represents the incremental difference in weekly low-E window sales at participating stores during the pilot period.



The Team calculated the NTG ratio as:

$$NTG\ ratio = \frac{Predicted\ Pilot\ Sales - Predicted\ Baseline\ Sales}{Predicted\ Pilot\ Sales}$$

**Table I-66. Low-E Window Sales**

	Total Low-E Window Sales
Predicted Pilot	2,656
Predicted Baseline	1,894
<b>Net Sales</b>	<b>762</b>

### Residential General Population Nonparticipant Spillover Findings

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers’ perceptions of their energy usage and, in some cases, motivate customers to take efficiency actions outside of Focus on Energy programs. This is generally called NPSO—energy savings caused by, but not rebated through, Focus on Energy’s energy efficiency and renewable resource programs.

To understand whether Focus on Energy’s general and program marketing efforts generated energy efficiency improvements outside of the company’s incentive programs, the Evaluation Team collected spillover data through the general population survey, conducted with randomly selected residential customers.

### Nonparticipant Spillover Methodology

The Evaluation Team purchased a list of Wisconsin residents in CY 2018 and developed a random sample of 8,500 residents for a general population survey (see Appendix J). Using this sample, the Team conducted surveys with 300 customers, from which the Team screened out customers who self-reported that they participated in a Focus on Energy residential program during CY 2018. The Evaluation Team also cross-checked respondents’ information across all CY 2018 program tracking data, removing respondents from NPSO consideration if the program records indicated they participated in a Focus on Energy Program in CY 2018. When estimating NPSO, Evaluation Team excluded these customers from analysis, focusing on identified nonparticipants; thus the analysis avoided potential double-counting of program savings and/or program-specific spillover.

The Evaluation Team limited the NPSO analysis to the same types of efficiency measures rebated through Focus on Energy programs (known as like spillover). Examples included installing a high-efficiency water heaters and installing high-efficiency insulation for which participants (for whatever reason) did not apply for and receive an incentive. The Evaluation Team did exclude one notable category of “like” measures: lighting products. This precluded potentially double-counting NPSO lighting savings already captured through the upstream lighting incentives.

Using a 1 to 4 scale, with 1 meaning *not at all important* and 4 meaning *very important*, the survey asked customers to rate the importance of several factors on their decisions to install energy efficient

equipment without receiving an incentive from Focus on Energy. This question determined whether Focus on Energy’s energy efficiency initiatives motivated energy-efficient purchases.

The Evaluation Team estimated NPSO savings from respondents who rated Focus on Energy as *very important* for any energy-efficient actions or installations reported. Additionally, the Evaluation Team called back respondents who passed the screening criteria for NPSO consideration to confirm the energy efficient actions they attributed to Focus on Energy. If a respondent could be reached for a callback interview, the information from the interview was used in the NPSO analysis. If a respondent could not be reached for a callback interview, the respondents original answers to the survey questions were used in the NPSO analysis. These callbacks were the only methodological change from the CY 2015 NPSO study.

The Evaluation Team leveraged measure-level estimated gross savings from the CY 2018 Focus on Energy residential evaluation activities for the reported NPSO measures. Using the variables shown in Table I-67., Evaluation Team determine total residential NPSO generated by Focus on Energy’s marketing and outreach efforts during the CY 2018 evaluation year.

**Table I-67. Residential NPSO Analysis Method**

Variable	Metric	Source
A	Total MMBtu Spillover Savings from Survey Respondents	Survey data / Engineering Estimates
B	Total Nonparticipant Customers Surveyed	Survey disposition minus matched CY 2018 participants
C	Average MMBtu Savings Per Nonparticipant Surveyed	$A \div B$
D	Total Residential Customer Nonparticipant Housing Units	2017 U.S. Census minus CY 2018 Focus on Energy Participant Population
E	NPSO MMBtu Savings Applied to Population	$C \times D$
F	Total Gross Program Evaluated Annual MMBtu Savings	CY 2018 Focus on Energy Evaluation
G	NPSO as a Percentage of Total Residential Portfolio Evaluated Annual Gross MMBtu Savings	$E \div F$

## Results

Table I-68. shows the survey attrition of the residential general population survey results to arrive at eight nonparticipant customers who reported installing energy efficient measures in their home in CY 2018 where Focus on Energy was *very important* in their purchasing decision.

**Table I-68. CY 2018 Residential General Population Survey Attrition for NPSO Consideration**

Removal Reason	Respondents
<b>Original Contacted</b>	<b>300</b>
Participated in CY 2018 Focus on Energy program	-10
Was not aware of Focus on Energy at time of interview	-156
No energy efficient equipment installed in past year	-75
Did not rate Focus on Energy as <i>very important</i> in purchasing decision of program eligible measure	-49
<b>Rated Focus on Energy as <i>very important</i> in purchasing decision of program eligible measure</b>	<b>10</b>
Removed after callback interview completed	-2
<b>Customers with NPSO activity being attributed to Focus on Energy for CY 2018</b>	<b>8</b>

Table I-69. presents measures and gross evaluated kilowatt-hour savings Evaluation Team attributed to Focus on Energy, generating average savings per NPSO measure of 22.98 MMBtus.

**Table I-69. Residential NPSO Response Summary**

Reported Spillover Measures	Mentions by Respondents	Unit Energy Savings (MMBtu) <sup>a</sup>	Total Savings (MMBtu)
High Efficiency Central Air Conditioner	1	0.23 per unit	0.23
High Efficiency Wall Insulation	1	10.56 per project	10.56
High Efficiency Water Heater	2	1.65 per unit	3.29
Low-E storm windows	4 <sup>b</sup>	1.78 per unit	8.90
<b>Total</b>	<b>8</b>		<b>22.98</b>

<sup>a</sup> UES estimated for each measure were generated from average CY 2018 Focus on Energy evaluated gross savings.

<sup>b</sup> Four respondents associated with 20 low-E storm windows.

Table I-70. presents variables used to estimate overall NPSO for the Focus on Energy residential portfolio, a figure the Team estimated as 15.2% of total CY 2018 Focus on Energy evaluated program savings.

**Table I-70. Residential NPSO Analysis Results**

Variable	Metric	Value	Source
A	Total MMBtu Spillover Savings from Survey Respondents	22.98	Survey data / Engineering Estimates
B	Total Nonparticipant Customers Surveyed	290	Survey disposition minus matched CY 2018 participants
C	Average MMBtu Savings Per Nonparticipant Surveyed	0.079	A÷B
D	Total Residential Customer Nonparticipant Population Housing Units	2,560,689	2017 U.S. Census minus Focus on Energy Participant Population
E	NPSO MMBtu Savings Applied to Population	202,881	C × D
F	Total Gross Program Evaluated Annual MMBtu Savings	1,334,112	CY 2018 Focus on Energy Evaluation
G	NPSO as a Percentage of Total CY 2018 Residential Portfolio Evaluated Annual Gross MMBtu Savings	15.2%	E ÷ F

Variable E above represents NPSO savings attributable to the CY 2018 Focus on Energy residential portfolio. The Evaluation Team averaged the CY 2018 NPSO estimate of 15.2% and the CY 2015 NPSO Estimate of 6.0% by weighting the NPSO estimates by each program year’s gross evaluated annual MMBtu savings. This resulted in a 10.9% NPSO estimate for the quadrennial residential portfolio. The Evaluation Team applied the 10.9% NPSO estimate to quadrennial year’s residential portfolio net savings. Table I-71. presents the NPSO estimate and gross evaluated annual MMBtu savings for the CY 2015 and CY 2018 program years in which NPSO analysis was conducted, along with the weighted average NPSO estimate of 10.9% for the quadrennial.

**Table I-71. Quadrennial Residential NPSO Analysis Results**

Program Year	NPSO	Gross Evaluated Annual MMBtu Savings
CY 2015	6.0%	1,165,785
CY 2018	15.2%	1,334,112
<b>Quadrennial</b>	<b>10.9%</b>	<b>n/a</b>

## Appendix J. Residential General Population Survey Results

During the fall of CY 2018, the Evaluation Team conducted a telephone survey of Wisconsin residents, including people who had and had not participated in Focus on Energy programs. Objectives of the study were to determine the following:

- Awareness of Focus on Energy and perceptions of the Focus on Energy brand
- Barriers to program participation and best ways to inform customers about Focus on Energy programs
- Prevalence of smart devices in Wisconsin homes
- Potential for a behavioral program offering
- Nonparticipant spillover savings

### Participant Sampling

The Evaluation Team purchased a list of Wisconsin residents and developed a random sample of 8,500 residents for the general population survey. As shown in Table J-1, the Evaluation Team contacted 8,481 residents from the sample and completed telephone surveys with 300 residents. Based on this population, the number of completed surveys achieved 90% confidence at  $\pm 4.7\%$  precision.

**Table J-1. Sample Information**

Stratum	Sample Frame	Contacted Residents	Target Sample Size	Achieved Sample Size
Wisconsin Residents	8,500	8,481	300	300

### Survey Findings

#### Awareness

The Evaluation Team asked respondents if they were aware of Focus on Energy before they received the call. Almost half (48%, 142 out of 297) said they were aware of Focus on Energy. This is a statistically significant increase in awareness compared to the CY 2015 general population survey,<sup>42</sup> which found that 41% (n=584) of respondents were aware of Focus on Energy.

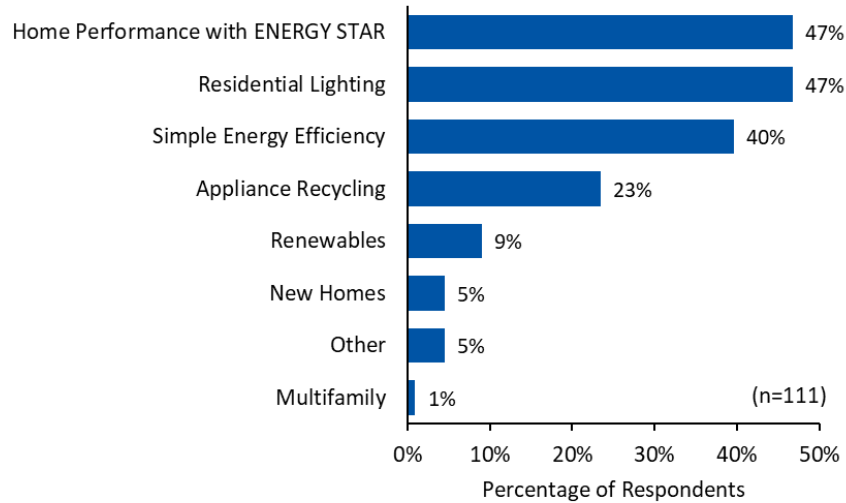
The CY 2018 survey respondents who reported being aware of Focus on Energy were then asked which Focus on Energy programs they were familiar with. As shown in Table J-1, the most frequent responses were Home Performance with ENERGY STAR and Retail Lighting (47% of respondents each). Other programs that were identified included Simple Energy Efficiency (40% of respondents), Appliance Recycling (23% of respondents), and Renewable Rewards (9% of respondents). The survey also asked if

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<sup>42</sup> Tested at the 90% confidence level.

respondents had participated in any Focus on Energy programs. Twenty-one percent (62 out of 300) reported that they had participated in a Focus on Energy program.

**Figure J-1. Awareness of Focus on Energy**



Source: General Population Survey Question C3. “Which Focus on Energy programs, if any, come to mind?”  
Multiple responses allowed (n=111)

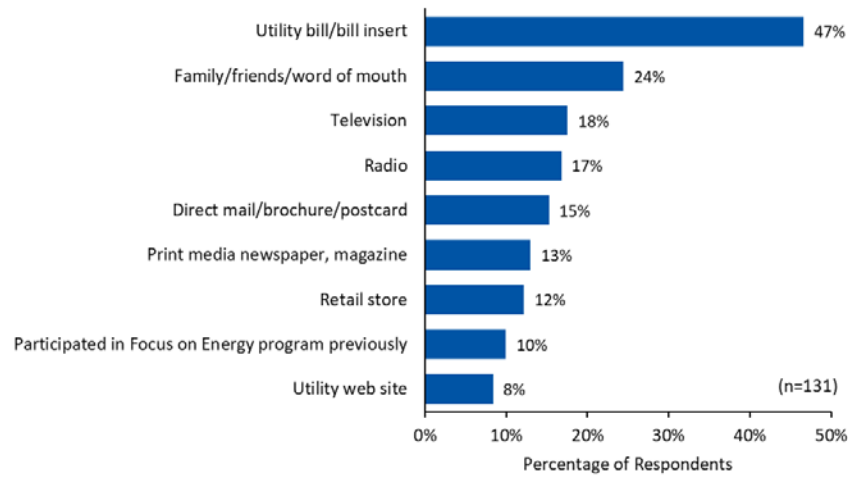
**Rural Programs**

The Evaluation Team identified that 87 of the 300 total survey respondents lived in designated rural zip codes and were eligible for Focus on Energy’s rural programs. The Evaluation Team asked this subset of respondents if they were aware that Focus on Energy had special offers for customers in their area (such as free and low-cost connected devices kits and a Home Performance with ENERGY STAR bundle). Twenty-four percent (20 out of 85) of rural respondents said that they were aware of these offers.

**Awareness Channels**

The Evaluation Team asked the 142 respondents who were aware of Focus on Energy before the survey how they heard about Focus on Energy. Nearly half (47%) said they heard about Focus on Energy through utility bill inserts. As shown in Figure J-2, other frequent responses included family/friends/word-of-mouth (24%), television (18%), and radio (17%).

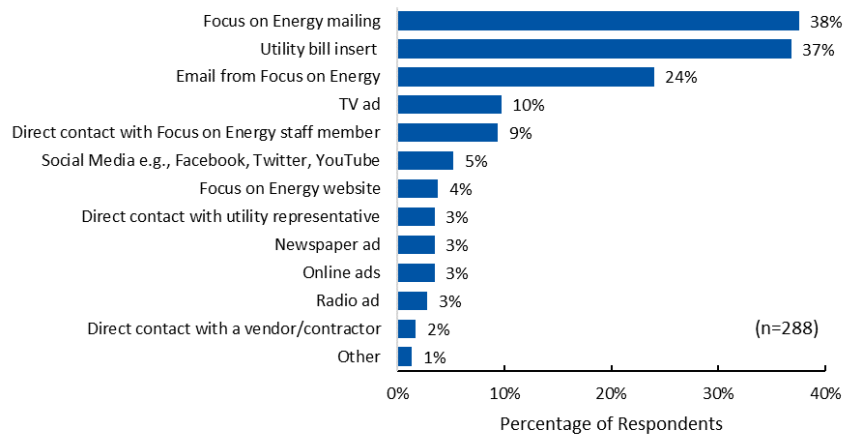
**Figure J-2. How Respondents Learned about Focus on Energy**



Source: General Population Survey Question C7. “How have you heard about Focus on Energy’s programs?” Multiple responses allowed (n=131)

The Evaluation Team asked all respondents about the best way for Focus on Energy to inform them about available incentives and programs. As shown in Figure J-3, the most frequent responses included Focus on Energy mailing (38% of respondents), utility bill inserts (37% of respondents), and emails from Focus on Energy (24% of respondents).

**Figure J-3. Preferred Methods of Being Informed of Program Offerings**



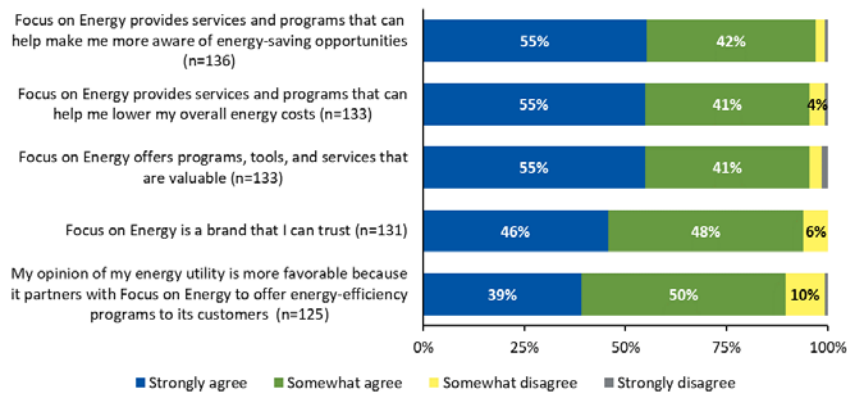
Source: General Population Survey Question E1. “What’s the best way for Focus on Energy to let you know about their incentives and services for energy-efficient improvements?” Multiple responses allowed (n=288)

Comparing how participants heard about Focus on Energy (Figure J-2) and the best way for Focus on Energy to notify them (Figure J-3), 38% of respondents said a mailing from Focus on Energy was a preferred method for hearing about available incentives. However, only 15% of respondents said they had learned about Focus on Energy through a direct mailing. Almost a quarter (24%) preferred emails from Focus on Energy to learn about available incentives; however, only 5% (six out of 131) reported that they had learned about Focus on Energy through an email from Focus on Energy.

**Brand Affinity**

The Evaluation Team asked the 142 respondents who were aware of Focus on Energy prior to the call how strongly they agreed or disagreed with several statements about Focus on Energy. As shown in Figure J-4., respondents strongly endorsed each statement (at least 89% of respondents either *strongly agree* or *somewhat agree* with each statement). Respondents agreed most (55% *strongly agree*, 42% *somewhat agree*) with the statement that “Focus on Energy provides services and programs that can help make me more aware of energy-saving opportunities.” The statement with the lowest level of agreement was, “My opinion of my energy utility is more favorable because it partners with Focus on Energy to offer energy-efficiency programs to its customers” (39% of respondents *strongly agree*, 50% *somewhat agree*, and 10% of respondents *somewhat disagree*).

**Figure J-4. Agreement Level with Statements about Focus on Energy**

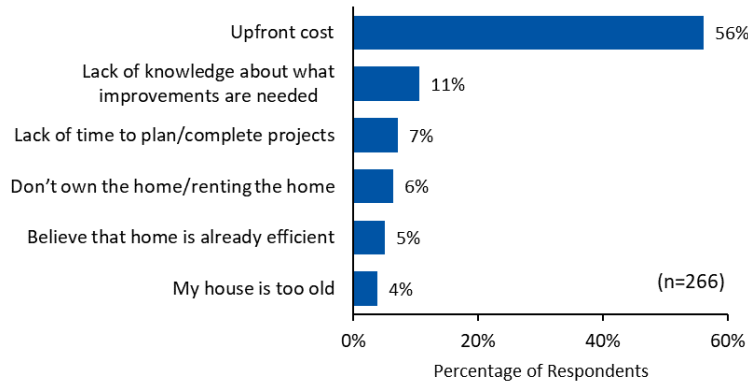


Source: General Population Survey Questions D1–D5. “Please indicate whether you agree or disagree with these statements.”

**Participation Barriers**

The Evaluation Team asked respondents about the biggest challenge in completing energy efficiency improvements in their homes. As shown in Figure J-5, the most common challenge reported (56% of respondents) was upfront cost. Other common responses included lack of knowledge (11%) and lack of time (7%).

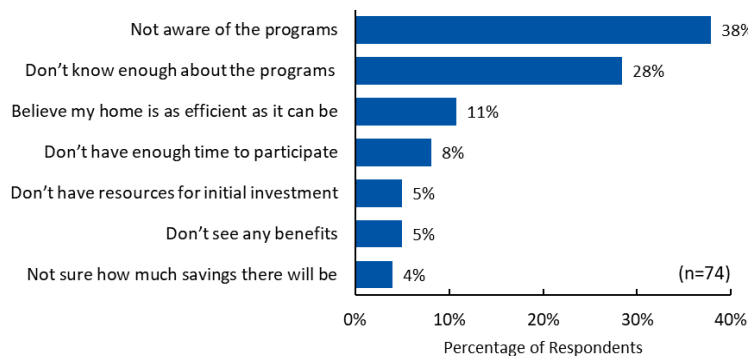
**Figure J-5. Challenges in Completing Energy-Efficiency Improvements**



Source: General Population Survey Question E2. “What is the biggest challenge in completing energy-efficiency improvements for your home?” (n=266)

Respondents who said they were aware of Focus on Energy prior to the call but had not participated in a Focus on Energy program were asked why they had not. As shown in Figure J-6, the most frequent responses included being unaware of program offerings (38% of respondents), not knowing enough about the programs (28%), and believing that their home is as efficient as it can be (11%). Although the most common challenge in completing energy efficiency improvements provided by respondents was upfront costs (56% of respondents), when asked why they had not participated in a Focus on Energy program only 5% (four out of 74) said it was because of a lack of resources for the initial investment.

**Figure J-6. Reasons for Nonparticipation**



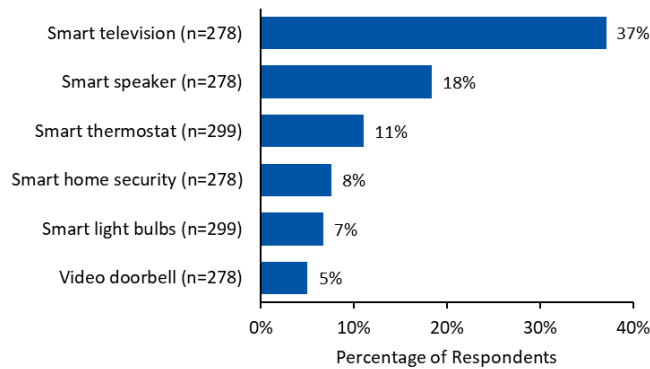
Source: General Population Survey Question E3. “What are the reasons you have not participated in a Focus on Energy program?” Multiple responses allowed (n=74)

### Smart Device Saturation

To investigate the prevalence of smart devices in Wisconsin homes, the Evaluation Team asked respondents what smart devices were in their homes. Twenty-one percent (62 out of 297) did not have wireless internet in their homes and were unable to operate smart devices in their home. As shown in Figure J-7, the most common smart device in respondents’ homes were smart televisions (37% of respondents) followed by smart speakers (18%) and smart thermostats (11%).



**Figure J-7. Prevalence of Smart Devices**



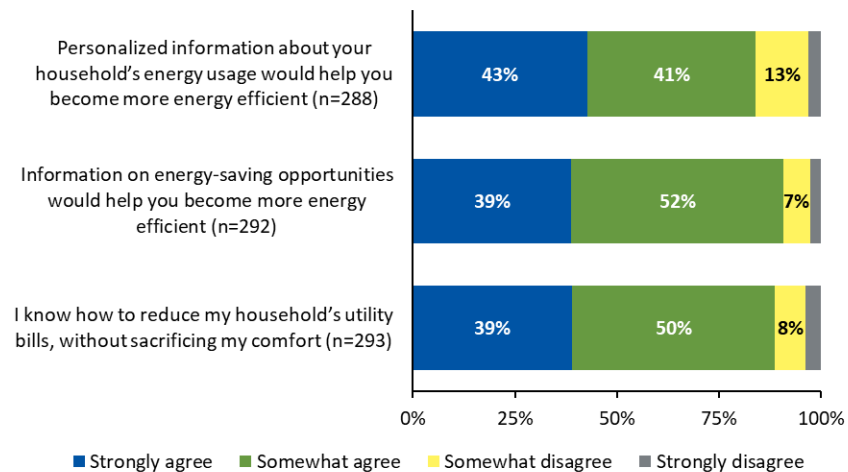
Source: General Population Survey Questions F2, F3, and F5. “Do you have any wi-fi connected [DEVICE NAMES] in your home?”

### Behavioral Program Potential

The Evaluation Team asked respondents a series of questions regarding what actions, services, and information would help them become more energy-efficient. The intention of these questions was to gauge the potential for a Behavioral Program offering from Focus on Energy. Although Behavioral programs vary in design, their goal is to encourage behavioral changes that result in energy savings by providing customers with detailed information about their energy use.

As shown in Figure J-8, 89% of survey respondents said they already know how to reduce their household utility bills; however, over 80% of respondents either *strongly agree* or *somewhat agree* that personalized information about their home’s energy use and information on energy-saving opportunities would help them become more energy-efficient. In other words, although most respondents believed they already had an understanding of how to reduce energy usage, they acknowledged that additional information could help them become even more energy-efficient.

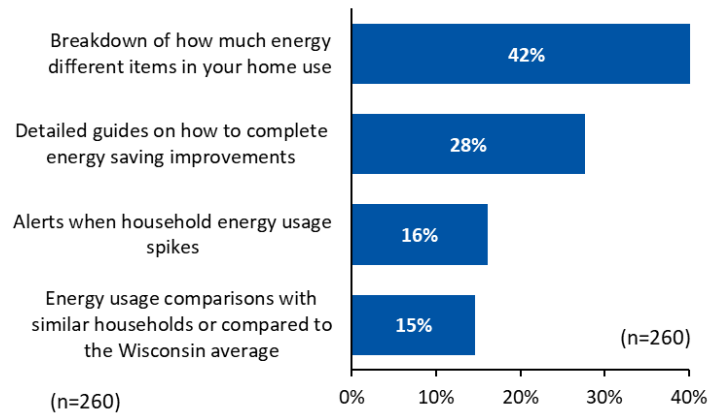
**Figure J-8. Agreement with Statements Reducing Household Energy Usage**



Source: General Population Survey Questions G1, G3, and G4. “To what extent do you agree or disagree with the following statement?”

The Evaluation Team also listed four types of information and asked respondents to rank what type of information would be most helpful in becoming more energy-efficient. Figure J-9 shows that respondents’ most frequent choice (42% of respondents) was a breakdown of how much energy was used by different items in their home. The least frequent response (15% of respondents) was a comparison of energy usage to similar households or to the Wisconsin average.

**Figure J-9. Information Most Helpful in Becoming Energy Efficient**



Source: General Population Survey Question G6. “What type of information do you think would be most helpful for becoming more energy efficient?” (n=260)

### Demographics

As shown in Table J-2 and Table J-3, most survey respondents lived in single-family attached houses (78% of respondents) and own their home (85% of respondents). Both of these percentages are somewhat higher than the Wisconsin average (71% of residents live in one-unit homes and 67% own their home). Survey respondents also had a higher level of education than the Wisconsin average. As shown in Table J-4 and Table J-5, 27% of respondents had bachelor’s degrees and 22% had graduate degrees while 18% of Wisconsin residents have bachelor’s degrees and 8% have graduate degrees.

**Table J-2. Type of Home**

Response	Percentage of Respondents	Response	Wisconsin Average <sup>a</sup>
Single-family home, detached house	78%	1-unit, detached and attached	71%
Multifamily apartment or condo building	14%	3 or more units	7%
Attached house with 1 to 3 units	4%	2 Units	19%
Mobile/manufactured home	3%	Mobile home	4%
Retirement Community	0%		
Other	0%		

Source: General Population Survey Question J1. “What type of home do you live in?” (n=295)

<sup>a</sup> U.S. Census Bureau. Accessed October 18, 2018. “Community Facts.” American Community Survey 2016 data. <https://factfinder.census.gov>

**Table J-3. Home Ownership**

Response	Percentage of Respondents	Wisconsin Average <sup>a</sup>
Own/buying	85%	67%
Rent/lease	15%	33%

Source: General Population Survey Question J2. “Do you or members of your household own this home or do you rent?” (n=297)

<sup>a</sup> U.S. Census Bureau. Accessed October 18, 2018. “Community Facts.” American Community Survey 2016 data. <https://factfinder.census.gov>

**Table J-4. Level of Education**

Response	Percentage of Respondents	Wisconsin Average <sup>a</sup>
Less than ninth grade	0%	3%
Ninth to twelfth grade; no diploma	1%	6%
High school graduate; includes GED	20%	32%
Some college, no degree <sup>b</sup>	18%	21%
Associates degree <sup>b</sup>	11%	12%
Bachelor’s degree	27%	18%
Graduate or professional degree	22%	8%

Source: General Population Survey Question J3. “What is the highest level of school that someone in your home has completed?” (n=294)

<sup>a</sup> U.S. Census Bureau. Accessed October 18, 2018. “Community Facts.” American Community Survey 2016 data. <https://factfinder.census.gov>

<sup>b</sup> American Community Survey data used for Wisconsin average included one category for “some college or associate’s degree” for the 18 to 24 year old segment of the population. That population was split evenly between “some college, no degree” and “associate’s degree” in this table.

**Table J-5. Household Income**

Response	Percentage of Respondents	Response	Wisconsin Average <sup>a</sup>
Less than \$20,000	11%	Less than \$15,000	11%
\$20,000 to \$49,999	26%	\$15,000 to \$49,999	35%
\$50,000 to \$74,999	24%	\$50,000 to \$74,999	20%
\$75,000, up to \$99,999	16%	\$75,000 to \$99,999	14%
\$100,000 to \$149,999	15%	\$100,000 to \$149,999	14%
\$150,000 to \$199,999	5%	\$150,000 to \$199,999	4%
\$200,000 or more	3%	\$200,000 or more	4%

Source: General Population Survey Question J4. “Which category best describes your total household income in 2017 before taxes?” (n=259)

<sup>a</sup> U.S. Census Bureau. Accessed October 18, 2018. “Community Facts.” American Community Survey 2016 data. <https://factfinder.census.gov>

## Appendix K. Nonresidential Nonparticipant Survey Results

The Evaluation Team conducted a telephone survey of nonresidential commercial customers who had not participated in Focus on Energy business program in the last year. Objectives of the survey were to assess the following:

- Awareness and perception of Focus on Energy
- Factors in making building upgrades, decision-making process, plans for future upgrades
- Reason for nonparticipation, challenges to energy efficiency, opportunities to overcome barriers
- Understand baseline practices for monitoring energy use in facility; likelihood to install renewable energy
- Spillover savings attributable to Focus on Energy

### Methodology

In July 2018, the Team contacted a random sample of 3,450 customers to assess their awareness of Focus on Energy and their motivations and challenges around implementing energy efficiency upgrades. Of the 3,450 contacted customers, 140 completed the survey. The sample frame, which was taken from the Focus on Energy potential study completed in CY 2016, included 122,934 customers across all industries, geographic locations, and sizes. Based on this population size, the number of completed surveys achieved 90% confidence at ±7% precision. Table K-1 lists the sample information by segment.

Respondents had to meet the following criteria to qualify for the commercial nonparticipant survey:

- Be a person at the business who makes equipment upgrade decisions
- The business had not received a Focus on Energy incentive for installing energy efficient equipment or renewable energy in the last year

**Table K-1. Sample Information**

Sector	Sample Frame	Target Completes	Completed Surveys	Confidence/ Precision
Agricultural	17,154	140	16	90/7
Commercial	92,185		107	
Industrial	92,185		17	
<b>Totals</b>	<b>122,934</b>	<b>140</b>	<b>140</b>	<b>90/7</b>

### Survey Findings

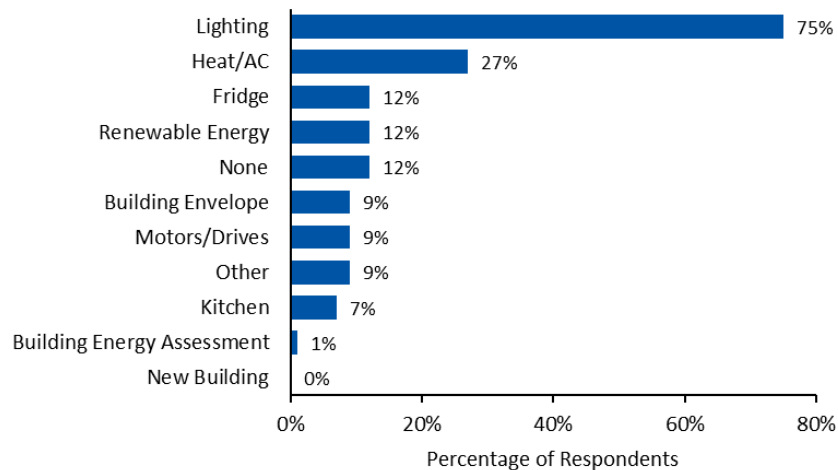
#### Program Awareness

Of the surveyed nonparticipant customers (n=140), 48% of the respondents said they were aware of Focus on Energy incentives for businesses, which was not significantly different from the CY 2015 nonparticipant survey in which 53% of customers (n=122) were aware of Focus on Energy incentives. Like the CY 2015 nonparticipant survey, respondents were most frequently familiar with lighting

incentives (75%, n=67), followed by heating and air conditioning (27%) incentives (Figure K-1). When these respondents were asked how they learned about the incentives, respondents most frequently said they were contacted by a contractor or vendor (28%), contacted by a Focus on Energy account representative or utility staff member (21%), learned through word of mouth (18%), or learned through a Focus on Energy mailing (16%).

When asked how Focus on Energy should inform them of business incentives, respondents (n=140) said the best methods were an email from Focus on Energy (52%), a Focus on Energy mailing (36%), online ads (24%), and direct contact with a Focus on Energy staff member (24%).

