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# Appendix A.

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

### Program Participants

**Estimated Residential:** 1,679,215

**Non-Residential:** 9,819

**Total:** 1,689,034

### Total Electric and Natural Gas Energy Use [2012]

**Electric Sales to Wisconsin Retail Customers megawatt hours (MWh):**  
68,820,000

**Wisconsin Aggregated Electric Utilities Noncoincident Peak Demand megawatts (MW):** 13,479

**Natural Gas Consumption (Therms):** 3,210,000,000

### Total Gross Verified Lifecycle Savings

**Energy Savings (MWh):** 8,593,656

**Demand Reduction (MW):** 126

**Natural Gas Savings (Therms):**  
318,094,910

### Total Net Verified Annual Savings

**Energy Savings (MWh):** 619,418

**Demand Reduction (MW):** 88

**Natural Gas Savings (Therms):**  
17,477,267

### Population Numbers

**Statewide Census Population:**  
5,742,713

**Wisconsin Residential Electric Accounts:** 2,609,168

**Wisconsin Residential Gas Accounts:** 1,681,001

**Wisconsin Nonresidential Electric Accounts:** 346,468

**Wisconsin Nonresidential Gas Accounts:** 172,238

	Residential	Nonresidential	Total
Administrative Costs	\$4,839,300	\$4,458,325	\$9,297,625
Delivery Costs	\$11,035,762	\$18,205,197	\$29,240,959
Incremental Measure Costs	\$62,287,090	\$115,237,111	\$177,524,202
<b>Total Non-Incentive Costs</b>	<b>\$78,162,152</b>	<b>\$137,900,633</b>	<b>\$216,062,785</b>
Electric Benefits	\$138,628,872	\$226,680,256	\$365,309,128
Gas Benefits	\$48,950,495	\$146,420,786	\$195,371,281
Emissions Benefits	\$64,154,495	\$111,096,441	\$175,250,937
<b>Total TRC Benefits</b>	<b>\$251,733,863</b>	<b>\$484,197,483</b>	<b>\$735,931,346</b>
<b>TRC Benefits Minus Costs</b>	<b>\$173,571,711</b>	<b>\$346,296,850</b>	<b>\$519,868,561</b>
<b>TRC Ratio<sup>1</sup></b>	<b>3.22</b>	<b>3.51</b>	<b>3.41</b>

<sup>1</sup> The TRC ratio equals total TRC benefits divided by non-incentive costs.

## Appendix B. Glossary of Terms and List of Acronyms

Term	Definition
<b>Attribution</b>	The establishment of a causal relationship between action(s) taken by a group or Program and an outcome.
<b>Avoided Costs</b>	Costs avoided by the implementation of an energy-efficiency measure, program, or practice.
<b>Administrative Cost</b>	Administrative costs include all costs related to the portfolio-wide management of Focus on Energy programs, including contract management, financial management, application and incentive processing, quality assurance, data collection and reporting, and utility coordination.
<b>Baseline</b>	Conditions (including energy consumption) that would have occurred without implementation of the subject measure or project.
<b>Benefit-Cost Ratio</b>	Mathematical relationship between the benefits and costs associated with the implementation of energy-efficiency measures, programs, practices, or emissions reductions.
<b>Claimed Savings</b>	The energy savings the Program Administrator or Implementer reports before they are verified by the Evaluation Team. (These are also called “reported savings” or “tracked savings.”)
<b>Cost-Effectiveness</b>	Indicator of relative performance or economic attractiveness associated with the implementation of energy-efficiency measures, programs, practices, or emissions reductions.
<b>Custom Savings</b>	Savings for nonprescriptive measures that are calculated by a program implementer or administrator at the time of project completion. The result reflects the savings for the specific project based on pre-installation and post-installation energy use.
<b>Deemed Savings</b>	An estimate of energy, demand, or gas savings for a single unit of an installed energy-efficient measure. Deemed savings are typically developed from data sources and analytical methods that are: (1) widely considered acceptable for the measure and (2) applicable to the situation.
<b>Ex Ante Savings Estimate</b>	Forecasted savings used for program and portfolio planning purposes.
<b>Ex Post Evaluation</b>	An assessment of the impact(s) of an activity after completion.

Term	Definition
<b>Estimated Savings</b>	Savings estimates an evaluator reports after a completed energy-impact evaluation.
<b>Freeriders</b>	Participants who would have adopted the energy-efficient measure without the program.
<b>Gross Savings</b>	The unadjusted program reported change in energy consumption and/or demand that results from program-related actions taken by participants in an efficiency program.
<b>Interactive Effects</b>	The influence in energy use between one technology application and the energy required to operate another application.
<b>Locational Marginal Price (LMP)</b>	The incremental cost to serve a unit of energy at a specific location at the time of delivery.
<b>Lifecycle Savings</b>	Energy savings—expressed either as verified gross or verified net—generated in the current program cycle. Savings incorporate annual savings and each measure’s estimated useful life.
<b>Lifetime Savings</b>	Energy savings—expressed as either verified gross or verified net—produced as a result of measures installed in the current program cycle and in the previous program cycle(s), provided the reporting period is within the measure’s useful life. Savings incorporate annual savings and each measure’s estimated useful life.
<b>Market Effects</b>	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 a result of program impacts on the market.
<b>Measure Life</b>	The life of an energy consuming measure, including its equipment life and measure persistence.
<b>Net Savings</b>	Savings directly attributable to program efforts, i.e., net of what would have occurred in the program’s absence. Savings “net” of what would have occurred in the program’s absence. (These are the observed impacts attributable to the program.) Evaluators typically calculate the savings by applying the net-to-gross ratio to the gross verified savings.
<b>Net-to-Gross Ratio (NTG)</b>	The ratio of the verified net savings attributed to the program after evaluation to the verified gross savings.



Term	Definition
<b>Nonenergy Benefits (NEBs)</b>	An array of valued attributes derived from energy-efficient measures in addition to energy savings, such as increased property value or reduced water usage.
<b>Participant Spillover</b>	Participants who, after an initial program experience, go on to adopt more energy-saving products or practices without program assistance.
<b>Precision</b>	The degree to which repeated measurements under unchanged conditions produce the same results.
<b>Realization Rate</b>	Ratio of gross savings to verified gross savings.
<b>Reported Savings</b>	Energy savings the Program Administrator or Implementer reports before they are verified by the Evaluation Team. Also referred to as tracked savings or claimed savings.
<b>Standard Error</b>	A measure of the variability in a data sample. In other words, how far a typical data point is from the mean of a sample.
<b>Tracked Savings</b>	Energy savings the Program Administrator or Implementer reports before they are verified by the Evaluation Team. These are also called reported savings or claimed savings.
<b>Unclaimed Rewards</b>	Incentives set aside for customers who fail to submit the paperwork to claim program incentives.
<b>Verified Gross Savings</b>	Energy savings verified by an independent evaluation team 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 the total calculated savings without considering the influence of freeriders or spillover.
<b>Verified Net Savings</b>	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.

## List of Acronyms

Acronym	Term
CB&I	Chicago Bridge & Iron Company
CFL	Compact Fluorescent Lamp
CY	Calendar Year
EIA	Energy Information Administration
EM&V	Evaluation, Measurement, and Verification
EUL	Expected Useful Life
HVAC	Heating, Ventilation, and Air Conditioning
KBtu/h	Thousand British Thermal Units per Hour
kW	Kilowatt
kWh	Kilowatt Hour
LED	Light-Emitting Diode
LMP	Locational Marginal Pricing
MISO	Midcontinent Independent Transmission System Operator, Inc.
MMBtu	Million British Thermal Units
MThm	Megatherm
MWh	Megawatt Hour
NTG	Net-to-Gross
PSC	Public Service Commission of Wisconsin
QA/QC	Quality Assurance/Quality Control
SEERA	Statewide Energy Efficiency and Renewable Administration
SMP	Standard Market Practice
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
TRC	Total Resource Cost (test)
TRM	Technical Reference Manual
VFD	Variable-Frequency Drive (also known as Variable-Speed Drive)

## Appendix C. CY 2013 Program Descriptions

The Evaluation Team investigated the performance of 17 programs delivering energy savings during CY 2013. The section below provides detailed descriptions of these programs.

### *Descriptions of Residential Programs*

The Evaluation Team assessed ten Residential programs during the CY 2013 evaluation, the programs are described here.

#### Multifamily Energy Savings Program and Multifamily Direct Install Program

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

**Program Purpose:** The Multifamily Energy Savings Program and Multifamily Direct Install Program provide information, financial incentives, and implementation assistance for energy-efficiency projects to owners and managers of multifamily buildings and condominiums of four or more units. The Multifamily Direct Install Program provides installation of free energy saving measures.

**Target Audience:** The target audiences are condominium and apartment associations, universities, and multifamily building owners and managers.

**Program Implementer:** Franklin Energy Services, LLC is the Implementer for both Programs.

**Process and Associated Measures:** The Multifamily Energy Savings Program and Multifamily Direct Install Program are similar to the discontinued Apartment and Condo Efficiency Services Program. The Multifamily Energy Savings Program and Multifamily Direct Install Program both launched in April 2012 and feature several design changes to achieve the following objectives:

- Lower non-incentive costs by recruiting Trade Allies to assist with market outreach;
- Use the direct-install path to guide participants to prescriptive and custom tracks;
- Reduce the number of audits that do not result in follow-up installations;
- Increase the amount of savings per building by introducing the custom track with increasing incentive amounts based on the savings achieved in the project.

The Multifamily Energy Savings Program offers two types of rewards:

- Prescriptive rebates for eligible measures; and
- Incentives for multi-tiered and performance-based custom projects.

The Multifamily Direct Install Program offers free direct-installations of compact fluorescent lamps (CFLs), pipe insulation, faucet aerators, low-flow showerheads, and LED retrofit kits as well as a walk-through assessment of the building.

The Programs' Implementer markets both Programs to building owners and managers, as well as Trade Allies and contractors that work with these customers, through regionally based Energy Advisors. The Programs' Implementer also processes customer applications, manages Program data, and educates Trade Allies in an effort to help cost-effectively promote the Programs.

To address market saturation in the densely populated portions of the state, the programs are targeting previously underserved markets including northwestern and southwestern Wisconsin and are collaborating with the Large Energy Users Program to provide energy savings to university campuses.

## Appliance Recycling Program

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

**Program Purpose:** The Appliance Recycling Program encourages households and multifamily building owners to turn in working refrigerators and freezers for recycling. By offering free pick-up and providing financial incentives, the Program is designed to encourage customers to: (1) discontinue using secondary refrigerators and freezers; (2) relinquish refrigerators and freezers previously in use as primary units when they are replaced; and (3) prevent the continued use of old refrigerators and freezers through resale or giving the unit away.

**Target Audience:** The target audience is Wisconsin residential electric customers. The Appliance Recycling Program allows participation for residential customers in multifamily residences or multifamily building owners and managers who are upgrading multiple units. However, participation skews strongly to single-family residential customers.

**Program Implementer:** The Appliance Recycling Program Implementer is JACO Environmental (JACO).

**Process and Associated Measures:** Participants received a \$50 rebate for recycling working refrigerators or freezers in CY 2013. The units must be between 10 and 30 cubic feet. Customers interested in the Appliance Recycling Program are directed to call a designated toll-free number operated by the Implementer or visit the Focus on Energy Website to schedule a time to have their old, working refrigerator or freezer picked up from their home. Implementer representatives verify customer eligibility and arrange a pick-up time, typically within two weeks of the request. A maximum of two pieces of equipment per customer address, per calendar year are eligible (\$100 maximum incentive per customer). This maximum does not apply to multifamily buildings that are participating in the Program.

After the appliances are picked up, they are delivered to a recycling facility. Focus on Energy staff can conduct unannounced site visits at the recycling center and ride-alongs to collection sites to ensure that the Implementer is following program rules and specifications.

## Residential Lighting and Appliance Program

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

**Program Purpose:** The Residential Lighting and Appliance Program is a retail-based promotion, price markdowns, that provides upstream incentives, markdowns, and coupon promotions for efficient lighting and water-saving products. In Upstream programs the higher cost of the measure is paid directly to the distributor or manufacturer by the program, as such upstream programs provide an instant discount to customers at point of sale.

**Target Audience:** The Residential Lighting and Appliance Program's target audience is residential customers. As an upstream program, it is difficult to limit participation to any single sector or population, or require that participants be customers of participating Focus on Energy utilities.

**Program Implementer:** The Residential Lighting and Appliance Program Implementer is Applied Proactive Technologies, Inc. (APT).

**Process and Associated Measures:** The Residential Lighting and Appliance Program partners with nation, regional, and local retail stores to discount products including ENERGY STAR®-qualified lighting technologies, Water Sense® certified low-flow showerheads, and ENERGY STAR high-efficiency clothes washers. The markdowns and incentives vary by product and store 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. The Residential Lighting and Appliance Program began a new initiative in 2013 to include ENERGY STAR qualified CFLs as give-away items in Wisconsin food banks.

## Home Performance with ENERGY STAR Program

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

**Program Purpose:** The Home Performance with ENERGY STAR Program provides homeowners with the opportunity to increase the energy efficiency of their home through the installation of energy-efficiency measures (envelope, lighting, and domestic hot water). The Program provides participants with incentives for installing eligible measures as well as the direct-installation of free energy-saving measures during a home energy assessment.

**Target Audience:** The target audience is homeowners of single-family (one- to three-unit) dwellings.

**Program Implementer:** The Home Performance with ENERGY STAR Program Implementer is Conservation Services Group (CSG).

**Process and Associated Measures:** The Home Performance with ENERGY STAR Program is contractor-oriented and can work in the following ways 1) One company performs all aspects of work; 2) One company acts as the general contractor but subcontracts out aspects of the work such as the energy assessment and/or the retrofit work. In both scenarios, the company, referred to as the Trade Ally, is

responsible for managing the customer relationship, completion of the full project, communication with the Program Implementer, and ensuring that all program requirements are met.

The Home Performance with ENERGY STAR Program provides incentives of 33 % of eligible measure cost, up to \$1,500, for energy-efficient improvements to a home's shell including air sealing and insulation (attic, exterior wall, sill box and interior foundation). Free direct-install measures such as CFLs, faucet aerators, and low-flow showerheads are installed during the home energy assessment.

Participants pay market rate for the assessment, a cost which is determined by each Trade Ally. Projects that achieve energy savings of 15 % or 25 % over the home's modeled baseline energy usage are eligible for incentive bonuses of \$200 and \$700 respectively.

### Assisted Home Performance with ENERGY STAR Program

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

**Program Purpose:** The Assisted Home Performance with ENERGY STAR Program provides income-eligible residents with the opportunity to increase the energy efficiency, durability, and comfort of their homes.

**Target Audience:** The target audience is income-eligible owner-occupants of 1 to 3 unit homes. Income-eligibility is defined by a household's gross income falling between 60% and 80% of the state median income (SMI). As of January 1, 2013 multi-family units are also eligible to participate as long as they meet program criteria.

**Program Implementer:** The Assisted Home Performance with ENERGY STAR Program Implementer is Conservation Services Group (CSG). Ineligible customers are directed to the Home Performance with ENERGY STAR Program.

**Process and Associated Measures:** A free home-energy assessment is provided by an Assisted Home Performance Program Trade Ally to identify energy-efficiency opportunities, and eligible customers can receive enhanced incentives that cover up to 75% of the cost of the improvement measures, up to \$2,500.

To be eligible to participate in the Assisted Home Performance with ENERGY STAR Program, customers submit an Income Eligibility Application; the Implementer notifies customers within 24 hours of eligibility. Eligible customers then schedule a free energy assessment (an abbreviated version of the Home Performance with ENERGY STAR assessment) with a Trade Ally and receive a list of recommended upgrades. After the retrofit work is completed, customers receive the Program incentive in the form of an instant reward deducted from the Trade Ally's invoice.

The associated measures are air sealing, attic insulation, exterior wall insulation; along with free direct-installation measures including CFLs, faucet aerators, and low-flow showerheads.

## New Homes Program

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

**Program Purpose:** Focus on Energy's New Homes Program provides information, implementation assistance and incentives for builders of new single (one- to three-unit) homes in Wisconsin that meet energy-efficiency requirements.

**Target Audience:** The target audience is builders of new, single-family homes.

**Program Implementer:** The New Homes Program Implementer is the Wisconsin Energy Conservation Corporation (WECC).

**Process and Associated Measures:** The New Homes Program provides education and motivation leading to the construction of new homes that are at least 10% more efficient than homes built to the Wisconsin Uniform Dwelling Code (UDC). Incentives are offered at four levels for homes that exceed the efficiency standards of the uniform dwelling code.

Higher tiers of efficiency require technology packages, which are home efficiency measures that are not covered in the building codes. These technology packages include: ENERGY STAR-Qualified Light Bulbs, ENERGY STAR-Qualified Light Fixtures, Energy Efficient Windows, R5 Exterior Insulation, Rim and Band Joist Insulation, Residential Water Heaters, Residential HVAC, and Renewable Energy Systems (solar PV, solar thermal, and geothermal).

The New Homes Program also provides a bonus reward for Affordable Housing. To qualify as Affordable Housing, agencies must have non-profit status or be a unit of the local government.

## Residential Rewards Program

**Program Dates:** Launched January 1, 2012. The Residential Rewards renewable component launched July 1, 2012.

**Program Purpose:** The Residential Rewards Program encourages single-family residential customers of participating utilities to install energy-efficient space and water heating equipment as well as renewable energy technologies and attic insulation.

**Target Audience:** The Residential Rewards Program's target market is residential customers in one- to three-unit homes.

**Program Implementer:** The Residential Rewards Program Implementer is Resource Solutions Group, LLC (RSG).

**Process and Associated Measures:** The Program provides incentives for the purchase of high-efficiency or renewable space heating and water heating equipment and attic insulation. Customers must select this equipment from a prequalified list. The Residential Rewards Implementer markets the Program

directly to homeowners, but the primary outreach method is through Trade Allies marketing the Program to their customers.

The qualifying measures include attic insulation; high-efficiency furnaces, boilers, and water heaters (tankless, storage, condensing); as well as renewables including solar electric (PV), solar hot water, and ground source heat pumps.

### Enhanced Rewards Program

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

**Program Purpose:** The Enhanced Rewards Program provides incentives for the purchase of high-efficiency home heating equipment to income-eligible residents.

**Target Audience:** The Enhanced Rewards Program's target audience is income-eligible owner-occupants of existing single-family residential buildings. Income eligibility is defined by a household's gross income falling between 60% and 80% of the state median income (SMI). The eligible income level targets customers who are unlikely to be able to participate in the Focus on Energy Residential Rewards Program and who do not qualify for Wisconsin's weatherization program, called Home Energy Plus.