**Figure K-1. Awareness of Focus on Energy Incentives by Equipment Type**

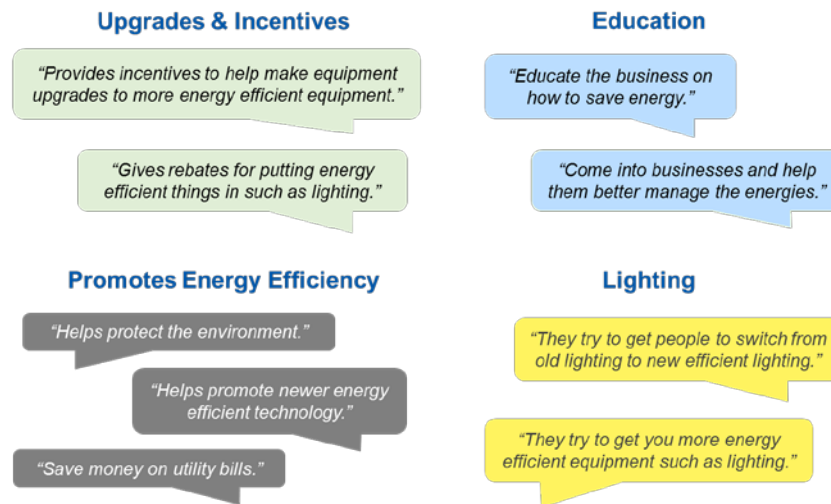


Source: Nonparticipant Survey Question C4. “Which Focus on Energy incentive programs, if any, come to mind?” Multiple responses allowed (n=67)

***Brand Awareness and Perception of Focus on Energy***

Respondents who were aware of Focus on Energy incentives were asked about the first three words that came to mind when thinking about Focus on Energy. Respondents most frequently said “saving money” (49%), “saving energy” (30%), and “lighting” (24%). Additionally, the survey asked respondents to describe in their own words what they thought Focus on Energy does. Generally, most respondents had a good understanding of Focus on Energy’s mission and offered descriptions that fell into one of these four themes: monetary incentives, energy education, energy efficiency promotion, or lighting. Selected responses are represented in Figure K-2.

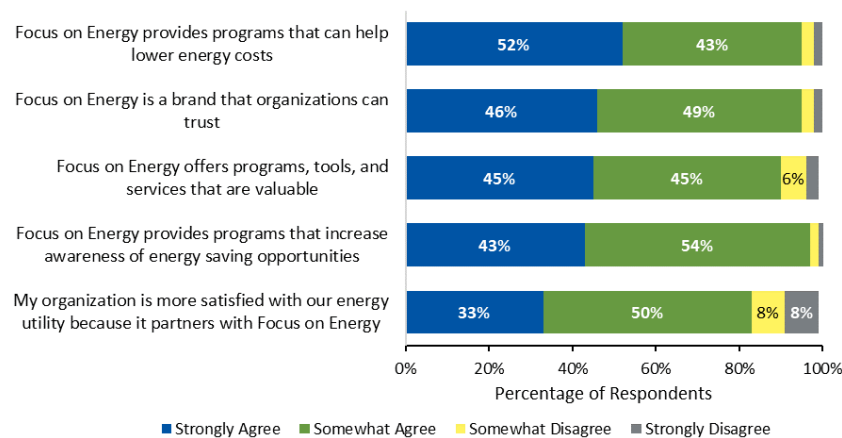
Figure K-2. Respondents' Open-Ended Descriptions of Focus on Energy



Source: Nonparticipant Survey Question C3. "We want to understand how much Wisconsin businesses know about the Focus on Energy program. In your own words, what do you think Focus on Energy does? [IF NEEDED, for example, what is their mission?]" (n=67)

When asked to rate their agreement with statements about services that Focus on Energy provides, over 83% of respondents (ns=60-66) said they *strongly agreed* or *somewhat agreed* with each statement (Table K-3). Agreement was highest with the statement, "Focus on Energy provides programs that can help my organization lower energy costs." When asked which statement would make them most interested in learning more about Focus on Energy, respondents (n=66) most frequently said "reducing energy costs and saving money" (45%) or "lowering energy costs" (29%).

Figure K-3. Nonparticipant Agreement Level with Statements about Focus on Energy



Source: Nonparticipant Survey Question D1. "The following are statements about Focus on Energy. Please indicate whether you agree or disagree with these statements." (n=60-66)

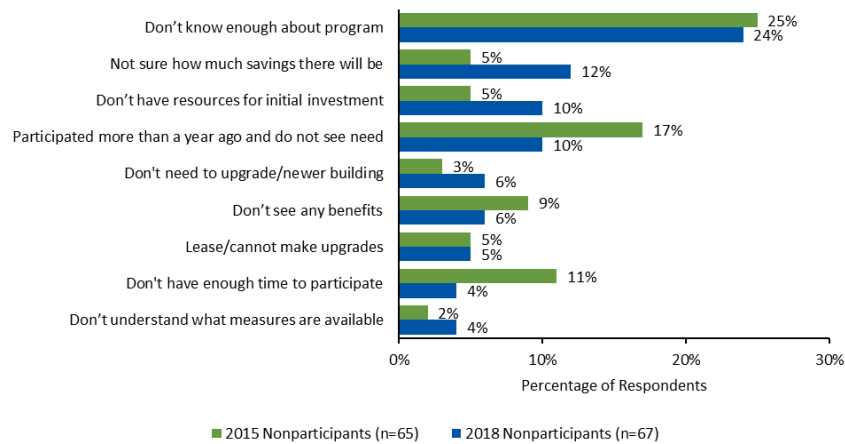
**Participation Barriers**

Most respondents said a lack of awareness about Focus on Energy prevented them from participating in a Focus on Energy program (24%, n=67), which was consistent with the CY 2015 nonparticipant survey.

Additionally, 12% of respondents said they were unsure about the amount of savings, 10% said they do not have resources for the initial investment, and 10% said they participated more than a year ago but did not see the need to participate again. Figure K-4 shows the reasons cited for not participating; “Other” responses include inability to make capital improvements, lack of seasonal cash flow, and facilities that are newer and are not ready for upgrades.

When respondents were asked what would motivate them to participate, 39% (n=132) said lowering the costs of products or equipment and 28% said higher incentives.

**Figure K-4. Reasons for Nonparticipation: CY 2015 and CY 2018**

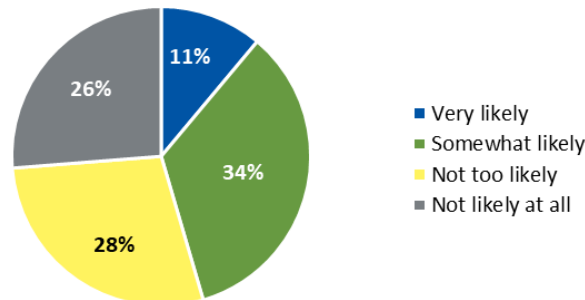


Source: Nonparticipant Survey Question E6. “What are the reasons you have not participated in a Focus on Energy program in the past year?”

*Future Engagement with Focus on Energy*

When asked about their likelihood to participate in a Focus on Energy program in the future, 45% of respondents (n=140) said they would be either *somewhat likely* or *very likely* to apply for an incentive in the next six months (Figure K-5). Of this group, over 55% said they were likely to retrofit their lighting, and 41% said they were considering upgrading HVAC systems.

**Figure K-5. Likelihood of Applying for a Focus on Energy Incentive in the Near Future**



Source: Nonparticipant Survey Questions C7 and C8. “How likely is it that your business requests an incentive from a Focus on Energy program for an energy efficiency project in the next 6 months? Would you say...” (n=140)

## Interest in Renewable Energy and Energy Management

The Evaluation Team assessed respondents’ interest in pursuing renewable energy at their business as well as their interest in energy management. Of respondents able to make capital improvements to their space (n=98), 13% reported they were likely to install solar with a \$3,000 incentive and 15% were likely to install solar with a \$5,000 incentive.

In terms of energy management, most respondents (61%; n=139) reported monitoring energy at their business, with 92% monitoring monthly (as opposed to daily or weekly). When respondents were asked about their interest in monitoring energy on a more frequent basis, 64% said they were *not too interested* or *not at all interested*. Despite this low interest in monitoring energy more frequently, most respondents (65%) said they were *somewhat interested* or *very interested* in learning more about energy use in their facility and how to reduce it.

## Firmographics

Most respondents (76%) fell into the commercial sector, which is representative of the population (75% of the sample frame comprised commercial sector customers) (Table K-2). As shown in Table K-3, most respondents had a single location facility (76%), heated their facility primarily with gas or propane (80%), and owned the facility (82%). Although firmographics were generally similar between sectors, there were two significant differences. Agricultural respondents were significantly more likely to own their facility (100%) compared to commercial (80%) and industrial (76%) respondents, and industrial respondents were significantly more likely to have a single location facility (94%) compared to commercial respondents (72%).

**Table K-2. Nonparticipant Sectors and Segments**

Sector	Segments	Sample Size
Agricultural (n=16)	Dairy	9
	Miscellaneous Agriculture	7
Commercial (n=107)	Office	34
	Miscellaneous	18
	Warehouse	13
	Restaurant	12
	Retail	11
	Assembly	11
	School	4
	Grocery	2
	Lodging	2
	Industrial (n=17)	Miscellaneous Manufacturer
Food Manufacturer		3
Fabricated Metal Product Manufacturer		2
Furniture Manufacturer		2
Machinery Manufacturer		2
Printing		2
Nonmetallic Mineral Product Manufacturer		1
Plastics Rubber Manufacturer		1
<b>Total</b>		<b>140</b>



**Table K-3. Nonparticipant Firmographics**

Sector	Sample Size	Percentage with Single Location	Average Square Footage	Percentage Heated Primarily with Gas or Propane	Percentage That Own Facility	Average Monthly kWh	Average Monthly Therms	Average Monthly Btu
Agricultural	16	88%	3,433	77%	100%	7,814	1,543	52,263,429
Commercial	107	72%	31,104	79%	80%	4,986	267	31,160,234
Industrial	17	94%	6,873	94%	76%	9,007	544	65,532,427
<b>Total</b>	<b>140</b>	<b>76%</b>	<b>15,326</b>	<b>80%</b>	<b>82%</b>	<b>5,903</b>	<b>347</b>	<b>37,745,794</b>

## Spillover

### Nonresidential Nonparticipant Spillover Findings

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers’ perceptions of their energy usage and, in some cases, motivate customers to take efficiency actions outside of the Focus on Energy’s programs. This is generally called NPSO—results in energy savings caused by, but not rebated through, Focus on Energy’s energy efficiency and renewable resource programs.

To understand whether Focus on Energy’s general and program marketing efforts generated energy efficiency improvements outside of the program offerings, the Evaluation Team collected spillover data through the general population survey conducted with randomly selected nonresidential customers.

### Nonparticipant Spillover Methodology

The Evaluation Team randomly selected and surveyed 140 customers from a sample of randomly nonresidential accounts provided. None of the 140 customers surveyed matched participating customer information in the CY 2018 program tracking data.

Using a 1 to 4 scale, with 1 meaning *not important* and 4 meaning *very important*, the survey asked customers to rate the importance of several factors on their decisions to install energy efficient equipment without receiving an incentive from Focus on Energy. This question determined whether Focus on Energy’s energy efficiency initiatives motivated energy-efficient purchases. The surveys asked respondents to address the following factors:

- Information about energy savings from Focus on Energy representative
- Information from colleagues or friends who installed energy-efficient equipment and received an incentive from Focus on Energy
- Past participation in a Focus on Energy business incentive program over a year ago

The Evaluation Team estimated NPSO savings from respondents who rated any of the above factors as *very important* for any energy-efficient actions or installations reported. Additionally, the Evaluation Team called back respondents who passed the screening criteria for NPSO consideration to confirm the

energy-efficient actions they attributed to Focus on Energy. If a respondent could be reached for a callback interview, the information from the interview was used in the NPSO analysis. If a respondent could not be reached, the respondent’s original answers to the survey questions were used in the NPSO analysis. These callbacks were the only methodological change from the CY 2015 NPSO study.

The Evaluation Team applied the measure-level estimated gross savings from the CY 2018 Focus on Energy nonresidential evaluation activities for the reported NPSO measures.

Using the variables shown in Table K-4, Evaluation Team determined total nonresidential NPSO generated by Focus on Energy’s marketing and outreach efforts during the CY 2018 evaluation year.

**Table K-4. Nonresidential NPSO Analysis Method**

Variable	Metric	Source
A	Total MMBtu Spillover Savings from Survey Respondents	Survey data/engineering estimates
B	Total Nonparticipant Customers Surveyed	Survey disposition
C	Average MMBtu Savings Per Nonparticipant Surveyed	A ÷ B
D	Total Nonresidential Customers	2016 Wisconsin Potential Study
E	NPSO MMBtu Savings Applied to Population	C × D
F	Total Gross Program Evaluated Annual MMBtu Savings	CY 2018 Focus on Energy Evaluation
G	NPSO as a Percentage of Total Nonresidential Portfolio Evaluated Annual Gross MMBtu Savings	E ÷ F

## Spillover Results

Table K-5 shows the survey attrition of the nonresidential general population survey results to arrive at four nonparticipant customers who reported installing energy-efficient measures in CY 2018 where a Focus on Energy-related factor was *very important* in their purchasing decision.

**Table K-5. CY 2018 Nonresidential General Population Survey Attrition for NPSO Consideration**

Removal Reason	Respondents
<b>Original Contacted</b>	<b>140</b>
Participated in CY 2018 Focus on Energy program	0
Was not aware of Focus on Energy at time of interview	-73
No energy efficient equipment installed in past year	-42
Did not rate Focus on Energy as <i>very important</i> in purchasing decision of program eligible measure	-17
<b>Rated Focus on Energy as <i>very Important</i> in purchasing decision of program eligible measure</b>	<b>8</b>
Removed after callback interview completed	-4
<b>Customers with NPSO activity being attributed to Focus on Energy for CY 2018</b>	<b>4</b>

Table K-6 presents measures and gross evaluated kilowatt-hour savings the Evaluation Team attributed to Focus on Energy, generating average savings per NPSO measure of 20.95 MMBtus.

**Table K-6. Nonresidential NPSO Response Summary**

Reported Spillover Measures	Quantity	Unit Energy Savings (MMBtu) <sup>a</sup>	Total Savings (MMBtu)
LED Lighting - Ceiling	16	0.69 per unit	11.08
LED Lighting - Outside	2	1.20 per unit	2.40
Milk Cooler Compressor	2	3.66 per unit	7.33
Milk Pump VFD	2	0.07 per unit	0.14
<b>Total</b>	<b>8</b>		<b>20.95</b>

<sup>a</sup> UES estimated for each measure were generated from average CY 2018 Focus on Energy evaluated gross savings.

Table K-7 presents variables used to estimate overall NPSO for the Focus on Energy nonresidential portfolio, which the Evaluation Team estimated as 0.5% of total CY 2018 Focus on Energy evaluated program savings.

**Table K-7. Nonresidential NPSO Analysis Results**

Variable	Metric	Value	Source
A	Total MMBtu Spillover Savings from Survey Respondents	20.95	Survey data / Engineering Estimates
B	Total Nonparticipant Customers Surveyed	140	Survey disposition
C	Average MMBtu Savings Per Nonparticipant Surveyed	0.150	A÷B
D	Total Nonresidential Customers	122,934	2016 Wisconsin Potential Study
E	NPSO MMBtu Savings Applied to Population	18,395	C × D
F	Total Gross Program Evaluated Annual MMBtu Savings	3,629,900	CY 2018 Focus on Energy Evaluation
G	NPSO as a Percentage of Total CY 2018 Nonresidential Portfolio Evaluated Annual Gross MMBtu Savings	0.5%	E ÷ F

Variable E in Table K-8 above represents NPSO savings attributable to the CY 2018 Focus on Energy nonresidential portfolio. The Evaluation Team averaged the CY 2018 NPSO estimate of 0.5% and the CY 2015 NPSO Estimate of 7.0% by weighting the NPSO estimates by each program year’s gross evaluated annual MMBtu savings. This resulted in a 4.2% NPSO estimate for the quadrennial nonresidential portfolio. The Evaluation Team applied the 4.2% NPSO estimate to the quadrennial year’s nonresidential portfolio net savings. Table K-8 presents the NPSO estimate and gross evaluated annual MMBtu savings for the CY 2015 and CY 2018 program years in which NPSO analysis was conducted, along with the weighted average nonresidential NPSO estimate of 4.2% for the quadrennial.

**Table K-8. Quadrennial Nonresidential NPSO Results**

Program Year	NPSO	Gross Evaluated Annual MMBtu Savings
CY 2015	7.0%	4,913,681
CY 2018	0.5%	3,629,900
<b>Quadrennial</b>	<b>4.2%</b>	<b>n/a</b>

## Appendix L. Survey Instruments by Program

This appendix includes the CY 2018 survey instruments and ongoing participant satisfaction survey questions for several programs in Focus on Energy's residential and nonresidential sectors:

- Residential Programs
  - Simple Energy Efficiency Program Multifamily Participant Online Survey
  - Connected Devices Kits Program Participant Online Survey
  - Retail Lighting and Appliance Program Advanced Power Strip and Smart Thermostat Participant Survey
  - Direct-Mail Home Energy Assessment Program Participant Survey
- Nonresidential Programs
  - Business Incentive Program Participant Survey
  - Agriculture, Schools and Government Program Participant Survey
- Multifamily Programs
  - Strategic Energy Management Program Participant Interview Guide
  - Large Energy Users Program Participant Customer Survey

Special text indicates the following throughout all of the survey scripts:

**GREEN TEXT: INTERVIEW INSTRUCTIONS**

**RED TEXT: CATI PROGRAMMING INSTRUCTIONS**

Asterisk (\*): Survey questions labeled with an asterisk are core question that were asked across all Focus on Energy phone surveys, where appropriate.

## Residential Programs

### Simple Energy Efficiency Program Multifamily Participant Online Survey

#### A. Introduction and Screening

Records from Focus on Energy show that you received a pack of energy efficient products in 2018 through Focus on Energy's Simple Energy Efficiency Program. The following survey will ask about your participation in that program. At the end, you will be given the opportunity to enter to win a \$150 Visa gift card as a token of our appreciation for your time.

- A1. Do you recall receiving a free pack of energy-saving products from Focus on Energy? You likely signed up to receive the pack online or by phone.
1. Yes
  2. No **[THANK AND TERMINATE]**
  98. Don't know **[THANK AND TERMINATE]**

**[TERMINATE MESSAGE: WE ARE ONLY SURVEYING CUSTOMERS WHO RECALL PARTICIPATING IN THE PROGRAM. THANK YOU FOR YOUR TIME.]**

- A2. Do you still live at the same address where you received the pack from Focus on Energy?
1. Yes **[SKIP TO B1]**
  2. No
- A3. Our records show you received the following items in your pack. Did you bring any of these items with you to your new residence? Select all that apply.
1. Standard (A19) LEDs
  2. Reflector (BR30) LEDs
  3. Globe (G25) LEDs
  4. Candelabra (B11) LEDs
  5. Showerhead
  6. Bathroom faucet aerators
  7. Smart power strip
  8. Pipe wrap
  9. None of the above **[EXCLUSIVE] [THANK AND TERMINATE]**
  98. Don't know **[EXCLUSIVE] [THANK AND TERMINATE]**

- A4. Which of these items are currently installed at your new home? Select all that apply.
1. Standard (A19) LEDs
  2. Reflector (BR30) LEDs
  3. Globe (G25) LEDs
  4. Candelabra (B11) LEDs
  5. Showerhead
  6. Bathroom faucet aerators
  7. Smart power strip
  8. Pipe wrap
  9. None of the above **[EXCLUSIVE]**
  98. Don't know **[EXCLUSIVE]**
- A5. Who is the Wisconsin electric utility provider at your new address? **[THANK AND TERMINATE]**
1. **[RECORD RESPONSE]**
  2. I no longer live in Wisconsin
  98. **Don't know**

**[TERMINATE MESSAGE: THANK YOU FOR YOUR TIME. THAT IS ALL THE QUESTIONS WE HAVE FOR YOU TODAY.]**

## *B. Program Awareness*

- B1. \*Where did you most recently hear about Focus on Energy's Simple Energy Efficiency Program?  
**[RANDOMIZE]**
1. Property owner or manager
  2. Bill insert
  3. Direct mail (Brochure, postcard, newsletter, etc.)
  4. Family/friends/word-of-mouth
  5. Focus on Energy or Utility email
  6. Focus on Energy or Utility website
  7. Other website **[SPECIFY]**
  8. Social Media (Twitter, Facebook, Instagram, etc.)
  9. Television
  10. Radio
  11. Print media advertisement (magazine, newspaper, etc.)
  12. Focus on Energy or Utility representative
  13. Other **[SPECIFY]**
  98. Don't know **[SKIP TO B3]**

B2. \*Are there any other ways you heard about the program? Select all that apply. **[RANDOMIZE; DO NOT SHOW RESPONSE SELECTED IN B1]**

1. Property owner or manager
2. Bill insert
3. Direct mail (postcard, newsletter, etc.)
4. Family/friends/word-of-mouth
5. Focus on Energy or Utility email
6. Focus on Energy or Utility website
7. Other website **[SPECIFY]**
8. Social Media (Twitter, Facebook, Instagram, etc.)
9. Television
10. Radio
11. Print media advertisement (magazine, newspaper, etc.)
12. Focus on Energy or Utility representative
13. Other **[SPECIFY]**
14. No other ways **[EXCLUSIVE]**
98. Don't know **[EXCLUSIVE]**

B3. \*What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs? Select all that apply. **[RANDOMIZE]**

1. Property owner or manager
2. Bill insert
3. Direct mail (postcard, newsletter, etc.)
4. Family/friends/word-of-mouth
5. Focus on Energy or Utility email
6. Focus on Energy or Utility website
7. Other website **[SPECIFY]**
8. Social Media (Twitter, Facebook, Instagram, etc.)
9. Television
10. Radio
11. Print media advertisement (magazine, newspaper, etc.)
12. Focus on Energy or Utility representative
13. Other **[SPECIFY]**
14. Do not want to receive information **[EXCLUSIVE]**
98. Don't know **[EXCLUSIVE]**

B4. \*What motivated you to participate in the program? Select up to two responses.

1. Reducing my utility bill
2. Protecting the environment
3. Making free home upgrades
4. Trying out new items to see if I like them
5. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## C. LEDs

The next questions are about the energy-saving items you received in your Program pack.

### A19 LED Mix (6 total)

**[ASK SECTION IF PACK NAME = LIGHT BULB]**

Our records show you received six LED light bulbs – two rated at 11 watts (11W) and four rated at 9 watts (9W). These look like your standard light bulbs; the bulbs with higher wattage ratings are brighter.

C1. How many of the 11W LEDs are currently installed in your home? These are the brighter bulbs that you received.

1. 0
2. 1
3. 2 **[SKIP TO C6]**
98. Don't know **[SKIP TO C7]**

C2. Did you install any of the brighter LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

C3. **[ASK IF C2=NO]** Why did you not install the brighter LEDs you received? **[RANDOMIZE]**

1. Property owner or manager would not allow install
2. Difficult to install **C3\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
3. Waiting for other bulbs to burn out
4. Never planned to install
5. Other **[SPECIFY]**
98. Don't know



- C4. **[ASK IF C2=YES]** Why did you install but later remove the brighter LEDs you received?  
**[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Didn't like the color
  5. Delay in light coming on
  6. Didn't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C5. What did you do with the brighter LED(s) *not currently* installed? Select all that apply.
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C6. **[ASK IF NOT ASKED IN C3]** Did you have any difficulty installing the brighter LEDs you received?
1. Yes **C6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- C7. How satisfied are you with the brighter LEDs you received?
1. Very satisfied **[SKIP TO D1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO D1]**

- C8. Why are you **[C7]**? Select all that apply. **[RANDOMIZE]**
1. Burned out/broke/stopped working
  2. Don't fit properly in fixture
  3. Difficult/unable to install
  4. Not bright enough
  5. Don't like the color
  6. Delay in light coming on
  7. Don't work with dimmer/three-way switch
  8. Flicker when turned on
  9. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C9. How many of the 9-watt LEDs are currently installed in your home? These bulbs are less bright than the others you received.
1. 0
  2. 1
  3. 2
  4. 3
  5. 4 **[SKIP TO C14]**
  98. Don't know **[SKIP TO C15]**
- C10. Did you install any of the less bright LEDs you received but later remove them?
1. Yes
  2. No
  98. Don't know
- C11. **[ASK IF C10=NO]** Why did you not install the less bright LEDs you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **C11\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Waiting for other bulbs to burn out
  4. Never planned to install
  5. Other **[SPECIFY]**
  98. Don't know

- C12. **[ASK IF C10=YES]** Why did you install but later remove the less bright LEDs you received?  
**[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Didn't like the color
  5. Delay in light coming on
  6. Didn't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C13. What did you do with the less bright LED(s) *not currently* installed? **SELECT ALL THAT APPLY.**
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C14. **[ASK IF C11 NOT ASKED]** Did you have any difficulty installing the less bright LEDs you received?
1. Yes **C14\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- C15. How satisfied are you with the less bright LEDs you received?
1. Very satisfied **[SKIP TO D1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO D1]**

C16. Why are you **[C15]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *A19 LEDs (2)*

**[ASK SECTION IF KIT NAME = FIXED SHOWERHEAD, DECORATIVE LIGHT]**

Our records show you received two A-lamp (standard) LEDs in your energy-saving pack. A-lamps are typical light bulbs.

C17. How many standard LEDs are currently installed in your home?

1. 0
2. 1
3. 2 **[SKIP TO C22]**
98. Don't know **[SKIP TO C23]**

C18. Did you install any of the standard LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

C19. **[ASK IF C18=NO]** Why did you not install the standard LEDs you received? **[RANDOMIZE]**

1. Property owner or manager would not allow install
2. Difficult to install **C19\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
3. Waiting for other bulbs to burn out
4. Never planned to install
5. Other **[SPECIFY]**
98. Don't know

- C20. **[ASK IF C18=YES]** Why did you install but later remove the standard LEDs you received?  
**[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Didn't like the color
  5. Delay in light coming on
  6. Didn't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C21. What did you do with the standard LED(s) *not currently* installed? **Select all that apply.**
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C22. **[ASK IF C19 NOT ASKED]** Did you have any difficulty installing the standard LEDs you received?
1. Yes **C22\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- C23. How satisfied are you with the standard LEDs you received?
1. Very satisfied **[SKIP TO D1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO D1]**

C24. Why are you **[C23]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

*A19 LEDs (3)*

**[ASK SECTION IF KIT NAME = FOCUS]**

Our records show you received three LEDs in your energy-saving pack. These are standard light bulbs.

C25. How many of the LEDs are currently installed in your home?

1. 0
2. 1
3. 2
4. 3 **[SKIP TO C30]**
98. Don't know **[SKIP TO C31]**

C26. Did you install any of the LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

C27. **[ASK IF C26=NO]** Why did you not install the LEDs you received? **[RANDOMIZE]**

1. Property owner or manager would not allow install
2. Difficult to install **C27\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
3. Waiting for other bulbs to burn out
4. Never planned to install
5. Other **[SPECIFY]**
98. Don't know

C28. **[ASK IF C26=YES]** Why did you install but later remove the LEDs you received? **[RANDOMIZE]**

1. Property owner or manager would not allow install
2. Burned out/broke/stopped working
3. Not bright enough
4. Didn't like the color
5. Delay in light coming on
6. Didn't work with dimmer/three-way switch
7. Flickered when turned on
8. Other **[SPECIFY]**
98. Don't know

C29. What did you do with the LED(s) not currently installed? **Select all that apply.**

1. Stored for future use
2. Discarded/recycled
3. Gave to someone else
4. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

C30. **[ASK IF C27 NOT ASKED]** Did you have any difficulty installing the LEDs you received?

1. Yes **C30\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
2. No
98. Don't know

C31. How satisfied are you with the LEDs you received?

1. Very satisfied **[SKIP TO D1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO D1]**

C32. Why are you **[C31]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *Globe LEDs*

**[ASK SECTION IF KIT NAME = FIXED SHOWERHEAD, HAND-WAND SHOWERHEAD]**

Our records show you received three globe LED light bulbs. Globes look like standard light bulbs, but the bulb is larger and rounder.

C33. How many of the globe LEDs are currently installed in your home?

1. 0
2. 1
3. 2
4. 3 **[SKIP TO C38]**
98. Don't know **[SKIP TO C39]**

C34. Did you install any of the globe LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

C35. **[ASK IF C34=NO]** Why did you not install the globe LEDs you received? **[RANDOMIZE]**

1. Property owner or manager would not allow install
2. Difficult to install **C35\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
3. Waiting for other bulbs to burn out
4. Never planned to install
5. Other **[SPECIFY]**
98. Don't know



- C36. **[ASK IF C34=YES]** Why did you install but later remove the globe LEDs you received?  
**[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Didn't like the color
  5. Delay in light coming on
  6. Didn't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C37. What did you do with the globe LED(s) *not currently* installed? Select all that apply.
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C38. **[ASK IF C35 NOT ASKED]** Did you have any difficulty installing the globe LEDs you received?
1. Yes **C38\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- C39. How satisfied are you with the globe LEDs you received?
1. Very satisfied **[SKIP TO C41]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO C41]**

C40. Why are you **[C39]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *Reflector LEDs*

**[ASK SECTION IF KIT NAME = FLOOD LIGHT]**

Our records show you received six flood (reflector) LED light bulbs. Reflectors typically are triangle-shaped and emit light through one large flat lens on top of the bulb, as opposed to all the way around like a standard bulb.

C41. How many of the reflector LEDs are currently installed in your home?

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5
7. 6 **[SKIP TO C46]**
98. Don't know **[SKIP TO C47]**

C42. Did you install any of the reflector LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

- C43. **[ASK IF C42=NO]** Why did you not install the reflector LEDs you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **C43\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Waiting for other bulbs to burn out
  4. Never planned to install
  5. Other **[SPECIFY]**
  98. Don't know
- C44. **[ASK IF C42=YES]** Why did you install but later remove the reflector LEDs you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Don't like the color
  5. Delay in light coming on
  6. Don't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C45. What did you do with the LED(s) not currently installed? **Select all that apply.**
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C46. **[ASK IF C43 NOT ASKED]** Did you have any difficulty installing the reflector LEDs you received?
1. Yes **C46\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know

C47. How satisfied are you with the reflector LEDs you received?

1. Very satisfied **[SKIP TO C49]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO C49]**

C48. Why are you **[C47]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *Candelabra LEDs*

**[ASK SECTION IF KIT NAME = DECORATIVE LIGHT]**

Our records show you also received six candelabra LED bulbs in your energy-saving kit. Candelabra bulbs are smaller decorative lamps with a bulb shaped like a candle flame.

C49. How many of the candelabra LEDs are currently installed in your home?

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5
7. 6 **[SKIP TO C54]**
98. Don't know **[SKIP TO C55]**

C50. Did you install any of the candelabra LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

- C51. **[ASK IF C50=NO]** Why did you not install the candelabra LEDs you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **C51\_2. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Waiting for other bulbs to burn out
  4. Never planned to install
  5. Other **[SPECIFY]**
  98. Don't know
- C52. **[ASK IF C50=YES]** Why did you install but later remove the candelabra LEDs you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Burned out/broke/stopped working
  3. Not bright enough
  4. Didn't like the color
  5. Delay in light coming on
  6. Didn't work with dimmer/three-way switch
  7. Flickered when turned on
  8. Other **[SPECIFY]**
  98. Don't know
- C53. What did you do with the candelabra LED(s) not currently installed? **Select all that apply.**
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C54. **[ASK IF C51 NOT ASKED]** Did you have any difficulty installing the candelabra LEDs you received?
1. Yes **C54\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know

C55. How satisfied are you with the candelabra LEDs you received?

1. Very satisfied **[SKIP TO D1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO D1]**

C56. Why are you **[C55]**? Select all that apply. **[RANDOMIZE]**

1. Burned out/broke/stopped working
2. Don't fit properly in fixture
3. Difficult/unable to install
4. Not bright enough
5. Don't like the color
6. Delay in light coming on
7. Don't work with dimmer/three-way switch
8. Flicker when turned on
9. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *D. Smart Strip*

**[ASK SECTION IF KIT NAME = FOCUS]**

Our records show you also received a smart power strip.

D1. Is the smart power strip you received currently being used in your home?

1. Yes **[SKIP TO D6]**
2. No
98. Don't know **[SKIP TO D8]**

D2. Did you use the smart power strip you received but later remove it?

1. Yes
2. No
98. Don't know

D3. **[ASK IF D2=NO]** Why did you not use the smart power strip you received? **[RANDOMIZE]**

1. Difficult/unable to set up
2. Didn't like how it looked
3. Didn't like how the attached equipment worked when hooked up to it
4. Not enough regular outlets
5. Never planned to install
6. Other **[SPECIFY]**
98. Don't know

- D4. **[ASK IF D2=YES]** Why did you stop using the smart power strip you received? **[RANDOMIZE]**
1. Broken/didn't work
  2. Didn't like how it looked
  3. Didn't like how the attached equipment worked when hooked up to it
  4. Not enough regular outlets
  5. Other **[SPECIFY]**
  98. Don't know
- D5. What did you do with the smart power strip?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- D6. **[ASK IF D3 NOT ASKED]** For what purpose(s) are you using your smart power strip? Select all that apply.
1. Home entertainment center (TVs, cable boxes, streaming devices Apple TV or Roku, DVD players)
  2. Home office (laptops, desktop computers, computer monitors, scanners, printers, fax machines)
  3. Other equipment **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- D7. Did you have any difficulty using the smart power strip to operate your electronics?
1. Yes **D7\_1. [ASK: WHAT WAS DIFFICULT ABOUT USING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- D8. How satisfied are you with the smart power strip you received?
1. Very satisfied **[SKIP TO E1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO E1]**

- D9. Why are you **[D8]**? Select all that apply. **[RANDOMIZE]**
1. Broken/doesn't work
  2. Difficult/unable to set up
  3. Don't like how it looks
  4. Don't like how the attached equipment works when hooked up to it
  5. Not enough regular outlets
  6. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

## E. Showerhead

**[ASK SECTION IF KIT NAME = FIXED SHOWERHEAD, HAND-WAND SHOWERHEAD]**

Our records show you also received a showerhead.

- E1. Is the showerhead you received currently installed in your home?
1. Yes **[SKIP TO E6]**
  2. No
  98. Don't know **[SKIP TO E7]**
- E2. Did you install the showerhead you received but later remove it?
1. Yes
  2. No
  98. Don't know
- E3. **[ASK IF E2=NO]** Why did you not install the showerhead you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **E3\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Didn't fit properly
  4. Didn't like how it looked
  5. Never planned to install
  6. Other **[SPECIFY]**
  98. Don't know



- E4. **[ASK IF E2=YES]** Why did you install but later remove the showerhead you received?  
**[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Broken/didn't work
  3. Difficult to install
  4. Didn't like the water pressure
  5. Didn't like how it looked
  6. Other **[SPECIFY]**
  98. Don't know
- E5. What did you do with the showerhead?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- E6. **[ASK IF E3 NOT ASKED]** Did you have any difficulty installing the water-saving showerhead you received?
1. Yes **E6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. Wrong size/didn't fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- E7. How satisfied are you with the showerhead you received?
1. Very satisfied **[SKIP TO F1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO F1]**
- E8. Why are you **[E7]**? Select all that apply. **[RANDOMIZE]**
1. Broken/doesn't work
  2. Difficult/unable to install
  3. Doesn't fit properly
  4. Don't like the water pressure
  5. Don't like how it looked
  6. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

## F. Faucet Aerators

**[ASK SECTION IF KIT NAME = FIXED SHOWERHEAD, HAND-WAND SHOWERHEAD]**

Our records show you also received two bathroom faucet aerators.

- F1. How many of the faucet aerators you received are currently installed in your home?
1. 0
  2. 1
  3. 2 **[SKIP TO F6]**
  98. Don't know **[SKIP TO F7]**
- F2. Did you install any of the faucet aerators you received but later remove them?
1. Yes
  2. No
  98. Don't know
- F3. **[ASK IF F2=NO]** Why did you not install the faucet aerators you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **F3\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Didn't fit properly
  4. Didn't like how it looked
  5. Never planned to install
  6. Other **[SPECIFY]**
  98. Don't know
- F4. **[ASK IF F2=YES]** Why did you install but later remove the faucet aerators you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Broken/didn't work
  3. Didn't like the water pressure
  4. Didn't like how it looked
  5. Other **[SPECIFY]**
  98. Don't know

- F5. What did you do with the faucet aerator(s) *not currently* installed? Select all that apply.
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- F6. **[ASK IF F3 NOT ASKED]** Did you have any difficulty installing the faucet aerators you received?
1. Yes **F6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- F7. How satisfied are you with the faucet aerators you received?
1. Very satisfied **[SKIP TO G1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO G1]**
- F8. Why are you **[F7]**? Select all that apply. **[RANDOMIZE]**
1. Broken/didn't work
  2. Difficult/unable to install
  3. Don't fit properly
  4. Don't like the water pressure
  5. Don't like how they look
  6. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

## G. Pipe Wrap Insulation

**[ASK SECTION IF KIT NAME = LIGHT BULB, FIXED SHOWERHEAD, HAND-WAND SHOWERHEAD, FOCUS]**

Our records also show you received pipe wrap insulation. This is a roll of one-inch wide stripping that you wrap around your water heater's pipes.

- G1. Is the pipe wrap you received currently installed in your home?
1. Yes **[SKIP TO G6]**
  2. No
  98. Don't know **[SKIP TO G7]**

- G2. Did you install the pipe wrap you received but later remove it?
1. Yes
  2. No
  98. Don't know
- G3. **[ASK IF G2=NO]** Why did you not install the pipe wrap you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Difficult to install **G3\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. Wrong size/did not fit
    2. Needed help/permission from property owner or manager
    3. Other **[SPECIFY]**
    4. Don't know
  3. Wrong size
  4. Didn't like how it looked
  5. Never planned to install
  6. Other **[SPECIFY]**
  98. Don't know
- G4. **[ASK IF G2=NO]** Why did you install but later remove the pipe wrap you received? **[RANDOMIZE]**
1. Property owner or manager would not allow install
  2. Didn't like how it looked
  3. Other **[SPECIFY]**
  98. Don't know
- G5. What did you do with the pipe wrap?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- G6. **[ASK IF G3 NOT ASKED]** Did you have any difficulty installing the pipe wrap you received?
1. Yes **G6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know

- G7. How satisfied are you with the pipe wrap you received?
1. Very satisfied **[SKIP TO H1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO H1]**

- G8. Why are you **[G7]**? Select all that apply. **[RANDOMIZE]**
1. Difficult to install
  2. Wrong size
  3. Don't like how it looked
  4. Never planned to install
  5. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

## *H. Hot Water Temperature Card*

**[ASK SECTION IF KIT NAME = FIXED SHOWERHEAD, HAND-WAND SHOWERHEAD, FOCUS]**

Your kit should have included a hot water temperature card that suggested turning down your water heater to save more energy.

- H1. Did you use the card to test your water temperature?
1. Yes **[SKIP TO H3]**
  2. No
  98. Don't know **[SKIP TO I1]**

- H2. Why did you not use the card to test your water temperature? **[SKIP TO I1]**
1. No access to water heater
  2. Not interested in using it
  3. Other **[SPECIFY]**
  98. Don't know

- H3. Did you reduce the temperature of your water heater as a result of using the card?
1. Yes
  2. No
  98. Don't know

## I. Program Satisfaction

The next questions will ask about your experience with the program.

- I1. Did you request your kit using the Focus on Energy website, or did you call the 1-800 number?
  1. Website
  2. 1-800 number **[SKIP TO I4]**
  3. Other **[SPECIFY] [SKIP TO I4]**
  98. Don't know **[SKIP TO I4]**
  
- I2. How easy was it to fill out the online request for your energy efficiency kit?
  1. Very easy **[SKIP TO I4]**
  2. Somewhat easy
  3. Somewhat difficult
  4. Very difficult
  98. Don't know **[SKIP TO I4]**
  
- I3. Why was it **[I2]**?
  1. **[RECORD RESPONSE]**
  98. Don't know
  
- I4. After you submitted the request for your energy efficiency kit, how long did it take to receive the pack in the mail?
  1. Less than 2 weeks
  2. Between 2 and 4 weeks
  3. Between 4 and 6 weeks
  4. More than 6 weeks
  98. Don't know
  
- I5. How satisfied were you with how long it took to receive the kit?
  1. Very satisfied **[SKIP TO J1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO J1]**
  
- I6. Why were you **[I5]** with how long it took to receive the kit?
  1. **[RECORD RESPONSE]**
  98. Don't know

## J. Energy-Saving Actions

J1. You should have received in your kit a pamphlet with information on actions you can take to save energy. Which of these actions listed in the pamphlet have you taken? Select all that apply.

**[RANDOMIZE]**

1. Use dimmers on indoor lighting to lower light levels
2. Change my furnace filter
3. Leave shades open during the day to heat my home
4. Keep the freezer full
5. Wash laundry in cold water
6. Reduce my water heater temperature to 120 degrees
7. Did not take any of these actions **J1\_1. [ASK: WHY DID YOU NOT TAKE ANY OF THESE ACTIONS?]**
  1. Did not want to take any of these actions
  2. Already took all of these actions before receiving pamphlet
  3. Don't know
8. Did not receive pamphlet **[EXCLUSIVE]**
98. Don't know **[EXCLUSIVE]**

J2. Since participating in the program, have you taken any other actions to reduce energy consumption that you have not already mentioned? An energy efficiency action could be turning down the temperature on your thermostat or water heater or powering down appliances or computers.

1. Yes
2. No
98. Don't know

J3. **[ASK IF J2=YES]** Specifically, what other actions have you taken? Select all that apply.

**[RANDOMIZE]**

1. Turn down the temperature on my furnace
2. Turn up the temperature on my air conditioner
3. Take shorter or fewer showers
4. Not leave water running
5. Turn off appliances
6. Turn off computers
7. Turn off lights
8. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

**[IF NO ACTIONS SELECTED FROM J1 AND J3, THEN SKIP TO K1]**

- J4. Did the Program motivate you to **[INSERT EACH ONE SELECTED IN J1 AND J3]**?
1. Yes
  2. No
  98. Don't know

## *K. Cross-Program Marketing*

- K1. \*Are you aware of any other Focus on Energy programs or rebates such as those for **[LED BULBS, ENERGY-EFFICIENT UPGRADES, OR HOME ENERGY AUDITS?]**
1. Yes
  2. No **[SKIP TO L1]**
  98. Don't know **[SKIP TO L1]**
- K2. \*Which programs or rebates are you aware of? Select all that apply. **[RANDOMIZE]**
1. Home Performance with ENERGY STAR (energy assessments, home audits, weatherization, insulation, HVAC equipment, heating equipment)
  2. New Homes (new construction)
  3. Appliance Recycling (refrigerator/freezer recycling/pickup)
  4. Retail Lighting (LED/CFL discounts rebates)
  5. Multifamily (direct install, free products for renters)
  6. Renewables (solar PV, ground-source heat pumps, geothermal)
  7. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- K3. \*Have you participated in any other Focus on Energy programs such as rebates on LED bulbs, energy-efficient upgrades, or home energy audits?
1. Yes
  2. No **[SKIP TO K5]**
  98. Don't know **[SKIP TO K5]**
- K4. \*Which programs, rebates, or projects have you participated in? Select all that apply. **[RANDOMIZE]**
1. Appliance Recycling
  2. Retail Lighting
  3. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**



- K5. Do you plan to participate in any Focus on Energy programs, rebates, or projects in the next year?
1. Yes **K5\_1. [ASK: WHICH PROGRAMS DO YOU PLAN TO PARTICIPATE IN? SELECT ALL THAT APPLY. RANDOMIZE]**
    1. Appliance Recycling
    2. Retail Lighting
    3. Other **[SPECIFY]**
    4. Don't know **[EXCLUSIVE]**
  2. No
  98. Don't know

## L. Customer Demographics

The last few questions are for statistical purposes only.

- L1. What type of fuel does your water heater use?
1. Natural gas
  2. Electricity
  3. Propane/Bottled gas
  4. Wood
  5. Other **[SPECIFY]**
  98. Don't know
- L2. What is the highest level of school that you have completed?
1. Less than 9th grade
  2. 9th to 12th grade; no diploma
  3. High school graduate (includes GED)
  4. Some college, no degree
  5. Associate's degree
  6. Bachelor's degree
  7. Graduate or professional degree
  99. (Refused)
- L3. Which of the following categories best represents your age?
1. 18-24
  2. 25-34
  3. 35-44
  4. 45-54
  5. 55-64
  6. 65-74
  7. 75 or older
  99. (Refused)

- L4. Which category best describes your total household income in 2017 before taxes?
1. Less than \$20,000
  2. \$20,000 to \$49,999
  3. \$50,000 to \$74,999
  4. \$75,000 to \$99,999
  5. \$100,000 to \$149,999
  6. \$150,000 to \$199,999
  7. \$200,000 or more
  99. (Refused)

**[CLOSING SCRIPT]**

Those are all the questions we have. Focus on Energy appreciates your input.

Thank you very much for your time.

To learn about additional opportunities to save energy and money in your home, please visit [focusonenergy.com](http://focusonenergy.com).

## Connected Devices Kits Program Participant Online Survey

### A. Introduction and Screening

Records from Focus on Energy show that you received a kit of energy efficient products in in 2017 or 2018 through Focus on Energy’s Connected Devices Kit Program. The following survey will ask about your participation in that program. At the end, you will be given the opportunity to enter to win a \$150 Visa gift card as a token of our appreciation for your time.

- A1. Do you recall receiving a free kit of energy-saving products (such as smart thermostats, connected LED lighting, or smart power strips) from Focus on Energy? You likely signed up to receive the kit online or by phone.
1. Yes
  2. No **[THANK AND TERMINATE]**
  98. Don’t know **[THANK AND TERMINATE]**

**[TERMINATE MESSAGE: WE ARE ONLY SURVEYING CUSTOMERS WHO RECALL PARTICIPATING IN THE PROGRAM. THANK YOU FOR YOUR TIME.]**

### B. Program Awareness

- B1. \*Where did you most recently hear about Focus on Energy’s Connected Devices Kit Program?
- [RANDOMIZE]**
1. Internet service provider
  2. Bill insert
  3. Direct mail (postcard, newsletter, etc.)
  4. Family/friends/word-of-mouth
  5. Focus on Energy or Utility email
  6. Focus on Energy or Utility website
  7. Other website **[SPECIFY]**
  8. Social Media (Twitter, Facebook, Instagram, etc.)
  9. Television
  10. Radio
  11. Print media advertisement (magazine, newspaper, etc.)
  12. Focus on Energy or Utility representative
  13. Other **[SPECIFY]**
  98. Don’t know **[SKIP TO B3]**

B2. \*Are there any other ways you heard about the program? Select all that apply. **[RANDOMIZE; DO NOT SHOW RESPONSE SELECTED IN B1]**

1. Internet service provider
2. Bill insert
3. Direct mail (postcard, newsletter, etc.)
4. Family/friends/word-of-mouth
5. Focus on Energy or Utility email
6. Focus on Energy or Utility website
7. Other website **[SPECIFY]**
8. Social Media (Twitter, Facebook, Instagram, etc.)
9. Television
10. Radio
11. Print media advertisement (magazine, newspaper, etc.)
12. Focus on Energy or Utility representative
13. Other **[SPECIFY]**
14. No other ways **[EXCLUSIVE]**
98. Don't know **[EXCLUSIVE]**

B3. \*What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs? Select all that apply. **[RANDOMIZE]**

1. Internet service provider
2. Bill insert
3. Direct mail (postcard, newsletter, etc.)
4. Family/friends/word-of-mouth
5. Focus on Energy or Utility email
6. Focus on Energy or Utility website
7. Other website **[SPECIFY]**
8. Social Media (Twitter, Facebook, Instagram, etc.)
9. Television
10. Radio
11. Print media advertisement (magazine, newspaper, etc.)
12. Focus on Energy or Utility representative
13. Other **[SPECIFY]**
14. Do not want to receive information **[EXCLUSIVE]**
98. Don't know **[EXCLUSIVE]**

B4. \*What motivated you to participate in the program? Select up to two responses.

1. Reducing my utility bill
2. Protecting the environment
3. Making home upgrades **[HIDE IF COPAY]** for free
4. Trying out new items to see if I like them
5. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## C. Kit #1: Connected Lighting and Smart Strip

The next questions are about the energy-saving items you received in your Program kit.

Our records show you received a Philips Hue White Starter Kit, which contained two smart LED light bulbs that can be controlled from smart devices, such as a smart phone or a tablet.

C1. How many of the smart LEDs from the kit are currently installed in your home?

1. 0
2. 1
3. 2 **[SKIP TO C6]**
98. Don't know **[SKIP TO O10]**

C2. Did you install any of the smart LEDs you received but later remove them?

1. Yes
2. No
98. Don't know

C3. **[ASK IF C2=NO]** Why did you not install the smart LEDs you received?

1. Difficult to install **C3\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
  1. Wrong size/did not fit
  2. Needed help/permission from property owner or manager
  3. Other **[SPECIFY]**
  4. Don't know
2. Waiting for other bulbs to burn out
3. Other **[SPECIFY]**
98. Don't know

- C4. **[ASK IF C2=YES]** Why did you install but later remove the smart LEDs you received? Select all that apply. **[RANDOMIZE]**
1. Burned out/broke/stopped working
  2. Not bright enough
  3. Didn't like the color
  4. Delay in light coming on
  5. Didn't work with dimmer/three-way switch
  6. Flickered when turned on
  7. Had difficulty controlling using smart device **O4\_7. [ASK: WHAT WAS DIFFICULT ABOUT CONTROLLING THEM?]**
    1. Could not download smart device app
    2. Downloaded app, but could not connect app to smart LEDs
    3. Connected app to smart LEDs, but could not control lighting how I wanted **[SPECIFY]**
    4. Other **[SPECIFY]**
    5. Don't know
    6. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C5. What did you do with the LED(s) not currently installed? Select all that apply.
1. Stored for future use
  2. Discarded/recycled
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
- C6. **[ASK IF NOT ASKED IN C3]** Did you have any difficulty installing the LEDs you received into your home's lighting sockets?
1. Yes **C6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING THEM?]**
    1. Wrong size/did not fit
    2. Other **[SPECIFY]**
    3. Don't know
  2. No
  98. Don't know
- C7. Do you use the Philips Hue app to control your lights (using your smart phone, a smart home device, or a Philips wireless dimmer switch)?
1. Yes
  2. No
  98. Don't know

- C8. **[ASK IF O7=NO]** Why do you not use the app to control your lights?
1. Could not download the smart device app
  2. Downloaded the app, but could not connect app to smart LEDs
  3. Connected the app to smart LEDs, but the app was too difficult to program
  4. Programmed the app, but I prefer to use my existing wall switch
  98. Don't know
- C9. **[ASK IF O7=YES]** How often do you control your lights using your smart home, smart home device, or Philips wireless dimmer instead of your existing wall switch?
1. Every time (multiple times per day)
  2. Daily (about once a day)
  3. Weekly (less than once a day)
  4. Rarely (less than once a week)
  5. Never
  98. Don't know
- C10. How satisfied are you with the smart LEDs you received?
1. Very satisfied **[SKIP TO D1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO D1]**
- C11. **[ASK IF C1>0 OR C2=NO]** Why are you **[O10]**? Select all that apply. **[RANDOMIZE]**
1. Burned out/broke/stopped working
  2. Don't fit properly in fixture
  3. Difficult/unable to install
  4. Not bright enough
  5. Don't like the color
  6. Delay in light coming on
  7. Don't work with smart device app
  8. Flicker when turned on
  9. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

Our records show you also received a smart power strip.

- C12. Is the smart power strip you received currently being used in your home?
1. Yes **[SKIP TO D6]**
  2. No
  98. Don't know **[SKIP TO D8]**

- C13. Did you start using the smart power strip you received but stop using it?
1. Yes
  2. No
  98. Don't know
- C14. **[ASK IF D2=NO]** Why did you not use the smart power strip you received? **[RANDOMIZE]**
1. Difficult/unable to set up
  2. Didn't like how it looked
  3. Didn't like how the attached equipment worked when hooked up to it
  4. Not enough regular outlets
  5. Never planned to use
  6. Other **[SPECIFY]**
  98. Don't know
- C15. **[ASK IF D2=YES]** Why did you stop using the smart power strip you received? **[RANDOMIZE]**
1. Broken/didn't work
  2. Didn't like how it looked
  3. Didn't like how the attached equipment worked when hooked up to it
  4. Not enough regular outlets
  5. Other **[SPECIFY]**
  98. Don't know
- C16. What did you do with the smart power strip?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- C17. **[ASK IF D1=YES]** For what purpose(s) are you using your smart power strip? Select all that apply.
1. Home entertainment center (TVs, cable boxes, streaming devices Apple TV or Roku, DVD players)
  2. Home office (laptops, desktop computers, computer monitors, scanners, printers, fax machines)
  3. Other equipment **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**



- C18. **[ASK IF D1=YES]** Have you had any difficulty using the smart power strip to operate your electronics?
1. Yes **O18\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT USING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- C19. How satisfied are you with the smart power strip you received?
1. Very satisfied **[SKIP TO P1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO P1]**
- C20. Why are you **[D8]**? Select all that apply. **[RANDOMIZE]**
1. Broken/doesn't work
  2. Difficult/unable to set up
  3. Don't like how it looks
  4. Don't like how the attached equipment works when hooked up to it
  5. Not enough regular outlets
  6. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**

## *D. Kit #2: Emerson Sensi Wi-Fi Programmable Thermostat*

The next questions are about the Emerson Sensi Wi-Fi thermostat you received in your kit.

- D1. Is the Sensi thermostat you received currently installed in your home?
1. Yes **[SKIP TO P6]**
  2. No
  98. Don't know **[SKIP TO P17]**
- D2. Did you install the Sensi thermostat but later remove it?
1. Yes
  2. No
  98. Don't know **[SKIP TO P17]**

- D3. **[ASK IF P2=NO]** Why did you not install the Sensi thermostat you received? **[RANDOMIZE]**
1. Difficult/unable to set up
  2. Didn't like how it looked
  3. Never planned to install
  4. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  5. Other **[SPECIFY]**
  98. Don't know
- D4. **[ASK IF P2=YES]** Why did you install but later remove the Sensi thermostat you received? **[RANDOMIZE]**
1. Broken/didn't work
  2. Difficult/unable to set up
  3. Couldn't connect smart device(s) to it
  4. Difficult to program using smart device(s)
  5. Didn't like how it looked
  6. It made my home less comfortable
  7. I saw an increase in my utility bills
  8. It did not work with my heating/cooling equipment
  9. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  10. Other **[SPECIFY]**
  98. Don't know
- D5. What did you do with the Sensi thermostat?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- D6. **[ASK IF P3=1 OR NOT ASKED]** Did you have any difficulty installing the Sensi thermostat you received?
1. Yes
  2. No **[SKIP TO P10]**
  98. Don't know **[SKIP TO P10]**
- D7. What was difficult about installing it?
1. **[RECORD RESPONSE]**
  98. Don't know

- D8. Did you watch Sensi’s online video tutorial for help with installation?
1. Yes
  2. No
  98. Don’t know

**[IF P1=NO, THEN SKIP TO P17]**

- D9. What equipment does your Sensi thermostat control? Select all that apply.
1. Furnace – Natural gas
  2. Furnace – LP/Propane
  3. Boiler – Natural gas
  4. Boiler – LP/Propane
  5. Air-source heat pump
  6. Central air conditioner
  7. Other
  98. Don’t know

- D10. Which smart phones and/or smart home systems do you have in your home? Select all that apply.

**[RANDOMIZE]**

1. iPhone
2. Android
3. Apple HomeKit
4. Amazon Alexa
5. Wink
6. Google Home
7. Other **[SPECIFY]**
8. None of the above **[EXCLUSIVE] [SKIP TO P17]**
98. Don’t know **[EXCLUSIVE] [SKIP TO P17]**

- D11. **[ASK IF P10=1, 2, OR 7]** Have you had any difficulty programming the Sensi thermostat from your smart device(s)?

1. Yes **P11\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT PROGRAMMING IT?]**
  1. Did not try downloading the Sensi smart device app
  2. Tried to download the Sensi smart device app but could not
  3. Downloaded Sensi app but could not connect it to thermostat
  4. Connected Sensi app to thermostat but could not easily program the thermostat **[SPECIFY]**
  5. Other **[SPECIFY]**
  6. Don’t know
2. No
98. Don’t know

- D12. **[ASK IF P10=3, 4, 5, OR 6]** Have you had any difficulty programming the Sensi thermostat from your smart home system(s)?
1. Yes **P12\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT PROGRAMMING IT?]**
    1. Could not connect my smart home device to the thermostat
    2. Connected my smart home device to thermostat but could not program the thermostat using my smart home device
    3. Other **[SPECIFY]**
    4. Don't know
  2. No
  98. Don't know
- D13. What type of thermostat did you have before participating in the program?
1. Programmable thermostat (allows user to use adjust temperature using settings that take effect at different times of day)
  2. Smart thermostat (automatically changes temperature and settings throughout day without user input)
  3. Manual thermostat (user manually turns on heating/cooling and adjusts temperature)
  4. I did not have a thermostat
  98. Don't know
- D14. **[ASK IF P13≠3]** How often do you override the programming on your Sensi thermostat?
1. Less often than before
  2. About as often as before
  3. More often than before
  4. My previous thermostat was not programmable
  5. I did not previously own a thermostat
  98. Don't know
- D15. How has your home comfort level changed as a result of installing your Sensi thermostat?
1. More comfortable than before
  2. About as comfortable as before
  3. Less comfortable than before
  98. Don't know
- D16. Have you noticed a change in your monthly energy bill as a result of installing your Sensi thermostat?
1. Yes, my bills are lower
  2. Yes, my bills are higher
  3. No, I have not noticed a change
  98. Don't know

D17. How satisfied are you with the Sensi thermostat?

1. Very satisfied **[SKIP TO Q1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO Q1]**

D18. Why are you **[P17]**? Select all that apply. **[RANDOMIZE]**

1. Broken/doesn't work
2. Difficult/unable to set up
3. Unable to connect smart device(s) to it
4. Difficult to program using smart device(s)
5. Don't like how it looks
6. Home is less comfortable
7. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *E. Kit #3: Nest Learning Thermostat*

The next questions are about the Nest smart thermostat you received in your kit.

E1. Is the Nest thermostat you received currently installed in your home?

1. Yes **[SKIP TO Q7]**
2. No
98. Don't know **[SKIP TO Q14]**

E2. Did you install the Nest thermostat but later remove it?

1. Yes
2. No
98. Don't know **[SKIP TO Q14]**

E3. **[ASK IF Q2=NO]** Why did you not install the Nest thermostat you received? **[RANDOMIZE]**

1. Difficult/unable to set up
2. Didn't like how it looked
3. Never planned to install
4. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
5. Other **[SPECIFY]**
98. Don't know

- E4. **[ASK IF Q2=YES]** Why did you install but later remove the Nest thermostat you received?  
**[RANDOMIZE]**
1. Broken/didn't work
  2. Difficult/unable to set up
  3. Unable to connect smart device(s) to it
  4. Difficult to program using smart device(s)
  5. Didn't like how it looked
  6. Home was less comfortable
  7. Higher energy bills
  8. It did not work with my heating/cooling equipment
  9. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  10. Other **[SPECIFY]**
  98. Don't know

- E5. What did you do with the Nest thermostat?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know

- E6. **[ASK IF Q3=1 OR NOT ASKED]** Did you have any difficulty installing the Nest thermostat you received?
1. Yes **Q6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know

**[IF Q1=NO, THEN SKIP TO Q14]**

- E7. What equipment does your Nest thermostat control? Select all that apply.
1. Furnace – Natural gas
  2. Furnace – LP/Propane
  3. Boiler – Natural gas
  4. Boiler – LP/Propane
  5. Air-source heat pump
  6. Central air conditioner
  7. Other
  98. Don't know

- E8. How often do you manually override the programming on the Nest thermostat?
1. Never **[SKIP TO Q12]**
  2. Rarely
  3. Sometimes
  4. Often
  98. Don't know **[SKIP TO Q12]**
- E9. Have you had any difficulty programming the Nest thermostat?
1. Yes **Q9\_1. [ASK: WHAT WAS DIFFICULT ABOUT PROGRAMMING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- E10. What type of thermostat did you have before participating in the program?
1. Programmable thermostat (allows user to use adjust temperature using settings that take effect at different times of day)
  2. Smart thermostat (automatically changes temperature and settings throughout day without user input)
  3. Manual thermostat (user manually turns on heating/cooling and adjusts temperature)
  4. I did not have a thermostat
  98. Don't know
- E11. How often do you program your Nest thermostat?
1. Less often than before
  2. About as often as before
  3. More often than before
  4. My previous thermostat was not programmable
  5. I did not previously own a thermostat
  98. Don't know
- E12. How has your home comfort level changed as a result of installing your Nest thermostat?
1. More comfortable
  2. About as comfortable
  3. Less comfortable
  98. Don't know
- E13. Have you noticed a change in your monthly energy bill as a result of installing your Nest thermostat?
1. Yes, my bills are lower
  2. Yes, my bills are higher
  3. No, I have not noticed a change
  98. Don't know

E14. How satisfied are you with the Nest thermostat?

1. Very satisfied **[SKIP TO R1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO R1]**

E15. Why are you **[Q14]**? Select all that apply. **[RANDOMIZE]**

1. Broken/doesn't work
2. Difficult/unable to set up
3. Unable to connect smart device(s) to it
4. Difficult to program using smart device(s)
5. Don't like how it looks
6. Home is less comfortable
7. Higher energy bills
8. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## *F. Kit #4: Ecobee4 Learning Thermostat*

The next questions are about the Ecobee4 smart thermostat you received in your kit.

F1. Is the Ecobee4 thermostat you received currently installed in your home?

1. Yes **[SKIP TO R7]**
2. No
98. Don't know **[SKIP TO R14]**

F2. Did you install the Ecobee4 thermostat but later remove it?

1. Yes
2. No
98. Don't know **[SKIP TO R14]**

F3. **[ASK IF R2=NO]** Why did you not install the Ecobee4 thermostat you received? **[RANDOMIZE]**

1. Difficult/unable to set up
2. Didn't like how it looked
3. Never planned to install
4. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
5. Other **[SPECIFY]**
98. Don't know



- F4. **[ASK IF R2=YES]** Why did you install but later remove the Ecobee4 thermostat you received?  
**[RANDOMIZE]**
1. Broken/didn't work
  2. Difficult/unable to set up
  3. Unable to connect smart device(s) to it
  4. Difficult to program using smart device(s)
  5. Didn't like how it looked
  6. Home was less comfortable
  7. Higher energy bills
  8. It did not work with my heating/cooling equipment
  9. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  10. Other **[SPECIFY]**
  98. Don't know
- F5. What did you do with the Ecobee4 thermostat?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know
- F6. **[ASK IF R3=1 OR NOT ASKED]** Did you have any difficulty installing the Ecobee4 thermostat you received?
1. Yes **R6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know

**[IF R1=NO, THEN SKIP TO R14]**

- F7. What equipment does your Ecobee4 thermostat control? Select all that apply.
1. Furnace – Natural gas
  2. Furnace – LP/Propane
  3. Boiler – Natural gas
  4. Boiler – LP/Propane
  5. Air-source heat pump
  6. Central air conditioner
  7. Other
  98. Don't know

- F8. How often do you manually override the programming on the Ecobee4 thermostat?
1. Never **[SKIP TO R12]**
  2. Rarely
  3. Sometimes
  4. Often
  98. Don't know **[SKIP TO R12]**
- F9. Have you had any difficulty programming the Ecobee4 thermostat?
1. Yes **R9\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT PROGRAMMING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- F10. What type of thermostat did you have before participating in the program?
1. Programmable thermostat (allows user to use adjust temperature using settings that take effect at different times of day)
  2. Smart thermostat (automatically changes temperature and settings throughout day without user input)
  3. Manual thermostat (user manually turns on heating/cooling and adjusts temperature)
  4. I did not have a thermostat
  98. Don't know
- F11. How often do you program your Ecobee4 thermostat?
1. Less often than before
  2. About as often as before
  3. More often than before
  4. My previous thermostat was not programmable
  5. I did not previously own a thermostat
  98. Don't know
- F12. How has your home comfort level changed as a result of installing your Ecobee4 thermostat?
1. More comfortable
  2. About as comfortable
  3. Less comfortable
  98. Don't know
- F13. Have you noticed a change in your monthly energy bill as a result of installing your Ecobee4 thermostat?
1. Yes, my bills are lower
  2. Yes, my bills are higher
  3. No, I have not noticed a change
  98. Don't know

F14. How satisfied are you with the Ecobee4 thermostat?

1. Very satisfied **[SKIP TO S1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO S1]**

F15. Why are you **[R14]**? Select all that apply. **[RANDOMIZE]**

1. Broken/doesn't work
2. Difficult/unable to set up
3. Unable to connect smart device(s) to it
4. Difficult to program using smart device(s)
5. Don't like how it looks
6. Home is less comfortable
7. Higher energy bills
8. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## G. Kit #5: Nest Thermostat E

The next questions are about the Nest E thermostat you received in your kit.