**Program Implementer:** The Enhanced Rewards Program Implementer is Resource Solutions Group, Inc. (RSG).

**Process and Associated Measures:** The Enhanced Rewards Program provides financial incentives to customers of participating gas and electric utilities who purchased and installed new energy-efficient heating equipment. The primary outreach method to these customers is through Trade Allies that are familiar with the Program offerings. Customers are required to submit an income eligibility application and are notified within 24 hours of their eligibility. Incentives are only available for pre-qualified energy-efficient furnaces and boilers. Ineligible customers are directed to the Wisconsin Home Energy Plus or the Focus on Energy Residential Rewards Program.

### Express Energy Efficiency Program

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

**Program Purpose:** The Express Energy Efficiency Program provides direct-installation of free energy-saving measures to participating customers, and helps to promote other Focus on Energy programs. The Express Energy Efficiency Program is offered in a selection of targeted communities for four to six weeks at a time before moving on to new locations. Over the three-year period from 2012 to 2014, the Express Energy Efficiency Program will be offered across most of the state.

**Target Audience:** The target audience is the owners of single-family residential dwellings with one to three units, as well as renters of single-family homes.

**Program Implementer:** The Express Energy Efficiency Program Implementer is Conservation Services Group (CSG).



**Process and Associated Measures:** The Program offers direct-installation of energy-efficiency measures including CFLs and LEDs (limit 12; 10 CFLs and 2 LEDs), faucet aerators, low-flow showerheads, water heater pipe insulation, and temperature turn-downs on water heaters at no cost to the customer. Installers also provide literature and information on other Focus on Energy programs.

## ***Descriptions of Nonresidential Programs***

The Evaluation Team assessed seven nonresidential programs during the CY 2013 evaluation.

### **Business Incentive Program**

**Program Dates:** Launched April 1, 2012

**Program Purpose:** The Business Incentive Program encourages energy efficiency by offering incentives for prescriptive and custom measures to nonresidential customers with electric demand up to 1000kW.

**Target Audience:** The Business Incentive Program targets nonresidential segments including agribusinesses (including farms and greenhouses); commercial spaces (including hotels and independent retailers, food sales, and food service establishments); small to medium sized industrial facilities, educational institutions (including K-12 schools, technical colleges, and University of Wisconsin two-year colleges); and municipal and county government facilities.

**Program Implementer:** The Program Implementer is Franklin Energy Services, LLC.

**Process and Associated Measures:** The Business Incentive Program relies on Trade Allies to drive energy savings. The Implementer Staff encourage Trade Allies to recruit eligible customers, identify energy-saving opportunities, and lead customers through the incentive application process. Prescriptive incentives are available for many technologies including lighting, HVAC, commercial refrigeration, variable frequency drives, and food service equipment. Customers may also receive custom incentives for more complex energy-efficiency projects.

### **Chain Stores and Franchises Program**

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

**Program Purpose:** The Chain Stores & Franchises Program is designed to motivate decision-makers at chain stores and franchise operations to make energy-efficiency upgrades to multiple locations.

**Target Audience:** The target audience is chain stores and franchise operations in retail, food service (restaurants), and food sales (grocery and convenience stores). To be eligible for the Program, a minimum of five locations in Wisconsin is required.

**Program Implementer:** The Program Implementer is Franklin Energy Services, LLC.

**Process and Associated Measures:** The Program Implementer staff assigns a dedicated Account Manager for specific chains and franchises. The Account Manager, or Energy Advisor, works with the customer and Trade Allies to identify opportunities to improve energy efficiency; The Energy Advisor provides customer service and technical knowledge; helps develop business cases to support projects, and may assist with marketing and messaging related to energy-efficiency actions. All Focus on Energy nonresidential measures and combined measures are associated with this Program. Customers may also propose additional energy-efficiency projects through the custom incentive option.

## Large Energy Users Program

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

**Program Purpose:** The Large Energy Users 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. Prescriptive incentives are available for many technologies including lighting, HVAC, commercial refrigeration, variable frequency drives, and food service equipment.

**Target Audience:** The Program is designed for large industrial, commercial and institutional business customers of participating Wisconsin electric and natural gas utilities that had a system-wide energy utility bill of at least \$60,000 in one month of the preceding year and had energy usage at one contiguous facility of:

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

**Program Implementer:** The Program Implementer is Leidos (formerly known as SAIC).

**Process and Associated Measures:** The Program Energy Advisors work directly with large industrial, commercial and institutional business customers to identify and analyze opportunities for improving energy efficiency in their facilities and processes. They provide technical expertise as well as on-going education about large-scale energy-efficiency measures and best practices. In addition, they help customers develop energy teams and energy management plans, energy baselines and key performance indicators for facilities and end-uses, as well as assist with the development of custom incentive projects or hybrid projects with custom and prescriptive incentives.

All nonresidential measures and combined measures are associated with this program. Customers may also propose additional energy-efficiency projects through the custom incentive option.

## Small Business Program

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

**Program Purpose:** The Small Business Program is designed to encourage small business owners to install easy and affordable energy-efficiency upgrades. It provides free on-site energy assessments to help small business customers identify energy-efficiency improvements and includes an energy-efficiency package of free, direct-installed measures. A package of additional measures is offered at a discounted price.

**Target Audience:** The Small Business Program targets independently owned and operated for-profit business customers, as well as not-for-profit organizations with average monthly electric demand of less than 100 kW. Typical customers are independent grocers, convenience stores, gas stations, retail shops, locally owned restaurants, small hotels and motels, day care centers, doctor’s offices, churches and community action agencies.

**Program Implementer:** The Program Implementer is Staples & Associates, Inc.

**Process and Associated Measures:** Any small business owner can schedule an assessment, or Trade Allies who have received program-specific training may recruit participants in their local communities. The Program Implementer and qualified Trade Allies conduct 30 to 45 minute energy assessments at customer facilities to identify energy-efficiency opportunities. After discussing the findings, the owner may elect to install the Free Energy Savings Package or purchase the Gold Energy Savings Package. The measures included in the Small Business Program packages are summarized in Table C-1.

**Table C-1. Small Business Program Measure Packages**

Free Energy Savings Package	Gold Energy Savings Package
CFLs, dimmable, non-dimmable, globe (unlimited)	Includes the Free Energy Savings Package
CFL reflectors (unlimited)	LED exit signs (up to 5) *
Vending machine controllers (unlimited)	De-lamping of redundant fixtures
LED “Open” sign (one, replacing a neon sign)	4’ T12 to T8 lighting retrofits (up to 80 lamps)*
Faucet aerators (unlimited)	Interior and exterior hard-wired fixtures (up to 5)*
Water-saving showerheads (unlimited)	Wall box occupancy sensors (up to 5)*
Engine block heater timer (agricultural customers)	1” and 2” hot water pipe wrap

\* Small business owners may purchase additional measures at discounted prices.

## Retrocommissioning Program

**Program Dates:** Launched in 2013

**Program Purpose:** The Retrocommissioning Program is designed to drive comprehensive and sustainable energy savings for individual buildings by improving the performance and energy efficiency of building systems, equipment, and operations as a whole.

**Target Audience:** The Retrocommissioning Program is best suited for buildings that are between 5-10 years old. These buildings are new enough to not require a retrofit, but would benefit from control calibration, and system tuning.

**Program Implementer:** The Program Implementer is Resource Solutions Group—a division of CLEAResult.

**Process and Associated Measures:** The Retrocommissioning Program uses specialized Trade Allies, called RSPs, to work directly with facility managers to examine all facets of a building, including:

envelope, building controls, lighting, HVAC, equipment choices, and operational habits and policies. The Retrocommissioning Program process begins with a customer selecting an individual Retrocommissioning Service Provider (RSP). The RSP conducts an Opportunity Assessment to determine if the building qualifies for this program before completing a comprehensive audit of the building. Incentives are provided for completed projects based on the energy savings provided by measures implemented through the program.

## Design Assistance Program

**Program Dates:** Launched January 1, 2013.

**Program Purpose:** The Design Assistance Program helps building owners and design teams analyze the costs and benefits of incorporating various energy-saving technologies into the design of their new construction, or substantial renovation projects.

**Target Audience:** The Design Assistance Program targets building owners and design teams engaged in the design and completion of new buildings or substantial remodeling projects. The Program offers building analysis support and incentives for building owners and design teams as they implement building renovations or new construction.

**Program Implementer:** The Program Implementer is Weidt Group Inc.

**Process and Associated Measures:** While customers can independently request to participate in the Design Assistance Program, the Program Implementer also develops relationships with key design firms to drive customer interest. The Program Implementer provides customers with modeling and analysis of how various energy-saving technologies can be incorporated into the building's design. The program also provides custom incentives for whole building design efficiency measures based on the incremental decrease in energy savings over a code-based design.

## Renewable Energy Competitive Incentive Program

**Program Dates: Launched:** Launched in 2013

**Program Purpose:** The goal of the Renewable Energy Competitive Incentive Program (RECIP) is to provide financial incentives to customers that propose the most cost-effective renewable energy projects to be installed at eligible business (non-residential) facilities.

**Target Audience:** The target audience is non-residential customer facilities that are interested in installing renewable energy technologies.

**Program Implementer:** The Program Implementer is Franklin Energy Services, LLC and SAIC.

**Process and Associated Measures:** RECIP applicants must submit a proposal for the installation of renewable energy technologies. RECIP will award successful proposals an incentive amount determined by the estimated first year net energy production of the installed renewable technology. 75% of incentives will be awarded to biomass, biogas, and geothermal technologies, while the remaining 25% of

incentives will be awarded to wind, solar thermal, and solar photovoltaic technologies. RECIP will judge proposals primarily by their cost-effectiveness, but will also consider completion date, system optimization, and applicant's commitment to completing the project.

## Appendix D. Summary of Savings by Sector and County

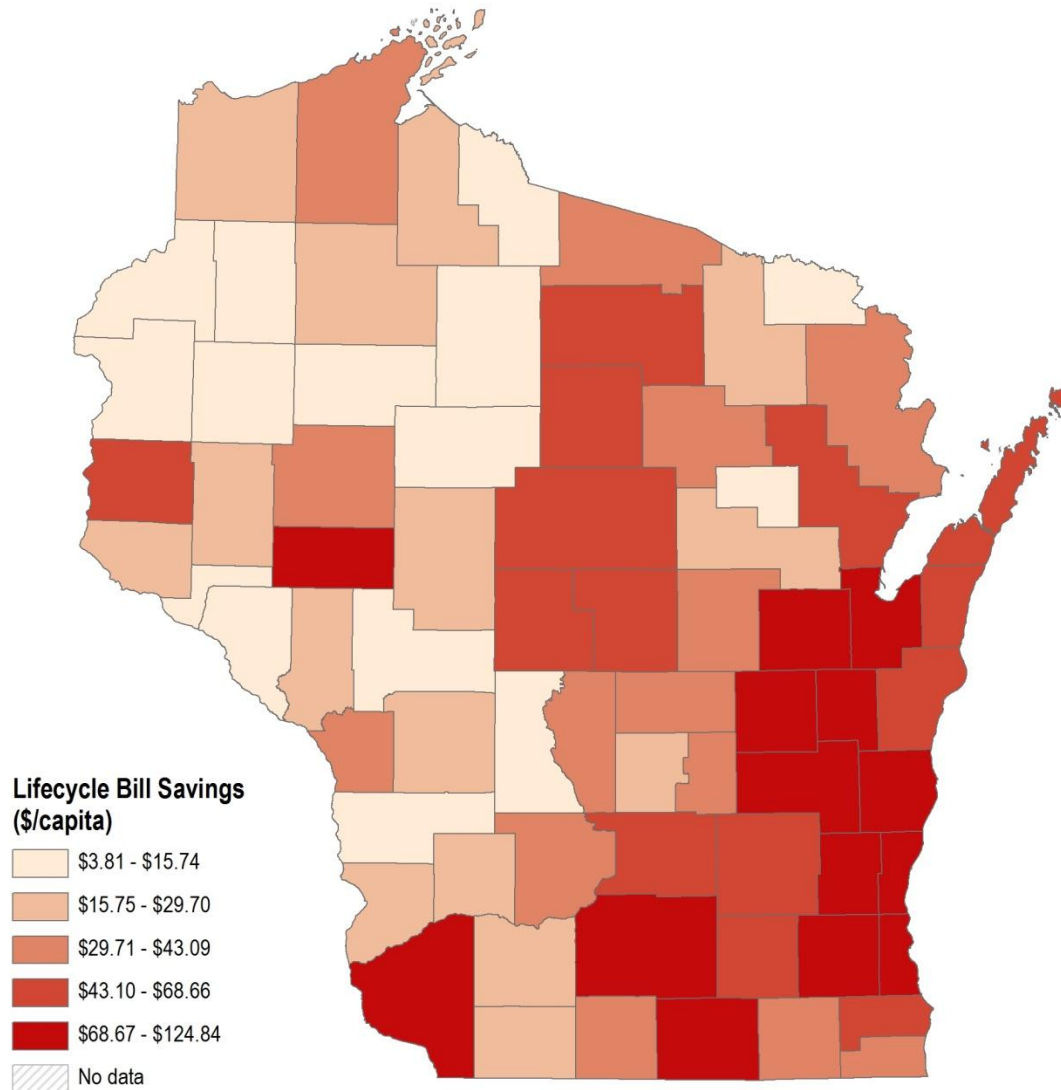
The following section includes twelve maps based on the results of the 2013 evaluation: three county-level maps (per capita lifetime bill savings, 2013 participation rates, and per capita incentives paid in 2013) for three primary sectors (residential, industrial, and commercial); and three maps by county with upstream lighting per capita lifetime bill savings, 2013 participation rates, and per capita incentives paid in 2013. Commercial maps include commercial, schools, government, and agricultural entities.

Similar to the 2011 and 2012 evaluation reports, the bill savings are defined as evaluated lifecycle verified gross energy savings multiplied by the average retail rate of delivered energy in 2013 and normalized on a per capita basis. The incentive dollars are also reported on a per capita basis.

The per capita residential numbers are based on the number of households reported in the most current US Census: American Community Survey (2012). The per capita county numbers for commercial and industrial are based on the county-level total number of active businesses in the 2010 evaluation report. The participation rates are the county-level participation normalized by the county-and sector-level populations.

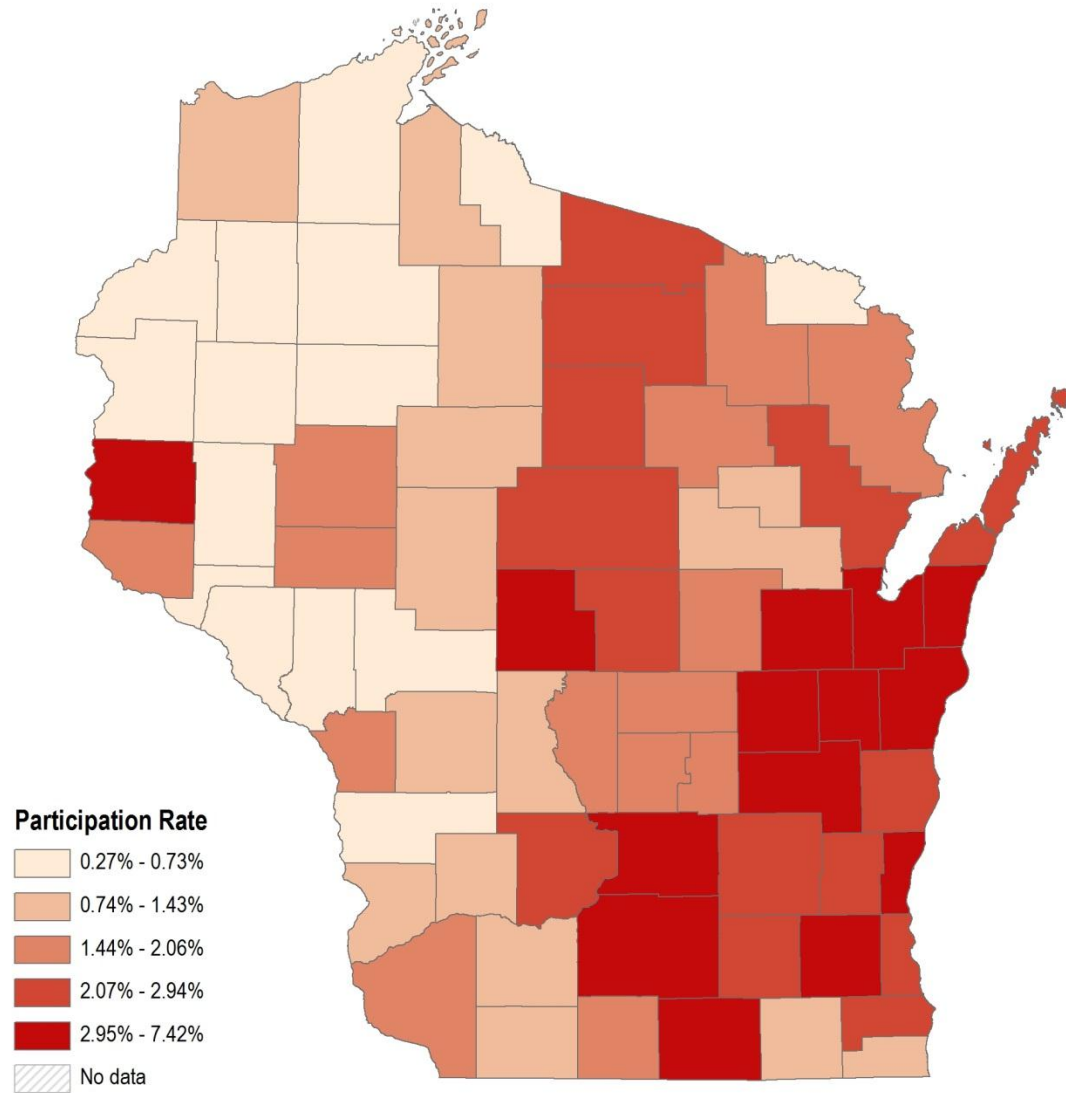
## Residential

### Residential Per Capita Energy Bill Savings by County

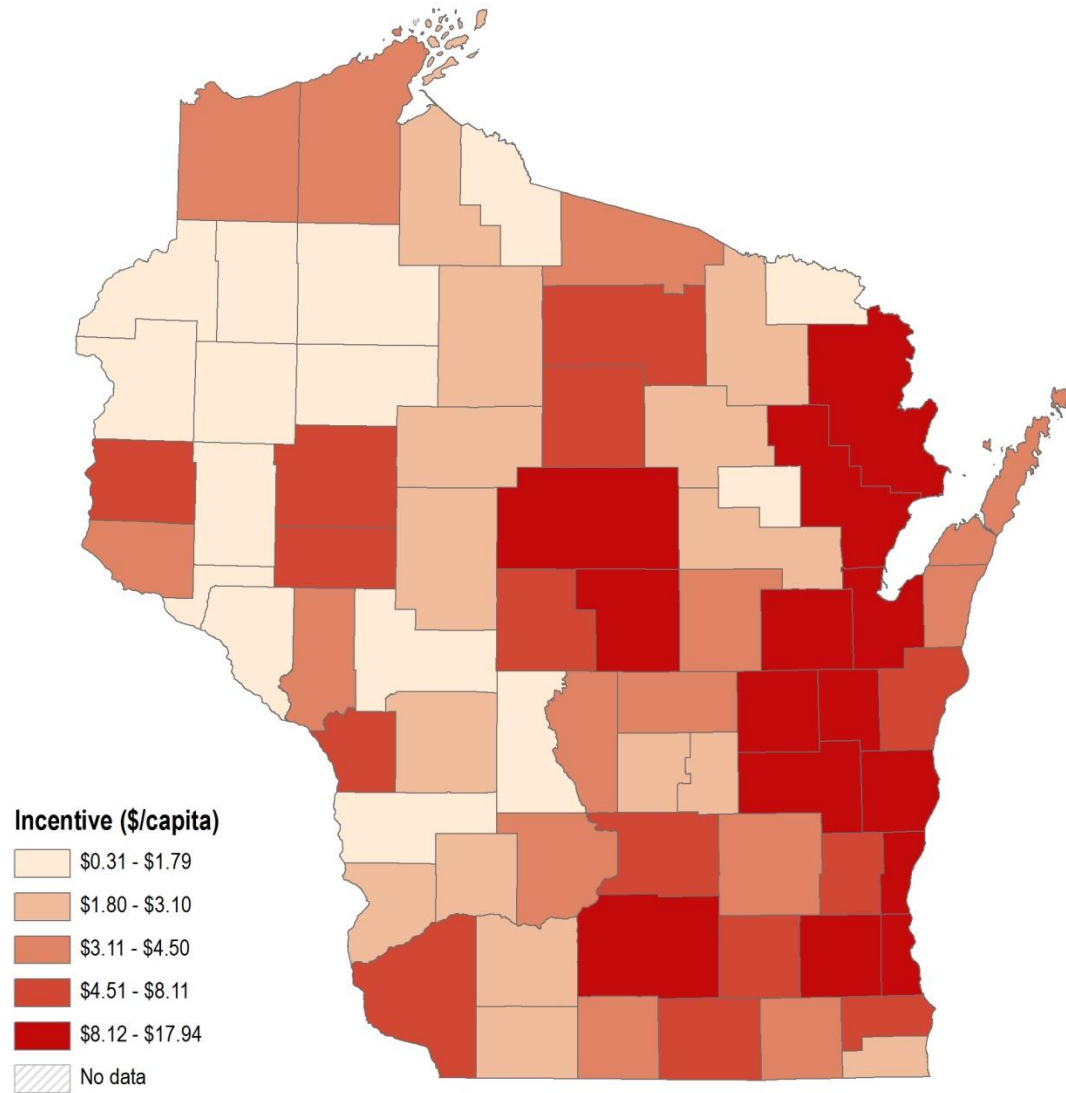




## Residential Participation Rate by County

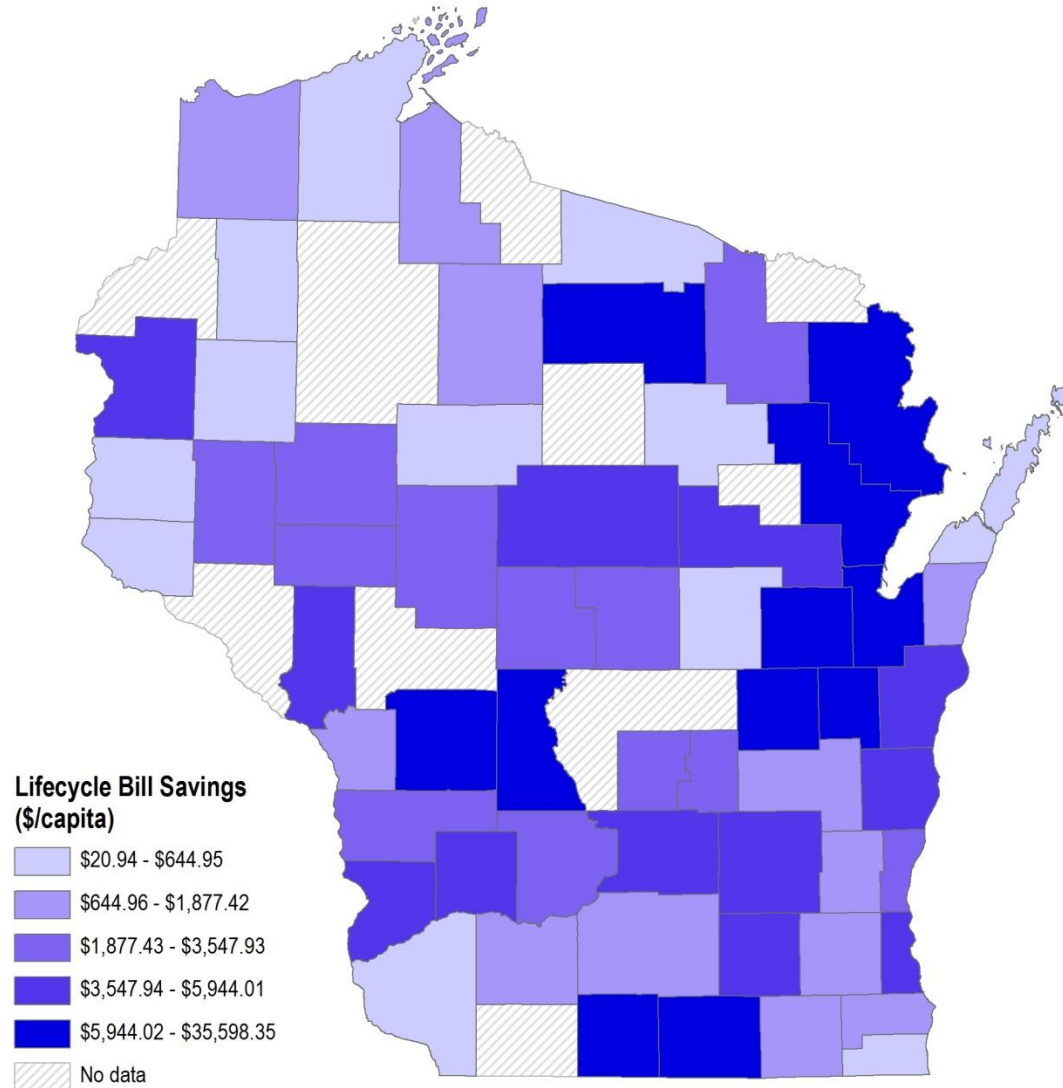


**Residential Per Capita Incentive Dollars Awarded by County**

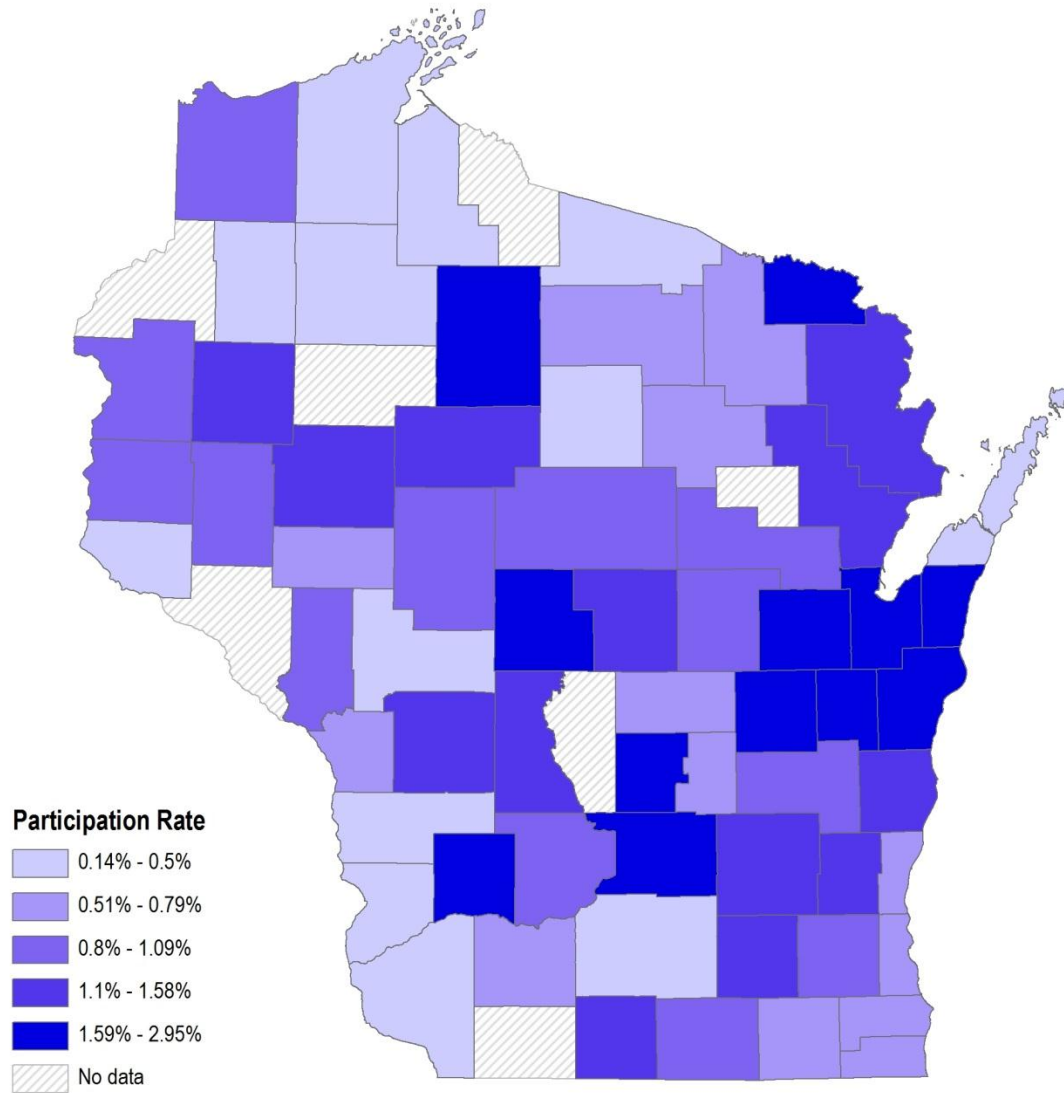


## Industrial

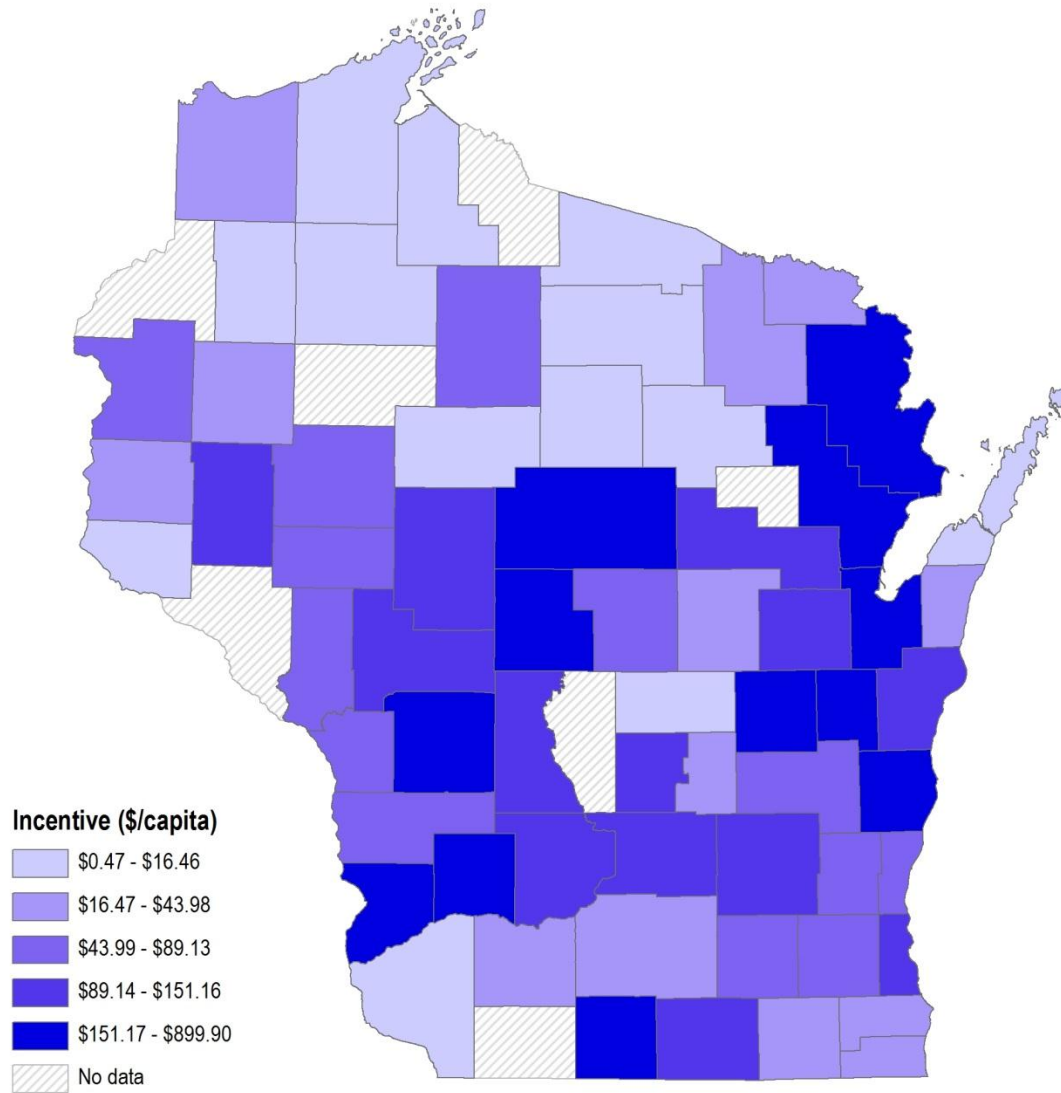
### Industrial Per Capita Energy Bill Savings by County