G1. Is the Nest E thermostat you received currently installed in your home?

1. Yes **[SKIP TO S6]**
2. No
98. Don't know **[SKIP TO S14]**

G2. Did you install the Nest E thermostat but later remove it?

1. Yes
2. No
98. Don't know **[SKIP TO S14]**

G3. **[ASK IF S2=NO]** Why did you not install the Nest E thermostat you received? **[RANDOMIZE]**

1. Difficult/unable to set up
2. Didn't like how it looked
3. Never planned to install
4. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
5. Other **[SPECIFY]**
98. Don't know

- G4. **[ASK IF S2=YES]** Why did you install but later remove the Nest E thermostat you received?  
**[RANDOMIZE]**
1. Broken/didn't work
  2. Difficult/unable to set up
  3. Unable to connect smart device(s) to it
  4. Difficult to program using smart device(s)
  5. Didn't like how it looked
  6. Home was less comfortable
  7. Higher energy bills
  8. It did not work with my heating/cooling equipment
  9. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  10. Other **[SPECIFY]**
  98. Don't know

- G5. What did you do with the Nest E thermostat?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know

- G6. **[ASK IF S3=1 OR NOT ASKED]** Did you have any difficulty installing the Nest E thermostat you received?
1. Yes **S6\_1. [ASK: WHAT WAS DIFFICULT ABOUT INSTALLING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know

**[IF S1=NO, THEN SKIP TO S14]**

- G7. What equipment does your Nest E thermostat control? Select all that apply.
1. Furnace – Natural gas
  2. Furnace – LP/Propane
  3. Boiler – Natural gas
  4. Boiler – LP/Propane
  5. Air-source heat pump
  6. Central air conditioner
  7. Other
  98. Don't know

- G8. How often do you manually override the programming on the Nest E thermostat?
1. Never **[SKIP TO S12]**
  2. Rarely
  3. Sometimes
  4. Often
  98. Don't know
- G9. Have you had any difficulty programming the Nest E thermostat?
1. Yes **S9\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT PROGRAMMING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- G10. What type of thermostat did you have before participating in the program?
1. Programmable thermostat (allows user to use adjust temperature using settings that take effect at different times of day)
  2. Smart thermostat (automatically changes temperature and settings throughout day without user input)
  3. Manual thermostat (user manually turns on heating/cooling and adjusts temperature)
  4. I did not have a thermostat
  98. Don't know
- G11. How often do you program your Nest E thermostat?
1. Less often than before
  2. About as often as before
  3. More often than before
  4. My previous thermostat was not programmable
  5. I did not previously own a thermostat
  98. Don't know
- G12. How has your home comfort level changed as a result of installing your Nest E thermostat?
1. More comfortable
  2. About as comfortable
  3. Less comfortable
  98. Don't know
- G13. Have you noticed a change in your monthly energy bill as a result of installing your Nest E thermostat?
1. Yes, my bills are lower
  2. Yes, my bills are higher
  3. No, I have not noticed a change
  98. Don't know

G14. How satisfied are you with the Nest E thermostat?

1. Very satisfied **[SKIP TO T1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. Don't know **[SKIP TO T1]**

G15. Why are you **[S14]**? Select all that apply. **[RANDOMIZE]**

1. Broken/doesn't work
2. Difficult/unable to set up
3. Unable to connect smart device(s) to it
4. Difficult to program using smart device(s)
5. Don't like how it looks
6. Home is less comfortable
7. Higher energy bills
8. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

## H. Freeridership

### **[ASK IF COPAY]**

The next questions ask what your plans were for replacing your thermostat **before** you found out about Focus on Energy's Connected Devices Kits Program.

H1. **Before** you heard about the program, had you already been **planning to purchase** a smart thermostat?

1. Yes
2. No
98. Don't know

H2. If you had not received a reduced-price **[THERMOSTAT NAME]** smart thermostat through the program, would you have still installed the **exact same [THERMOSTAT NAME]** smart thermostat?

1. Yes **[SKIP TO T5]**
2. No
98. Don't know

H3. Would you still have installed a different thermostat or would you have decided to install nothing?

1. I would have installed a different thermostat
2. I would have decided to install nothing **[SKIP TO T6]**
98. Don't know **[SKIP TO T9]**

- H4. When you say you would have installed a thermostat in the absence of the program, would you have installed a **smart** thermostat? (A *smart* thermostat can be controlled by Wi-Fi-connected devices and can sense when rooms are occupied, in addition to standard programming features)?
1. Yes
  2. No
  98. Don't know
- H5. And, thinking about timing, in the absence of the program, would you have installed the thermostat...
1. At the same time **[SKIP TO T9]**
  2. Within the same year **[SKIP TO T9]**
  3. One to two years out **[SKIP TO T9]**
  4. More than two years out **[SKIP TO T9]**
  5. Never
  98. Don't know **[SKIP TO T8]**
- H6. So just to confirm, you would not have installed a thermostat at all without the program. Is that correct?
1. Yes **[SKIP TO T9]**
  2. No
  98. Don't know
- H7. Without the program, would you have installed a thermostat, but one that does not have the Wi-Fi or occupancy sensor capabilities of a smart thermostat?
1. Yes
  2. No
  98. Don't know
- H8. And, with respect to timing, would you have installed the thermostat...
1. At the same time
  2. Within the same year
  3. One to two years out
  4. More than two years out
  5. Never
  98. Don't know
- H9. How important was the Focus on Energy Program in your decision to purchase the smart thermostat?
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know

## I. Spillover

### [ASK IF COPAY]

The next section asks about any energy saving improvements you may have made since installing the discounted smart thermostat you received from Focus on Energy.

11. Since installing your reduced-price smart thermostat courtesy of Focus on Energy, have you installed any other energy-efficient products in your home for which you did **NOT** receive a rebate or incentive? For example, appliances such as ENERGY STAR clothes washers, high-efficiency water heaters, insulation, or windows.
  1. Yes
  2. No **[SKIP TO U5]**
  98. Don't know **[SKIP TO U5]**
  
12. What were the products that you installed without getting a rebate or incentive? Select all that apply.
  1. Gas boiler
  2. Gas furnace
  3. Gas tankless water heater
  4. Gas storage water heater
  5. Electric tankless water heater
  6. Electric storage water heater
  7. Insulation; attic and ceiling **[ASK: HOW MANY SQUARE FEET?]**
  8. Insulation; floor **[ASK: HOW MANY SQUARE FEET?]**
  9. Insulation; wall **[ASK: HOW MANY SQUARE FEET?]**
  10. Insulation; other **[SPECIFY] [ASK: HOW MANY SQUARE FEET?]**
  11. Air sealing
  12. Clothes washer
  13. Dishwasher
  14. Windows **[ASK: HOW MANY SQUARE FEET?]**
  15. Programmable thermostat
  16. Refrigerator
  17. Heat pump water heater
  18. Room air conditioner **[ASK: HOW MANY DID YOU INSTALL?]**
  19. Central air conditioner
  20. Heat pump; air source
  21. Heat pump; ground source
  22. Heat pump; other **[SPECIFY]**
  23. Smart power strip
  24. Other **[SPECIFY] [ASK: HOW MANY DID YOU INSTALL?]**
  98. Don't know **[EXCLUSIVE] [SKIP TO U5]**



13. How important was your participation in the Focus on Energy Connected Devices Kit Program in your decision to install these products? **[REPEAT FOR EACH RESPONSE SELECTED IN U2]**
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know
14. Did you receive any rebate or incentive for installing the **[U2 MEASURE]**?
1. Yes
  2. No
  98. Don't know
15. Since installing your smart thermostat, have you taken any other actions to reduce energy consumption? An energy efficiency action could be turning down the temperature on your thermostat or water heater or powering down appliances or computers.
1. Yes
  2. No **[SKIP TO I1]**
  98. Don't know **[SKIP TO I1]**
16. Specifically, what actions have you taken? Select all that apply.
1. Turn down temperature on water heater
  2. Turn down temperature on furnace
  3. Take shorter or fewer showers
  4. Wash clothes only in cold water
  5. Not leave water running
  6. Turn off appliances
  7. Turn off computers
  8. Turn off lights
  9. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]**
17. **[PIPE TEXT FROM U6; MATRIX]** How important was your participation in the Focus on Energy Connected Devices Kit Program in your decision to take these actions?
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know

18. **[PIPE TEXT FROM U6; MATRIX]** And, over time, have you continued to perform these actions?
1. Yes
  2. No
  98. Don't know

## J. Program Satisfaction

The next questions ask about your experience with the program.

- J1. Did you request your kit using the Focus on Energy website, or did you call the 1-800 number?
1. Website
  2. 1-800 number **[SKIP TO I4]**
  3. Other **[SPECIFY] [SKIP TO I4]**
  98. Don't know **[SKIP TO I4]**
- J2. How easy was it to fill out the online request for your energy efficiency kit?
1. Very easy **[SKIP TO I4]**
  2. Somewhat easy
  3. Somewhat difficult
  4. Very difficult
  98. Don't know **[SKIP TO I4]**
- J3. Why was it **[I2]**?
1. **[RECORD RESPONSE]**
  98. Don't know
- J4. **[ASK IF COPAY]** After you submitted the request for your energy efficiency kit, how long did it take to receive the kit in the mail?
1. Less than a week
  2. Between 1 and 2 weeks
  3. More than 2 weeks
  98. Don't know
- J5. **[ASK IF NOT COPAY]** After you submitted the request for your energy efficiency kit, how long did it take to receive the kit in the mail?
1. Less than 2 weeks
  2. Between 2 and 4 weeks
  3. More than 4 weeks
  98. Don't know

- J6. How satisfied were you with how long it took to receive the kit?
1. Very satisfied **[SKIP TO J1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  98. Don't know **[SKIP TO J1]**

- J7. Why were you **[I5]** with how long it took to receive the kit?
1. **[RECORD RESPONSE]**
  98. Don't know

## K. Energy-Saving Actions

- K1. Your kit should have included a pamphlet with information on actions you can take to save energy. Which of these actions have you taken? Select all that apply. **[RANDOMIZE]**
1. Use dimmers on indoor lighting to lower light levels
  2. Change my furnace filter
  3. Leave shades open during the day to heat my home
  4. Keep the freezer full
  5. Wash laundry in cold water
  6. Reduce my water heater temperature to 120 degrees
  7. Did not take any of these actions **J1\_1. [ASK: WHY DID YOU NOT TAKE ANY OF THESE ACTIONS?]**
    1. Did not want to take any of these actions
    2. Was unable to take these actions
    3. Already took all of these actions before receiving pamphlet
    4. Don't know
  8. Did not receive pamphlet
  98. Don't know **[EXCLUSIVE]**
- K2. **[ASK IF NOT COPAY]** Since participating in Focus on Energy's program, have you taken any other actions to reduce energy consumption that you have not already mentioned? An energy efficiency action could be turning down the temperature on your thermostat or water heater or powering down appliances or computers.
1. Yes
  2. No **[SKIP TO K1]**
  98. Don't know **[SKIP TO K1]**

K3. **[ASK IF NOT COPAY]** Specifically, what other actions have you taken? Select all that apply.

**[RANDOMIZE]**

1. Turn down the temperature on my furnace
2. Turn up the temperature on my air conditioner
3. Take shorter or fewer showers
4. Don't leave water running
5. Turn off appliances
6. Turn off computers
7. Turn off lights
8. Other **[SPECIFY]**
98. Don't know **[SKIP TO K1]**

K4. Did the Program motivate you to **[EACH ONE SELECTED IN J1 AND J3]**?

1. Yes
2. No
98. Don't know

## L. Cross-Program Marketing

L1. \*Are you aware of any other Focus on Energy programs or rebates, such as those for **[LED BULBS, ENERGY-EFFICIENT UPGRADES, OR HOME ENERGY AUDITS?]**

1. Yes
2. No **[SKIP TO L1]**
98. Don't know **[SKIP TO L1]**

L2. \*Which programs or rebates are you aware of? Select all that apply. **[RANDOMIZE]**

1. Simple Energy Efficiency (free kits with energy-saving items, such as LEDs and showerheads)
2. Home Performance with ENERGY STAR (energy assessments, home audits, weatherization, insulation, HVAC equipment, heating equipment)
3. New Homes (new construction)
4. Appliance Recycling (refrigerator/freezer recycling/pickup)
5. Retail Lighting (LED/CFL discounts rebates)
6. Renewables (solar PV, ground-source heat pumps, geothermal)
7. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

L3. \*Have you participated in any other Focus on Energy programs such as rebates on LED bulbs, energy-efficient upgrades or home energy audits?

1. Yes
2. No **[SKIP TO K5]**
98. Don't know **[SKIP TO K5]**

L4. \*Which programs, rebates, or projects have you participated in? Select all that apply.

**[RANDOMIZE]**

1. Simple Energy Efficiency
2. Home Performance with ENERGY STAR
3. New Homes
4. Appliance Recycling
5. Retail Lighting
6. Multifamily
7. Renewables
8. Other **[SPECIFY]**
98. Don't know **[EXCLUSIVE]**

L5. Do you plan to participate in any Focus on Energy programs, rebates, or projects in the next year?

1. Yes **K5\_1. [ASK: WHICH PROGRAMS DO YOU PLAN TO PARTICIPATE IN? SELECT ALL THAT APPLY] [RANDOMIZE]**

1. Simple Energy Efficiency
2. Home Performance with ENERGY STAR
3. New Homes
4. Appliance Recycling
5. Retail Lighting
6. Multifamily
7. Other **[SPECIFY]**
8. Don't know **[EXCLUSIVE]**
2. No
98. Don't know

## *M. Customer Demographics*

The last few questions are for statistical purposes only.

M1. What type of fuel does your water heater use?

1. Natural gas
2. Electricity
3. Propane/Bottled gas
4. Wood
5. Other **[SPECIFY]**
98. Don't know

- M2. What type of home do you live in?
1. Mobile/manufactured home
  2. Single-family home, detached house
  3. Attached house townhouse, row house, or duplex
  4. Multifamily apartment or condo building with 4 or more units
  5. Co-op/retirement community
  6. Other **[SPECIFY]**
  98. Don't know
- M3. Do you or members of your household own or rent this home?
1. Own
  2. Rent
  3. Other **[SPECIFY]**
  98. Don't know
- M4. What is the highest level of school that you have completed?
1. Less than 9th grade
  2. 9th to 12th grade; no diploma
  3. High school graduate (includes GED)
  4. Some college, no degree
  5. Associate's degree
  6. Bachelor's degree
  7. Graduate or professional degree
  99. (Refused)
- M5. Which of the following categories best represents your age?
1. 18-24
  2. 25-34
  3. 35-44
  4. 45-54
  5. 55-64
  6. 65-74
  7. 75 or older
  99. (Refused)

M6. Which category best describes your total household income in 2017 before taxes?

1. Less than \$20,000
2. \$20,000 to \$49,999
3. \$50,000 to \$74,999
4. \$75,000 to \$99,999
5. \$100,000 to \$149,999
6. \$150,000 to \$199,999
7. \$200,000 or more
99. (Refused)

## [CLOSING SCRIPT]

Those are all the questions we have. Focus on Energy appreciates your input.

Thank you very much for your time.

To learn about additional opportunities to save energy and money in your home, please visit [focusonenergy.com](http://focusonenergy.com).

## Retail Lighting and Appliance Program Advanced Power Strip and Smart Thermostat Participant Survey

### A. Introduction and Screening

Subject: Take a survey to win \$150!

Hello **[FIRST NAME]**,

Focus on Energy works with Wisconsin utilities to help customers like you save money and use energy more efficiently. On behalf of Focus on Energy and the Public Service Commission of Wisconsin, Cadmus is conducting a survey to better understand your experience with the Retail Lighting and Appliance Program. Through this program, you received a rebate for your purchase of a **[MEASURE]**.

We invite you to complete the following brief survey for a chance to win a \$150 Visa gift card. Your participation is voluntary, but your input plays an important role in guiding future Program enhancements. All of your survey responses will be kept confidential.

The survey should take about 15 minutes to complete and will be open until **5 p.m. on [DATE]**.

**[SURVEY LINK]**

If you have problems with the survey link, please contact the survey coordinator, Alex Chamberlain, at (714) 955-1904 or via email at Alex.Chamberlain@cadmusgroup.com. If you would like to confirm the research effort, please call Joe Fontaine at the Public Service Commission at (608) 266-0910.

We hope you will take this opportunity to have your voice heard. Thank you in advance for your time and for sharing your experiences.

### Survey Introduction

Records from Focus on Energy show that you received a rebate for the purchase of a **[MEASURE]**. This survey will ask about your experience purchasing and using your **[MEASURE]** and receiving your rebate. At the end, you will be given the opportunity to enter to win a \$150 Visa gift card as a token of our appreciation for your time.

- A1. Do you recall purchasing a **[MEASURE]** and receiving a rebate for your purchase from Focus on Energy? **[ASK IF MEASURE=ADVANCED POWER STRIP]** An advanced power strip looks like a standard multi-plug strip, but saves energy by turning off electronics that would otherwise stay in standby mode and consume small amounts of power. **[ASK IF MEASURE = S T-STAT]** A smart thermostat controls your heating and cooling equipment like a regular thermostat, but connects to Wi-Fi and can be controlled through your mobile phone or other personal electronic devices.
1. Yes
  2. No **[THANK AND TERMINATE]**
  98. Don't know **[THANK AND TERMINATE]**



**[TERMINATE MESSAGE: WE ARE ONLY SURVEYING CUSTOMERS WHO RECALL PARTICIPATING IN THE PROGRAM. THANK YOU FOR YOUR TIME.]**

## *B. Advanced Power Strip*

**[ASK SECTION IF MEASURE = ADVANCED POWER STRIP]**

- B1. Is the advanced power strip you purchased currently being used in your home?
1. Yes **[SKIP TO D6]**
  2. No
  98. Don't know **[SKIP TO D8]**
- B2. Did you start using the advanced power strip you received but stop using it?
1. Yes
  2. No
  98. Don't know **[SKIP TO D6]**
- B3. **[ASK IF B2=NO]** Why did you not use the advanced power strip you received? **[RANDOMIZE]**
1. Difficult/unable to set up
  2. Didn't like how it looked
  3. Didn't like how the attached equipment worked when hooked up to it
  4. Not enough regular outlets
  5. Never planned to use
  6. Other **[SPECIFY]**
  98. Don't know
- B4. **[ASK IF B2=YES]** Why did you stop using the advanced power strip you received? **[RANDOMIZE]**
1. Broken/didn't work
  2. Didn't like how it looked
  3. Didn't like how the attached equipment worked when hooked up to it
  4. Not enough regular outlets
  5. Other **[SPECIFY]**
  98. Don't know
- B5. What did you do with the advanced power strip?
1. Stored for future use
  2. Threw away
  3. Gave to someone else
  4. Other **[SPECIFY]**
  98. Don't know

- B6. **[ASK IF D1=YES]** What equipment do you currently have connected to your advanced power strip?  
Select all that apply.
1. Home entertainment center [TVs, cable boxes, streaming devices Apple TV or Roku, DVD players]
  2. Home office [laptops, desktop computers, computer monitors, scanners, printers, fax machines]
  3. Other equipment **[SPECIFY]**
  98. Don't know
- B7. **[ASK IF D1 OR B2=YES]** Have you had any difficulty using the smart strip to operate your electronics?
1. Yes **B7\_1. [ASK: WHAT HAS BEEN DIFFICULT ABOUT USING IT?]**
    1. **[RECORD RESPONSE]**
    2. Don't know
  2. No
  98. Don't know
- B8. How satisfied are you with the advanced power strip you purchased?
1. Very satisfied **[SKIP TO B10]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
- B9. Why are you **[D8]**? Select all that apply.
1. Broken/doesn't work
  2. Difficult/unable to set up
  3. Don't like how it looked
  4. Don't like how the attached equipment works when hooked up to it
  5. Not enough regular outlets
  6. Seems flimsy/poor quality
  7. Other **[SPECIFY]**
- B10. How satisfied were you with the purchase price?
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
  5. I don't know how much the purchase price was

B11. How satisfied are you overall with your experience to purchase a smart strip at a discounted price?

1. Very satisfied **[SKIP TO C1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied

B12. Why are you **[B11]**?

1. **[RECORD RESPONSE]**

## *C. Advanced Power Strip Freeridership*

The following questions ask about your decision to purchase an advanced power strip.

C1. Without the reduced purchase price from the Focus on Energy Retail Lighting and Appliance Program, would you have still purchased the exact same advanced power strip? (An advanced power strip, unlike a regular power strip, prevents appliances from consuming small amounts of energy while turned off or in standby mode.)

1. Yes
2. No **[SKIP TO C4]**
98. Don't know **[SKIP TO C4]**

C2. Would you have still purchased the advanced power strip at the same time?

1. Yes **[SKIP TO C4]**
2. No
98. Don't know

C3. When would you have installed the advanced power strip you purchased?

1. Within one year of original participation date
2. In one to two years from original participation date
3. More than two years from original participation date
98. Don't know

C4. **[MATRIX: 1-5, N/A]** On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, how important was each of the following factors in deciding to purchase an advanced power strip?

1. Recommendation from contractor or vendor
2. Information provided by Focus on Energy on energy-saving opportunities
3. Information on payback
4. The Focus on Energy incentive/discount
5. Familiarity with advanced power strips
6. Previous participation with a Focus on Energy program

## D. Smart Thermostats

### [ASK SECTION IF MEASURE = SMART THERMOSTAT]

- D1. What was the main reason you purchased a new smart thermostat?
1. My old thermostat quit working properly
  2. I wanted to try out a new smart technology
  3. I replaced my heating/cooling equipment and needed to upgrade my thermostat
  4. I added heating/cooling equipment to my home and needed to install a thermostat
  5. Other [SPECIFY]
  98. Don't know
- D2. Is the thermostat you purchased currently installed in your home or business?
1. Yes, it is installed in my home [SKIP TO D7]
  2. Yes, it is installed in my business [SKIP TO D7]
  3. No
  98. Don't know [SKIP TO D9]
- D3. Was the thermostat ever installed and later removed?
1. Yes
  2. No
  98. Don't know [SKIP TO D7]
- D4. [ASK IF D3=NO] Why did you not install the thermostat? [RANDOMIZE]
1. Difficult/unable to set up
  2. Didn't like how it looked
  3. Never planned to install
  4. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
  5. Other [SPECIFY]
  98. Don't know
- D5. [ASK IF D3=YES] Why did you install but later remove the thermostat? [RANDOMIZE]
1. Broken/didn't work
  2. Difficult/unable to set up
  3. Unable to connect
  4. Difficult to program using smart device(s)
  5. Didn't like how it looked
  6. Home was less comfortable
  7. Higher energy bills

8. It did not work with my heating/cooling equipment
9. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
10. Other **[SPECIFY]**
98. Don't know

D6. What did you do with the thermostat?

1. Stored for future use
2. Threw away
3. Gave to someone else
4. Other **[SPECIFY]**
98. Don't know

D7. Who installed the new thermostat(s)?

1. Myself/someone in my household
2. A Focus on Energy participating contractor
3. A non-participating contractor
4. Haven't installed it yet
5. Other **[SPECIFY]**
98. Don't know

D8. What equipment does your new thermostat control? Select all that apply.

1. Furnace – Natural gas
2. Furnace – LP/Propane
3. Boiler – Natural gas
4. Boiler – LP/Propane
5. Air-source heat pump
6. Central air conditioner
7. Other
98. Don't know

The next questions are about your ***previous*** thermostat, the one you used before you installed the thermostat you purchased with a rebate from Focus on Energy.

D9. What kind of thermostat did you use before? **[SELECT ONE]**

1. Manual (you manually adjust the temperatures)
2. Programmable (you schedule certain temperatures at specific times / days)
3. Wi-Fi enabled (you are able to adjust or scheduled temperature remotely using the internet)
4. Smart (the thermostat adjusts the temperature for you and you can adjust the temperature remotely)
5. Did not previously use a thermostat
98. Don't know

**[ASK IF D9=2 OR 3]**

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?)

1. Yes
2. No
98. Don't know

D11. **[ASK IF D10=1]** Did you manually adjust your previous thermostat, or did you use the thermostat's programming features to control the temperature?

1. I manually adjusted the thermostat
2. I used the programming features to control the temperature
98. Don't know

D12. Did you have any difficulty physically installing your new thermostat?

1. Yes
2. No
98. Don't know

**[ASK IF D12=1]**

D13. What was difficult about installing it?

1. **[RECORD RESPONSE]**

D14. What method do you most often use to control your new smart thermostat?

1. Using an electronic device such as a mobile phone or virtual assistant device
2. Manually, using the touch screen on the thermostat
3. I don't control the thermostat **[SKIP TO D18]**
98. I don't know **[SKIP TO D18]**

D15. Have you had any difficulty setting up or using an electronic device to control your thermostat?

1. Yes
2. No **[SKIP TO D18]**
98. Don't know **[SKIP TO D18]**

D16. What has been difficult about setting up or using an electronic device to control your thermostat?

1. **[RECORD RESPONSE]**

D17. For each feature listed below, please tell us if you think that feature works well in your new smart thermostat, does not work well, if you don't use it, or your thermostat doesn't offer it.

	This feature works well	This feature does not work well	I don't use this feature	My thermostat doesn't have this feature	I don't know if I have this feature or if it works well
Ability to learn heating/cooling trends in the home and create a heating/cooling schedule					
Wi-Fi/internet connectivity					
Ability to control remotely through mobile application/web browser					
Ability to connect to other devices – smoke alarms, cameras, voice command systems					
Look/design/style					
Motion detection (bring room up to temperature when occupied, suspend when unoccupied)					
Geofencing (uses phone's location services to tell thermostat when someone has entered/left the home and adjust temperatures accordingly)					
Usage reporting (provides historical view of system usage and trends)					
Alerts/messages/reminders					
Touch display					
Display that lights up when someone enters the room					

D18. Overall, how satisfied are you with the smart thermostat you purchased?

1. Very satisfied **[SKIP TO T1]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied

D19. Why are you **[D18]**? Select all that apply.

1. Doesn't work
2. Difficult/unable to set up
3. Difficult/unable to use
4. Doesn't have the features I wanted
5. Doesn't work with my other devices
6. Not worth the expense
7. Other **[SPECIFY]**

### E. Smart Thermostat Freeridership

The following questions ask about your decision to purchase a smart thermostat.

- E1. **Before** you heard about the rebate through Focus on Energy’s Retail Lighting and Appliance Program, had you already been planning to purchase a smart thermostat? (A smart thermostat can be controlled by Wi-Fi connected devices and can sense when rooms are occupied, in addition to standard programming features.)
1. Yes
  2. No
  98. Don’t know
- E2. Without the incentive through the Retail Lighting and Appliance Program, would you have still purchased and installed the **exact same** smart thermostat?
1. Yes **[SKIP TO E5]**
  2. No
  98. Don’t know
- E3. Without the incentive through the Retail Lighting and Appliance Program, would you still have installed a different thermostat, or would you have decided to install nothing?
1. I would have installed a different thermostat
  2. I would have decided to install nothing **[SKIP TO T9]**
  98. Don’t know **[SKIP TO T9]**
- E4. When you say you would have installed a different thermostat, would you have installed a **smart** thermostat? (As a reminder, a smart thermostat can be controlled by Wi-Fi connected devices and can sense when rooms are occupied, in addition to standard programming features.)
1. Yes
  2. No
  98. Don’t know
- E5. When would you have installed the smart thermostat?
1. At the same time
  2. Within the same year
  3. One to two years out
  4. More than two years out
  5. Never
  98. Don’t know



- E6. How important was the incentive from the Retail Lighting and Appliance Program in your decision to purchase the smart thermostat?
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know

## F. Spillover

The next section asks about any energy saving improvements you may have made since purchasing your new **[ADVANCED POWER STRIP/SMART THERMOSTAT]**.

- F1. Since purchasing your new **[SMART STRIP/SMART THERMOSTAT]**, have you installed any other energy-efficient products in your home for which you did **NOT** receive a rebate or incentive from Focus on Energy? For example, appliances such as ENERGY STAR clothes washers, high-efficiency water heaters, insulation, or windows.
1. Yes
  2. No **[SKIP TO U5]**
  98. Don't know **[SKIP TO U5]**
- F2. What were the products that you installed without getting a rebate or incentive from Focus on Energy? Select all that apply.
1. Gas boiler
  2. Gas furnace
  3. Gas tankless water heater
  4. Gas storage water heater
  5. Electric tankless water heater
  6. Electric storage water heater
  7. Insulation, attic and ceiling **[ASK: HOW MANY SQUARE FEET?]**
  8. Insulation, floor **[ASK: HOW MANY SQUARE FEET?]**
  9. Insulation, wall **[ASK: HOW MANY SQUARE FEET?]**
  10. Insulation, other **[SPECIFY]** **[ASK: HOW MANY SQUARE FEET?]**
  11. Air sealing
  12. Clothes washer
  13. Dishwasher
  14. Windows **[ASK: HOW MANY SQUARE FEET?]**
  15. **[ASK IF MEASURE = SMART STRIP]** Smart thermostat
  16. Refrigerator
  17. Heat pump water heater
  18. Room air conditioner **[ASK: HOW MANY DID YOU INSTALL?]**
  19. Central air conditioner
  20. Heat pump, air source

21. Heat pump, ground source
  22. Heat pump, other **[SPECIFY]**
  23. **[ASK IF MEASURE = SMART THERMOSTAT]** Advanced power strip
  24. Other **[SPECIFY]** **[ASK: HOW MANY DID YOU INSTALL?]**
  98. Don't know **[EXCLUSIVE]** **[SKIP TO U5]**
- F3. **[FOR EACH U2]** How important was your participation in the Focus on Energy Retail Lighting and Appliance Program in your decision to install these products?
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know
- F4. Did you receive any rebate or incentive for installing the **[U2 MEASURE]**?
1. Yes
  2. No
  98. Don't know
- F5. Since receiving an incentive through the Retail Lighting and Appliance Program for installing your **[SMART STRIP/SMART THERMOSTAT]**, have you taken any other actions to reduce energy consumption? Such actions might include turning down the temperature on your thermostat or water heater or powering down appliances or computers.
1. Yes
  2. No **[SKIP TO I2]**
  98. Don't know **[SKIP TO I2]**
- F6. Specifically, what actions have you taken? Select all that apply.
1. Turn down temperature on water heater
  2. Turn down temperature on furnace
  3. Turn up temperature on air conditioner
  4. Take shorter or fewer showers
  5. Wash clothes only in cold water
  6. Not leave water running
  7. Turn off appliances
  8. Turn off computers
  9. Turn off lights
  10. Other **[SPECIFY]**
  98. Don't know **[EXCLUSIVE]** **[SKIP TO I2]**

- F7. **[RESPONSES FROM U6; MATRIX]** How important was your participation in the Focus on Energy Retail Lighting and Appliance Program in your decision to **[U6]**?
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. Don't know
- F8. **[RESPONSES FROM U6; MATRIX]** And, over time, have you continued to perform **[U6]**?
1. Yes
  2. No
  98. Don't know

## G. Rebate Experience

### **[ASK IF MEASURE=SMART THERMOSTAT]**

The next questions ask about your experience with the program.