## Industrial Participation Rate by County

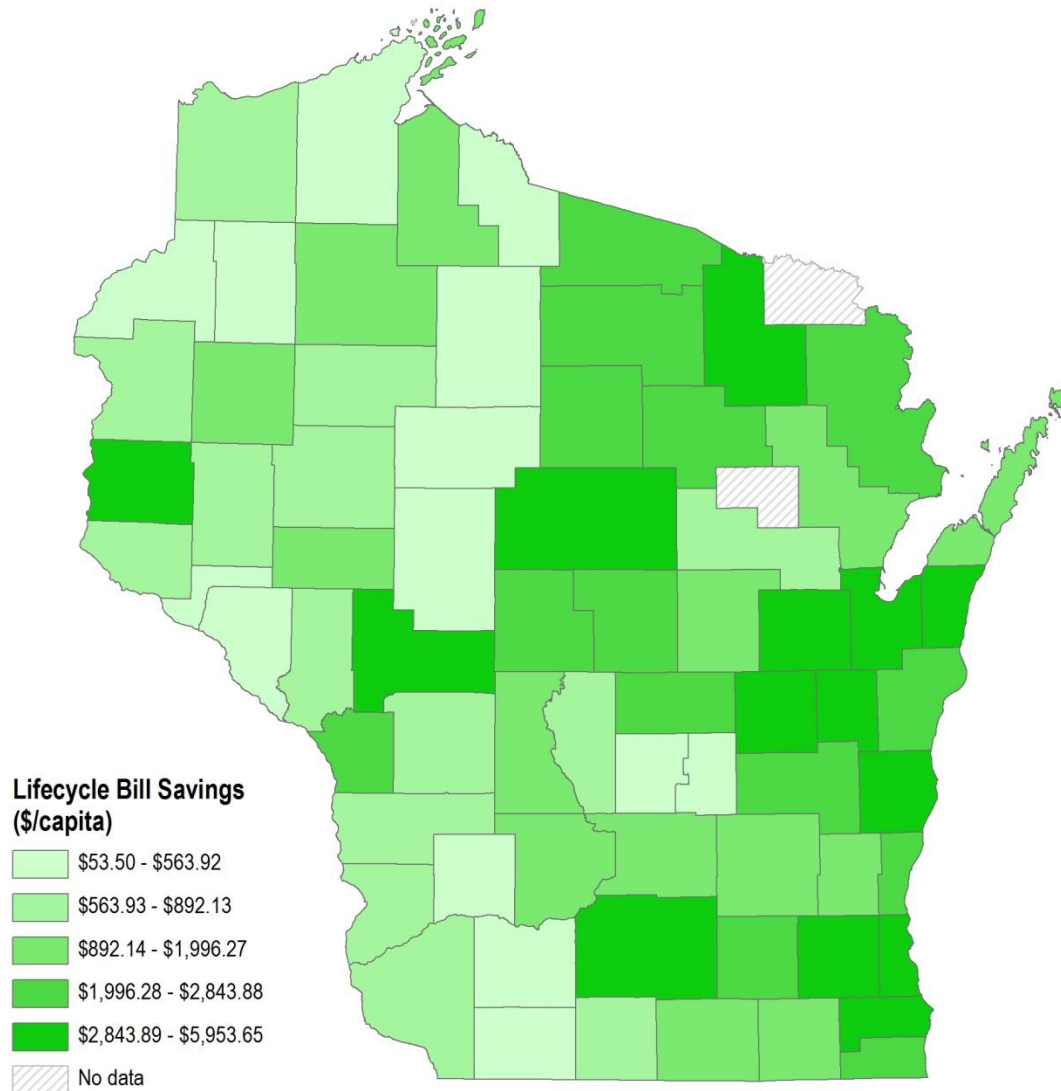


## Industrial Per Capita Incentive Dollars Awarded by County

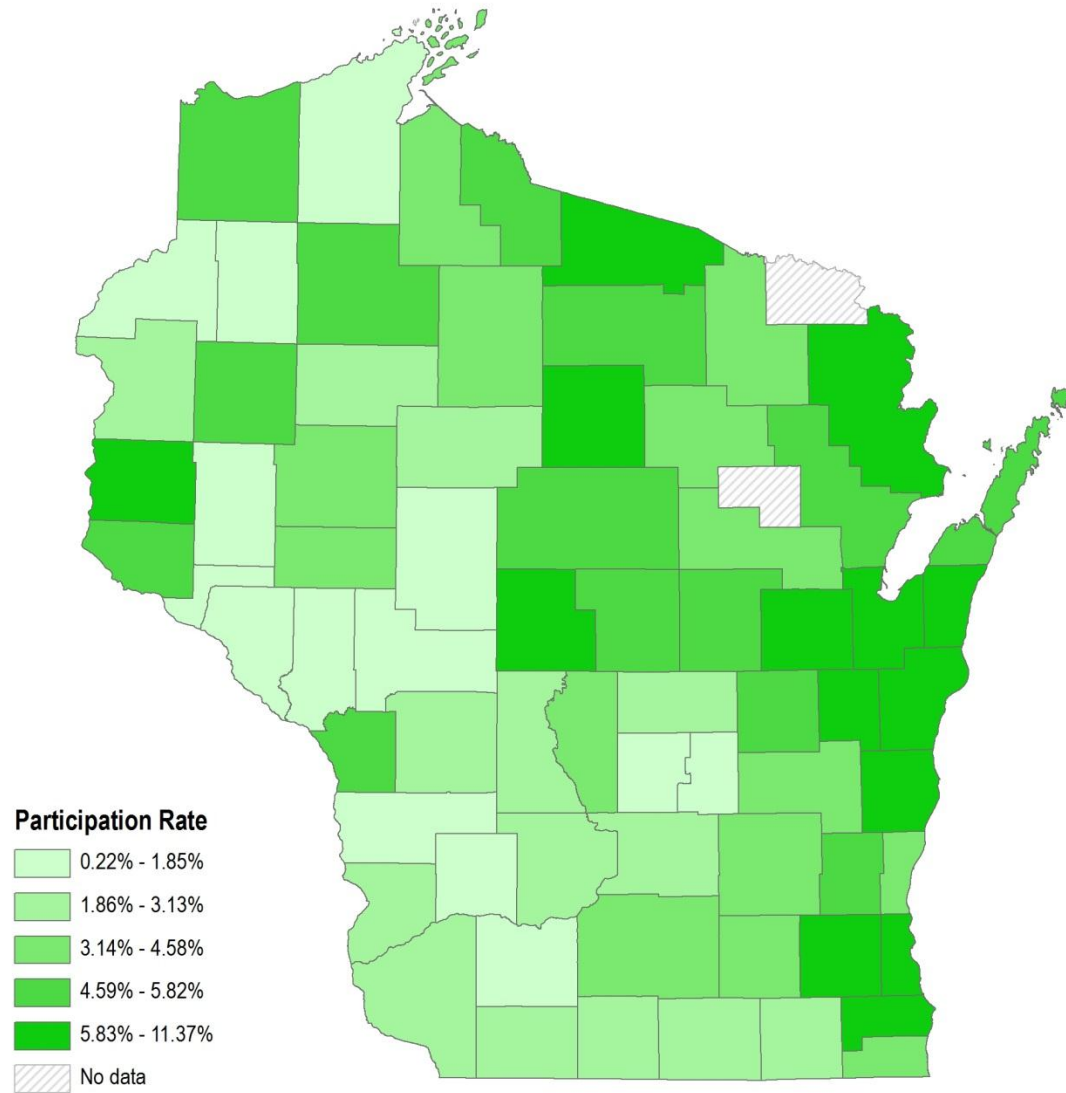


## Commercial

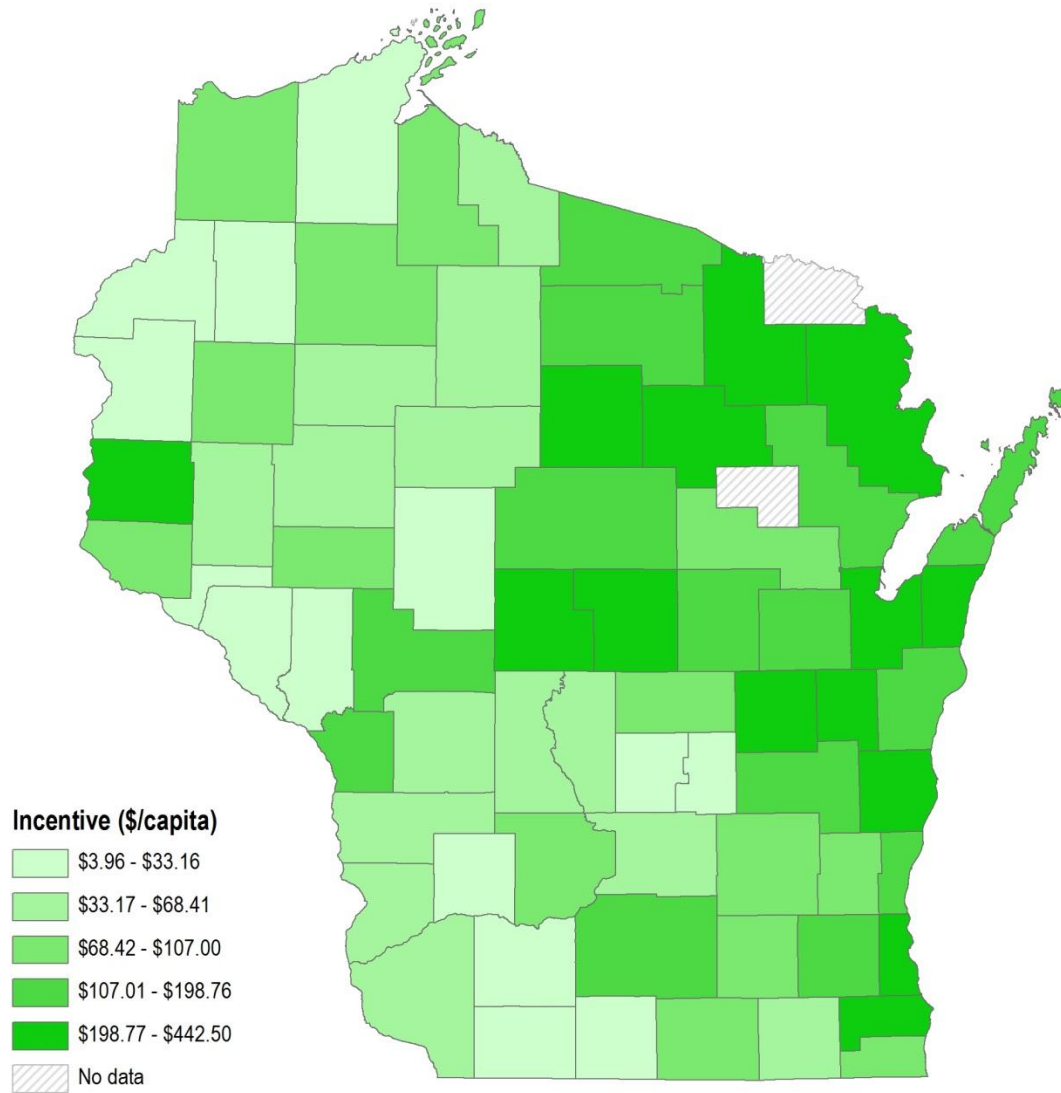
### Commercial Per Capita Energy Bill Savings by County



## Commercial Participation Rate by County



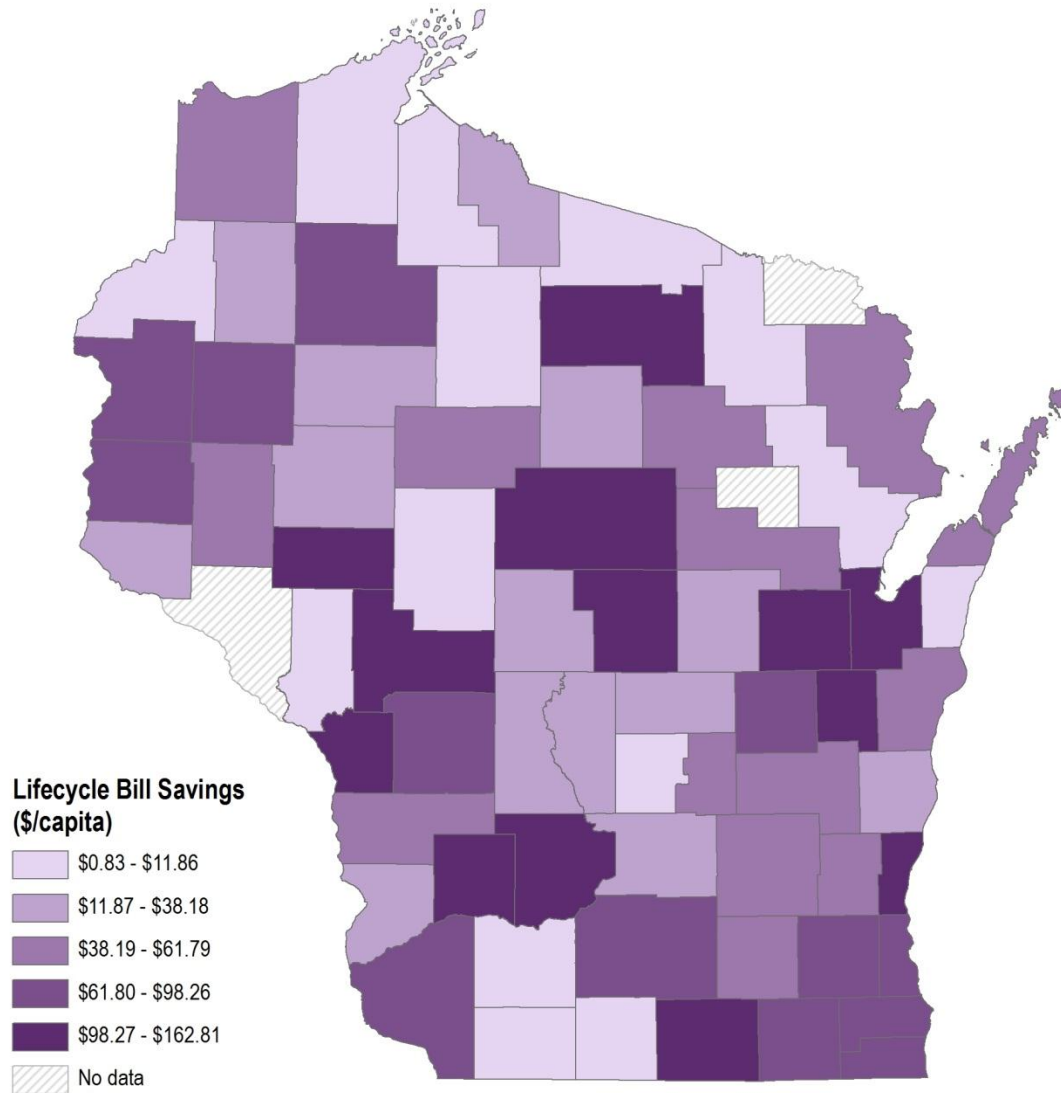
Commercial Per Capita Incentive Dollars Awarded by County



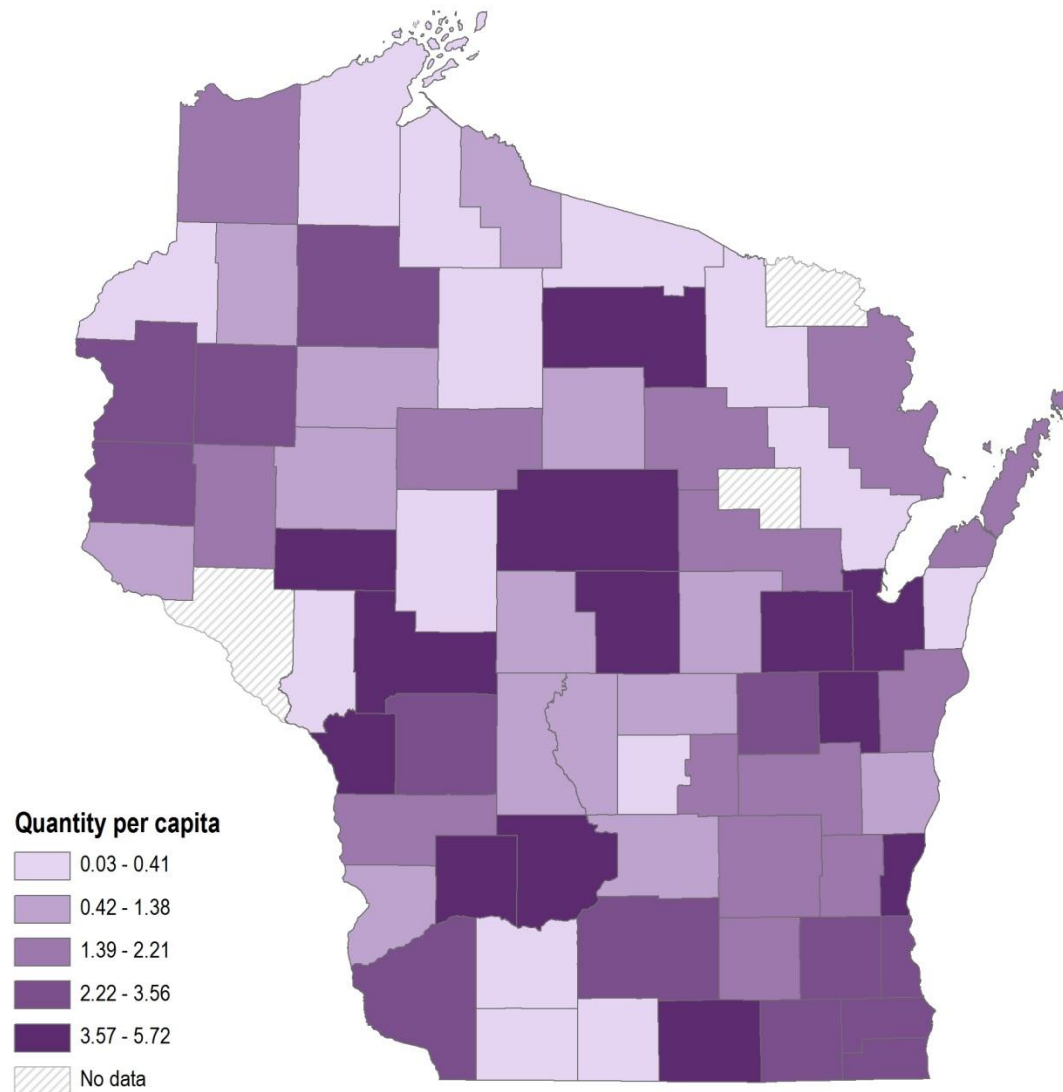


## Upstream Lighting

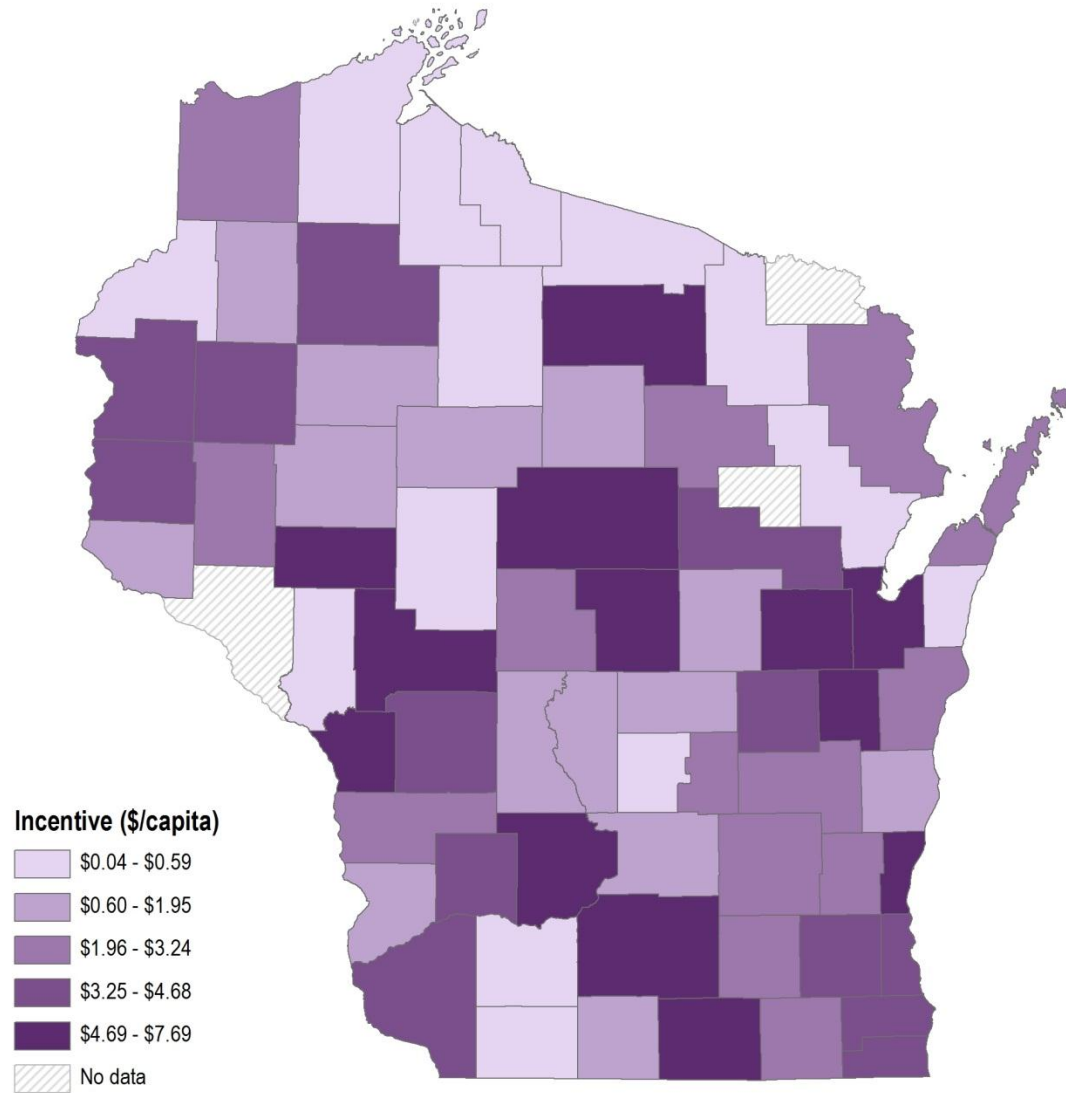
### Upstream Lighting Per Capita Energy Bill Savings by County



## Upstream Lighting Participation Rate by County



## Upstream Lighting Per Capita Incentive Dollars Awarded by County



**Table D-1. Savings and Participation by County and Segment**

County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
Adams	Commercial	\$721.71	3.94%	\$64.97
Ashland	Commercial	\$1,057.71	4.58%	\$90.88
Barron	Commercial	\$951.55	4.65%	\$82.01
Bayfield	Commercial	\$253.44	1.48%	\$24.71
Brown	Commercial	\$4,970.72	9.90%	\$442.50
Buffalo	Commercial	\$53.50	0.22%	\$3.96
Burnett	Commercial	\$324.76	1.75%	\$33.16
Calumet	Commercial	\$3,311.21	5.90%	\$290.06
Chippewa	Commercial	\$892.13	3.75%	\$63.41
Clark	Commercial	\$280.06	1.54%	\$20.40
Columbia	Commercial	\$1,299.78	2.53%	\$68.41
Crawford	Commercial	\$725.46	2.66%	\$49.20
Dane	Commercial	\$4,702.47	4.54%	\$198.76
Dodge	Commercial	\$1,375.83	4.08%	\$81.29
Door	Commercial	\$1,262.12	4.65%	\$129.06
Douglas	Commercial	\$708.78	4.74%	\$76.93
Dunn	Commercial	\$610.21	1.85%	\$38.81
Eau Claire	Commercial	\$1,738.97	3.79%	\$83.72
Florence	Commercial	\$0.00	0.00%	\$0.00
Fond du Lac	Commercial	\$2,677.03	4.37%	\$120.51
Forest	Commercial	\$3,122.65	4.54%	\$325.24
Grant	Commercial	\$568.66	2.94%	\$49.19
Green	Commercial	\$672.57	2.42%	\$32.65
Green Lake	Commercial	\$305.17	0.92%	\$14.66
Iowa	Commercial	\$420.35	1.22%	\$25.92
Iron	Commercial	\$553.26	5.44%	\$55.34
Jackson	Commercial	\$3,121.51	1.70%	\$190.95
Jefferson	Commercial	\$2,063.98	3.65%	\$103.78
Juneau	Commercial	\$1,433.37	2.58%	\$68.00
Kenosha	Commercial	\$2,572.80	3.76%	\$103.54
Kewaunee	Commercial	\$5,953.65	9.03%	\$433.28
La Crosse	Commercial	\$2,843.88	4.99%	\$178.46
Lafayette	Commercial	\$283.99	1.88%	\$19.09
Langlade	Commercial	\$2,111.04	4.26%	\$206.71
Lincoln	Commercial	\$2,198.47	8.53%	\$230.40
Manitowoc	Commercial	\$2,131.12	7.51%	\$190.72
Marathon	Commercial	\$3,457.66	4.90%	\$192.70
Marinette	Commercial	\$2,555.15	5.88%	\$254.22
Marquette	Commercial	\$461.45	1.35%	\$17.55
Menominee	Commercial	\$0.00	0.00%	\$0.00

County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
Milwaukee	Commercial	\$5,128.57	6.66%	\$229.09
Monroe	Commercial	\$885.96	2.68%	\$67.46
Not mapped*	Commercial	\$0.00	0.00%	\$0.00
Oconto	Commercial	\$1,506.28	5.75%	\$127.20
Oneida	Commercial	\$2,663.20	5.48%	\$184.66
Outagamie	Commercial	\$3,894.43	7.32%	\$188.56
Ozaukee	Commercial	\$2,669.67	4.27%	\$123.35
Pepin	Commercial	\$314.26	1.72%	\$14.57
Pierce	Commercial	\$813.94	5.66%	\$81.99
Polk	Commercial	\$595.35	1.88%	\$32.31
Portage	Commercial	\$2,697.56	5.82%	\$228.33
Price	Commercial	\$547.67	4.14%	\$52.44
Racine	Commercial	\$5,098.66	6.81%	\$260.91
Richland	Commercial	\$275.59	1.21%	\$22.82
Rock	Commercial	\$1,732.05	3.13%	\$80.37
Rusk	Commercial	\$631.17	1.88%	\$46.42
Sauk	Commercial	\$1,651.30	2.55%	\$88.01
Sawyer	Commercial	\$1,053.93	5.68%	\$82.20
Shawano	Commercial	\$813.02	4.37%	\$78.22
Sheboygan	Commercial	\$3,926.00	7.77%	\$216.74
St. Croix	Commercial	\$3,335.11	9.88%	\$247.64
Taylor	Commercial	\$348.58	2.05%	\$46.08
Trempealeau	Commercial	\$604.83	1.19%	\$27.40
Vernon	Commercial	\$747.10	1.44%	\$45.84
Vilas	Commercial	\$2,550.05	9.24%	\$184.38
Walworth	Commercial	\$1,328.27	2.44%	\$61.33
Washburn	Commercial	\$563.92	1.42%	\$31.07
Washington	Commercial	\$1,539.08	4.61%	\$107.00
Waukesha	Commercial	\$3,113.21	6.73%	\$163.85
Waupaca	Commercial	\$1,996.27	5.62%	\$153.05
Waushara	Commercial	\$2,562.92	2.71%	\$74.71
Winnebago	Commercial	\$4,812.85	5.14%	\$230.53
Wood	Commercial	\$2,752.29	11.37%	\$237.02
Adams	Industrial	\$0.00	0.00%	\$0.00
Ashland	Industrial	\$1,540.60	0.34%	\$13.31
Barron	Industrial	\$644.95	1.49%	\$39.57
Bayfield	Industrial	\$20.94	0.41%	\$0.73
Brown	Industrial	\$8,542.05	2.00%	\$237.33
Buffalo	Industrial	\$0.00	0.00%	\$0.00
Burnett	Industrial	\$0.00	0.00%	\$0.00
Calumet	Industrial	\$6,919.84	2.17%	\$270.32

County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
Chippewa	Industrial	\$2,008.18	1.23%	\$72.73
Clark	Industrial	\$3,547.93	1.09%	\$90.45
Columbia	Industrial	\$4,618.95	1.64%	\$147.81
Crawford	Industrial	\$5,675.12	0.46%	\$258.59
Dane	Industrial	\$1,272.38	0.50%	\$30.88
Dodge	Industrial	\$3,832.46	1.58%	\$122.39
Door	Industrial	\$37.40	0.14%	\$1.69
Douglas	Industrial	\$1,088.79	1.06%	\$27.36
Dunn	Industrial	\$2,583.50	1.02%	\$108.51
Eau Claire	Industrial	\$2,034.99	0.57%	\$49.67
Florence	Industrial	\$0.00	1.79%	\$21.87
Fond du Lac	Industrial	\$1,288.73	0.96%	\$57.69
Forest	Industrial	\$2,027.67	0.62%	\$18.70
Grant	Industrial	\$383.99	0.43%	\$15.90
Green	Industrial	\$10,569.46	1.11%	\$424.24
Green Lake	Industrial	\$1,943.43	0.56%	\$26.55
Iowa	Industrial	\$984.56	0.60%	\$34.42
Iron	Industrial	\$0.00	0.00%	\$0.00
Jackson	Industrial	\$0.00	0.49%	\$112.32
Jefferson	Industrial	\$3,690.26	1.16%	\$89.13
Juneau	Industrial	\$7,178.63	1.58%	\$151.16
Kenosha	Industrial	\$576.08	0.56%	\$22.43
Kewaunee	Industrial	\$1,205.41	2.36%	\$37.68
La Crosse	Industrial	\$1,785.39	0.54%	\$58.77
Lafayette	Industrial	\$0.00	0.00%	\$0.00
Langlade	Industrial	\$525.75	0.57%	\$15.04
Lincoln	Industrial	\$0.00	0.44%	\$10.83
Manitowoc	Industrial	\$4,899.18	2.70%	\$138.54
Marathon	Industrial	\$4,977.49	1.03%	\$213.45
Marinette	Industrial	\$16,021.92	1.14%	\$364.44
Marquette	Industrial	\$2,963.03	2.49%	\$107.93
Menominee	Industrial	\$0.00	0.00%	\$0.00
Milwaukee	Industrial	\$5,944.01	0.70%	\$122.43
Monroe	Industrial	\$35,598.35	1.57%	\$899.90
Oconto	Industrial	\$11,373.27	1.14%	\$183.19
Oneida	Industrial	\$9,936.82	0.52%	\$6.24
Outagamie	Industrial	\$6,096.78	1.64%	\$97.21
Ozaukee	Industrial	\$2,304.33	0.79%	\$68.34
Pepin	Industrial	\$0.00	0.00%	\$0.00
Pierce	Industrial	\$72.40	0.41%	\$2.08
Polk	Industrial	\$4,690.48	0.84%	\$75.40

County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
Portage	Industrial	\$2,803.06	1.30%	\$75.12
Price	Industrial	\$1,877.42	2.95%	\$45.52
Racine	Industrial	\$1,838.71	0.79%	\$43.98
Richland	Industrial	\$4,508.14	1.85%	\$192.48
Rock	Industrial	\$5,954.99	0.88%	\$116.35
Rusk	Industrial	\$0.00	0.00%	\$0.00
Sauk	Industrial	\$2,765.93	0.81%	\$121.78
Sawyer	Industrial	\$0.00	0.25%	\$0.48
Shawano	Industrial	\$4,441.04	0.96%	\$116.59
Sheboygan	Industrial	\$3,711.08	1.53%	\$173.51
St. Croix	Industrial	\$566.55	0.84%	\$20.96
Taylor	Industrial	\$144.97	1.20%	\$16.46
Trempealeau	Industrial	\$4,380.90	1.03%	\$55.62
Vernon	Industrial	\$2,177.85	0.27%	\$86.39
Vilas	Industrial	\$235.29	0.19%	\$7.80
Walworth	Industrial	\$846.58	0.64%	\$26.30
Washburn	Industrial	\$43.85	0.29%	\$5.66
Washington	Industrial	\$1,057.66	1.43%	\$51.79
Waukesha	Industrial	\$1,768.22	0.89%	\$54.15
Waupaca	Industrial	\$568.49	0.94%	\$36.73
Waushara	Industrial	\$0.00	0.72%	\$0.94
Winnebago	Industrial	\$13,113.86	2.62%	\$453.77
Wood	Industrial	\$2,905.31	1.61%	\$169.78
Adams	Residential	\$36.98	1.76%	\$3.63
Ashland	Residential	\$19.55	0.73%	\$2.37
Barron	Residential	\$9.27	0.56%	\$1.28
Bayfield	Residential	\$34.95	0.43%	\$3.21
Brown	Residential	\$114.08	7.42%	\$17.11
Buffalo	Residential	\$6.80	0.44%	\$0.58
Burnett	Residential	\$10.97	0.27%	\$0.75
Calumet	Residential	\$104.09	5.93%	\$10.57
Chippewa	Residential	\$41.62	1.58%	\$5.19
Clark	Residential	\$26.74	1.41%	\$2.47
Columbia	Residential	\$56.49	3.99%	\$5.60
Crawford	Residential	\$18.33	0.80%	\$1.87
Dane	Residential	\$124.84	4.42%	\$12.62
Dodge	Residential	\$50.91	2.66%	\$4.45
Door	Residential	\$44.52	2.52%	\$4.50
Douglas	Residential	\$25.72	1.25%	\$3.48
Dunn	Residential	\$16.45	0.70%	\$1.79
Eau Claire	Residential	\$80.44	1.98%	\$7.59

County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
Florence	Residential	\$4.39	0.32%	\$0.31
Fond du Lac	Residential	\$87.73	5.89%	\$8.40
Forest	Residential	\$28.00	2.02%	\$2.36
Grant	Residential	\$74.97	2.06%	\$5.25
Green	Residential	\$34.98	1.98%	\$3.88
Green Lake	Residential	\$33.16	1.85%	\$2.91
Iowa	Residential	\$21.56	1.15%	\$2.52
Iron	Residential	\$7.58	0.73%	\$1.11
Jackson	Residential	\$10.88	0.38%	\$1.39
Jefferson	Residential	\$54.14	2.91%	\$5.30
Juneau	Residential	\$13.82	0.83%	\$1.32
Kenosha	Residential	\$35.92	1.14%	\$3.06
Kewaunee	Residential	\$49.75	3.12%	\$4.26
La Crosse	Residential	\$41.57	1.43%	\$4.84
Lafayette	Residential	\$25.36	1.30%	\$2.61
Langlade	Residential	\$32.48	1.67%	\$3.10
Lincoln	Residential	\$59.86	2.52%	\$6.19
Manitowoc	Residential	\$64.19	2.96%	\$6.76
Marathon	Residential	\$52.24	2.84%	\$8.70
Marinette	Residential	\$41.00	1.74%	\$9.79
Marquette	Residential	\$29.70	1.49%	\$3.02
Menominee	Residential	\$9.76	0.93%	\$0.82
Milwaukee	Residential	\$79.80	2.38%	\$9.05
Monroe	Residential	\$27.09	1.15%	\$2.99
Oconto	Residential	\$64.74	2.20%	\$17.94
Oneida	Residential	\$43.82	2.37%	\$4.80
Outagamie	Residential	\$85.33	4.16%	\$8.33
Ozaukee	Residential	\$114.14	4.00%	\$9.77
Pepin	Residential	\$10.35	0.73%	\$0.89
Pierce	Residential	\$27.78	1.58%	\$4.48
Polk	Residential	\$15.40	0.44%	\$1.40
Portage	Residential	\$64.35	2.67%	\$9.88
Price	Residential	\$15.29	0.91%	\$1.81
Racine	Residential	\$63.38	2.40%	\$5.83
Richland	Residential	\$22.14	1.22%	\$2.13
Rock	Residential	\$78.90	6.15%	\$8.11
Rusk	Residential	\$3.81	0.37%	\$0.50
Sauk	Residential	\$43.09	2.34%	\$3.94
Sawyer	Residential	\$17.35	0.30%	\$0.37
Shawano	Residential	\$25.31	1.36%	\$2.85
Sheboygan	Residential	\$78.82	2.56%	\$15.01



County	Segment	Per Capita Lifecycle Bill Savings (\$)	Participation Rate (%)	Per Capita Incentive (\$)
St. Croix	Residential	\$51.53	3.07%	\$7.54
Taylor	Residential	\$15.74	0.82%	\$2.10
Trempealeau	Residential	\$20.66	0.61%	\$3.39
Vernon	Residential	\$12.17	0.52%	\$1.54
Vilas	Residential	\$36.57	2.11%	\$3.75
Walworth	Residential	\$38.79	1.43%	\$3.25
Washburn	Residential	\$10.86	0.51%	\$1.71
Washington	Residential	\$72.14	2.94%	\$6.20
Waukesha	Residential	\$99.13	3.84%	\$8.82
Waupaca	Residential	\$33.66	1.44%	\$3.91
Waushara	Residential	\$34.13	1.57%	\$3.34
Winnebago	Residential	\$80.68	4.23%	\$9.47
Wood	Residential	\$68.66	4.60%	\$7.81

**Table D-2. Upstream Lighting Savings and Participation by County**

County	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
Adams	\$18.87	0.66	\$1.15
Ashland	\$11.86	0.41	\$0.53
Barron	\$80.25	2.93	\$4.18
Bayfield	\$2.35	0.08	\$0.10
Brown	\$116.89	4.16	\$5.72
Buffalo	N/A	N/A	N/A
Burnett	\$2.61	0.09	\$0.11
Calumet	\$133.31	4.77	\$5.92
Chippewa	\$23.84	0.87	\$1.40
Clark	\$8.33	0.31	\$0.55
Columbia	\$38.18	1.38	\$1.81
Crawford	\$22.74	0.78	\$1.66
Dane	\$93.83	3.36	\$4.74
Dodge	\$60.08	2.14	\$3.05
Door	\$57.37	2.03	\$2.99
Douglas	\$57.02	2.07	\$2.60
Dunn	\$52.35	1.93	\$2.45
Eau Claire	\$155.57	5.62	\$7.69
Florence	N/A	N/A	N/A
Fond du Lac	\$59.29	2.09	\$3.11
Forest	\$6.33	0.22	\$0.28
Grant	\$90.97	3.27	\$4.02

County	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
Green	\$11.30	0.39	\$0.82
Green Lake	\$47.34	1.72	\$2.05
Iowa	\$2.85	0.10	\$0.14
Iron	\$13.08	0.47	\$0.59
Jackson	\$162.81	5.72	\$6.57
Jefferson	\$58.70	2.09	\$3.24
Juneau	\$13.92	0.52	\$0.87
Kenosha	\$91.62	3.28	\$4.56
Kewaunee	\$0.83	0.03	\$0.04
La Crosse	\$127.58	4.56	\$6.24
Lafayette	\$5.66	0.21	\$0.35
Langlade	\$51.94	1.87	\$2.29
Lincoln	\$36.23	1.31	\$1.64
Manitowoc	\$61.79	2.21	\$2.93
Marathon	\$149.15	5.34	\$7.55
Marinette	\$49.54	1.75	\$2.48
Marquette	\$3.83	0.14	\$0.19
Menominee	N/A	N/A	N/A
Milwaukee	\$93.41	3.33	\$4.68
Monroe	\$73.05	2.65	\$3.25
Oconto	\$6.31	0.23	\$0.34
Oneida	\$130.20	4.56	\$7.07
Outagamie	\$125.31	4.44	\$6.50
Ozaukee	\$103.12	3.66	\$4.72
Pepin	N/A	N/A	N/A
Pierce	\$19.98	0.75	\$1.27
Polk	\$74.60	2.72	\$3.78
Portage	\$116.52	4.19	\$5.57
Price	\$1.79	0.07	\$0.09
Racine	\$69.56	2.48	\$3.46
Richland	\$100.13	3.63	\$4.58
Rock	\$112.36	3.97	\$5.22
Rusk	\$17.50	0.64	\$0.97
Sauk	\$128.97	4.65	\$5.93
Sawyer	\$98.26	3.56	\$4.31
Shawano	\$55.80	1.95	\$3.24
Sheboygan	\$31.76	1.12	\$1.74
St. Croix	\$70.03	2.51	\$3.35

County	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
Taylor	\$43.62	1.58	\$1.95
Trempealeau	\$8.84	0.33	\$0.54
Vernon	\$53.61	1.95	\$2.99
Vilas	\$9.78	0.36	\$0.46
Walworth	\$68.29	2.47	\$3.06
Washburn	\$19.13	0.71	\$1.07
Washington	\$51.49	1.82	\$2.73
Waukesha	\$69.92	2.50	\$3.27
Waupaca	\$28.57	1.04	\$1.48
Waushara	\$25.26	0.95	\$1.67
Winnebago	\$62.87	2.26	\$3.40
Wood	\$33.90	1.18	\$1.97

## **Appendix E. Summary of Savings by Political District**

The maps in this appendix summarize the evaluation findings by Assembly District and Senate District in the residential, commercial, and industrial sectors.