- G1. How easy was it to fill out the application for your smart thermostat rebate?
1. Very easy **[SKIP TO G3]**
  2. Somewhat easy
  3. Somewhat difficult
  4. Very difficult
- G2. Why was it **[I2]**?
1. **[RECORD RESPONSE]**
- G3. About how long did it take to receive your rebate check once you had submitted all the necessary information?
1. 1 – 5 weeks
  2. 5 – 10 weeks
  3. More than 10 weeks
  98. Don't know
- G4. How satisfied were you with how long it took to receive your rebate?
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied

- G5. How satisfied were you with the rebate amount?
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
- G6. How satisfied are you overall with your experience to purchase and use a smart thermostat and receive a rebate?
1. Very satisfied **[SKIP TO K1]**
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not at all satisfied
- G7. Why were you **[G6]** overall with your experience?
1. **[RECORD RESPONSE]**

## H. Cross-Program Marketing

- H1. \*Are you aware of any other Focus on Energy programs or rebates such as those for **[LED BULBS, ENERGY-EFFICIENT UPGRADES, OR HOME ENERGY AUDITS]**?
1. Yes
  2. No **[SKIP TO I1]**
  98. Don't know **[SKIP TO I1]**
- H2. \*Which programs or rebates are you aware of? Select all that apply.
1. Home Performance with ENERGY STAR (energy assessments, home audits, weatherization, insulation, HVAC equipment, heating equipment)
  2. New Homes (new construction)
  3. Appliance Recycling (refrigerator/freezer recycling/pickup)
  4. Retail Lighting (LED/CFL discounts rebates)
  5. Simple Energy Efficiency (free kits with energy-saving items, such as LEDs and showerheads)
  6. Multifamily (direct install, free products for renters)
  7. Renewables (solar PV, ground-source heat pumps, geothermal)
  8. Other **[SPECIFY]**
  98. Don't know
- H3. \*Have you participated in any other Focus on Energy programs such as rebates on LED bulbs, free kits of energy-efficient items, energy-efficient upgrades, or home energy audits?
1. Yes
  2. No **[SKIP TO I1]**
  98. Don't know **[SKIP TO I1]**

- H4. \*Which programs, rebates, or projects have you participated in? Select all that apply.
1. Home Performance with ENERGY STAR
  2. New Homes
  3. Appliance Recycling
  4. Retail Lighting
  5. Simple Energy Efficiency
  6. Multifamily
  7. Renewables
  8. Other **[SPECIFY]**
  98. Don't know

## I. Program Awareness

- I1. \*Where did you most recently hear about Focus on Energy's **[MEASURE]** rebates? **[RANDOMIZE RESPONSES]**
1. Bill insert
  2. Direct mail/brochure/postcard
  3. Family/friends/word-of-mouth
  4. Focus on Energy or Utility website
  5. Other website **[SPECIFY]**
  6. Social Media such as Twitter, Facebook, Instagram, etc.
  7. Television
  8. Radio
  9. Print media magazine, newspaper article or advertisement
  10. Focus on Energy or Utility representative
  11. Pop-up retail event outside my place of work
  12. Other **[SPECIFY]**
  98. Don't know **[SKIP TO I3]**
- I2. \*Are there any other ways you heard about the program? Select all that apply. **[RANDOMIZE RESPONSES]**
1. No other ways
  2. Bill insert
  3. Direct mail/brochure/postcard
  4. Family/friends/word-of-mouth
  5. Focus on Energy or Utility website
  6. Other website **[SPECIFY]**
  7. Social Media such as Twitter, Facebook, Instagram, etc.
  8. Television
  9. Radio

10. Print media magazine, newspaper article or advertisement
  11. Focus on Energy or Utility representative
  12. Other **[SPECIFY]**
  98. Don't know
13. \*What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs? Select all that apply. **[RANDOMIZE RESPONSES]**
1. Television
  2. Radio
  3. Print media, such as magazine, newspaper article or advertisement
  4. Billboard/outdoor ad
  5. Bill insert
  6. Direct mail/brochure/postcard
  7. Family/friends/word-of-mouth
  8. Focus on Energy or Utility website
  9. Other website **[SPECIFY]**
  10. Social Media such as Twitter, Facebook, or Instagram
  11. Other **[SPECIFY]**
  12. Do not want to receive information
  98. Don't know
14. \* What motivated you to participate in the program?
1. **[RECORD RESPONSE]**

## *J. Customer Demographics*

The last few questions are for statistical purposes only.

- J1. What type of fuel does your water heater use?
1. Natural gas
  2. Electricity
  3. Propane/Bottled gas
  4. Wood
  5. Other **[SPECIFY]**
  98. Don't know
- J2. What fuel do you use primarily to heat your home?
1. Natural Gas
  2. Oil
  3. Propane
  4. Electricity
  5. Wood
  6. Other **[SPECIFY]**
  98. Don't know

- J3. What type of home do you live in?
1. Mobile/manufactured home
  2. Single-family home, detached house
  3. Attached house townhouse, row house, or duplex
  4. Multifamily apartment or condo building with 4 or more units
  5. Co-op/retirement community
  6. Other **[SPECIFY]**
  98. Don't know
- J4. Do you or members of your household own or rent this home?
1. Own
  2. Rent
  3. Other **[SPECIFY]**
  98. Don't know
- J5. What is the highest level of school that you have completed?
1. Less than 9th grade
  2. 9th to 12th grade; no diploma
  3. High school graduate (includes GED)
  4. Some college, no degree
  5. Associate's degree
  6. Bachelor's degree
  7. Graduate or professional degree
  99. Prefer not to answer
- J6. Which of the following categories best represents your age?
1. 18-24
  2. 25-34
  3. 35-44
  4. 45-54
  5. 55-64
  6. 65-74
  7. 75 or older
  99. Prefer not to answer

- J7. Which category best describes your total household income in 2017 before taxes?
1. Less than \$20,000
  2. \$20,000 to \$49,999
  3. \$50,000 to \$74,999
  4. \$75,000 to \$99,999
  5. \$100,000 to \$149,999
  6. \$150,000 to \$199,999
  7. \$200,000 or more
  99. Prefer not to answer

## [CLOSING SCRIPT]

Those are all the questions we have. Focus on Energy appreciates your input. If you would like to enter for a chance to win a **\$150 Visa gift card**, click Next below. If you do not want to enter the gift card drawing, please select Opt Out before clicking Next.

Thank you very much for your time.

To learn about additional opportunities to save energy and money in your home, please visit [focusonenergy.com](http://focusonenergy.com).



## Direct-Mail Home Energy Assessment Program Participant Survey

Thank you for providing feedback about Focus on Energy’s Energy Savings Survey. This survey will take less than 5 minutes to complete, and your responses will be kept strictly confidential.

Open drop-down menus by clicking on this icon  within the survey.

Click on the Next and Back buttons at the bottom of each page to navigate through the survey.

Do not forget to opt-in at the end of the survey for a chance to win a \$100 gift card!

- A1. Our records show that you participated in Focus on Energy’s Energy Savings Survey in 2017. In this survey, you completed a home energy profile that asked questions about various features of your home, such as type of air conditioner and insulation. After mailing this profile to Focus on Energy, you received a customized Home Energy Savings report. Is this correct? **[FORCE RESPONSE]**
1. Yes
  2. No **[THANK AND TERMINATE]**
  3. Don’t remember **[THANK AND TERMINATE]**
  4. (Prefer not to answer) **[THANK AND TERMINATE]**

**[TERMINATE MESSAGE: SINCE THIS SURVEY IS REGARDING THE ENERGY SAVINGS SURVEY, WE ONLY NEED FEEDBACK FROM PEOPLE WHO REMEMBER PARTICIPATING. THANK YOU FOR YOUR TIME.]**

### B. Program Satisfaction

The first set of questions ask for your opinion about completing and submitting the Energy Savings Survey, and the report you received from Focus on Energy.

B1. How easy was it to complete the Energy Savings Survey?

Not at all easy 0	1	2	3	4	5	6	7	8	9	Very easy 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B2. Could the process to complete and submit the Energy Savings Survey be improved?

1. Yes
2. No

B3. **[ASK IF B2=1]** What about the Energy Savings Survey could be improved?

1. **[RECORD RESPONSE]**

B4. Were you satisfied with the length of time it took to receive your customized Home Energy Savings report after submitting the survey?

Not at all satisfied 0	1	2	3	4	5	6	7	8	9	Very satisfied 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B5. How helpful was the information provided in your customized Home Energy Savings report about how you can save energy and money?

Not at all helpful 0	1	2	3	4	5	6	7	8	9	Very helpful 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B6. How would you rate your satisfaction with the level of detail provided in your customized Home Energy Savings report?

Not at all satisfied 0	1	2	3	4	5	6	7	8	9	Very satisfied 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B7. How would you rate your overall satisfaction with the Energy Savings Survey program?

Not at all satisfied 0	1	2	3	4	5	6	7	8	9	Very satisfied 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B8. **[Ask if 014<8]** What changes could have improved your satisfaction with the Home Energy Savings program?

1. **[RECORD RESPONSE]**

## C. Energy-Saving Actions

The next few questions are about the energy-saving actions you have taken (or might take) since participating in Home Energy Savings program.

C1. 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?

1. Yes
2. No

- C2. Do you plan to purchase or install any energy-efficient products in the next 6 months?
1. Yes
  2. No
- C3. **[ASK IF C1=1]** Which energy-efficient products have you purchased/installed? Select all that apply.
1. Received an energy-efficiency kit
  2. Had an in-home assessment
  3. Upgraded insulation
  4. Replaced old light bulbs with LED bulbs
  5. Replaced old refrigerator or freezer
  6. Recycled old refrigerator or freezer
  7. Replaced older appliances with efficient models **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
  8. Replaced old thermostat with a smart thermostat (can be controlled via Wi-Fi)
  9. Replaced inefficient heating and/or cooling equipment
  10. Installed a ductless mini-split heat pump
  11. Installed a renewable energy system
  12. Replaced standard electric water heater with a heat pump water heater
  13. Other **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
- C4. **[ASK IF C2=1]** Which energy-efficient products do you plan to purchase/install in the next 6 months? Select all that apply.
1. Order an energy-efficiency kit (simple energy efficiency packs)
  2. Have an in-home assessment
  3. Upgrade insulation
  4. Replace old light bulbs with LED bulbs
  5. Replace old refrigerator or freezer
  6. Replace older appliances with efficient models **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
  7. Replace old thermostat with a smart thermostat
  8. Replace inefficient heating and/or cooling equipment
  9. Install a ductless mini-split heat pump
  10. Install a renewable energy system
  11. Replace standard electric water heater with a heat pump water heater
  12. Other **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**

C5. **[Ask if C1≠1 and C2=2]** Why do you not plan to purchase/install energy-efficient products in the next 6 months? Select all that apply.

1. Cost/too expensive
2. Don't have time to make efficiency upgrades
3. Unsure about potential energy savings
4. Unsure about potential monetary savings
5. Don't know where to find additional information about energy-efficient products
6. Don't know where to purchase energy-efficient products
7. Don't know where to find contractor to install energy-efficient products
8. The report said my home does not need upgrades
9. Other **[SPECIFY] [ALLOW TEXT ENTRY – MEDIUM-SIZED TEXT BOX – FORCE TEXT ENTRY]**
98. Don't know **[MAKE RESPONSE EXCLUSIVE]**

C6. **[ASK IF C1=1 AND C3≠4 OR BLANK]** Did you receive a rebate from Focus on Energy for purchasing/installing this/these energy-efficient products? **[PIPE IN RESPONSES SELECTED IN C3] [USE DROP-DOWN LISTS]**

1. Yes
2. No
98. Don't know

C7. **[Ask if C1=1 or C2=1]** How important was the Home Energy Savings Program in your decision to purchase/install additional energy-efficient products?

Not at all important 0	1	2	3	4	5	6	7	8	9	Very important 10	Don't know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## D. Educational Effectiveness

D1. Were you aware of Focus on Energy programs before you participated in the Energy Savings Survey?

1. Yes
2. No

D2. **[ASK IF D1=1]** Which programs are you aware of now that you have participated? Select all that apply. **[RANDOMIZE RESPONSES 1-5]**

1. Simple Energy Efficiency (energy kits/energy packs)
2. Home Performance with ENERGY STAR
3. Heating and Cooling
4. Appliance Recycling
5. Retail Lighting
6. Other **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
98. None **[MAKE RESPONSE EXCLUSIVE]**

- D3. Your Home Energy Savings report recommended ways that Focus on Energy can help save energy in your home. Did you connect with Focus on Energy to learn more about those energy-saving opportunities? Select all that apply.
1. Yes – researched online
  2. Yes – inquired by phone
  3. No **[MAKE RESPONSE EXCLUSIVE]**
  98. Don't know **[MAKE RESPONSE EXCLUSIVE]**
- D4. **[ASK IF D3=1 OR 2]** Which energy-saving opportunities did you investigate? Select all that apply.
1. Ordering an energy-efficiency kit (simple energy efficiency packs)
  2. Having an in-home assessment
  3. Upgrading insulation to modern standards
  4. Replacing old light bulbs with LED bulbs
  5. Replacing old thermostat with a smart thermostat
  6. Replacing old refrigerator or freezer
  7. Replacing inefficient heating and/or cooling equipment
  8. Replacing appliances with efficient models
  9. Installing a ductless mini-split heat pump
  10. Installing a renewable energy system
  11. Replacing standard electric water heater with a heat pump water heater
  98. Don't know **[EXCLUSIVE]**

## E. Demographics

These last few questions are for statistical purposes only.

- E1. What type of home do you live in? Is it a:
1. Single-family home, detached house
  2. Attached house (townhouse, row house, or duplex)
  3. Multifamily apartment or condo building with 4 or more units
  4. Mobile/manufactured home
  5. Co-op/retirement community
  6. Other **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
  99. Prefer not to respond
- E2. Do you or members of your household own this home or do you rent?
1. Own
  2. Rent/lease
  3. Other **[SPECIFY] [ALLOW TEXT ENTRY – FORCE TEXT ENTRY]**
  99. Prefer not to respond

- E3. What is the highest level of school that you have completed?
1. Less than ninth grade
  2. Ninth to twelfth grade; no diploma
  3. High school graduate (includes GED)
  4. Some college, no degree
  5. Associates degree
  6. Bachelor's degree
  7. Graduate or professional degree
  99. Prefer not to respond
- E4. Please enter your age:
1. **[RECORD RESPONSE]**
- E5. Which category best describes your total household income in 2016 before taxes?
1. Less than \$30,000
  2. Between \$30,000 and \$49,999
  3. Between \$50,000 and \$69,999
  4. Between \$70,000 and \$89,999
  5. Between \$90,000 and \$109,999
  6. Between \$110,000 and \$129,999
  7. Between \$130,000 and \$149,999
  8. \$150,000 or more
  99. Prefer not to respond

## F. Closing

- F1. Those are all the questions we have. Thank you for your time! Before you go, please tell us if you would like to be entered into the drawing to win a \$100 gift card.
1. Yes – I want to enter the contest
  2. No – I **do not** want to enter the contest
- F2. **[Ask if F1=1]** To be entered into the drawing for the gift card, please verify your name and address. Your information will only be used to mail you the prize if you win the contest. Focus on Energy will not use it for marketing purposes, and they will not update any of your billing or mailing preferences with this information. Please note, if you do not complete your mailing address, or only fill some of the fields below, you will not be entered into the drawing.
1. First and Last Name:
  2. Street Address:
  3. City:
  4. State:
  5. Zip code:

**[CLOSING SCRIPT]** The survey is now complete. Focus on Energy appreciates your input. Thank you very much for your time!

## Nonresidential Programs

### Business Incentive Program Participant Survey

#### Researchable Questions

Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	A4-A7
Marketing and Outreach	Program Awareness	A7, B1
	Brand identity and messaging impacts	B1-B6, K1
	Key factors influencing customers' decision to participate in program	C1
Barriers	Obstacles to installing high-efficiency equipment	D1-D4
	Barriers to and opportunities for converting participants from single Program participation to engaging in more and deeper efforts to save energy.	C2-C9
Satisfaction	Assess satisfaction with various Program components and reasons for dissatisfaction among participants	E1-E5, K1-K2
Firmographics	Determine building and company characteristics of participants	J1-J4
Decision Making	Understand decision making processes and how they relate to corporate structure	C1-C3, C5-C9
Verification, Freeridership and Spillover	Verify project, assess net savings	A3, F1-I5

#### A. Introduction

- A1. Hello, may I speak with **[PRIMARY APPLICATION CONTACT]** **[OR IF NO NAME: MAY I SPEAK WITH THE PERSON WHO HANDLES ENERGY AND BUILDING PROJECT DECISIONS FOR YOUR COMPANY]**? **[ASK IF NOT AT THIS LOCATION, ASK FOR PHONE NUMBER AND NAME AT CORRECT LOCATION AND CALL RESPONDENT]**
1. (Yes) **[CONTINUE WITH RESPONDENT ON PHONE]**
  99. (Refused) **[THANK AND TERMINATE]**
- A2. Hello, I am **[INSERT NAME]** calling with a short survey on behalf of Wisconsin's Focus on Energy Programs. Are you the person responsible for making equipment decisions regarding energy efficiency at your company? **[ASK IF NEEDED: FOCUS ON ENERGY IS A STATEWIDE UTILITY-FUNDED PROGRAM TO ENCOURAGE ENERGY EFFICIENCY.]**
1. (Yes)
  2. (No, but person can come to phone) **[START OVER AT A2 WITH NEW RESPONDENT]**
  3. (No, not available) **[SCHEDULE CALLBACK]**
  98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN]**
  98. (Refused) **[THANK AND TERMINATE]**

- A3. \*Our records show that you installed energy efficient equipment including [MEASURE CATEGORY1], [MEASURE CATEGORY2], and [MEASURE CATEGORY3] at [SITE ADDRESS]. To ensure our records are correct, can you confirm that you received an incentive for this/these upgrades earlier this year?
1. (Yes)
  2. (No, wrong year) [RECORD CORRECT YEAR, IF POSSIBLE]
  3. (No, wrong address) [RECORD CORRECT ADDRESS]
  4. (No, wrong measure) [CORRECT BELOW]
    1. (MEASURE CATEGORY1 IS INCORRECT [CORRECT]) [CALL THIS VARIABLE C\_MEASURE1]
    2. (MEASURE CATEGORY2 IS INCORRECT [CORRECT]) [CALL THIS VARIABLE C\_MEASURE2]
    3. (MEASURE CATEGORY3 IS INCORRECT [CORRECT]) [CALL THIS VARIABLE C\_MEASURE3]
  5. (No, I did not install any measures) [THANK AND TERMINATE]
  98. (Don't know) Is there someone we could speak with that would know this? [RECORD NAME AND CONTACT INFORMATION]
  99. (Refused) [THANK AND TERMINATE]

**[THANK AND TERMINATE TEXT: THOSE ARE ALL OF OUR QUESTIONS. THANKS FOR YOUR HELP. HAVE A NICE DAY.]**

- A4. \*I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you initiate your energy efficiency project. [READ LIST AND MARK 1= YES, 2=NO, 99=DON'T KNOW; 88 REFUSED FOR EACH]
1. Your contractor, vendor, or a National Rebate Administrator
  2. A Focus on Energy Energy Advisor
  3. Your utility account manager
- A5. \*How did your organization learn about the Focus on Energy incentives available for this project? [DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE] [ASK IF RESPONDENT MENTIONS WEBSITE CLARIFY IF UTILITY OR FOCUS ON ENERGY WEBSITE SO YOU KNOW HOW TO CODE ANSWER ON LIST.]
1. (Contact with Focus on Energy representative through phone, email, or in person)
  2. (Focus on Energy quarterly newsletter)
  3. (Focus on Energy website)
  4. (Focus on Energy sponsored workshop or event)
  5. (Focus on Energy printed Program materials)
  6. (Contact with utility representative)
  7. (Utility mailing, bill insert, or utility Website)
  8. (Word of mouth (family, friend, or business colleague))
  9. (I contacted my contractor/vendor/National Rebate Administrator to ask)
  10. (My contractor/vendor/National Rebate Administrator let me know about them)



11. (Previously participated in program/received an incentive)
  12. (Through a trade association or professional organization **[SPECIFY]**)
  13. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- A6. \*Did you receive an incentive check in the mail for the upgrades, or did your contractor provide a discount on the cost of the project?
1. (Rebate/financial incentive in the mail)
  2. (Contractor discount on invoice)
  98. (Don't know)
  99. (Refused)
- A7. \*Who took the lead role in completing the application for the financial incentive? Was it... **[READ OPTIONS, RANDOMIZE OPTIONS, ONLY ONE RESPONSE]**
1. You (the respondent)
  2. Someone at your organization
  3. The contractor, vendor, and/or National Rebate Administrator
  4. A Focus on Energy Energy Advisor
  5. Someone else **[SPECIFY]**
  98. (Don't know)
  99. (Refused)
- A8. \*Who else contributed to completing the application for the financial incentive? **[ READ LIST IF NEEDED, PROBE FOR ALL PARTIES INVOLVED, MULTIPLE RESPONSES ALLOWED]**
1. (No one else was involved)
  2. (Someone else at my organization)
  3. (The contractor, vendor, and/or National Rebate Administrator)
  4. (A Focus on Energy Energy Advisor)
  5. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## B. Awareness

- B1. ~ What are the first three words that come to mind when you hear "Focus on Energy"? **[OPEN END, RECORD ONLY FIRST THREE RESPONSES]**

- 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. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY YOU STRONGLY AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR STRONGLY DISAGREE?]**  
**[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Focus on Energy is a brand that businesses like mine can trust.
  2. Focus on Energy offers programs, tools, and/or services that are valuable to my business.
  3. Focus on Energy provides programs that can or did help my business lower its overall energy costs.
  4. Focus on Energy provides programs that can or did help make my business more aware of energy saving opportunities.
  5. My business is more satisfied with our energy utility because it partners with Focus on Energy to offer energy efficiency programs to businesses like mine.
- B3. ~ Which of the following statements would make you most interested in learning more about Focus on Energy? **[READ LIST AND RANDOMIZE; ALLOW ONLY ONE RESPONSE; REPEAT INTRO STATEMENT AS NEEDED]** Focus on Energy helps Wisconsin businesses:
1. Reduce their energy costs and save money.
  2. With solutions to use energy smarter and save money.
  3. Grow by making smarter decisions about their energy use.
  4. Lower their energy costs.
  5. (None of the above)
- B4. ~ Next, I'm going to read you a list of statements about energy efficiency. Please tell me how important these statements are to you when deciding whether to upgrade the energy efficiency of your business. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY THIS STATEMENT IS VERY IMPORTANT, SOMEWHAT IMPORTANT, NOT TOO IMPORTANT, OR NOT AT ALL IMPORTANT WHEN DECIDING WHETHER TO UPGRADE THE ENERGY EFFICIENCY OF YOUR BUSINESS?]**  
**[READ LIST AND RECORD 1=VERY IMPORTANT, 2=SOMEWHAT IMPORTANT, 3=NOT TOO IMPORTANT, AND 4=NOT AT ALL IMPORTANT; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Energy efficiency saves my business money on its utility bills.
  2. Energy efficiency upgrades make my business more productive.
  3. Energy efficiency creates jobs and contributes to the Wisconsin economy.
  4. Energy efficiency protects the environment by reducing greenhouse gas emissions.

- B5. ~ Of the energy efficiency statements you just rated, which is the **most important** to you when deciding whether to upgrade the energy efficiency of your business? **[READ RESPONSES FROM B4 IF NEEDED; RECORD ONLY ONE RESPONSE]**
- 98. (Don't know)
  - 99. (Refused)

## C. Decision Making

Now I'd like to understand more about how your organization made decisions about your specific energy efficiency project.

- C1. \*What factor was **most** important to your company's decision to make the energy-efficient upgrades for which you received an incentive? **[DO NOT READ LIST; SINGLE RESPONSE]**
- 1. (To save money on energy bills, reduce energy consumption or energy demand)
  - 2. (To obtain a Program or bonus incentive)
  - 3. (To obtain a tax credit)
  - 4. (To replace old (but still functioning) equipment)
  - 5. (To replace broken equipment)
  - 6. (To enhance performance of our system(s))
  - 7. (To improve comfort)
  - 8. (Other **[SPECIFY]**)
  - 98. (Don't know)
  - 99. (Refused)
- C2. How important is energy efficiency to your organization when making capital upgrades or improvements? Is energy efficiency ... **[READ LIST]**
- 1. Very important
  - 2. Somewhat important
  - 3. Not too important
  - 4. Not at all important
  - 98. (Don't know)
  - 99. (Refused)
- C3. **[ASK IF C2=3 OR 4]** Can you please tell me why energy efficiency is not an important factor in making upgrades?
- 1. **[RECORD RESPONSE]**
  - 98. (Don't know)
  - 99. (Refused)

- C4. ~ What is your role or title at your organization?
1. (President/CEO/Executive Director/Owner)
  2. (Facility or Maintenance lead/manager)
  3. (Chief financial officer (CFO)/ controller/ finance manager)
  4. (Property manager)
  5. (General manager)
  6. (Regional manager)
  7. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- C5. ~ Do you require approval from someone else at your organization before committing to an energy efficiency upgrade?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- C6. **[ASK IF C5=1]** ~ Who at your organization, including yourself, is involved in making decisions about energy efficiency when making capital upgrades or improvements? **[DO NOT READ OPTIONS, MULTIPLE RESPONSES ALLOWED]**
1. (President/CEO/Executive Director)
  2. (Facility maintenance department/manager)
  3. (Corporate headquarters)
  4. (Board of directors)
  5. (Chief financial officer (CFO)/ controller/ finance manager)
  6. (Property manager)
  7. (General manager)
  8. (Regional manager)
  9. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- C7. **[ASK IF C5=1]** ~ How long does it typically take to receive approval to move forward with an energy efficiency upgrade?
1. Less than 1 week
  2. 1-3 weeks
  3. 4-6 weeks
  4. 7-8 weeks
  5. Over 8 weeks
  98. (Don't know)
  99. (Refused)

- C8. Are you considering implementing other energy efficient equipment or building upgrades in the next year?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- C9. **[ASK IF C8=1]** What other upgrades are you considering? [MULTIPLE ANSWERS ALLOWED; DO NOT READ LIST]
1. (Lighting, such as LED, fluorescent, or advanced lighting controls technologies; or equipment such as troffers, fixtures, lamps, sensors, indoor or outdoor)
  2. (HVAC, such as air conditioning, heating technology or equipment such as heat pumps, furnaces, boilers, air conditioners, chillers, thermostats, pumps, VFDs, air handlers/roof-top units)
  3. (Process/manufacturing equipment)
  4. (Water heaters)
  5. (Compressed air nozzles, variable speed drives, filters, valves)
  6. (Commercial kitchen equipment, such as ovens, fryers, ice machines, steam cookers, freezers and refrigerators)
  7. (Windows, window film)
  8. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)

## D. Benefits and Barriers

- D1. \*What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**
1. (The incentive payment)
  2. (Using less energy, reducing energy consumption or energy demand)
  3. (Saving money on our utility bills; lower energy bills)
  4. (Increased occupant comfort)
  5. (Better aesthetics/better or brighter lighting)
  6. (Saving money on maintenance costs)
  7. (Helping achieve organizational sustainability goals)
  8. (Other **[SPECIFY]**)
  9. (No benefits)
  98. (Don't know)
  99. (Refused)

- D2. \*What do you see as the biggest challenges to making energy-efficient improvements inside your company? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**
1. (High initial costs)
  2. (Budget limitations)
  3. (Long payback period)
  4. (Funding competition for other investments/improvements)
  5. (Replacing equipment without affecting operations)
  6. (Understanding potential areas for improvement)
  7. (Lack of awareness about available incentives for energy efficient equipment)
  8. (Understanding equipment eligibility)
  9. (Issues with Program application process)
  10. (Finding a contractor/vendor with which to work)
  11. (Inadequate incentive)
  12. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- D3. \*What could be done to help your company overcome challenges with energy-efficiency improvements? **[DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]**
1. (Nothing)
  2. (Higher incentives)
  3. (Provide upfront rewards/instant discount from contractor)
  4. (Offer low-interest loans)
  5. (Simplify the paperwork)
  6. (Provide better/more information about Program **[SPECIFY WHAT TYPE OF INFORMATION THEY NEED]**)
  7. (Provide an energy audit)
  8. (Provide a point of contact/Energy Advisor)
  9. (Other **[RECORD RESPONSE]**)
  98. (Don't know)
  99. (Refused)
- D4. ~ Who do you seek out as a trusted source of information regarding energy efficiency upgrades for your business? **[MULTIPLE RESPONSE ALLOWED; READ LIST IF NEEDED]**
1. My Focus on Energy Energy Advisor
  2. Energy utility representatives
  3. My installation contractor/vendor
  4. Other business owners/managers
  5. Web resources **[SPECIFY SITES]**
  6. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## E. Satisfaction and Application Ease

Next, I have a few questions for you about your application.

- E1. **[ASK IF A7=1; OTHERWISE SKIP TO E2.1]** \*Thinking about the application you submitted, how easy would you say this paperwork was to complete? Would you say: **[READ LIST]**
1. Very easy,
  2. Easy,
  3. Somewhat challenging, or
  4. Very challenging?
  98. (Don't know)
  99. (Refused)
- E2. **[ASK IF E1=3 OR 4]** \*Why do you say that?
1. [Record response]
- E3. **[ASK IF A6=1; OTHERWISE SKIP TO E5]** \*Thinking about the incentive check you received in the mail, about how long did it take to arrive? **[READ LIST]**
1. 1-3 weeks
  2. 4-6 weeks
  3. 7-8 weeks
  4. Over 8 weeks?
  98. (Don't know)
  99. (Refused)
- E4. How satisfied were you with the time it took to receive the check? Would you say: **[READ LIST]**
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not satisfied at all
  98. (Don't know)
  99. (Refused)
- E5. \*Is there anything that Focus on Energy could have done to improve your overall experience with the Business Incentive Program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**
1. (Better/more communication **[ASK: WHO WOULD YOU LIKE MORE COMMUNICATION FROM?]**)
  2. (Quicker response time **[ASK: WHO WOULD YOU LIKE A QUICKER RESPONSE TIME FROM?]**)
  3. (Larger selection of eligible equipment **[ASK: WHAT ENERGY-EFFICIENT EQUIPMENT SHOULD FOCUS ON ENERGY OFFER INCENTIVES FOR?]**)
  4. (Increasing the incentive amount)
  5. (Simplify the application process) **[ASK: IN WHAT WAY?]**
  6. (Allow me to fill out the applications online)
  7. (Simplify the website) **[ASK: IN WHAT WAY?]**

- 8. (Provide quicker approval on applications)
- 9. (Send incentive check out faster)
- 10. (Provide more face-time with my Energy Advisor (this may include more frequent visits))
- 11. (Other **[SPECIFY]**)
- 12. (No, nothing)
- 98. (Don't know)
- 99. (Refused)

## F. Verification

F1. Is all of the energy efficient equipment installed through the Program this year still in-place and operating as planned? My records show that you installed **[MEASURE CATEGORY1]**, **[MEASURE CATEGORY2]**, and **[MEASURE CATEGORY3]**.

- 1. (Yes)
- 2. (No)
- 98. (Don't know)
- 99. (Refused)

F2. **[ASK IF F1=2]** Which equipment is no longer installed or operating as planned? **[DO NOT READ LIST, SELECT ALL THAT APPLY]**

- 1. **[MEASURE CATEGORY1]**
- 2. **[MEASURE CATEGORY2]**
- 3. **[MEASURE CATEGORY3]**
- 4. (Other) **[SPECIFY]**
- 98. (Don't know)
- 99. (Refused)

**[ASK F3-F5F4 IF F1=2] [ASK FOR EACH RESPONSE SELECTED IN F2]**

F3. How many **[RESPONSE FROM F2]** did you or your contractor originally install?

- 1. **[RECORD RESPONSE]**

F4. And how many **[RESPONSE FROM F2]** are installed and operating now?

- 1. **[RECORD RESPONSE]**

F5. Why are the **[RESPONSE FROM F2]** no longer installed or operating as planned?

- 1. **[RECORD RESPONSE]**



## G. +Freeridership

**[ASK IF A4.1=1 SKIP TO SECTION H; OTHERWISE ASK SECTION G- CONTRACTOR DID NOT HELP IN THE DECISION MAKING]**

Now I'd like to talk with you a bit more about your decisions to purchase the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though you may have received incentives for other energy saving equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]** that was purchased.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

- G1. First, did your organization have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) before learning about the incentive?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**
- G2. Prior to learning about the incentive, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) included in your organization's capital budget?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**
- G3. Had your organization **ALREADY** ordered or purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) **BEFORE** your organization heard about the Business Incentive Program incentive?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- G4. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) without the incentive and information or education from Focus on Energy?
1. (Yes) **[SKIP TO G7]**
  2. (No) **[SKIP TO G9]**
  98. (Don't know)
  99. (Refused)

G5. Would you have installed **something** without the incentive and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**

1. (Yes, would have installed something)
2. (No, would NOT have installed anything) **[SKIP TO G10]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

G6. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?

1. (Yes, the same amount)
2. (No, would have installed less)
3. (No, would have installed more)
98. (Don't know)
99. (Refused)

G8. Without the **[INCENTIVE FOR MEASURE CATEGORY1 OR C\_MEASURE1]** and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**...**[READ LIST AND RECORD ONE RESPONSE]**

1. Within the same year? **[SKIP TO I1]**
2. Within one to two years? **[SKIP TO I1]**
3. Within three to five years? **[SKIP TO I1]**
4. In more than five years? **[SKIP TO I1]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

**[ASK G9 TO G12 IF G4 =2 OR G5=2]**

G9. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the incentive and information or education from Focus on Energy, would you have installed anything at all?

1. (Yes, would have installed something)
2. (No, would not have installed anything at all) **[SKIP TO I1]**
98. (Don't know)
99. (Refused)

G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?