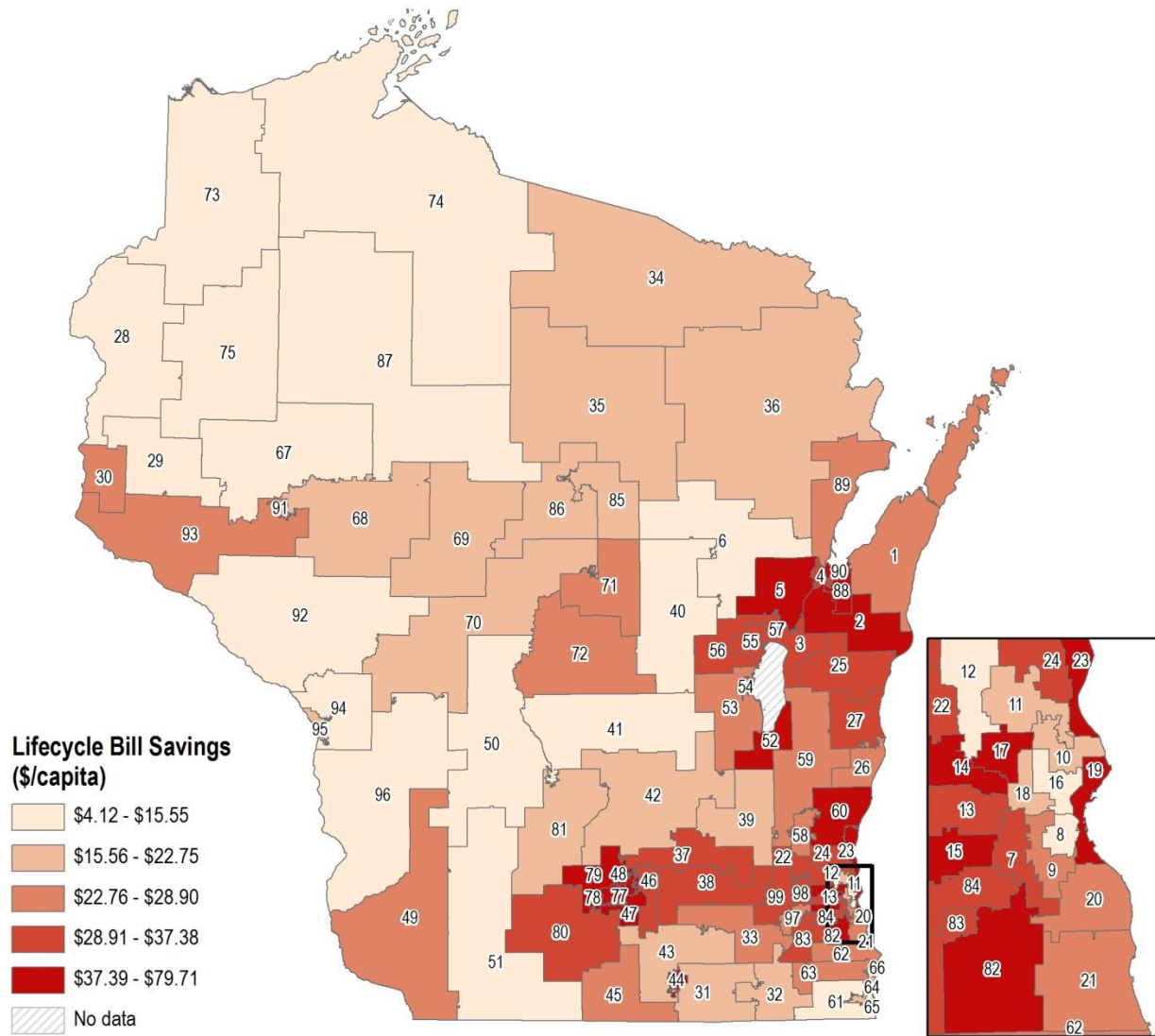
### ***2013 Savings by Segment, by Assembly District***

The following section includes twenty four maps based on the results of the 2013 evaluation: three Assembly District and three Senate District maps (total lifetime bill savings, total 2013 participation, and total incentive paid in 2013) each for three primary segments (residential, industrial, and commercial), as well as six maps with upstream lighting per capita lifetime bill savings, 2013 participation rates, and per capita incentives paid in 2013 by Assembly and Senate Districts. Commercial maps include commercial businesses, schools, government, and agricultural entities.

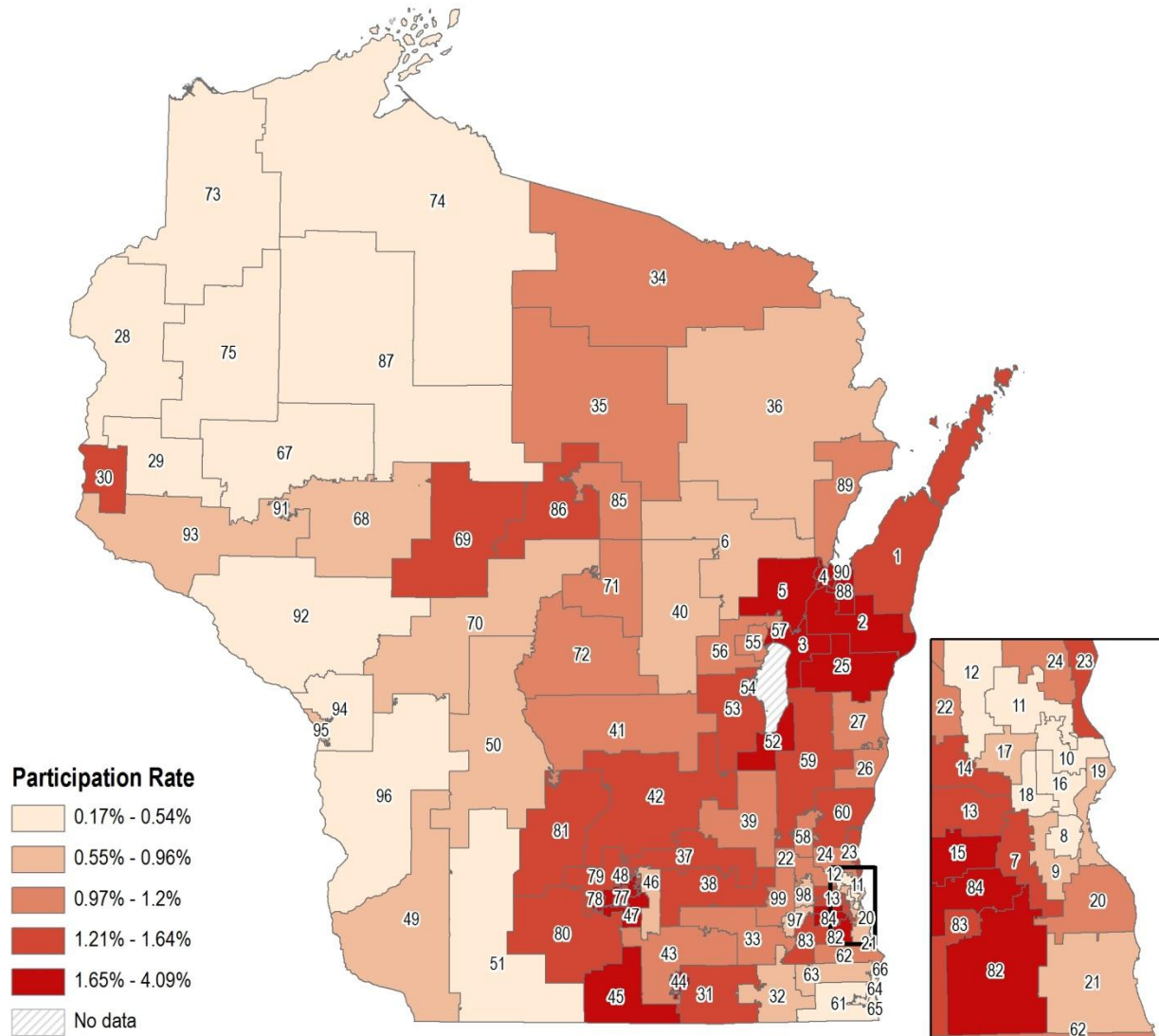
Similar to the 2011 and 2012 evaluation reports, the bill savings are defined as evaluated lifecycle verified gross energy savings multiplied by the retail rate of delivered energy in 2013. The participation is defined as total participation within each Assembly / Senate District. The incentives are defined as total incentives within each Assembly / Senate District.

## Residential

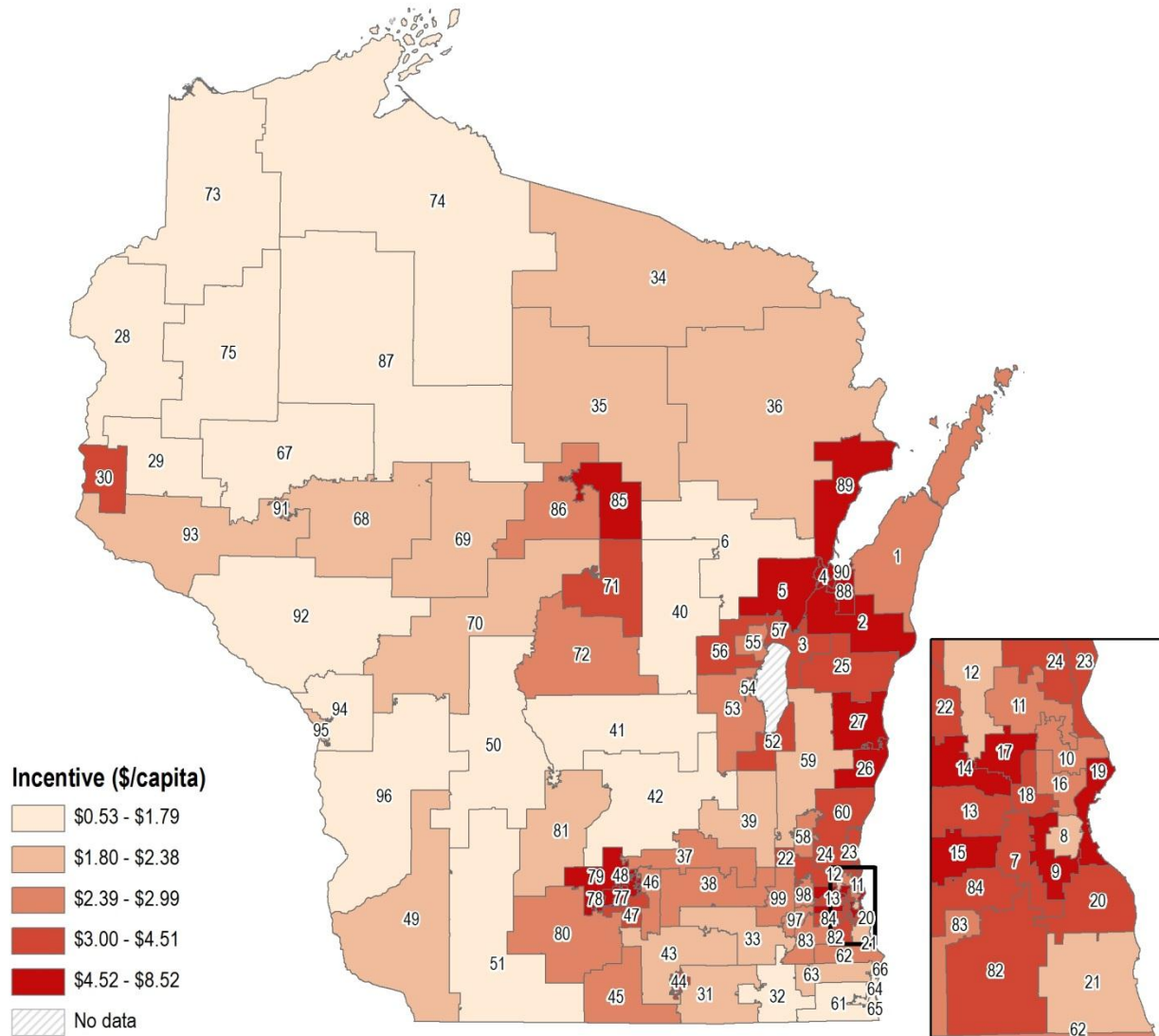
### Residential Energy Bill Savings by Assembly District



## Residential Participation by Assembly District



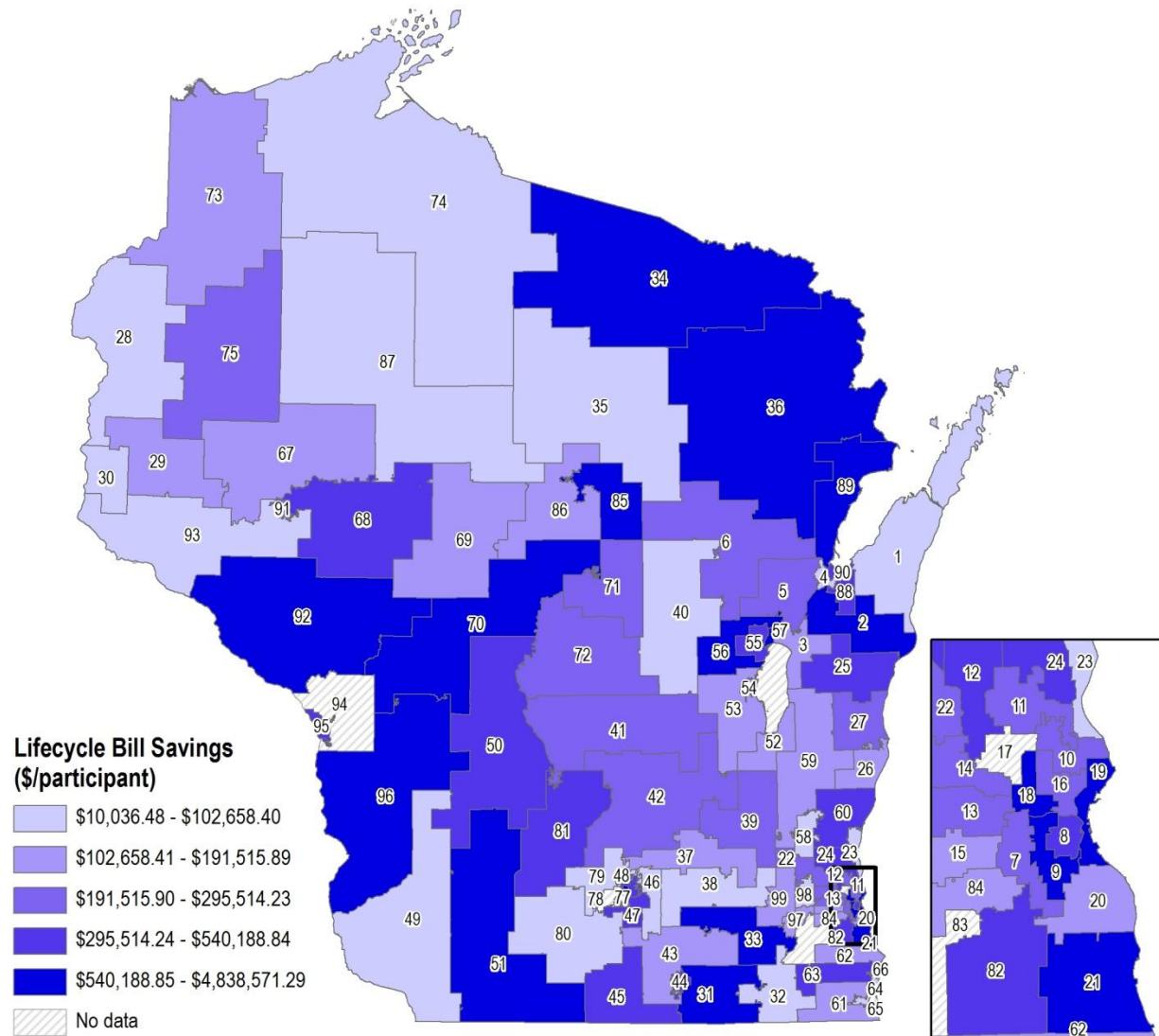
## Residential Incentive Dollars Awarded by Assembly District





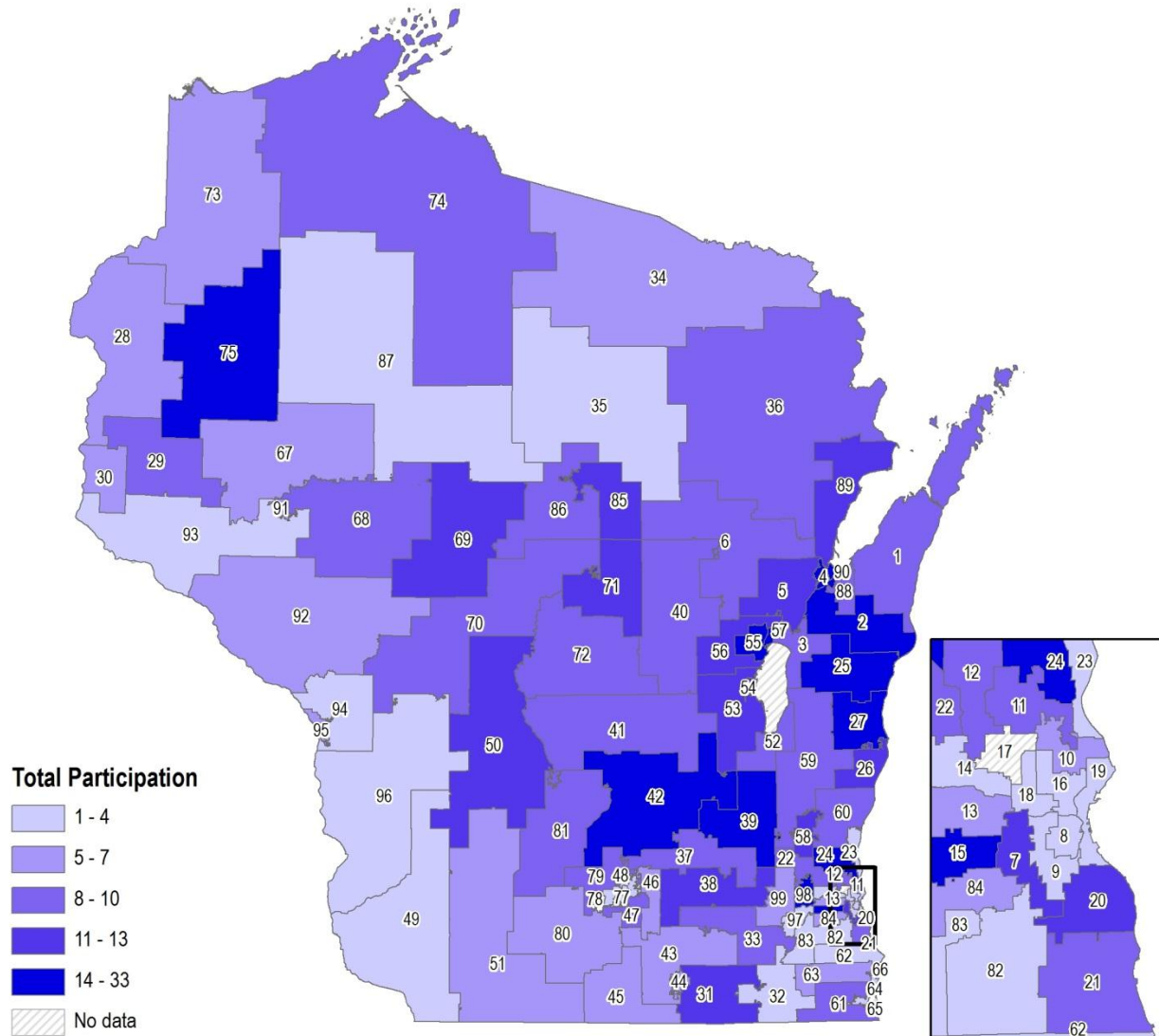
## Industrial

### Industrial Energy Bill Savings by Assembly District

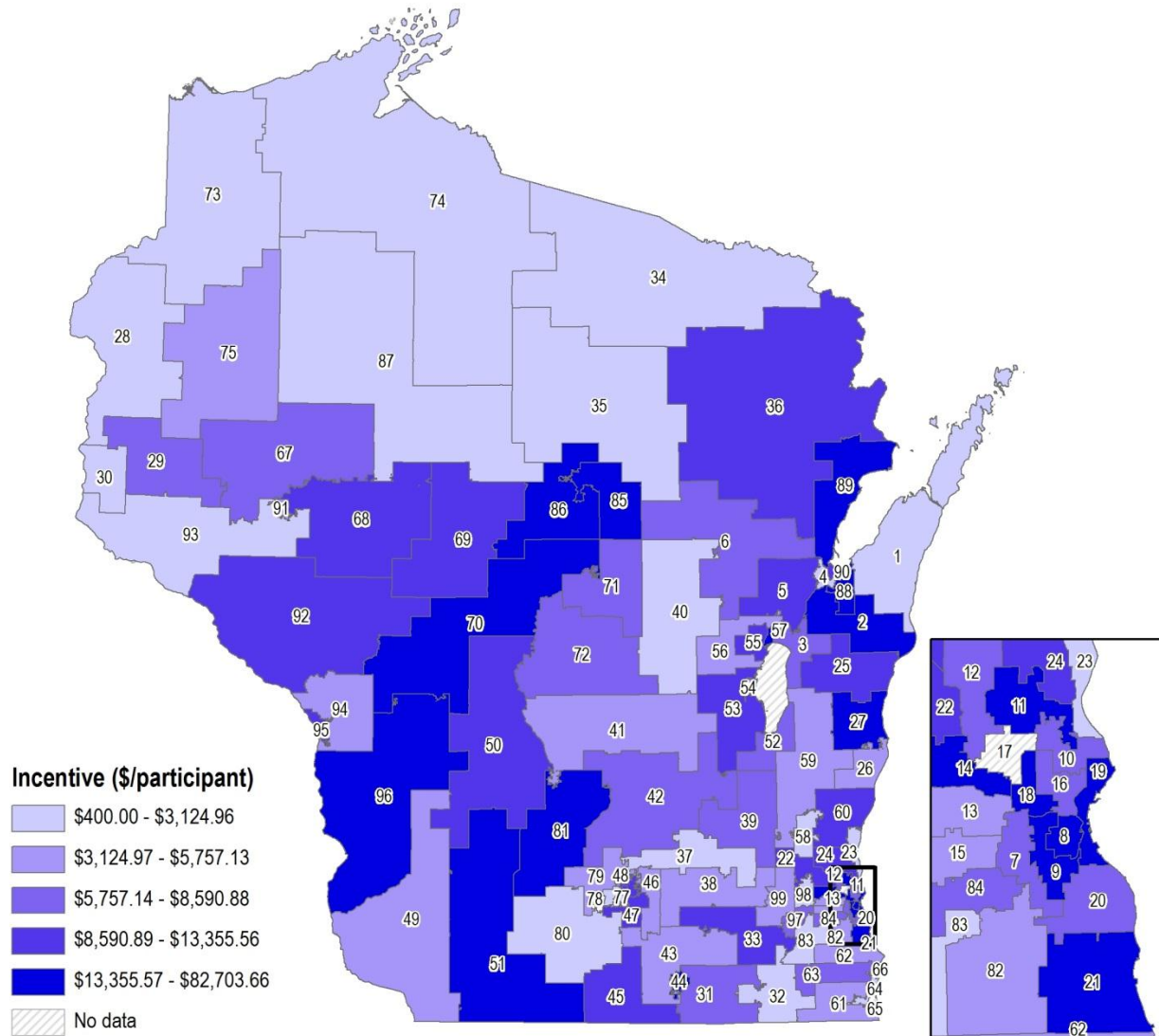




## Industrial Participation by Assembly District

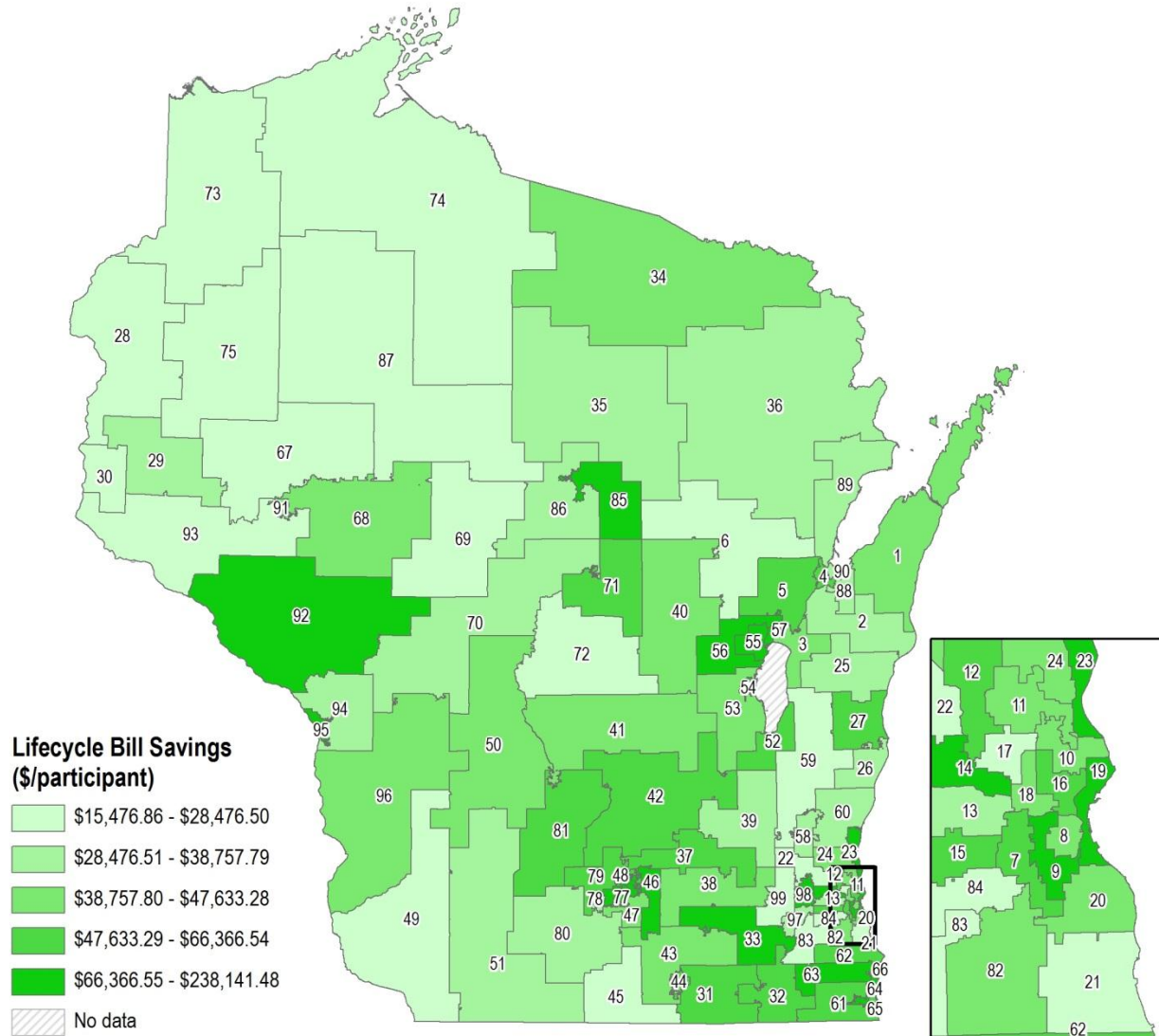


## Industrial Incentive Dollars Awarded by Assembly District

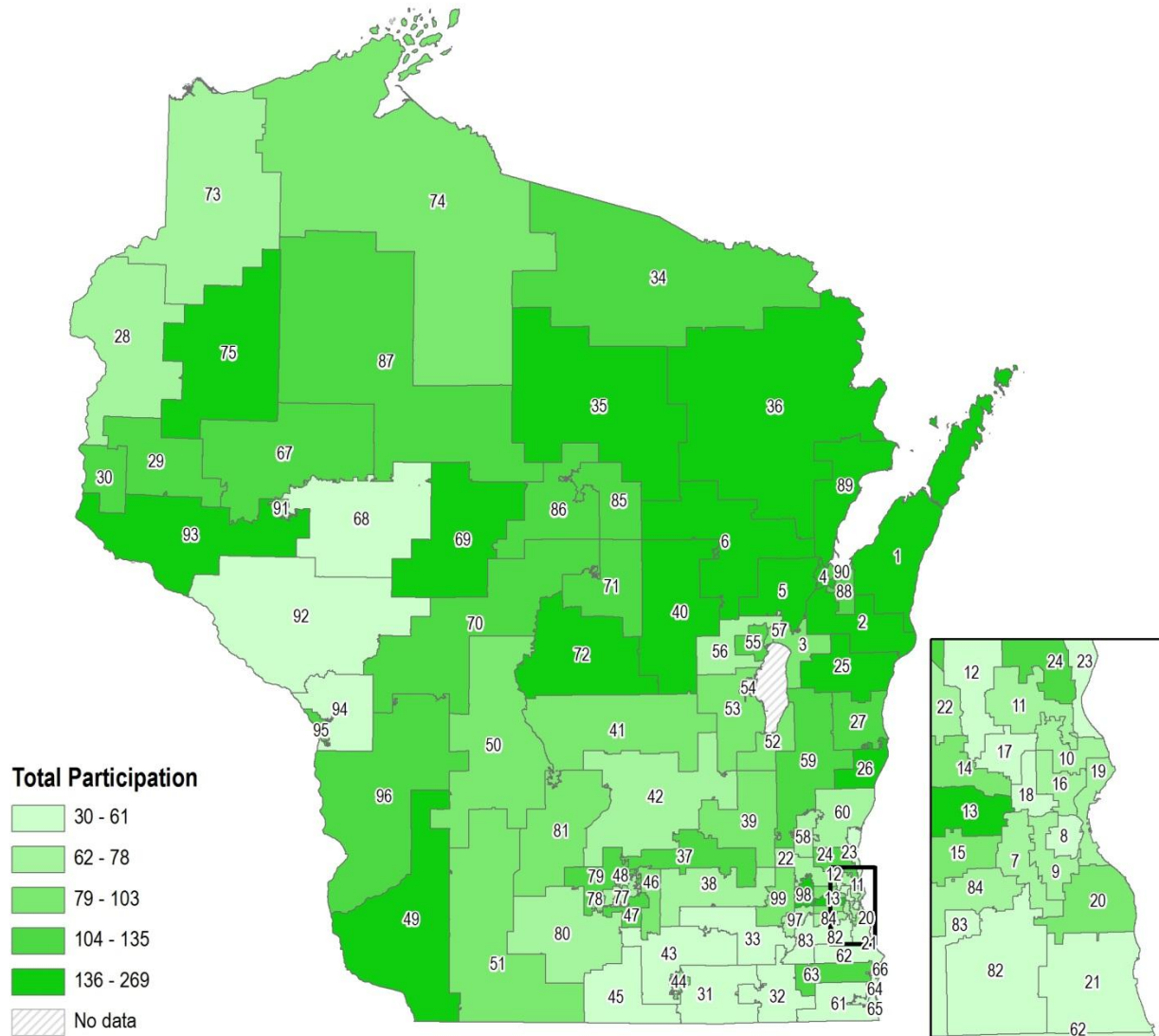


## Commercial

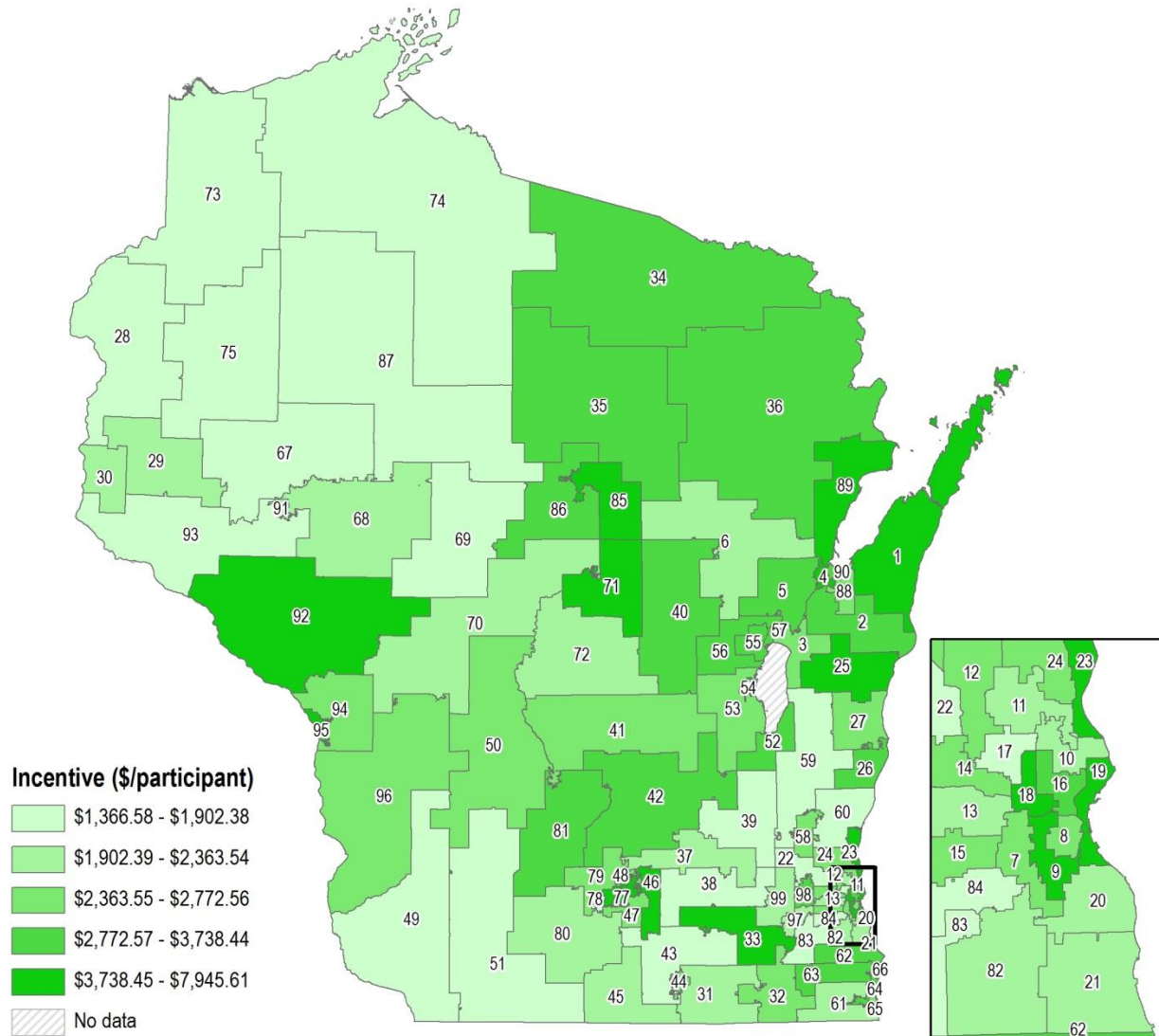
### Commercial Energy Bill Savings by Assembly District



## Commercial Participation by Assembly District



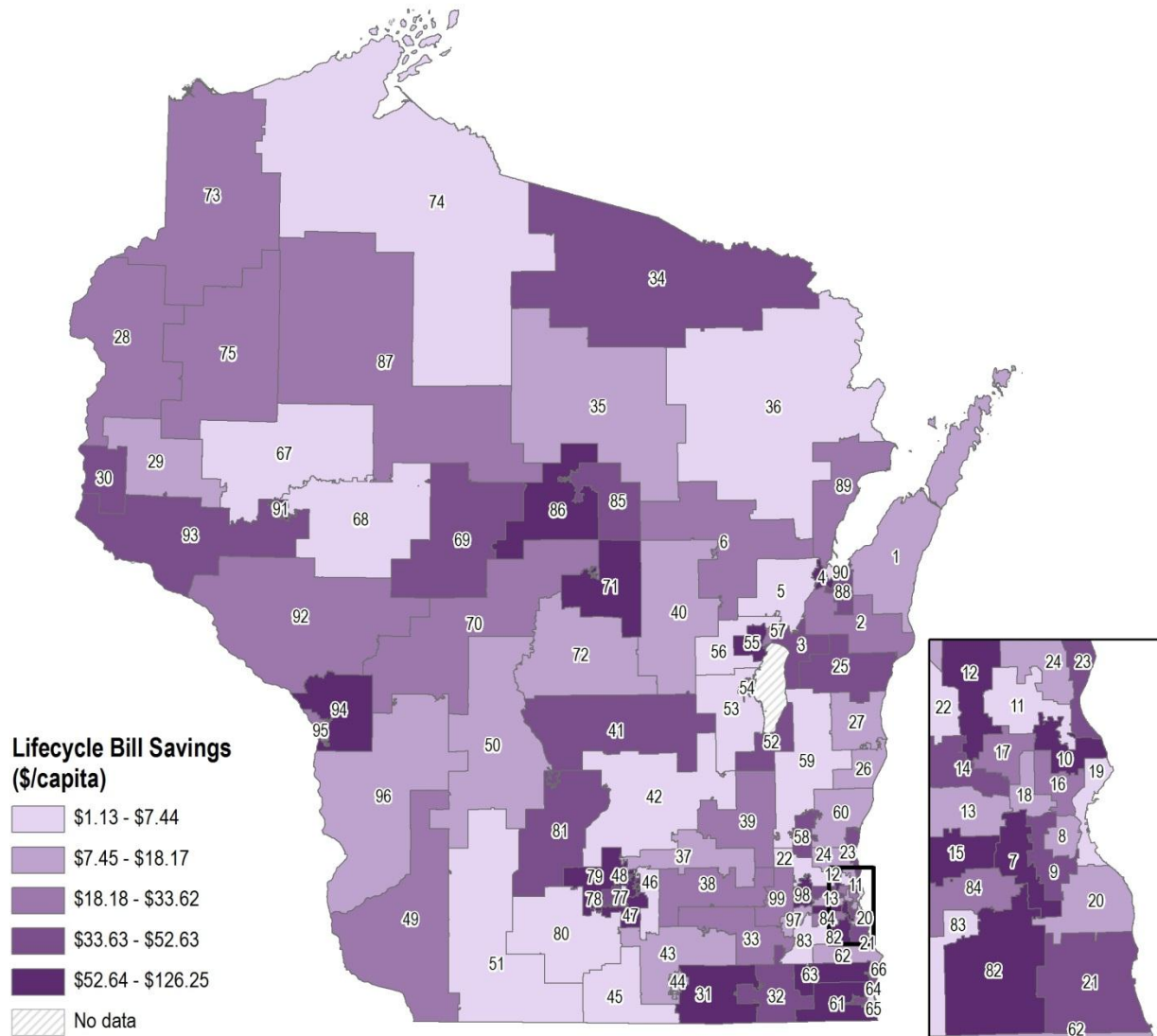
## Commercial Incentive Dollars Awarded by Assembly District