1. (Yes, the same amount)
2. (No, would have installed less)
3. (No, would have installed more)
98. (Don't know)
99. (Refused)

G12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**

1. In the same year? **[SKIP TO I1]**
2. In one to two years? **[SKIP TO I1]**
3. In three to five years? **[SKIP TO I1]**
4. More than five years out? **[SKIP TO I1]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

## *H. +Freeridership – (Contractor)*

**[ASK EITHER SECTION G OR SECTION H]**

**[ASK IF A4.1=1 CONTRACTOR HELPED IN THE DECISION MAKING]**

Now I'd like to talk with you about the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though your contractor may have installed other energy efficient equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]**.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

- H1. At the time that you first started working with your contractor on this project, had you...? **[READ LIST AND RECORD ONE FOR EACH: 1=YES OR 2=NO OR 99=DON'T KNOW OR 88=REFUSED]**
1. Already been thinking about purchasing **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  2. Already begun collecting information about **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  3. Already selected the particular **[MEASURE CATEGORY1 OR C\_MEASURE1]** and were going to purchase it?
  4. Already purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  5. Already installed the **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  6. Already heard about Focus on Energy?
- H2. Just to make sure I understand, did your organization have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) before you began working with your contractor?
1. (Yes) **[ASK H3]**
  2. (No) **[SKIP TO H4]**
  98. (Don't know) **[SKIP TO H4]**
  99. (Refused) **[SKIP TO H4]**
- H3. Before you began working with your contractor, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) included in your organization's capital budget?
1. (Yes ) ASK:
    - A2a. Did your contractor help your organization make the decision to include the purchase of **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) in your organization's capital budget?
  2. (No)
  98. (Don't know)
  99. (Refused)
- H4. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) without the assistance from your contractor and information or education from Focus on Energy?
1. (Yes) **[SKIP TO H7]**
  2. (No) **[SKIP TO H9]**
  98. (Don't know)
  99. (Refused)
- H5. Would you have installed **something** without the involvement of your contractor and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**
1. (Yes, would have installed something) **[ASK H6]**
  2. (No, would NOT have installed anything) **[SKIP TO H9]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

- H6. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- H7. And without the involvement of your contractor and information or education from Focus on Energy would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes)
  2. (No) **[ASK H7.2A]**
    - B2a. Would you have installed fewer or more of the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
  98. (Don't know)
  99. (Refused)
- H8. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**...**[READ LIST AND RECORD ONE RESPONSE]**
1. Within the same year? **[SKIP TO I1]**
  2. Within one to two years? **[SKIP TO I1]**
  3. Within three to five years? **[SKIP TO I1]**
  4. In more than five years? **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

**[ASK H9 TO H13 IF H4=2 OR H5=2]**

- H9. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the assistance from your contractor and information or education from Focus on Energy, would you have installed anything at all?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know)
  99. (Refused)

- H10. Without the assistance from your contractor and information or education from Focus on Energy, **would you have installed** something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- H11. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes)
  2. (No) **[ASK H11.2A]**
    - C2a. Would you have installed fewer or more of the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
  98. (Don't know)
  99. (Refused)
- H12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**
1. In the same year?
  2. In one to two years?
  3. In three to five years?
  4. More than five years out?
  98. (Don't know)
  99. (Refused)
- H13. If the assistance or information from your contractor had not been available, would you have done anything differently on this project?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**
- H14. What would you have done differently?
1. **[RECORD RESPONSE]**

## I. +Spillover

### [ASK EVERYONE SECTION I]

11. Since making these energy efficiency upgrades has your company installed any other energy-efficient products in your facility that you did **NOT** receive a Focus on Energy incentive for? **[ASK IF NEEDED: BY ENERGY-EFFICIENT PRODUCTS, I MEAN HIGH EFFICIENCY LIGHTING SUCH AS LEDs; HIGH EFFICIENCY MOTORS AND VARIABLE SPEED DRIVES; HIGH EFFICIENCY AIR CONDITIONERS AND HEAT PUMPS, EFFICIENT HEATING OR WATER HEATING EQUIPMENT, ET CETERA.]**
  1. (Yes)
  2. (No) **[SKIP TO SECTION J]**
  98. (Don't know) **[SKIP TO SECTION J]**
  99. (Refused) **[SKIP TO SECTION J]**
  
12. What were the other energy-efficient products that you installed without getting an incentive? **[DO NOT READ LIST; MARK ALL THAT APPLY; 99=DON'T KNOW, 88=REFUSED, -96=N/A] [ASK IF THE CUSTOMER SAYS THEY BOUGHT SOMETHING BUT HAVE NOT INSTALLED IT, THE EQUIPMENT HAS TO BE INSTALLED AND OPERATING FOR US TO COUNT IT TOWARD SPILLOVER.]**
  1. (LEDs)
  2. (Fluorescent tubes (T5s, T8s, etc.))
  3. (Efficient lighting controls (occupancy sensors, daylighting, timers))
  4. (High efficiency motors)
  5. (Air source heat pumps)
  6. (Ground source heat pumps)
  7. (Central air conditioner)
  8. (Variable speed drive)
  9. (Water heating equipment)
  10. (Boiler)
  11. (Compressed air equipment)
  12. (Gas furnaces)
  13. (Exit signs)
  14. (Refrigeration equipment (refrigerators, freezers))
  15. Operational Improvements **[SPECIFY]**
  16. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

### **[ASK I2.11-I2.13 IF I2=1, 2]**

- I2.11 What is the wattage of the lighting? **[SPECIFY]**
- I2.12 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]**
- I2.13 What type of equipment was removed or replaced? **[SPECIFY]**

**[ASK I2.21-I2.23 IF I2=4]**

I2.21 What equipment was the motor installed on? **[SPECIFY TYPE]**

I2.22 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.31-I2.33 IF I2=5, 6, 7]**

I2.31 What Fuel type is used? **[SPECIFY]**

I2.32 What is the efficiency rating of the equipment? **[SPECIFY]**

I2.33 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.41-I2.42 IF I2=8]**

I2.41 What type of motor was it installed on? **[SPECIFY TYPE]**

I2.42 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.51-I2.54 IF I2=9]**

I2.51 What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]**

I2.52 What Fuel type is used? **[SPECIFY]**

I2.53 What is the efficiency rating of the equipment? **[SPECIFY]**

I2.54 (If water heater with storage) What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.61-I2.62 IF I2=11]**

I2.61 What type of application was the compressed air equipment purchased and installed?  
**[SPECIFY APPLICATION]**

I2.62 What is the horsepower of the compressor motor? **[SPECIFY]**

**[ASK I2.71-I2.72 IF I2=12]**

I2.71 What is the efficiency rating of the equipment? **[SPECIFY]**

I2.72 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.81 IF I2=14]**

I2.81 What type of refrigeration equipment was purchased and installed? **[SPECIFY TYPE]**

I3. **[REPEAT FOR EACH ITEM MENTIONED IN I2]** How many **[INSERT ITEM FROM I2]** did you install?

1. [RECORD NUMBER]

98. (Don't know)

99. (Refused)



14. **[REPEAT FOR EACH ITEM MENTIONED IN I2]** Please tell me how important **[ASK IF A4=1 READ, “THE ASSISTANCE FROM YOUR CONTRACTOR” OTHERWISE READ, “THE BUSINESS INCENTIVE PROGRAM”]** was in your decision to install **[ANSWER FROM I2]**. Was it: **[EMPHASIZE EACH ANSWER OPTION AND PAUSE IN BETWEEN EACH OPTION.]**
1. Very important
  2. Somewhat important
  3. Not too important,
  4. Not at all important
  98. (Don’t know)
  99. (Refused)
15. Was **[INSERT EACH ITEM FROM I2]** installed at **[SITE ADDRESS]**?
1. Yes
  2. No **[ASK: WHAT IS THE ADDRESS OF THE LOCATION WHERE YOU INSTALLED [INSERT EACH ITEM FROM I2]? [SPECIFY]]**
  98. (Don’t know)
  99. (Refused)

## J. Firmographics

Finally, I would like to ask you some questions about your company.

- J1. \*What industry is your company in? **[CODE ONE RESPONSE BELOW; DON’T READ UNLESS NECESSARY]**
1. (Agriculture)
  2. (Communications)
  3. (Construction)
  4. (Education)
  5. (Finance, Insurance, Real Estate)
  6. (Food Service (restaurants))
  7. (Government)
  8. (Health Care)
  9. (Manufacturing)
  10. (Nonprofit / churches / schools)
  11. (Retail, Wholesale)
  12. (Transportation)
  13. (Hotel/motels)
  14. (Mining)
  15. (Other **[SPECIFY]**)
  98. (Don’t know)
  99. (Refused)

- J2. How many locations does your company operate in Wisconsin?
1. [RECORD number]
  98. (Don't know)
  99. (Refused)
- J3. \*Does your organization lease or own the facility or facilities?
1. (Lease)
  2. (Own)
  3. (Other [SPECIFY])
  98. (Don't know)
  99. (Refused)
- J4. \*How many people are employed at the location where the project took place?
1. [RECORD number]
  98. (Don't know)
  99. (Refused)

## K. Closing

- K1. \*Do you have any other comments about energy efficiency decisions and purchases you would like to share?
1. [RECORD RESPONSE]
  98. (Don't know)
  99. (Refused)
- K2. \*On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with a Program manager, who may contact you regarding your experience?
1. Yes
  2. No
  98. (Don't know)
  99. (Refused)

Thank you. We appreciate your help with this survey. You may also be contacted for an on-site visit if you have not been contacted already. Have a nice day.

## Agriculture, Schools and Government Program Participant Survey

- A1. Hello, may I speak with **[PRIMARY.APPLICATION.CONTACT]** **[OR IF NO NAME: MAY I SPEAK WITH THE PERSON WHO HANDLES ENERGY AND BUILDING PROJECT DECISIONS FOR YOUR [COMPANY CATEGORY IN SURVEY]]?** **[ASK IF NOT AT THIS LOCATION, ASK FOR PHONE NUMBER AND NAME AT CORRECT LOCATION AND CALL RESPONDENT]**
1. (Yes) **[CONTINUE WITH RESPONDENT ON PHONE]**
  99. (Refused) **[THANK AND TERMINATE]**
- A2. Hello, I am **[INSERT NAME]** calling with a short survey on behalf of Wisconsin's Focus on Energy Programs. Are you the person responsible for making equipment decisions regarding energy efficiency at your **[COMPANY CATEGORY IN SURVEY]**? **[ASK IF NEEDED: FOCUS ON ENERGY IS A STATEWIDE UTILITY-FUNDED PROGRAM TO ENCOURAGE ENERGY EFFICIENCY.]**
1. (Yes)
  2. (No, but person can come to phone) **[START OVER AT A2 WITH NEW RESPONDENT]**
  3. (No, not available) **[SCHEDULE CALLBACK]**
  98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN]**
  99. (Refused) **[THANK AND TERMINATE]**
- A3. \*Our records show that you installed energy efficient equipment including **[MEASURE CATEGORY1]**, **[MEASURE CATEGORY2]**, and **[MEASURE CATEGORY3]** at **[SITE ADDRESS]** **[SITE CITY, WI]**. To ensure our records are correct, can you confirm that you received an incentive for this/these upgrades earlier this year?
1. (Yes)
  2. (No, wrong year) [Record correct year, if possible]
  3. (No, wrong address) [RECORD CORRECT ADDRESS]
  4. (No, wrong measure) **[CORRECT BELOW]**
    1. (MEASURE CATEGORY1 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE1]**
    2. (MEASURE CATEGORY2 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE2]**
    3. (MEASURE CATEGORY3 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE3]**
  5. (No, I did not install any measures) **[THANK AND TERMINATE]**
  98. (Don't know) Is there someone we could speak with that would know this? **[RECORD NAME AND CONTACT INFORMATION]**
  99. (Refused) **[THANK AND TERMINATE]**

**[THANK AND TERMINATE TEXT: THOSE ARE ALL OF OUR QUESTIONS. THANKS FOR YOUR HELP. HAVE A NICE DAY.]**

- A4. \*I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you initiate your energy efficiency project. **[READ LIST AND MARK 1= YES, 2=NO, 99=DON'T KNOW; 88 REFUSED FOR EACH]**
1. Your contractor or vendor
  2. A Focus on Energy Energy Advisor
  3. Your utility account manager
  4. Energy Service Company
- A5. \*How did your **[COMPANY CATEGORY IN SURVEY]** learn about the Focus on Energy incentives available for this project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE] [ASK IF RESPONDENT MENTIONS WEBSITE CLARIFY IF UTILITY OR FOCUS ON ENERGY WEBSITE SO YOU KNOW HOW TO CODE ANSWER ON LIST.]**
1. (Contact with Focus on Energy representative through phone, email, or in person)
  2. (Focus on Energy quarterly newsletter)
  3. (Focus on Energy website)
  4. (Focus on Energy sponsored workshop or event)
  5. (Focus on Energy printed Program materials)
  6. (Contact with utility representative)
  7. (Utility mailing, bill insert, or utility Website)
  8. (Word of mouth (family, friend, or business colleague))
  9. (I contacted my contractor/vendor to ask)
  10. (My contractor/vendor let me know about them)
  11. (Previously participated in program/received an incentive)
  12. (Through a trade association or professional organization **[SPECIFY]**)
  13. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- A6. \*Did you receive an incentive check in the mail for the upgrades, or did your contractor provide a discount on the cost of the project?
1. (Financial incentive in the mail)
  2. (Contractor discount)
  98. (Don't know)
  99. (Refused)

- A7. \*Who took the lead role in completing the application for the financial incentive? Was it... **[READ OPTIONS, RANDOMIZE OPTIONS, ONLY ONE RESPONSE]**
1. You (the respondent)
  2. Someone at your organization
  3. The contractor and/or vendor
  4. A Focus on Energy Energy Advisor
  5. Someone else **[SPECIFY]**
  98. (Don't know)
  99. (Refused)
- A8. \*Who else contributed to completing the application for the financial incentive? **[READ LIST IF NEEDED, PROBE FOR ALL PARTIES INVOLVED, MULTIPLE RESPONSES ALLOWED]**
1. (Me [the respondent])
  2. (No one else was involved)
  3. (Someone else at my organization)
  4. (The contractor and/or vendor)
  5. (A Focus on Energy Energy Advisor)
  6. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## B. Awareness

- B1. ~ What are the first three words that come to mind when you hear "Focus on Energy"? **[OPEN END, RECORD ONLY FIRST THREE RESPONSES]**
- 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. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY YOU STRONGLY AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR STRONGLY DISAGREE?]** **[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Focus on Energy is a brand that **[COMPANY CATEGORY IN SURVEY]** like mine can trust.
  2. Focus on Energy offers programs, tools, and/or services that are valuable to my **[COMPANY CATEGORY IN SURVEY]**.
  3. Focus on Energy provides programs that can or did help my **[COMPANY CATEGORY IN SURVEY]** lower its overall energy costs.
  4. Focus on Energy provides programs that can or did help make my **[COMPANY CATEGORY IN SURVEY]** more aware of energy saving opportunities.
  5. My business is more satisfied with our energy utility because it partners with Focus on Energy to offer energy efficiency programs to **[COMPANY CATEGORY IN SURVEY]**'s like mine.

- B3. ~ Which of the following statements would make you most interested in learning more about Focus on Energy? **[READ LIST AND RANDOMIZE; ALLOW ONLY ONE RESPONSE; REPEAT INTRO STATEMENT AS NEEDED]** Focus on Energy helps Wisconsin **[COMPANY CATEGORY IN SURVEY]**:
1. Reduce their energy costs and save money.
  2. With solutions to use energy smarter and save money.
  3. Grow by making smarter decisions about their energy use.
  4. Lower their energy costs.
  5. (None of the above)
- B4. ~ Next, I'm going to read you a list of statements about energy efficiency. Please tell me how important these statements are to you when deciding whether to upgrade the energy efficiency of your **[COMPANY CATEGORY IN SURVEY]**. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY THIS STATEMENT IS VERY IMPORTANT, SOMEWHAT IMPORTANT, NOT TOO IMPORTANT, OR NOT AT ALL IMPORTANT WHEN DECIDING WHETHER TO UPGRADE THE ENERGY EFFICIENCY OF YOUR BUSINESS?]**  
**[READ LIST AND RECORD 1=VERY IMPORTANT, 2=SOMEWHAT IMPORTANT, 3=NOT TOO IMPORTANT, AND 4=NOT AT ALL IMPORTANT; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Energy efficiency saves my **[COMPANY CATEGORY IN SURVEY]** money on its utility bills.
  2. Energy efficiency upgrades make my **[COMPANY CATEGORY IN SURVEY]** more productive.
  3. Energy efficiency creates jobs and contributes to the Wisconsin economy.
  4. Energy efficiency protects the environment by reducing greenhouse gas emissions.
- B5. ~ Of the energy efficiency statements you just rated, which is the **most important** to you when deciding whether to upgrade the energy efficiency of your **[PROPERTY USAGE CATEGORY]**? **[READ RESPONSES FROM B4 IF NEEDED; RECORD ONLY ONE RESPONSE]**
98. (Don't know)
  99. (Refused)
- B6. ~Have you received a copy of the Focus on Energy Energy Efficiency Best Practices Guidebook or viewed it online? **[DON'T READ: THERE IS A GUIDEBOOK FOR AGRICULTURE, A GUIDEBOOK FOR SCHOOLS AND GOVERNMENT FACILITIES, AND A GUIDEBOOK FOR WATER AND WASTEWATER INDUSTRY]**.
1. Yes
  2. No
  3. No, but I would like to receive one
  98. Don't know
- B7. **[ASK IF B6=3]** Would you like Focus on Energy to email you the guidebook?
1. Yes
  2. No

- B8. **[ASK IF B7= 3]** To which email address should Focus on Energy send you the guidebook? [Record email address]
- B9. **[ASK IF B6=1]** Have you read the guidebook?
1. Yes
  2. No
  98. (Don't know)
  99. (Refused)
- B10. **[ASK IF B9= YES]** Please tell me whether you agree or disagree with these statements about the Energy Efficiency guidebook. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY YOU STRONGLY AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR STRONGLY DISAGREE?]**  
**[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. The guidebook helps me understand best practices for energy efficiency at my facility
  2. The guidebook's information helped me to save energy at my facility
  3. The guidebook's information helped me to complete an energy efficiency project at my facility
  4. The guidebook's information helped me to complete an energy efficiency project at my facility
  5. I will use the guidebook for reference in the future

**[ASK B11-B15 IF SECTOR= AGRICULTURE; OTHERWISE SKIP TO C1]**

- B11. In the past ten months, have you heard a radio advertisement from Focus on Energy promoting financial incentives for agriculture customers?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- B12. In the past ten months, have you received any materials in the mail promoting Focus on Energy financial incentives for agriculture customers?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)

- B13. In the past ten months, have you received **emails** promoting Focus on Energy financial incentives for agriculture customers?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- B14. Which of the following ways would you prefer to stay informed about Focus on Energy financial incentives for agriculture customers? **[MULTIPLE RESPONSES ALLOWED; READ LIST]**
1. E-mails
  2. Energy Advisor
  3. Trade Ally
  4. Website
  5. Mailings
  6. Other **[SPECIFY]**
- B15. **[SKIP IF A4=1 OR A5=10]** Did your contractor inform you of the Focus on Energy financial incentives available to agriculture customers when discussing your energy efficiency project?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)

## C. Decision Making

Now I'd like to understand more about how your **[COMPANY CATEGORY IN SURVEY]** made decisions about your specific energy efficiency project.

- C1. \*What factor was **most** important to your **[COMPANY CATEGORY IN SURVEY]**'s decision to make the energy-efficient upgrades for which you received an incentive? **[DO NOT READ LIST; SINGLE RESPONSE]**
1. (To save money on energy bills, reduce energy consumption or energy demand)
  2. (To obtain a Program or bonus incentive)
  3. (To obtain a tax credit)
  4. (To replace old (but still functioning) equipment)
  5. (To replace broken equipment)
  6. (To enhance performance of our system(s))
  7. (To improve comfort)
  8. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)



- C2. How important is energy efficiency to your **[COMPANY CATEGORY IN SURVEY]** when making facility upgrades or improvements? Is energy efficiency ... **[READ LIST]**
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. (Don't know)
  99. (Refused)
- C3. **[ASK IF C2=3 OR 4]** Can you please tell me why energy efficiency is not an important factor in making upgrades?
1. **[RECORD RESPONSE]**
  98. (Don't know)
  99. (Refused)
- C4. ~ What is your role or title at your **[COMPANY CATEGORY IN SURVEY]**? **[DO NOT READ OPTIONS, ONLY ONE RESPONSE ALLOWED]**
1. (Farm owner)
  2. (School board)
  3. (School administrator)
  4. (School principal)
  5. (Facility or Maintenance lead/manager)
  6. (Chief financial officer (CFO)/ controller/ finance manager)
  7. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- C5. **[ASK C5 IF SECTOR= SCHOOLS AND GOVERNMENT]** ~ Do you require approval from someone else at your **[COMPANY CATEGORY IN SURVEY]** before committing to an energy efficiency upgrade?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- C6. **[ASK C5 IF SECTOR= AGRICULTURE]** What is the title of the person, including yourself, at your **[COMPANY CATEGORY IN SURVEY]** who is responsible for making decisions about energy efficient upgrades? **[OPEN END]**
1. Owner
  2. Farm or facility manager
  3. (Accountant/Bookkeeper/Controller)
  4. (President/CEO/Executive Director)

- C7. **[ASK IF C5=1]** ~ Who at your **[COMPANY CATEGORY IN SURVEY]** is involved in making decisions about energy efficiency when making capital upgrades or improvements? **[DO NOT READ OPTIONS, MULTIPLE RESPONSES ALLOWED]**
1. (School board)
  2. (School administrator)
  3. (School principal)
  4. (Facility maintenance department/manager)
  5. (Corporate headquarters)
  6. (Board of directors)
  7. (City or town manager)
  8. (City or town council)
  9. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- C8. **[ASK IF C5=1]** ~ How long does it typically take to receive approval to move forward with an energy efficiency upgrade?
1. Less than 1 week
  2. 1-3 weeks
  3. 4-6 weeks
  4. 7-8 weeks
  5. Over 8 weeks
  98. (Don't know)
  99. (Refused)
- C9. ~ Are you considering implementing other energy efficient equipment or building upgrades in the next year?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- C10. **[ASK IF C9=1]** What other upgrades are you considering? **[MULTIPLE ANSWERS ALLOWED; DO NOT READ LIST]**
1. (Lighting, such as LED, or advanced lighting controls technologies; or equipment such as troffers, fixtures, lamps, sensors, indoor or outdoor)
  2. (HVAC, such as air conditioning, heating technology or equipment such as heat pumps, furnaces, boilers, air conditioners, chillers, thermostats, pumps, VFDs, air handlers/roof-top units)
  3. (Process/manufacturing equipment)
  4. (Water heaters)

- 5. (Compressed air nozzles, variable speed drives, filters, valves)
- 6. (Windows, window film)
- 7. (Other **[SPECIFY]**)
- 98. (Don't know)
- 99. (Refused)

## *D. Benefits and Barriers*

- D1. \*What would you say are the main benefits your **[COMPANY CATEGORY IN SURVEY]** has experienced as a result of the energy efficiency upgrades we've discussed? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**
- 1. (The incentive payment)
  - 2. (Using less energy, reducing energy consumption or energy demand)
  - 3. (Saving money on our utility bills; lower energy bills)
  - 4. (Increased occupant comfort)
  - 5. (Better aesthetics/better or brighter lighting)
  - 6. (Saving money on maintenance costs)
  - 7. (Helping achieve organizational sustainability goals)
  - 8. (Other **[SPECIFY]**)
  - 9. (NO BENEFITS)
  - 98. (Don't know)
  - 99. (Refused)
- D2. \*What do you see as the biggest challenges to making energy-efficient improvements inside your **[COMPANY CATEGORY IN SURVEY]**? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**
- 1. (High initial costs)
  - 2. (Budget limitations)
  - 3. (Long payback period)
  - 4. (Funding competition for other investments/improvements)
  - 5. (Replacing equipment without affecting operations)
  - 6. (Understanding potential areas for improvement)
  - 7. (Lack of awareness about available incentives for energy efficient equipment)
  - 8. (Understanding equipment eligibility)
  - 9. (Issues with Program application process)
  - 10. (Finding a contractor/vendor with which to work)
  - 11. (Inadequate incentive)
  - 12. (Other **[SPECIFY]**)
  - 98. (Don't know)
  - 99. (Refused)

- D3. \*What could be done to help your **[COMPANY CATEGORY IN SURVEY]** overcome challenges with energy-efficiency improvements? **[DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]**
1. (Nothing)
  2. (Higher incentives)
  3. (Provide upfront rewards/instant discount from contractor)
  4. (Offer low-interest loans)
  5. (Simplify the paperwork)
  6. (Provide better/more information about Program **[SPECIFY WHAT INFORMATION]**)
  7. (Provide an energy audit)
  8. (Provide a point of contact/Energy Advisor)
  9. (Other **[RECORD RESPONSE]**)
  98. (Don't know)
  99. (Refused)
- D4. ~ Who do you seek out as a trusted source of information regarding energy efficiency upgrades for your **[COMPANY CATEGORY IN SURVEY]**? **[MULTIPLE RESPONSE ALLOWED; READ LIST IF NEEDED]**
1. My Focus on Energy Energy Advisor
  2. [Energy utility representatives
  3. My installation contractor/vendor
  4. Other business owners/managers
  5. Web resources **[SPECIFY SITES]**
  6. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## *E. Satisfaction and Application Ease*

Next, I have a few questions for you about your application.

- E1. **[ASK IF A7=1; OTHERWISE SKIP TO E2.1]** \*Thinking about the application you submitted, how easy would you say this paperwork was to complete? Would you say: **[READ LIST]**
1. Very easy,
  2. Easy,
  3. Somewhat challenging, or
  4. Very challenging?
  98. (Don't know)
  99. (Refused)
- E2. **[ASK IF E1=3 OR 4]** \*Why do you say that?
1. **[RECORD RESPONSE]**

- E3. **[ASK IF A6=1; OTHERWISE SKIP TO E5]** \*Thinking about the incentive check you received in the mail, about how long did it take to arrive? **[READ LIST]**
1. 1-3 weeks
  2. 4-6 weeks
  3. 7-8 weeks
  4. Over 8 weeks?
  98. (Don't know)
  99. (Refused)
- E4. How satisfied were you with the time it took to receive the check? Would you say: **[READ LIST]**
1. Very satisfied,
  2. Somewhat satisfied,
  3. Not too satisfied, or
  4. Not satisfied at all?
  98. (Don't know)
  99. (Refused)
- E5. \*Is there anything that Focus on Energy could have done to improve your overall experience with the Agriculture, Schools, and Government Program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**
1. (Better/more communication **[ASK: MORE COMMUNICATION FROM WHO?]**)
  2. (Quicker response time **[ASK: QUICKER RESPONSE TIME FROM WHO?]**)
  3. (Larger selection of eligible equipment **[ASK: WHAT ENERGY-EFFICIENT EQUIPMENT SHOULD FOCUS ON ENERGY OFFER INCENTIVES FOR?]**)
  4. (Increasing the incentive amount)
  5. (Simplify the application process **[ASK: IN WHAT WAY?]**)
  6. (Allow me to fill out the applications online)
  7. (Simplify the website **[ASK: IN WHAT WAY?]**)
  8. (Provide quicker approval on applications)
  9. (Send incentive check out faster)
  10. (Provide more face-time with my Energy Advisor (this may include more frequent visits))
  11. (Other **[SPECIFY]**)
  12. (No, nothing)
  98. (Don't know)
  99. (Refused)

## F. Verification

- F1. Is all of the energy efficient equipment installed through the Program this year still in-place and operating as planned? My records show that you installed **[MEASURE CATEGORY1]**, **[MEASURE CATEGORY2]**, and **[MEASURE CATEGORY3]**.
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)

- F2. **[ASK IF F1=2]** Which equipment is no longer installed or operating as planned? **[DO NOT READ LIST, SELECT ALL THAT APPLY]**
1. [MEASURE CATEGORY1]
  2. [MEASURE CATEGORY2]
  3. [MEASURE CATEGORY3]
  4. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

**[ASK F3-F5F4 IF F1=2] [ASK FOR EACH RESPONSE SELECTED IN F2]**

- F3. How many **[RESPONSE FROM F2]** did you or your contractor originally install?
1. **[OPEN END NUMERIC]**
- F4. And how many **[RESPONSE FROM F2]** are installed and operating now?
1. **[OPEN END NUMERIC]**
- F5. Why are the **[RESPONSE FROM F2]** no longer installed or operating as planned?
1. **[OPEN END]**

## G. +Freeridership

**[ASK IF A4.1=1 SKIP TO SECTION H; OTHERWISE ASK SECTION G- CONTRACTOR DID NOT HELP IN THE DECISION MAKING]**

Now I'd like to talk with you a bit more about your decisions to purchase the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though you may have received incentives for other energy saving equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]** that was purchased.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

- G1. First, did your **[COMPANY CATEGORY IN SURVEY]** have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) before learning about the incentive?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**

- G2. Prior to learning about the incentive, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) included in your **[COMPANY CATEGORY IN SURVEY]**'s capital budget?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**
- G3. Had your organization **ALREADY** ordered or purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) **BEFORE** your **[COMPANY CATEGORY IN SURVEY]** heard about the Agriculture, Schools, and Government Program incentive?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- G4. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) without the incentive and information or education from Focus on Energy?
1. (Yes) **[SKIP TO G7]**
  2. (No) **[SKIP TO G9]**
  98. (Don't know)
  99. (Refused)
- G5. Would you have installed **something** without the incentive and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**
1. (Yes, would have installed something)
  2. (No, would NOT have installed anything) **[SKIP TO G9]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**
- G6. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- G7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s)?
1. (Yes, the same amount)
  2. (No, would have installed less)
  3. (No, would have installed more)
  98. (Don't know)
  99. (Refused)

- G8. Without the **[INCENTIVE FOR MEASURE CATEGORY1 OR C\_MEASURE1]** and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**...**[READ LIST AND RECORD ONE RESPONSE]**
1. Within the same year? **[SKIP TO I1]**
  2. Within one to two years? **[SKIP TO I1]**
  3. Within three to five years? **[SKIP TO I1]**
  4. In more than five years? **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

**[ASK G9 TO G12 IF G4 =2 OR G5=2]**

- G9. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the incentive and information or education from Focus on Energy, would you have installed anything at all?
1. (Yes, would have installed something)
  2. (No, would not have installed anything at all) **[SKIP TO I1]**
  98. (Don't know)
  99. (Refused)

- G10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)

- G11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes, the same amount)
  2. (No, would have installed less)
  3. (No, would have installed more)
  98. (Don't know)
  99. (Refused)

- G12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**
1. In the same year? **[SKIP TO I1]**
  2. In one to two years? **[SKIP TO I1]**
  3. In three to five years? **[SKIP TO I1]**
  4. More than five years out? **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**



## H. +Freeridership – (Contractor)

**[ASK EITHER SECTION G OR SECTION H] [ASK IF A4.1=1 CONTRACTOR HELPED IN THE DECISION MAKING]**

Now I'd like to talk with you about the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though your contractor may have installed other energy efficient equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]**.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

- H1. At the time that you first started working with your contractor on this project, had you...? **[READ LIST AND RECORD ONE FOR EACH: 1=YES OR 2=NO OR 99=DON'T KNOW OR 88=REFUSED]**
1. Already been thinking about purchasing **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  2. Already begun collecting information about **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  3. Already selected the particular **[MEASURE CATEGORY1 OR C\_MEASURE1]** and were going to purchase it?
  4. Already purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  5. Already installed the **[MEASURE CATEGORY1 OR C\_MEASURE1]**?
  6. Already heard about Focus on Energy?
- H2. Just to make sure I understand, did your organization have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) before you began working with your contractor?
1. (Yes)
  2. (No) **[SKIP TO H4]**
  98. (Don't know) **[SKIP TO H4]**
  99. (Refused) **[SKIP TO H4]**
- H3. Before you began working with your contractor, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) included in your **[COMPANY CATEGORY IN SURVEY]**'s capital budget?
1. (Yes ) ASK:
    - H3a. Did your contractor help your organization make the decision to include the purchase of **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) in your **[COMPANY CATEGORY IN SURVEY]** 's capital budget?
  2. (No)
  98. (Don't know)
  99. (Refused)

- H4. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the assistance from your contractor and information or education from Focus on Energy?
1. (Yes) **[SKIP TO H7]**
  2. (No) **[SKIP TO H9]**
  98. (Don't know)
  99. (Refused)
- H5. Would you have installed **something** without the involvement of your contractor and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**
1. (Yes, would have installed something)
  2. (No, would NOT have installed anything) **[SKIP TO H9]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**
- H6. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes )
  2. (No)
  98. (Don't know)
  99. (Refused)
- H7. And without the involvement of your contractor and information or education from Focus on Energy would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes)
  2. (No) **[ASK J7.2A]**
- H7a. Would you have installed fewer or more of the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
98. (Don't know)
  99. (Refused)
- H8. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**...**[READ LIST AND RECORD ONE RESPONSE]**
1. Within the same year? **[SKIP TO I1]**
  2. Within one to two years? **[SKIP TO I1]**
  3. Within three to five years? **[SKIP TO I1]**
  4. In more than five years? **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

**[ASK H9 TO H13 IF H4=2 OR H5=2]**

- H9. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the assistance from your contractor and information or education from Focus on Energy, would you have installed anything at all?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know)
  99. (Refused)
- H10. Without the assistance from your contractor and information or education from Focus on Energy, **would you have installed** something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- H11. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes)
  2. (No) **[ASK J11.2A]**
- H11a. Would you have installed fewer or more of the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
98. (Don't know)
  99. (Refused)
- H12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**
1. In the same year?
  2. In one to two years?
  3. In three to five years?
  4. More than five years out?
  98. (Don't know)
  99. (Refused)
- H13. If the assistance or information from your contractor had not been available, would you have done anything differently on this project?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

H14. What would you have done differently?

1. [RECORD RESPONSE]

## I. +Spillover

### [ASK EVERYONE SECTION I]

11. Since making these energy efficiency upgrades has your company installed any other energy-efficient products in your facility that you did **NOT** receive a Focus on Energy incentive for? [ASK IF NEEDED: BY ENERGY-EFFICIENT PRODUCTS, I MEAN HIGH EFFICIENCY LIGHTING SUCH AS LEDs; HIGH EFFICIENCY MOTORS AND VARIABLE SPEED DRIVES; HIGH EFFICIENCY AIR CONDITIONERS AND HEAT PUMPS, EFFICIENT HEATING OR WATER HEATING EQUIPMENT, ET CETERA.]
  1. (Yes) [ASK I2]
  2. (No) [SKIP TO SECTION J]
  98. (Don't know) [SKIP TO SECTION J]
  99. (Refused) [SKIP TO SECTION J]
  
12. What were the other energy-efficient products that you installed without getting an incentive? [DO NOT READ LIST; MARK ALL THAT APPLY; 99=DON'T KNOW, 88=REFUSED, -96=N/A] [ASK IF THE CUSTOMER SAYS THEY BOUGHT SOMETHING BUT HAVE NOT INSTALLED IT, THE EQUIPMENT HAS TO BE INSTALLED AND OPERATING FOR US TO COUNT IT TOWARD SPILLOVER.]
  1. (LEDs)
  2. (Efficient lighting controls (occupancy sensors, daylighting, timers))
  3. (High efficiency motors)
  4. (Air source heat pumps)
  5. (Ground source heat pumps)
  6. (Central air conditioner)
  7. (Variable speed drive)
  8. (Water heating equipment)
  9. (Boiler)
  10. (Compressed air equipment)
  11. (Gas furnaces)
  12. (Exit signs)
  13. (Refrigeration equipment (refrigerators, freezers))
  14. Operational Improvements [SPECIFY]
  15. (Other) [SPECIFY]
  98. (Don't know)
  99. (Refused)

**[ASK I2.11-I2.13 IF I2=1, 2]**

- I2.11 What is the wattage of the lighting? **[SPECIFY]**
- I2.12 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]**
- I2.13 What type of equipment was removed or replaced? **[SPECIFY]**

**[ASK I2.21-I2.23 IF I2=4]**

- I2.21 What equipment was the motor installed on? **[SPECIFY TYPE]**
- I2.22 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.31-I2.33 IF I2=5, 6, 7]**

- I2.31 What Fuel type is used? **[SPECIFY]**
- I2.32 What is the efficiency rating of the equipment? **[SPECIFY]**
- I2.33 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.41-I2.42 IF I2=8]**

- I2.41 What type of motor was it installed on? **[SPECIFY TYPE]**
- I2.42 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.51-I2.54 IF I2=9]**

- I2.51 What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]**
- I2.52 What Fuel type is used? **[SPECIFY]**
- I2.53 What is the efficiency rating of the equipment? **[SPECIFY]**
- I2.54 (If water heater with storage) What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.61-I2.62 IF I2=11]**

- I2.61 What type of application was the compressed air equipment purchased and installed?  
**[SPECIFY APPLICATION]**
- I2.62 What is the horsepower of the compressor motor? **[SPECIFY]**

**[ASK I2.71-I2.72 IF I2=12]**

- I2.71 What is the efficiency rating of the equipment? **[SPECIFY]**
- I2.72 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.81 IF I2=14]**

- I2.81 What type of refrigeration equipment was purchased and installed? **[SPECIFY TYPE]**

13. **[REPEAT FOR EACH ITEM MENTIONED IN I2] HOW MANY [INSERT ITEM FROM I2] did you install?**
1. [RECORD NUMBER]
  98. Don't know
  99. Refused
14. **[REPEAT FOR EACH ITEM MENTIONED IN I2] Please tell me how important [ASK IF A4=1 READ, "THE ASSISTANCE FROM YOUR CONTRACTOR" OTHERWISE READ, "THE AGRICULTURE, SCHOOLS, AND GOVERNMENT PROGRAM"] was in your decision to install [ANSWER FROM I2]. Was it:**  
**[EMPHASIZE EACH ANSWER OPTION AND PAUSE IN BETWEEN EACH OPTION.]**
1. Very important,
  2. Somewhat important,
  3. Not too important, or
  4. Not at all important?
  98. (Don't know)
  99. (Refused)
15. Was **[INSERT EACH ITEM FROM I2]** installed at **[SITE ADDRESS], [SITE CITY, WI]**?
1. Yes
  2. No **[ASK: WHAT IS THE ADDRESS OF THE LOCATION WHERE YOU INSTALLED [INSERT EACH ITEM FROM I2]]? [SPECIFY]**
  98. (Don't know)
  99. (Refused)

## J. Firmographics

Finally, I would like to ask you some questions about your **[COMPANY CATEGORY IN SURVEY]**.

### **[ASK J1 IF SECTOR=AGRICULTURE]**

- J1. How would you describe the type of farm or agricultural facility you run? **[READ LIST]**
1. Individual
  2. Co-Op
  3. Corporate
  4. (Other **[SPECIFY]**)

### **[ASK J2 AND J3 ONLY IF SECTOR= AGRICULTURE]**

- J2. How many locations does your company operate in Wisconsin?
1. [RECORD number]
  98. (Don't know)
  99. (Refused)

- J3. \*Does your **[COMPANY CATEGORY IN SURVEY]** lease or own the facility or facilities?
1. (Lease)
  2. (Own)
  3. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)

**[ASK ALL RESPONDENTS J4]**

- J4. \*How many people are employed at the location where the project took place?
1. **[RECORD NUMBER]**
  98. (Don't know)
  99. (Refused)

## *K. Closing*

- K1. \*Do you have any other comments about energy efficiency decisions and purchases you would like to share?
1. **[RECORD RESPONSE]**
  98. (Don't know)
  99. (Refused)
- K2. \*On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with a Program manager, who may contact you regarding your experience?
1. Yes
  2. No
  98. (Don't know)
  99. (Refused)

Thank you. We appreciate your help with this survey. You may also be contacted for an on-site visit if you have not been contacted already. Have a nice day.

## Multifamily Programs

### Strategic Energy Management Program Participant Interview Guide

Researchable Questions	Item
Are participants satisfied with the overall Pilot and various components (contractor, rebate levels and timeliness, etc.)?	G1 - G6
Is it easy to participate? What are the primary reasons for participation? Will you continue to look for and implement SEM related activities (energy team, employee engagement activities, list of opportunities)? What are the barriers and challenges?	C2, D3, D4, D5, F1, G5, G6
Is the Pilot functioning smoothly and as expected? Are there improvements that can be made to streamline processes/ease of use?	H2
What have been the impacts of this Pilot?	F2, F3, F4, F4.2, F6
What is the Pilot's influence on decision-making and changes in practice?	C2, D1, F4

SEM Pilot Elements	Data Source
Roles & Responsibilities	B1, B2
Energy Model	E1
Energy Team Meetings	C1, C2, D3
Implement Opportunities	D1, D2, D3
Operational Controls	D4, E3
Administrative Infrastructure	C1-C4, E2, E4

## A. Introduction

- A1. May I speak with **[CONTACT NAME]**? **[ASK IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR NAME AND PHONE NUMBER AND START AGAIN]**
1. (Yes)
  2. (No, person is not able to come to phone) **[GET NAME, PHONE NUMBER, AND SCHEDULE CALLBACK]**
  3. (No, person no longer works there) **[ASK FOR THE CONTACT NAME AND PHONE NUMBER FOR THE PERSON MOST FAMILIAR WITH PARTICIPATING IN {SEM TYPE} IN {SEM YEAR}]**
  98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]**
  99. (Refused) **[THANK AND TERMINATE]**
- A2. Hello, I'm **[INSERT NAME]** calling on behalf of Wisconsin Focus on Energy. Our records show that you are the person who is most knowledgeable about your company's involvement in Focus on Energy's Strategic Energy Management Pilot, often referred to as SEM, is this correct?
1. (Yes)
  2. (No) **[ASK FOR THE CONTACT NAME AND PHONE NUMBER FOR THE CONTACT]**
  98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]**
  99. (Refused) **[THANK AND TERMINATE]**



- A3. Focus on Energy wants to hear about your experience with the Strategic Energy Management Pilot. Your opinions will directly influence how Focus on Energy delivers this Pilot. We expect this call to take about 20-25 minutes. Is this a good time? **[IF NOT A GOOD TIME, ASK TO SCHEDULE A TIME TO CALL BACK]**

## *B. Roles and Responsibilities*

- B1. First, can you please tell me your title and describe your role with the SEM Pilot?

## *C. Customer Commitment*

- C1. Do you have an energy team **[DEDICATED STAFF FOR ENERGY AND ENERGY EFFICIENCY MANAGEMENT]** at your facility?
1. **[ASK IF SO]** How frequently does the energy team currently meet? **[ASK IF “AS NEEDED” ASK IF THEY AT LEAST MEET ANNUALLY, QUARTERLY, MONTHLY OR WEEKLY.]**
- C2. How did the Focus on Energy SEM pilot influence the way your energy team operates?
- C3. Thinking about communication with your energy team, what is working well in regards to communication and what is not working as well? **[PROBE FOR PARTICULAR REASONS FOR DISSATISFACTION]**  
Thinking about how you communicate about strategic energy management outside of your energy team, what is working well and what is not working as well? **[PROBE FOR PARTICULAR REASONS FOR DISSATISFACTION]**
- C4. What feedback, if any, have you received from senior management about participating in the SEM Pilot?
1. How will senior management support the energy team in continuing to implement SEM strategies in the future?

## *D. Customer Commitment - Energy Policies & Goals*

- D1. How, if at all, has your company’s process for implementing and pursuing energy-saving opportunities changed since you began participating in the SEM Pilot?
- D2. Do you have an energy management plan? If so, was this a result of the SEM Pilot?
- D3. Do you have an energy savings goal in 2018 (such as percentage reduction per year)?
1. If yes, please describe.
  2. Do you have an energy savings goal for 2019 and beyond? If so, what is your energy savings goal beyond 2018?
- D4. What are some of the operational and capital energy-saving opportunities your company is looking to implement in the next year? **[PROBE FOR PROJECTS IN 2018 AND 2019]**

- D5. How often are you reviewing the list of energy saving opportunities to ensure that they still align with business and energy performance priorities?
- D6. On a scale of 0 meaning not at all likely and 10 meaning extremely likely, how likely are you to initiate energy-efficiency improvements in the next 12 months?
- D7. Did your participation in the SEM Pilot lead your organization to consider these opportunities?  
**[CLARIFY FOR EACH OPPORTUNITY]**
- D8. Did your participation in the SEM Pilot encourage your organization to complete these projects sooner than you would have without participating in the Pilot?
- D9. Did strategic energy management result in greater understanding of energy use and opportunities in your production process?
- D10. Do you plan to continue to add capital energy saving opportunities to your list in the future?
- D11. Does your company have any requirements or procedures in place to ensure the longevity and sustainability of the non-technology (operational) actions taken or changes made through the SEM Pilot? **[PROBE FOR SPECIFICS]**
- D12. Now thinking about employee engagement opportunities, what, if any, employee engagement activities pertaining to energy efficiency have you implemented or do you plan to implement in 2018? **[ASK IF NEEDED: INCLUDES ANY ACTIVITIES THAT INVOLVE STAFF OUTSIDE THE ENERGY TEAM, SUCH AS ENGAGING STAFF TO TURNING OFF EQUIPMENT WHEN NOT USED, AWARENESS CAMPAIGNS, ETC.]**
1. **[ASK IF ANY]** Are you planning to continue offering these employee engagement activities after 2018? **[PROBE FOR TYPES OF TRAININGS AND WORKSHOPS]**
  2. **[ASK IF NONE]** What are the challenges you face in offering employee engagement activities? **[PROBE FOR BARRIERS IN DOING SO]**

## *E. Program Elements*

- E1. Have you referenced the energy performance model developed through the SEM pilot to track your energy performance since it was first created? **[ASK IF NEEDED: AN ENERGY PERFORMANCE MODEL IS A STATISTICALLY VALID MODEL FOR TRACKING PERFORMANCE IN TOP-DOWN ANALYSIS]**
- E2. On a scale of 0 meaning not valuable to 10 meaning highly valuable, how valuable is your energy performance model?
1. **[ASK IF 7 OR LOWER]** Why did you rate the value of your energy performance model a **[INSERT RATING]**?

- E3. How frequently does your company review its energy performance? **[PROBE FOR WHO SHARES WITH WHOM]**
1. Will you continue to review energy performance in the future?
- E4. How often is energy use data shared with others in your organization or company? **[PROBE FOR WHO SHARES WITH WHOM]**
- E5. Does your company have plans for enhancing your energy data acquisition or analysis capability?
1. (If yes) How are you planning to do this?

## *F. Challenges, Benefits, and Initiatives*

- F1. What are some of the most significant challenges your company faces when promoting energy-efficiency?
1. Has your participation in the SEM Pilot helped address these challenges? **[ASK IF YES, ASK HOW SEM PARTICIPATION HAS HELPED ADDRESS THESE CHALLENGES?]**
  2. How can Focus on Energy help your company alleviate the challenges your company faces when promoting energy-efficiency?
- F2. What have been the most challenging aspects of participating in the SEM Pilot?
- F3. What have been the most beneficial aspects of participating in the SEM Pilot?
- F4. What non-energy benefits has your company experienced through participating in the SEM Pilot?

## *G. Certification*

- G1. Is your company participating in the ENERGYSTAR Challenge? **[ASK IF NEEDED: A CALL-TO-ACTION FOR INDUSTRIAL SITES TO REDUCE THEIR ENERGY INTENSITY BY 10% WITHIN 5 YEARS FOR EPA RECOGNITION]** Why or why not?
- G2. Is your company pursuing or considering pursuing ISO 50001 or 50001 Ready? If so, why? If not, why?
- G3. Does your company pursue other ISO standards? Which ones? **[OPTIONS INCLUDE 9001-QUALITY, 10003 CUSTOMER SATISFACTION, 140001 ENVIRONMENT, 22000 FOOD SAFETY, 26000 SOCIAL RESPONSIBILITY, 27001 INFORMATION SECURITY, 28000 SUPPLY CHAIN SECURITY, 31000 RISK MANAGEMENT, 50001 ENERGY MANAGEMENT, OTHER]**
1. **[ASK IF SO]** How influential was the Focus on Energy SEM Pilot in your decision to pursue this/these standard(s)?
- G4. Is your company interested in achieving Superior Energy Performance certification from the Department of Energy? **[READ IF NEEDED: A COMPANY THAT HAS MET THE ISO 50001 STANDARD AND HAVE IMPROVED THEIR ENERGY PERFORMANCE UP TO 30% OVER THREE YEARS]**

## H. Participant Satisfaction

I have just a few more questions to ask. You may simply answer using a 10-point scale where 0 is not at all satisfied, and 10 is extremely satisfied. Using the 0 through 10 scale, please tell me:

- H1. Overall, how satisfied are you with the support you receive from Focus on Energy for your SEM participation? **[0 TO 10 SCALE]**
1. **[ASK IF 7 OR LESS]** Why do you say that?
- H2. Overall, how satisfied are you with the Energy Advisor who has assisted you while participating in the SEM Pilot? **[0 TO 10 SCALE / I DID NOT WORK WITH AN ENERGY ADVISOR]**
- H3. Overall, how satisfied are you with the SEM Pilot? **[0 TO 10 SCALE]**
- 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 SEM Pilot.
1. \$70,000 for SEM completion
  2. \$15,000 for the EMIS study
  3. \$15,000 for EMIS implementation
  4. \$12,500 for low cost project support
  5. \$2,000 for professional training
- H5. Which financial incentive was most valuable and why?
- H6. Which financial incentive was least valuable and why?
- H7. On a scale where 0 means not likely and 10 means extremely likely, how likely is it that you would recommend this pilot to others?
- H8. On that same 0 to 10 scale, how likely is it that you will continue to implement the aspects of your SEM Pilot once incentives are no longer available from Focus on Energy? **[0=NOT LIKELY AT ALL, 10 = EXTREMELY LIKELY, ALREADY HAVE]**
- H9. I'm going to read you a list of three statements about the SEM Pilot. Please tell me whether you strongly agree, agree somewhat, disagree somewhat or disagree strongly with each statement. **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING] [READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. The SEM Pilot has met the needs of my company or organization as a sustainable energy management framework.
  2. The SEM Pilot uses the knowledge of my company's staff to find savings.
  3. The SEM Pilot uses data for analysis which provides opportunities for low and no-capital project savings.

## *I. Closing*

And finally just a few questions about your company.

- I1. Is the building that is participating in the SEM Pilot owned or leased?
- I2. Do you have any additional comments about your participation in the SEM Pilot?
- I3. On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with the SEM Pilot manager, who may contact you regarding your experience?

Those are all my questions. Thank you very much for your time and for your support of this important study. Have a great day!

## Large Energy Users Program Participant Customer Survey

### Researchable Questions

Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	A4-A7
Marketing and Outreach	Program Awareness	A4, A6, A7, B1
	Brand identity and messaging impacts	B1-B5
	Key factors influencing customers' decision to participate in program	C1, K1
Barriers	Obstacles to installing high-efficiency equipment	D1-D4
	Barriers to and opportunities for converting participants from single Program participation to engaging in more and deeper efforts to save energy.	C2-C3
Satisfaction	Assess satisfaction with various Program components and reasons for dissatisfaction among participants	E1-E5, K1-K2
Firmographics	Determine building and company characteristics of participants	J1-0
Decision Making	Understand decision making processes and how they relate to corporate structure	C1-C10
Verification, Freeridership and Spillover	Verify project, assess net savings	A4F1-I5

### A. Introduction

- A1. Hello, may I speak with **[PRIMARY APPLICATION CONTACT]** **[OR IF NO NAME: MAY I SPEAK WITH THE PERSON WHO HANDLES ENERGY AND BUILDING PROJECT DECISIONS FOR YOUR COMPANY]?** **[ASK IF NOT AT THIS LOCATION, ASK FOR PHONE NUMBER AND NAME AT CORRECT LOCATION AND CALL RESPONDENT]**
1. (Yes) **[CONTINUE WITH RESPONDENT ON PHONE]**
  99. (Refused) **[THANK AND TERMINATE]**
- A2. Hello, I am **[INSERT NAME]** calling with a survey on behalf of Wisconsin Focus on Energy Large Energy Users Program. Are you the person responsible for making equipment decisions regarding energy efficiency at your company? **[ASK IF NEEDED: FOCUS ON ENERGY IS A STATEWIDE UTILITY-FUNDED PROGRAM TO ENCOURAGE ENERGY EFFICIENCY.]**
1. (Yes)
  2. (No, but person can come to phone) **[START OVER AT A2 WITH NEW RESPONDENT]**
  3. (No, not available) **[SCHEDULE CALLBACK]**
  98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN]**
  99. (Refused) **[THANK AND TERMINATE]**

- A3. **[ASK IF TYPE=SEM OR BOTH]** Our records show that you are participating in the Focus on Energy Strategic Energy Management portion of the Large Energy Users Program. Is this correct?
1. Yes **[CONTINUE]** For the rest of the survey, please think about your participation in Strategic Energy Management
  2. No **[THANK AND TERMINATE UNLESS ALSO INSTALLED OTHER MEASURES THROUGH PROGRAM]**
  98. Don't know **[THANK AND TERMINATE UNLESS ALSO INSTALLED OTHER MEASURES THROUGH PROGRAM]**
  99. Refused **[THANK AND TERMINATE]**
- A4. **[ASK IF TYPE=OTHER OR BOTH]** \*Our records show that you installed energy efficient equipment including **[MEASURE CATEGORY1]**, **[MEASURE CATEGORY2]**, and **[MEASURE CATEGORY3]** at **[SITE ADDRESS]**. To ensure our records are correct, can you confirm that you received an incentive for this/these upgrades earlier this year?
1. (Yes)
  2. (No, wrong year) **[RECORD CORRECT YEAR, IF POSSIBLE]**
  3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
  4. (No, wrong measure) **[CORRECT BELOW]**
    4. (MEASURE CATEGORY1 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE1]**
    5. (MEASURE CATEGORY2 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE2]**
    6. (MEASURE CATEGORY3 IS INCORRECT **[CORRECT]**) **[CALL THIS VARIABLE C\_MEASURE3]**
  5. (No, I did not install any measures) **[THANK AND TERMINATE]**
  98. (Don't know) Is there someone we could speak with that would know this? **[RECORD NAME AND CONTACT INFORMATION]**
  99. (Refused) **[THANK AND TERMINATE]**

**[THANK AND TERMINATE TEXT: THOSE ARE ALL OF OUR QUESTIONS. THANKS FOR YOUR HELP. HAVE A NICE DAY.]**

- A5. \*I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you initiate **[ASK IF PROGRAM=OTHER, "YOUR ENERGY EFFICIENCY PROJECT", IF PROGRAM=SEM OR BOTH, "YOUR PARTICIPATION IN STRATEGIC ENERGY MANAGEMENT OR SEM"]**. **[READ LIST AND MARK 1= YES, 2=NO, 99=DON'T KNOW; 88 REFUSED FOR EACH]**
1. Your contractor or vendor
  2. A Focus on Energy Energy Advisor
  3. Your utility account manager

- A6. \*How did your organization learn about the Focus on Energy incentives available for **[ASK IF PROGRAM=OTHER, "THIS PROJECT?" IF PROGRAM=SEM OR OTHER, "STRATEGIC ENERGY MANAGEMENT?"]** **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]** **[ASK IF RESPONDENT MENTIONS WEBSITE CLARIFY IF UTILITY OR FOCUS ON ENERGY WEBSITE SO YOU KNOW HOW TO CODE ANSWER ON LIST.]**
1. (Contact with Focus on Energy Energy Advisor through phone, email, or in person)
  2. (Focus on Energy quarterly newsletter)
  3. (Focus on Energy website)
  4. (Focus on Energy sponsored workshop or event)
  5. (Focus on Energy printed Program materials)
  6. (Contact with utility representative)
  7. (Utility mailing, bill insert, or utility Website)
  8. (Word of mouth (family, friend, or business colleague))
  9. (I contacted my contractor/vendor to ask)
  10. (My contractor/vendor let me know about them)
  11. (Previously participated in program/received an incentive)
  12. (Through a trade association or professional organization **[SPECIFY]**)
  13. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- A7. **[ASK IF TYPE=BOTH]** \*Did you receive an incentive check in the mail for the upgrades, or did your contractor provide a discount on the cost of the project?
1. (Incentive check in the mail)
  2. (Contractor discount)
  98. (Don't know)
  99. (Refused)
- A8. \*Who took the lead role in completing the application for the financial incentive? Was it... **[READ OPTIONS, RANDOMIZE OPTIONS, ONLY ONE RESPONSE]**
1. You (the respondent)
  2. Someone at your organization
  3. The contractor and/or vendor
  4. A Focus on Energy Energy Advisor
  5. Someone else **[SPECIFY]**
  98. (Don't know)
  99. (Refused)



- A9. \*Who else contributed to completing the application for the financial incentive? **[READ LIST IF NEEDED, PROBE FOR ALL PARTIES INVOLVED, MULTIPLE RESPONSES ALLOWED]**
1. (No one else was involved)
  2. (Me [the respondent])
  3. (Someone else at my organization)
  4. (The contractor and/or vendor)
  5. (A Focus on Energy Energy Advisor)
  6. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## B. Awareness

- B1. ~ What are the first three words that come to mind when you hear "Focus on Energy"? **[OPEN END, RECORD ONLY FIRST THREE RESPONSES]**
- 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. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY YOU STRONGLY AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR STRONGLY DISAGREE?]** **[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Focus on Energy is a brand that businesses like mine can trust.
  2. Focus on Energy offers programs, tools, and/or services that are valuable to my business.
  3. Focus on Energy provides programs that can or did help my business lower its overall energy costs.
  4. Focus on Energy provides programs that can or did help make my business more aware of energy saving opportunities.
  5. My business is more satisfied with our energy utility because it partners with Focus on Energy to offer energy efficiency programs to businesses like mine.
- B3. ~ Which of the following statements would make you most interested in learning more about Focus on Energy? **[READ LIST AND RANDOMIZE; ALLOW ONLY ONE RESPONSE; REPEAT INTRO STATEMENT AS NEEDED]** Focus on Energy helps Wisconsin businesses:
1. Reduce their energy costs and save money.
  2. With solutions to use energy smarter and save money.
  3. Grow by making smarter decisions about their energy use.
  4. Lower their energy costs.
  5. (None of the above)

- B4. ~ Next, I'm going to read you a list of statements about energy efficiency. Please tell me how important these statements are to you when deciding whether to upgrade the energy efficiency of your business. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: WOULD YOU SAY THIS STATEMENT IS VERY IMPORTANT, SOMEWHAT IMPORTANT, NOT TOO IMPORTANT, OR NOT AT ALL IMPORTANT WHEN DECIDING WHETHER TO UPGRADE THE ENERGY EFFICIENCY OF YOUR BUSINESS?]**  
**[READ LIST AND RECORD 1=VERY IMPORTANT, 2=SOMEWHAT IMPORTANT, 3=NOT TOO IMPORTANT, AND 4=NOT AT ALL IMPORTANT; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]**
1. Energy efficiency saves my business money on its utility bills.
  2. Energy efficiency upgrades make my business more productive.
  3. Energy efficiency creates jobs and contributes to the Wisconsin economy.
  4. Energy efficiency protects the environment by reducing greenhouse gas emissions.
- B5. ~ Of the energy efficiency statements you just rated, which is the **most important** to you when deciding whether to upgrade the energy efficiency of your business? **[READ RESPONSES FROM B4 IF NEEDED; RECORD ONLY ONE RESPONSE]**
98. (Don't know)
  99. (Refused)

## C. Decision Making

Now I'd like to understand more about how your organization made decisions about your specific energy efficiency project.

- C1. \*What factor was **most** important to your company's decision to make the energy-efficient upgrades for which you received an incentive? **[DO NOT READ LIST; SINGLE RESPONSE]**
1. (To save money on energy bills, reduce energy consumption or energy demand)
  2. (To obtain a Program or bonus incentive)
  3. (To obtain a tax credit)
  4. (To replace old (but still functioning) equipment)
  5. (To replace broken equipment)
  6. (To enhance performance of our system(s))
  7. (To improve comfort)
  8. (To improve facility safety)
  9. (To confirm claimed energy savings by program)
  10. (To reduce the project's payback period)
  11. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)

- C2. How important is energy efficiency to your organization when making capital upgrades or improvements? Is energy efficiency ... **[READ LIST]**
1. Very important
  2. Somewhat important
  3. Not too important
  4. Not at all important
  98. (Don't know)
  99. (Refused)
- C3. **[ASK IF C2=3 OR 4]** Can you please tell me why energy efficiency is not an important factor in making upgrades?
1. **[RECORD RESPONSE]**
  98. (Don't know)
  99. (Refused)
- C4. ~ What is your role or title at your organization?
1. (President/CEO/Executive Director/Owner)
  2. (Facility or Maintenance lead/manager)
  3. (Chief financial officer (CFO)/ controller/ finance manager)
  4. (Property manager)
  5. (General manager)
  6. (Regional manager)
  7. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- C5. ~ Do you require approval from someone else at your organization before committing to an energy efficiency upgrade?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- C6. **[ASK IF C5=1]** ~ Who at your organization, including yourself, is involved in making decisions about energy efficiency when making capital upgrades or improvements? **[DO NOT READ OPTIONS, MULTIPLE RESPONSES ALLOWED]**
1. (President/CEO/Executive Director)
  2. (Facility maintenance department/manager)
  3. (Corporate headquarters)
  4. (Board of directors)
  5. (Chief financial officer (CFO)/ controller/ finance manager)
  6. (Property manager)

- 7. (General manager)
  - 8. (Regional manager)
  - 9. (Other **[SPECIFY]**)
  - 98. (Don't know)
  - 99. (Refused)
- C7. **[ASK IF C5=1]** ~ How long does it typically take to receive approval from someone else at your organization to move forward with an energy efficiency upgrade?
- 1. Less than 1 week
  - 2. 1-3 weeks
  - 3. 4-6 weeks
  - 4. 7-8 weeks
  - 5. Over 8 weeks
  - 98. (Don't know)
  - 99. (Refused)
- C8. Do you have an internal payback threshold that projects must meet in order to go forward?
- 1. (Yes) **[ASK: WHAT IS THAT THRESHOLD, IN YEARS?]**
  - 2. (No)
  - 98. (Don't know)
  - 99. (Refused)
- C9. Are You considering implementing other energy efficient building upgrades in the next year?
- 1. (Yes)
  - 2. (No)
  - 98. (Don't know)
  - 99. (Refused)
- C10. **[ASK IF C9=1]** What other upgrades are you considering? **[MULTIPLE ANSWERS ALLOWED; DO NOT READ LIST]**
- 1. (Lighting, such as LED, fluorescent, or advanced lighting controls technologies; or equipment such as troffers, fixtures, lamps, sensors, indoor or outdoor)
  - 2. (HVAC, such as air conditioning, heating technology or equipment such as heat pumps, furnaces, boilers, air conditioners, chillers, thermostats, pumps, VFDs, air handlers/roof-top units)
  - 3. (Process/manufacturing equipment)
  - 4. (Water heaters)
  - 5. (Compressed air nozzles, variable speed drives, filters, valves)

6. (Commercial kitchen equipment, such as ovens, fryers, ice machines, steam cookers, freezers and refrigerators)
7. (Windows, window film)
8. (Other **[SPECIFY]**)
98. (Don't know)
99. (Refused)

## *D. Benefits and Barriers*

D1. \*What would you say are the main benefits your company has experienced as a result of **[ASK IF TYPE=OTHER, "THE ENERGY EFFICIENCY UPGRADES WE'VE DISCUSSED?" IF TYPE=SEM OR BOTH, "YOUR PARTICIPATION IN STRATEGIC ENERGY MANAGEMENT?"] [DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**

1. (The incentive payment)
2. (Using less energy, reducing energy consumption or energy demand)
3. (Saving money on our utility bills; lower energy bills)
4. (Increased occupant comfort)
5. (Better aesthetics/better or brighter lighting)
6. (Saving money on maintenance costs)
7. (Improved facility safety)
8. (Other **[SPECIFY]**)
9. (No benefits)
98. (Don't know)
99. (Refused)

D2. \*What do so see as the biggest challenges to making energy-efficient improvements inside your company? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**

1. (High initial costs)
2. (Budget limitations)
3. (Long payback period)
4. (Funding competition for other investments/improvements)
5. (Replacing equipment without affecting operations)
6. (Understanding potential areas for improvement)
7. (Lack of awareness about available incentives for energy efficient equipment)
8. (Understanding equipment eligibility)
9. (Issues with Program application process)
10. (Finding a Trade Ally with whom to work)
11. (Inadequate incentive)
12. (Other **[SPECIFY]**)
98. (Don't know)
99. (Refused)

- D3. \*What could be done to help your company overcome challenges with energy-efficiency improvements? **[DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]**
1. (Nothing)
  2. (Higher incentives)
  3. (Provide upfront rewards/instant discount from contractor)
  4. (Offer low-interest loans)
  5. (Simplify the paperwork)
  6. (Provide better/more information about Program **[ASK: WHAT TYPE OF INFORMATION DO YOU NEED?]**)
  7. (Provide an energy audit)
  8. (Technical support for proposed equipment)
  9. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- D4. ~ Who do you seek out as a trusted source of information regarding energy efficiency upgrades for your business? **[MULTIPLE RESPONSE ALLOWED; READ LIST IF NEEDED]**
1. My Focus on Energy Energy Advisor
  2. Utility representatives
  3. My installation contractor/vendor
  4. Other business owners/managers
  5. Web resources **[SPECIFY SITES]**
  6. (Other) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

## *E. Energy Management*

**[ASK SECTION E IF TYPE=OTHER]**

- E1. Do you currently monitor energy use in your facility?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- E2. **[ASK IF E2=1]** How do you monitor energy use? **[READ LIST; RECORD ALL THAT APPLY]**
1. Energy bill from utility company
  2. Software or app on phone, tablet or computer
  3. An energy management system
  4. (Something else) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)

- E3. **[ASK IF E2=1]** How frequently do you monitor energy use? **[READ LIST]**
1. Daily
  2. Weekly
  3. Monthly
  98. (Don't know)
  99. (Refused)
- E4. How interested would you be in learning more about energy use in your facility and how to reduce it?
1. Very interested
  2. Somewhat interested
  3. Not too interested
  4. Not at all interested
  98. (Don't know)
  99. (Refused)
- E5. Do you know what the biggest energy consumption comes from in your facility? **[DO NOT READ LIST; RECORD ALL THAT APPLY]**
1. (Lighting)
  2. (Heating and cooling)
  3. (Servers/IT/data centers)
  4. (Refrigeration)
  5. (Industrial process)
  6. (Something else) **[SPECIFY]**
  98. (Don't know)
  99. (Refused)
- E6. **[ASK IF E5≠ 98]** What steps do you take to reduce energy from **[PIPE IN RESPONSE FROM E5]**, if anything?
1. **[RECORD RESPONSE]**

## *F. Satisfaction and Application Ease*

Next, I have a few questions for you about the program.

- F1. **[ASK IF A7=1; OTHERWISE SKIP TO E2.1]** \*Thinking about the application you submitted, how easy would you say this paperwork was to complete? Would you say: **[READ LIST]**
1. Very easy,
  2. Easy,
  3. Somewhat challenging, or
  4. Very challenging?
  98. (Don't know)
  99. (Refused)

- F2. **[ASK IF E1=3 OR 4]** \*Why do you say that? **[OPEN END]**
- F3. **[ASK IF A7=1 AND MEASURE TYPE= CUSTOM]** Did you have to submit a pre-approval application for your project?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- F4. **[ASK IF F3=1]** Thinking about the pre-approval process, how satisfied were you with the amount of time it took to receive approval to begin the project? Would you say?
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not satisfied at all
  98. (Don't know)
  99. (Refused)
- F5. **[ASK F5 IF TYPE=SEM OR BOTH]** How useful are the monthly progress update calls with Focus on Energy? Would you say: **[READ LIST]** **[ASK IF NEEDED: THESE ARE THE MEETINGS YOU HAVE WITH THE FOCUS ON ENERGY ENERGY ADVISORS AND MODELING TEAM TO REVIEW AND ANALYZE ENERGY PERFORMANCE AND TRACK PROGRESS TOWARD GOALS.]**
1. Very useful,
  2. Somewhat useful,
  3. Not too useful, or
  4. Not useful at all
  98. (Don't know)
  99. (Refused)
- F6. **[ASK IF F5=3 OR 4]** What suggestions do you have to improve the monthly progress update calls?
1. **[RECORD RESPONSE]**
- F7. **[ASK IF TYPE = SEM OR BOTH]** How satisfied are you with the support you receive from the Focus on Energy Energy Advisors? Would you say: **[READ LIST]**
1. Very satisfied
  2. Somewhat satisfied,
  3. Not too satisfied, or
  4. Not satisfied at all?
  98. (Don't know)
  99. (Refused)
- F8. **[ASK IF F7=3 OR 4]** What suggestions do you have to improve the support you receive from the Focus on Energy Energy Advisors?
1. **[RECORD RESPONSE]**



- F9. **[ASK IF TYPE = SEM OR BOTH]** How useful is the energy model in helping you track energy usage?  
 Would you say: **[READ LIST]**
1. Very useful
  2. Somewhat useful
  3. Not too useful
  4. Not at all useful
  98. (Don't know)
  99. (Refused)
- F10. **[ASK IF F9=3 OR 4]** What suggestions do you have to improve the energy model so it is more useful as a tool to track energy usage?
1. **[RECORD RESPONSE]**
- F11. **[ASK IF A6=1; OTHERWISE SKIP TO E5]** \*Thinking about the incentive check you received in the mail, about how long did it take to arrive? **[READ LIST]**
1. 1-3 weeks
  2. 4-6 weeks
  3. 7-8 weeks
  4. Over 8 weeks?
  5. (Haven't received a check yet)
  98. (Don't know)
  99. (Refused)
- F12. **[ASK IF F11=1-4]** How satisfied were you with the time it took to receive the check? Would you say: **[READ LIST]**
1. Very satisfied
  2. Somewhat satisfied
  3. Not too satisfied
  4. Not satisfied at all
  98. (Don't know)
  99. (Refused)
- F13. \*Is there anything that Focus on Energy could have done to improve your overall experience with the Large Energy Users Program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**
1. (Better/more communication about Program processes **[ASK: WHO WOULD YOU LIKE MORE COMMUNICATION FROM?]**)
  2. (Quicker response time **[ASK: WHO WOULD YOU LIKE A QUICKER RESPONSE TIME FROM?]**)
  3. (Larger selection of eligible equipment **[ASK: WHAT ENERGY-EFFICIENT EQUIPMENT SHOULD FOCUS ON ENERGY OFFER INCENTIVES FOR?]**)
  4. (Increasing the incentive amount)
  5. (Simplify the application process **[ASK: IN WHAT WAY?]**)
  6. (Allow me to fill out the applications online)
  7. (Simplify the website) **[ASK: IN WHAT WAY?]**

- 8. (Provide quicker approval on applications)
- 9. (Send incentive check out faster)
- 10. (Provide more face-time with my Energy Advisor (this may include more frequent visits))
- 11. (Other **[SPECIFY]**)
- 12. (No, nothing)
- 98. (Don't know)
- 99. (Refused)

## G. Verification

G1. **[ASK F1 IF TYPE = OTHER OR BOTH]** Is all of the energy efficient equipment installed through the Program this year still in-place and operating as planned? My records show that you installed **[MEASURE CATEGORY1]**, **[MEASURE CATEGORY2]**, and **[MEASURE CATEGORY3]**.

- 1. (Yes)
- 2. (No)
- 98. (Don't know)
- 99. (Refused)

G2. **[ASK IF F1=2]** Which equipment is no longer installed or operating as planned? **[DO NOT READ LIST, SELECT ALL THAT APPLY]**

- 1. [MEASURE CATEGORY1]
- 2. [MEASURE CATEGORY2]
- 3. [MEASURE CATEGORY3]
- 4. (Other) **[SPECIFY]**
- 98. (Don't know)
- 99. (Refused)

**[ASK F3-G5 IF F1=2] [ASK FOR EACH RESPONSE SELECTED IN F2]**

G3. How many **[RESPONSE FROM F2]** did you or your contractor originally install?

- 1. **[OPEN END NUMERIC]**

G4. And how many **[RESPONSE FROM F2]** are installed and operating now?

- 1. **[OPEN END NUMERIC]**

G5. Why are the **[RESPONSE FROM F2]** no longer installed or operating as planned?

- 1. **[OPEN END]**

## H. +Freeridership [OTHER OR BOTH]

**[ASK EITHER SECTION H OR SECTION I - NOT MORE THAN ONE SECTION]**

**[ASK IF TYPE=OTHER OR BOTH AND A5.1=2 OR 3 ASK THIS SECTION (CONTRACTOR DID NOT HELP IN THE DECISION MAKING) OTHERWISE SKIP TO SECTION I OR SECTION J]**

Now I'd like to talk with you a bit more about your decisions to purchase the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though you may have received incentives for other energy saving equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]** that was purchased.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

- H1. First, did your organization have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) before learning about the incentive?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**
- H2. Prior to learning about the incentive, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) included in your organization's capital budget?
1. (Yes)
  2. (No) **[SKIP TO G4]**
  98. (Don't know) **[SKIP TO G4]**
  99. (Refused) **[SKIP TO G4]**
- H3. Had your organization **ALREADY** ordered or purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) **BEFORE** your organization heard about the Large Energy Users Program incentive?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)
- H4. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1]**(s) without the incentive and information or education from Focus on Energy?
1. (Yes) **[SKIP TO G7]**
  2. (No) **[SKIP TO G9]**
  98. (Don't know)
  99. (Refused)

H5. Would you have installed **something** without the incentive and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**

1. (Yes, would have installed something)
2. (No, would NOT have installed anything) **[SKIP TO I1]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

H6. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

H7. And without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?

1. (Yes, the same amount)
2. (No, would have installed less)
3. (No, would have installed more)
98. (Don't know)
99. (Refused)

H8. Without the **[INCENTIVE FOR MEASURE CATEGORY1 OR C\_MEASURE1]** and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**...**[READ LIST AND RECORD ONE RESPONSE]**

1. Within the same year? **[SKIP TO I1]**
2. Within one to two years? **[SKIP TO I1]**
3. Within three to five years? **[SKIP TO I1]**
4. In more than five years? **[SKIP TO I1]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

**[ASK G9 TO G12 IF G4 =2]**

H9. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the incentive and information or education from Focus on Energy, would you have installed anything at all?

1. (Yes, would have installed something)
2. (No, would not have installed anything at all) **[SKIP TO I1]**
98. (Don't know)
99. (Refused)

H10. Without the incentive and information or education from Focus on Energy, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

H11. Without the incentive and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?

1. (Yes, the same amount)
2. (No, would have installed less)
3. (No, would have installed more)
98. (Don't know)
99. (Refused)

H12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**

1. In the same year? **[SKIP TO I1]**
2. In one to two years? **[SKIP TO I1]**
3. In three to five years? **[SKIP TO I1]**
4. More than five years out? **[SKIP TO I1]**
98. (Don't know) **[SKIP TO I1]**
99. (Refused) **[SKIP TO I1]**

## *I. +Freeridership – (Contractor/OTHER OR BOTH)*

**[ASK EITHER SECTION H OR SECTION I - NOT MORE THAN ONE SECTION]**

**[ASK IF TYPE = OTHER OR BOTH AND IF A5.1=1 (CONTRACTOR HELPED IN THE DECISION MAKING)]**

Now I'd like to talk with you about the new **[MEASURE CATEGORY1 OR C\_MEASURE1]**. Even though your contractor may have installed other energy efficient equipment, these questions are just about the **[MEASURE CATEGORY1 OR C\_MEASURE1]**.

**[INTERVIEWER NOTE ABOUT THIS SECTION (DON'T READ TO RESPONDENT): THIS SECTION IS BASED ON HYPOTHETICAL BEHAVIOR SO WE ARE ASKING SIMILAR QUESTIONS TO VERIFY THAT WE ARE GATHERING THE CORRECT RESPONSES.]**

11. At the time that you first started working with your contractor on this project, had you...? **[READ LIST AND RECORD ONE FOR EACH: 1=YES OR 2=NO OR 99=DON'T KNOW OR 88=REFUSED]**
  1. Already been thinking about purchasing **[MEASURE CATEGORY1 OR C\_MEASURE1]?**
  2. Already begun collecting information about **[MEASURE CATEGORY1 OR C\_MEASURE1]?**
  3. Already selected the particular **[MEASURE CATEGORY1 OR C\_MEASURE1]** and were going to purchase it?
  4. Already purchased the **[MEASURE CATEGORY1 OR C\_MEASURE1]?**
  5. Already installed the **[MEASURE CATEGORY1 OR C\_MEASURE1]?**
  6. Already heard about Focus on Energy?
  
12. Just to make sure I understand, did your organization have specific plans to install the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** before you began working with your contractor?
  1. (Yes)
  2. (No) **[SKIP TO H4]**
  98. (Don't know) **[SKIP TO H4]**
  99. (Refused) **[SKIP TO H4]**
  
13. Before you began working with your contractor, was the purchase of the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** included in your organization's capital budget?
  1. (Yes ) ASK:
    - D2a. Did your contractor help your organization make the decision to include the purchase of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** in your organization's capital budget?
  2. (No)
  98. (Don't know)
  99. (Refused)
  
14. Would you have purchased and installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the assistance from your contractor and information or education from Focus on Energy?
  1. (Yes) **[SKIP TO H7]**
  2. (No) **[SKIP TO H9]**
  98. (Don't know)
  99. (Refused)
  
15. Would you have installed **something** without the involvement of your contractor and information or education from Focus on Energy? **[DO NOT READ LIST UNLESS NECESSARY]**
  1. (Yes, would have installed something)
  2. (No, would NOT have installed anything) **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

16. When you say you **would have installed** something, would you have installed something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes )
  2. (No)
  98. (Don't know)
  99. (Refused)
17. And without the involvement of your contractor and information or education from Focus on Energy would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes, the same amount)
  2. (No, would have installed less)
  3. (No, would have installed more)
  98. (Don't know)
  99. (Refused)
18. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)...****[READ LIST AND RECORD ONE RESPONSE]**
1. Within the same year? **[SKIP TO I1]**
  2. Within one to two years? **[SKIP TO I1]**
  3. Within three to five years? **[SKIP TO I1]**
  4. In more than five years? **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**

**[ASK H9 TO H13 IF H4=2]**

19. When you say **you would not have installed** the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** without the assistance from your contractor and information or education from Focus on Energy, would you have installed anything at all?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know)
  99. (Refused)
110. Without the assistance from your contractor and information or education from Focus on Energy, **would you have installed** something that was just as energy efficient as the **[MEASURE CATEGORY1 OR C\_MEASURE1](s)** you installed?
1. (Yes)
  2. (No)
  98. (Don't know)
  99. (Refused)

- I11. Without the assistance from your contractor and information or education from Focus on Energy, would you have installed the same amount of **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**?
1. (Yes, the same amount)
  2. (No, would have installed less)
  3. (No, would have installed more)
  98. (Don't know)
  99. (Refused)
- I12. And, would you have installed the same **[MEASURE CATEGORY1 OR C\_MEASURE1](s)**. . . **[READ LIST AND RECORD ONE RESPONSE]**
1. In the same year?
  2. In one to two years?
  3. In three to five years?
  4. More than five years out?
  98. (Don't know)
  99. (Refused)
- I13. If the assistance or information from your contractor had not been available, would you have done anything differently on this project?
1. (Yes)
  2. (No) **[SKIP TO I1]**
  98. (Don't know) **[SKIP TO I1]**
  99. (Refused) **[SKIP TO I1]**
- I14. What would you have done differently?
1. [record response]

## J. +Spillover

### **[ASK EVERYONE SECTION J]**

- J1. Since making these energy efficiency upgrades or process, operational, or maintenance improvements has your company installed any other energy-efficient products in your facility that you did **NOT** receive a Focus on Energy incentive for? **[ASK IF NEEDED: BY ENERGY-EFFICIENT PRODUCTS, I MEAN HIGH EFFICIENCY LIGHTING SUCH AS LEDS; HIGH EFFICIENCY MOTORS AND VARIABLE SPEED DRIVES; HIGH EFFICIENCY AIR CONDITIONERS AND HEAT PUMPS, EFFICIENT HEATING OR WATER HEATING EQUIPMENT, ET CETERA.]**
1. (Yes)
  2. (No) **[SKIP TO SECTION J]**
  98. (Don't know) **[SKIP TO SECTION J]**
  99. (Refused) **[SKIP TO SECTION J]**



J2. What were the other energy-efficient products or operational improvements that you installed or made without getting an incentive? **[DO NOT READ LIST; MARK ALL THAT APPLY; 99=DON'T KNOW, 88=REFUSED, -96=N/A] [ASK IF THE CUSTOMER SAYS THEY BOUGHT SOMETHING BUT HAVE NOT INSTALLED IT, THE EQUIPMENT HAS TO BE INSTALLED AND OPERATING FOR US TO COUNT IT TOWARD SPILLOVER.]**

1. (LEDs)
2. (Fluorescent tubes (T5s, T8s, etc.))
3. (Efficient lighting controls (occupancy sensors, daylighting, timers))
4. (High efficiency motors)
5. (Air source heat pumps)
6. (Ground source heat pumps)
7. (Central air conditioner)
8. (Variable speed drive or motors)
9. (Water heating equipment)
10. (Boiler)
11. (Compressed air equipment)
12. (Gas furnaces)
13. (Exit signs)
14. (Refrigeration equipment (refrigerators, freezers))
15. Operational Improvements **[SPECIFY]**
16. (Other) **[SPECIFY]**
98. (Don't know)
99. (Refused)

**[ASK I2.11-I2.13 IF I2=1, 2]**

I2.11 What is the wattage of the lighting? **[SPECIFY]**

I2.12 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]**

I2.13 What type of equipment was removed or replaced? **[SPECIFY]**

**[ASK I2.21-I2.23 IF I2=4]**

I2.21 What equipment was the motor installed on? **[SPECIFY TYPE]**

I2.22 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.31-I2.33 IF I2=5, 6, 7]**

I2.31 What Fuel type is used? **[SPECIFY]**

I2.32 What is the efficiency rating of the equipment? **[SPECIFY]**

I2.33 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.41-I2.42 IF I2=8]**

12.41 What type of motor was it installed on? **[SPECIFY TYPE]**

12.42 What is the horsepower of the motor? **[SPECIFY]**

**[ASK I2.51-I2.54 IF I2=9]**

12.51 What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]**

12.52 What Fuel type is used? **[SPECIFY]**

12.53 What is the efficiency rating of the equipment? **[SPECIFY]**

12.54 (If water heater with storage) What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.61-I2.62 IF I2=11]**

12.61 What type of application was the compressed air equipment purchased and installed?

**[SPECIFY APPLICATION]**

12.62 What is the horsepower of the compressor motor? **[SPECIFY]**

**[ASK I2.71-I2.72 IF I2=12]**

12.71 What is the efficiency rating of the equipment? **[SPECIFY]**

12.72 What is the capacity of the equipment? **[SPECIFY]**

**[ASK I2.81 IF I2=14]**

12.81 What type of refrigeration equipment was purchased and installed? **[SPECIFY TYPE]**

J3. **[REPEAT FOR EACH ITEM MENTIONED IN I2]** How many **[INSERT ITEM FROM I2]** did you install?

1. **[RECORD NUMBER]**

98. (Don't know)

99. (Refused)

J4. **[REPEAT FOR EACH ITEM MENTIONED IN I2]** Please tell me how important **[ASK IF A4=1 READ, "THE ASSISTANCE FROM YOUR CONTRACTOR" OTHERWISE READ, "THE LARGE ENERGY USERS PROGRAM"]** was in your decision to install **[ANSWER FROM I2]**. Was it: **[EMPHASIZE EACH ANSWER OPTION AND PAUSE IN BETWEEN EACH OPTION.]**

1. Very important

2. Somewhat important

3. Not too important

4. Not at all important

98. (Don't know)

99. (Refused)

- J5. Was **[INSERT EACH ITEM FROM I2]** installed at **[SITE ADDRESS]**?
1. Yes
  2. No **[ASK: WHAT IS THE ADDRESS OF THE LOCATION WHERE YOU INSTALLED [INSERT EACH ITEM FROM I2]? [SPECIFY]**
  98. (Don't know)
  99. (Refused)

## K. Firmographics

Finally, I would like to ask you some questions about your company.

- K1. \*What industry is your company in? **[CODE ONE RESPONSE BELOW; DON'T READ UNLESS NECESSARY]**
1. (Agriculture)
  2. (Communications)
  3. (Construction)
  4. (Education)
  5. (Finance, Insurance, Real Estate)
  6. (Food Service (restaurants))
  7. (Government)
  8. (Health Care)
  9. (Manufacturing)
  10. (Nonprofit / churches / schools)
  11. (Retail, Wholesale)
  12. (Transportation)
  13. (Hotel/motels)
  14. (Mining)
  15. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)
- K2. How many locations does your company operate in Wisconsin?
1. **[RECORD number]**
  98. (Don't know)
  99. (Refused)
- K3. \*Does your organization lease or own the facility or facilities?
1. (Lease)
  2. (Own)
  3. (Other **[SPECIFY]**)
  98. (Don't know)
  99. (Refused)

- K4. \*How many people are employed at the location where the project took place?
1. [RECORD number]
  98. (Don't know)
  99. (Refused)

## *L. Closing*

- L1. \*Do you have any other comments about energy efficiency decisions and purchases you would like to share?
1. [RECORD RESPONSE]
  98. (Don't know)
  99. (Refused)
- L2. \*On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with a Program manager, who may contact you regarding your experience?
1. Yes
  2. No
  98. (Don't know)
  99. (Refused)

Thank you. We appreciate your help with this survey. You may also be contacted for an on-site visit if you have not been contacted already. Have a nice day.

### *Customer Satisfaction Survey Questions*

The Program Administrator fielded online customer satisfaction surveys throughout CY 2018, and the Evaluation Team fielded supplementary mail surveys for all nonresidential programs (except the Community Small Business Offering) and for all residential programs (except Home Performance with ENERGY STAR and Multifamily Energy Savings).

Table L-1 shows a matrix of the ratings questions asked in the online and mail satisfaction surveys. All questions were based on a 0 to 10 scale, where 10 indicated the highest satisfaction or likelihood and 0 indicated the lowest satisfaction or likelihood. Seven core ratings questions were asked across the surveys.

- **Overall program satisfaction:** “Overall, how satisfied are you with the Focus on Energy program?”
- **Upgrade satisfaction:** “How satisfied are you with the energy-efficient improvement(s) that were completed?”
- **Staff satisfaction:** “How satisfied are you with the Focus on Energy staff member who assisted you with your project?”
- **Trade Ally satisfaction:** “How satisfied are you with the contractor (Trade Ally) that provided the service?”
- **Incentive satisfaction:** “How satisfied are you with the amount of incentive you received?”
- **More improvements likelihood:** “How likely are you to initiate another energy-efficiency improvement in the next 12 months?”
- **Recommend the program likelihood:** “How likely is it that that you would recommend this program to others?”

Three additional ratings questions were limited to specific Retail Lighting and Appliance surveys:

- **Retail Lighting and Appliance Nest Smart Thermostats:**
  - “How would you describe your experience in obtaining your instant coupon to use on nest.com?”
  - “How would you describe your experience in redeeming your instant coupon on nest.com?”
- **Retail Lighting and Appliance Pop-Up Retail:**
  - “How satisfied are you with the event experience for purchasing the energy-efficient products?”

**Table L-1. CY 2018 Customer Satisfaction Survey Question Matrix: Ratings**

Program Survey	Core Ratings Questions							Other Ratings
	Program Overall	Upgrades	Staff	Trade Allies	Incentive	More Improvements	Recommend Program	
Agriculture, Schools, and Government	✓	✓	✓	✓	✓	✓	✓	
Business Incentive	✓	✓	✓	✓	✓	✓	✓	
Large Energy Users	✓	✓	✓	✓	✓	✓	✓	
Small Business	✓	✓	✓	✓	✓	✓	✓	
Community Small Business Offering	✓	✓	✓	✓	✓	✓	✓	
Multifamily Energy Savings	✓	✓	✓	✓	✓	✓	✓	
Home Performance with ENERGY STAR – HVAC Path	✓	✓		✓	✓	✓	✓	
Home Performance with ENERGY STAR – Whole Home Path	✓	✓		✓	✓	✓	✓	
Home Performance with ENERGY STAR – Renewable Rewards	✓	✓		✓	✓	✓	✓	
Appliance Recycling	✓		✓		✓	✓	✓	
Simple Energy Efficiency	✓	✓				✓	✓	
Connected Devices Kits	✓	✓				✓	✓	
Retail Lighting and Appliance – Retail Smart Thermostats	✓	✓			✓	✓	✓	
Retail Lighting and Appliance – Nest Smart Thermostats	✓	✓			✓	✓	✓	✓
Retail Lighting and Appliance – Pop-Up Retail	✓	✓				✓	✓	✓

Table L-2 shows a matrix of CY 2018 satisfaction survey questions that were not based on a rating. Six core questions were asked across surveys.

- **Comments and suggestions:** “Please tell us more about your experience and any suggestions for improvement.”
- **Opinion of utility:** “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?”
- **Preferred sources:**
  - **Nonresidential version:** “How do you MOST prefer to learn about energy efficiency opportunities for your organization? Please choose your top two from the list below.”
  - **Residential version:** “How would you most prefer to identify opportunities to improve the energy efficiency of your home?”
- **Focus on Energy assistance (nonresidential only):** “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.”

- **Purchase decision factors (residential only):** “What do you value the most in making a purchase decision (energy efficiency or otherwise)? Choose your top two from the list below.”
- **Respondent age (residential only):** “Which of the following categories best represents your age?”

Several surveys also included program-specific questions, listed in the “Other Questions” column of Table L-2.

**Table L-2. CY 2018 Customer Satisfaction Survey Question Matrix: Non-Ratings**

Program Survey	Core Questions						Other Questions
	Comments and Suggestions	Opinion of Utility	Preferred Sources	Focus Assistance	Purchase Decision Factors	Respondent Age	
Agriculture, Schools, and Government	✓	✓	✓	✓	-	-	Three-question freerider battery
Business Incentive	✓	✓	✓	✓	-	-	Three-question freerider battery
Large Energy Users	✓	✓	✓	✓	-	-	-
Small Business	✓	✓	✓	✓	-	-	-
Community Small Business Offering	✓	-	-	-	-	-	Source of awareness of Focus on Energy
Multifamily Energy Savings	✓	✓	✓	✓	-	-	-
Home Performance with ENERGY STAR – HVAC Path	✓	✓	✓	-	✓	✓	Planned improvements in next 12 months
Home Performance with ENERGY STAR – Whole Home Path	✓	✓	✓	-	✓	✓	<ul style="list-style-type: none"> <li>• Received Home Energy Score</li> <li>• Most and least useful aspects of Home Energy Score</li> <li>• Planned improvements in next 12 months</li> </ul>
Home Performance with ENERGY STAR – Renewable Rewards	✓	-	-	-	-	-	Planned improvements in next 12 months
Appliance Recycling	✓	✓	✓	-	✓	✓	-
Simple Energy Efficiency	✓	✓	✓	-	✓	✓	Respondent housing type
Connected Devices Kits	✓	✓	✓	-	✓	✓	Source of awareness of Focus on Energy

Program Survey	Core Questions						Other Questions
	Comments and Suggestions	Opinion of Utility	Preferred Sources	Focus Assistance	Purchase Decision Factors	Respondent Age	
Retail Lighting and Appliance – Retail Smart Thermostats	✓	✓	✓	-	✓	✓	Ease of installation
Retail Lighting and Appliance – Nest Smart Thermostats	✓	-	-	-	-	-	Ease of installation
Retail Lighting and Appliance – Pop-Up Retail	✓	-	-	-	-	-	<ul style="list-style-type: none"> <li>• Awareness of lighting discounts</li> <li>• Previous efficient lighting purchases</li> <li>• Equipment plugged into smart strip</li> <li>• Improving the event experience</li> </ul>



## Appendix M. Rural Zip Code Eligibility

Table M-1 shows Wisconsin rural zip codes designated to be eligible for Focus on Energy rural programs.

**Table M-1. Zip Codes Eligible for Rural Focus on Energy Programs**

Zip Code	Zip Code	Zip Code	Zip Code	Zip Code
49801	53052	53145	53504	53553
51016	53054	53147	53505	53554
52114	53056	53148	53506	53555
53001	53057	53152	53507	53556
53002	53059	53156	53508	53557
53003	53060	53157	53510	53559
53004	53061	53159	53512	53560
53006	53063	53168	53515	53561
53008	53064	53170	53516	53565
53009	53065	53171	53517	53566
53010	53070	53176	53518	53569
53011	53073	53178	53520	53570
53013	53075	53179	53521	53571
53014	53078	53180	53522	53572
53015	53079	53181	53523	53573
53016	53082	53187	53525	53574
53019	53088	53190	53526	53575
53020	53091	53192	53528	53576
53021	53093	53193	53529	53577
53023	53096	53194	53530	53578
53026	53098	53195	53531	53579
53030	53099	53199	53533	53580
53031	53101	53201	53534	53581
53032	53102	53237	53535	53582
53034	53107	53267	53536	53583
53035	53109	53290	53537	53584
53038	53114	53298	53540	53585
53039	53115	53317	53541	53586
53040	53120	53401	53542	53587
53042	53127	53407	53543	53588
53047	53128	53425	53544	53594
53048	53137	53501	53547	53596
53049	53138	53502	53550	53599
53050	53141	53503	53551	53707
53783	53929	54002	54120	54182

Zip Code	Zip Code	Zip Code	Zip Code	Zip Code
53792	53930	54003	54121	54194
53801	53931	54004	54123	54195
53802	53932	54005	54124	54201
53803	53933	54006	54125	54202
53804	53934	54007	54126	54203
53805	53935	54009	54127	54204
53806	53936	54011	54128	54205
53807	53937	54013	54129	54206
53808	53939	54014	54131	54207
53809	53940	54015	54132	54208
53810	53941	54016	54135	54209
53811	53942	54017	54137	54210
53812	53943	54018	54138	54211
53813	53944	54020	54139	54212
53816	53945	54021	54148	54213
53817	53946	54022	54149	54214
53818	53947	54023	54150	54215
53820	53948	54024	54151	54216
53821	53949	54025	54152	54217
53824	53950	54026	54153	54221
53825	53951	54027	54154	54226
53826	53952	54028	54156	54227
53827	53953	54082	54157	54228
53901	53954	54091	54158	54229
53910	53955	54101	54159	54230
53911	53956	54102	54160	54231
53913	53957	54103	54161	54232
53916	53959	54104	54162	54234
53919	53960	54105	54164	54235
53920	53961	54106	54165	54240
53922	53962	54107	54166	54245
53923	53963	54108	54170	54246
53924	53964	54110	54171	54247
53925	53965	54111	54174	54305
53926	53968	54112	54175	54306
53927	53969	54114	54177	54308
53928	54001	54119	54180	54310
54344	54444	54498	54549	54625
54354	54445	54499	54550	54626
54402	54446	54501	54551	54627

Appendix M. Rural Zip Code Eligibility

Zip Code	Zip Code	Zip Code	Zip Code	Zip Code
54405	54447	54510	54552	54628
54406	54448	54511	54553	54629
54407	54449	54512	54554	54630
54408	54450	54513	54555	54631
54409	54451	54514	54556	54632
54410	54452	54515	54557	54634
54411	54453	54516	54558	54635
54412	54454	54517	54559	54637
54413	54455	54519	54560	54638
54414	54456	54520	54561	54639
54415	54457	54521	54562	54640
54416	54458	54524	54563	54641
54417	54459	54525	54564	54642
54418	54460	54526	54565	54643
54420	54462	54527	54566	54644
54421	54463	54528	54567	54645
54422	54464	54529	54568	54646
54423	54465	54530	54570	54647
54424	54466	54531	54572	54648
54425	54470	54532	54590	54649
54426	54471	54533	54602	54651
54427	54473	54534	54610	54652
54428	54475	54535	54611	54653
54429	54479	54536	54612	54654
54430	54480	54537	54613	54655
54431	54484	54538	54614	54656
54432	54485	54539	54615	54657
54433	54486	54540	54616	54658
54434	54487	54541	54618	54659
54435	54488	54542	54619	54660
54436	54489	54543	54620	54661
54437	54490	54545	54621	54662
54440	54491	54546	54622	54664
54442	54493	54547	54623	54665
54443	54495	54548	54624	54666
54667	54758	54836	54881	54957
54670	54759	54837	54888	54958
54702	54760	54838	54889	54959
54716	54761	54839	54890	54960
54721	54762	54840	54891	54961

Appendix M. Rural Zip Code Eligibility

Zip Code	Zip Code	Zip Code	Zip Code	Zip Code
54722	54763	54841	54892	54962
54723	54764	54842	54893	54963
54724	54765	54843	54895	54964
54725	54766	54844	54896	54965
54726	54767	54845	54903	54966
54727	54768	54846	54909	54967
54728	54769	54847	54912	54968
54730	54770	54848	54916	54969
54731	54771	54849	54919	54970
54732	54772	54850	54921	54971
54733	54773	54852	54922	54974
54734	54801	54853	54923	54975
54735	54805	54854	54924	54976
54736	54806	54855	54926	54977
54737	54810	54856	54928	54978
54738	54811	54857	54929	54980
54739	54812	54858	54930	54981
54740	54813	54859	54931	54982
54741	54814	54861	54932	54983
54742	54815	54862	54933	54984
54743	54817	54864	54934	54986
54744	54819	54865	54935	55007
54745	54820	54866	54936	55011
54746	54821	54867	54940	55047
54747	54822	54868	54941	55056
54748	54824	54870	54943	55066
54749	54826	54871	54945	55072
54750	54827	54872	54947	55073
54751	54828	54873	54948	55074
54754	54829	54874	54949	55317
54755	54830	54875	54950	55450
54756	54832	54876	54951	55749
54757	54835	54880	54954	55808
56026				
57534				
61761				