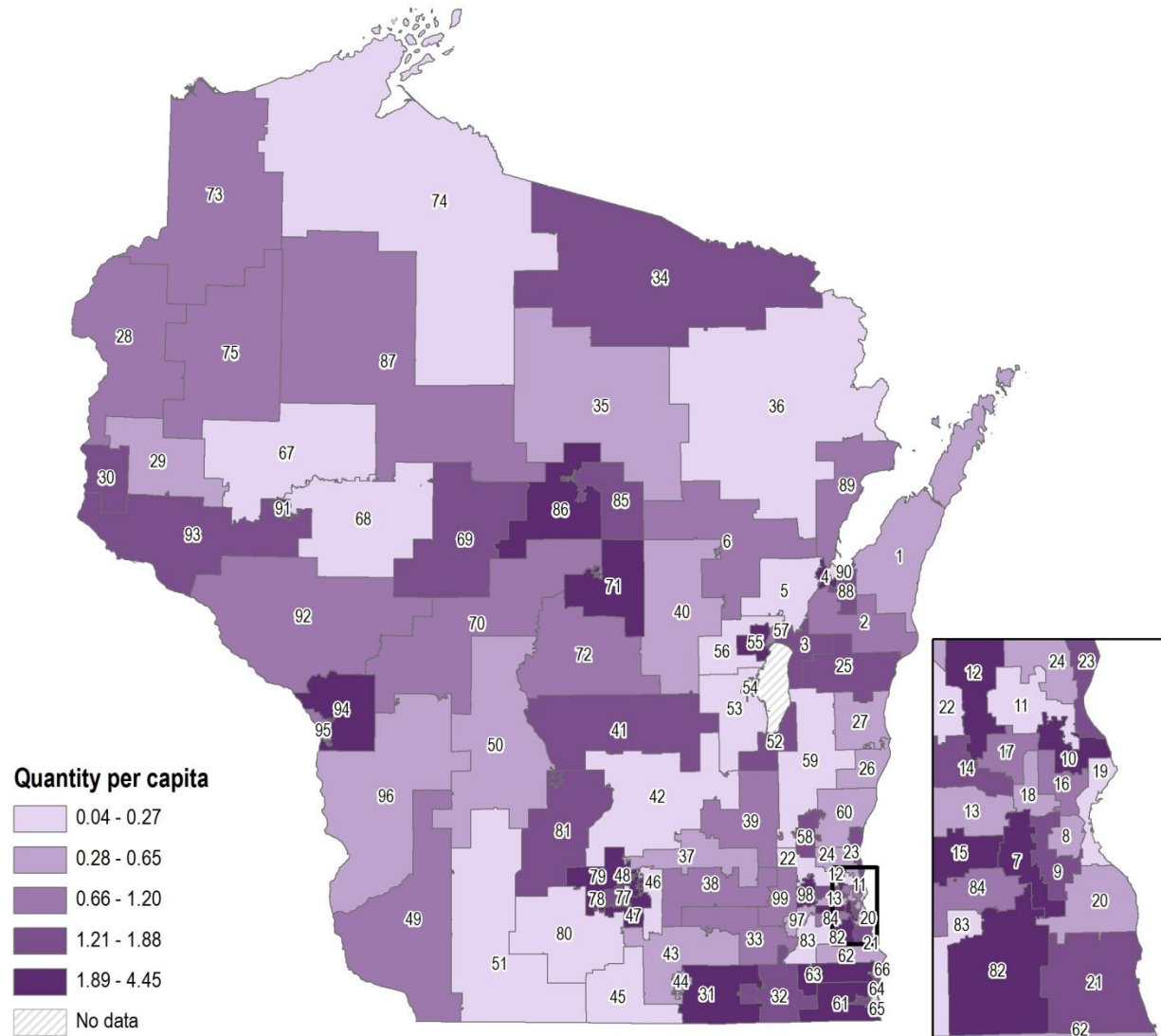


## Lighting

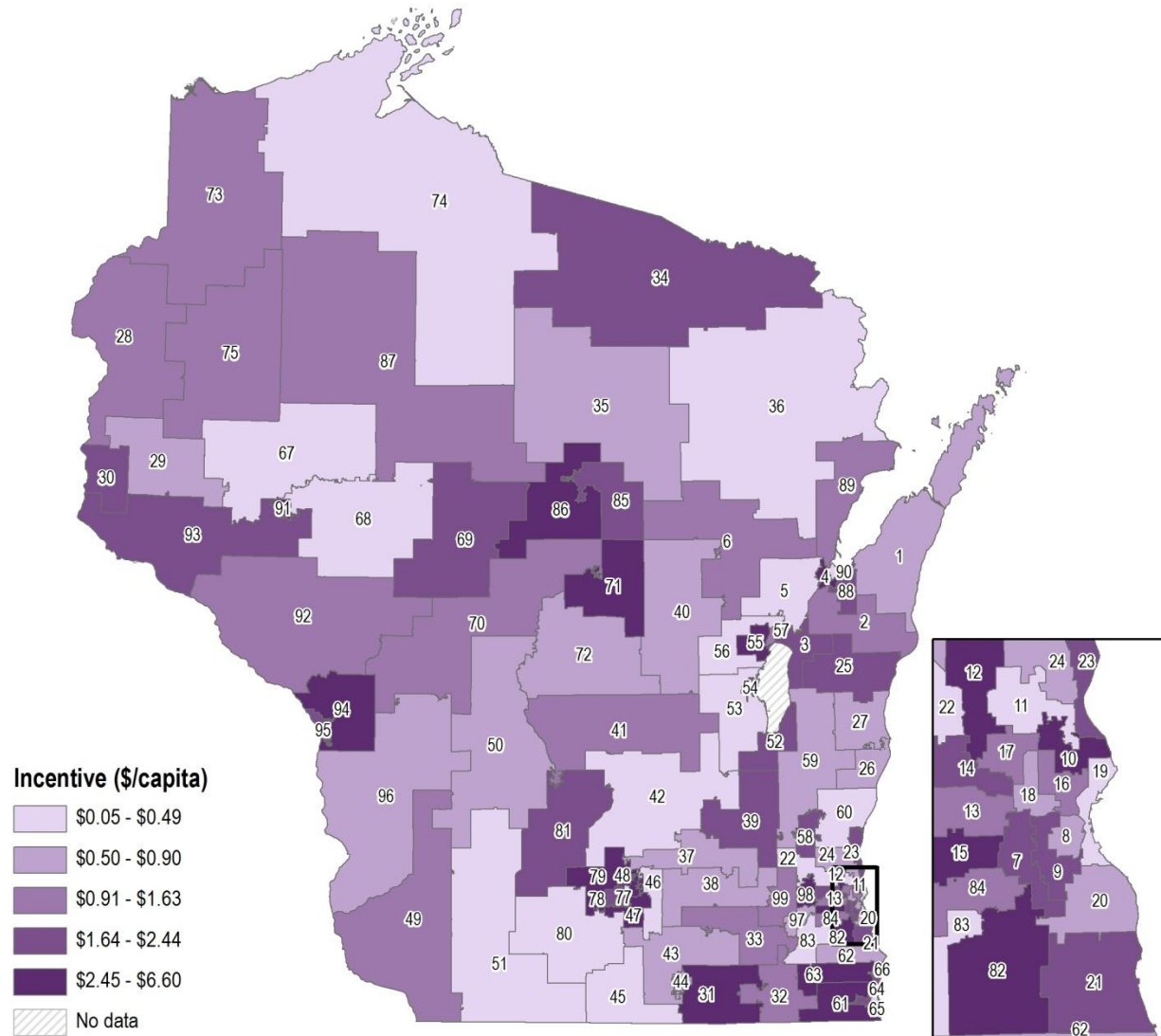
### Lighting Energy Bill Savings by Assembly District



## Lighting Participation by Assembly District



## Lighting Incentive Dollars Awarded by Assembly District





**Table E-1. Residential Savings and Participation by Assembly District**

Assembly District	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
1	Residential	\$23.55	1.45%	\$2.42
2	Residential	\$47.06	2.67%	\$5.04
3	Residential	\$35.44	1.83%	\$3.52
4	Residential	\$37.38	2.27%	\$6.24
5	Residential	\$41.26	2.50%	\$5.08
6	Residential	\$12.87	0.63%	\$1.31
7	Residential	\$30.50	1.54%	\$3.82
8	Residential	\$13.78	0.19%	\$2.08
9	Residential	\$28.64	0.81%	\$4.95
10	Residential	\$16.45	0.41%	\$2.85
11	Residential	\$16.63	0.44%	\$2.65
12	Residential	\$15.15	0.43%	\$2.35
13	Residential	\$36.94	1.46%	\$3.70
14	Residential	\$46.38	1.52%	\$4.81
15	Residential	\$45.92	3.02%	\$4.78
16	Residential	\$14.96	0.41%	\$2.44
17	Residential	\$57.56	0.68%	\$4.91
18	Residential	\$22.75	0.38%	\$3.24
19	Residential	\$79.71	0.62%	\$6.85
20	Residential	\$25.13	0.99%	\$3.71
21	Residential	\$24.96	0.96%	\$2.34
22	Residential	\$32.40	1.15%	\$3.18
23	Residential	\$41.96	1.30%	\$3.68
24	Residential	\$32.15	1.18%	\$3.09
25	Residential	\$31.31	1.66%	\$3.34
26	Residential	\$27.87	1.02%	\$6.44
27	Residential	\$37.00	1.12%	\$5.91
28	Residential	\$6.12	0.17%	\$0.62
29	Residential	\$9.16	0.53%	\$1.17
30	Residential	\$24.38	1.43%	\$4.00
31	Residential	\$21.26	1.40%	\$2.14
32	Residential	\$15.71	0.59%	\$1.30
33	Residential	\$26.06	1.20%	\$2.37
34	Residential	\$18.00	0.97%	\$1.88
35	Residential	\$21.07	1.00%	\$2.14
36	Residential	\$15.56	0.76%	\$1.92
37	Residential	\$28.92	1.45%	\$2.70
38	Residential	\$32.23	1.56%	\$2.96

Assembly District	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
39	Residential	\$22.45	1.06%	\$2.01
40	Residential	\$13.78	0.60%	\$1.49
41	Residential	\$15.55	0.99%	\$1.62
42	Residential	\$18.94	1.25%	\$1.75
43	Residential	\$19.41	1.12%	\$1.87
44	Residential	\$40.15	2.95%	\$4.01
45	Residential	\$22.96	2.25%	\$2.62
46	Residential	\$30.91	0.88%	\$2.60
47	Residential	\$44.77	1.69%	\$4.09
48	Residential	\$58.33	2.48%	\$6.78
49	Residential	\$26.70	0.75%	\$1.93
50	Residential	\$10.94	0.63%	\$1.05
51	Residential	\$10.39	0.52%	\$1.19
52	Residential	\$44.22	2.87%	\$4.05
53	Residential	\$23.01	1.33%	\$2.92
54	Residential	\$31.74	2.10%	\$4.13
55	Residential	\$29.79	1.05%	\$2.81
56	Residential	\$33.48	1.10%	\$3.09
57	Residential	\$34.27	1.69%	\$3.37
58	Residential	\$28.20	1.14%	\$2.39
59	Residential	\$23.42	1.40%	\$2.33
60	Residential	\$39.54	1.60%	\$3.32
61	Residential	\$14.63	0.46%	\$1.15
62	Residential	\$28.28	1.15%	\$2.69
63	Residential	\$27.13	0.83%	\$2.15
64	Residential	\$18.43	0.54%	\$1.58
65	Residential	\$11.23	0.38%	\$1.05
66	Residential	\$17.96	0.84%	\$1.94
67	Residential	\$12.74	0.47%	\$1.63
68	Residential	\$20.67	0.69%	\$2.01
69	Residential	\$21.25	1.64%	\$2.38
70	Residential	\$17.40	0.79%	\$1.96
71	Residential	\$25.94	1.03%	\$4.10
72	Residential	\$24.72	1.17%	\$2.74
73	Residential	\$10.10	0.45%	\$1.25
74	Residential	\$9.52	0.34%	\$1.07
75	Residential	\$4.12	0.26%	\$0.62
76	Residential	\$75.50	1.37%	\$6.80
77	Residential	\$58.05	2.27%	\$8.52

Assembly District	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
78	Residential	\$73.21	2.81%	\$6.36
79	Residential	\$49.24	1.57%	\$4.68
80	Residential	\$32.45	1.58%	\$2.94
81	Residential	\$19.97	1.30%	\$1.88
82	Residential	\$59.51	2.46%	\$4.51
83	Residential	\$35.42	1.58%	\$2.95
84	Residential	\$37.24	1.97%	\$4.16
85	Residential	\$22.05	1.04%	\$4.68
86	Residential	\$22.28	1.51%	\$2.99
87	Residential	\$6.03	0.27%	\$0.53
88	Residential	\$58.23	4.09%	\$7.26
89	Residential	\$27.67	1.10%	\$7.80
90	Residential	\$40.22	2.88%	\$8.25
91	Residential	\$25.38	0.77%	\$2.86
92	Residential	\$5.97	0.21%	\$0.88
93	Residential	\$23.20	0.59%	\$1.79
94	Residential	\$15.24	0.52%	\$1.79
95	Residential	\$18.17	0.64%	\$2.10
96	Residential	\$6.30	0.27%	\$0.68
97	Residential	\$28.90	0.96%	\$2.66
98	Residential	\$37.20	0.91%	\$2.67
99	Residential	\$35.17	1.19%	\$2.91

**Table E-2. Nonresidential Savings and Participation by Assembly District and Segment**

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
1	Commercial	\$46,465.98	269	\$3,804.83
2	Commercial	\$36,611.19	208	\$3,584.72
3	Commercial	\$44,799.47	92	\$2,420.83
4	Commercial	\$60,070.33	145	\$3,945.57
5	Commercial	\$54,987.75	148	\$3,321.25
6	Commercial	\$27,164.54	141	\$2,176.73
7	Commercial	\$57,580.95	74	\$2,722.95
8	Commercial	\$42,668.27	61	\$2,707.02
9	Commercial	\$130,168.50	75	\$4,219.28
10	Commercial	\$46,939.71	71	\$2,361.45
11	Commercial	\$42,582.22	78	\$2,101.10
12	Commercial	\$52,490.59	55	\$2,772.56
13	Commercial	\$36,450.58	180	\$2,096.07

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
14	Commercial	\$88,955.82	93	\$2,654.64
15	Commercial	\$57,440.65	87	\$2,379.10
16	Commercial	\$65,016.68	69	\$2,778.02
17	Commercial	\$19,964.18	56	\$1,499.83
18	Commercial	\$46,979.31	60	\$4,972.40
19	Commercial	\$238,141.48	68	\$7,945.61
20	Commercial	\$39,005.11	91	\$2,069.96
21	Commercial	\$25,840.82	50	\$1,917.82
22	Commercial	\$23,419.18	63	\$1,376.58
23	Commercial	\$100,606.12	58	\$3,967.48
24	Commercial	\$39,987.61	106	\$2,656.58
25	Commercial	\$34,962.90	146	\$3,833.79
26	Commercial	\$37,512.59	139	\$2,986.69
27	Commercial	\$64,078.94	119	\$2,608.99
28	Commercial	\$22,923.01	66	\$1,616.44
29	Commercial	\$31,368.91	115	\$2,116.14
30	Commercial	\$28,098.58	114	\$2,363.54
31	Commercial	\$51,068.79	50	\$2,044.22
32	Commercial	\$60,736.45	50	\$2,729.53
33	Commercial	\$109,489.54	38	\$5,470.08
34	Commercial	\$40,901.04	134	\$3,197.96
35	Commercial	\$32,358.34	172	\$3,240.44
36	Commercial	\$30,572.19	160	\$2,867.74
37	Commercial	\$49,404.73	104	\$2,270.33
38	Commercial	\$39,228.66	78	\$1,902.38
39	Commercial	\$34,018.36	90	\$1,787.86
40	Commercial	\$47,633.28	154	\$2,893.99
41	Commercial	\$41,981.98	89	\$2,454.08
42	Commercial	\$52,191.18	76	\$2,933.35
43	Commercial	\$39,611.94	30	\$1,700.52
44	Commercial	\$55,849.80	79	\$2,757.69
45	Commercial	\$26,592.14	35	\$1,924.04
46	Commercial	\$88,007.66	84	\$3,876.18
47	Commercial	\$42,679.59	108	\$2,445.82
48	Commercial	\$222,866.43	75	\$7,712.80
49	Commercial	\$19,529.46	137	\$1,702.22
50	Commercial	\$43,355.21	81	\$2,540.15
51	Commercial	\$29,977.55	100	\$1,467.43
52	Commercial	\$66,366.54	93	\$2,844.88

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
53	Commercial	\$47,558.96	84	\$2,719.34
54	Commercial	\$66,386.27	68	\$4,864.15
55	Commercial	\$75,071.51	118	\$3,335.36
56	Commercial	\$69,536.72	75	\$3,738.44
57	Commercial	\$98,171.65	100	\$3,169.21
58	Commercial	\$36,459.71	76	\$2,477.39
59	Commercial	\$22,587.73	105	\$1,633.80
60	Commercial	\$36,502.02	63	\$1,821.72
61	Commercial	\$59,946.51	39	\$2,288.30
62	Commercial	\$64,835.61	40	\$3,377.97
63	Commercial	\$74,053.80	114	\$3,507.16
64	Commercial	\$101,004.64	37	\$3,104.84
65	Commercial	\$57,052.46	42	\$2,743.18
66	Commercial	\$65,236.08	103	\$3,960.17
67	Commercial	\$23,773.35	105	\$1,771.65
68	Commercial	\$47,385.68	55	\$2,039.04
69	Commercial	\$20,344.50	199	\$1,886.88
70	Commercial	\$31,554.94	135	\$2,238.65
71	Commercial	\$49,102.63	125	\$4,121.89
72	Commercial	\$23,608.94	165	\$2,006.00
73	Commercial	\$20,177.96	76	\$1,802.70
74	Commercial	\$18,035.41	103	\$1,620.64
75	Commercial	\$23,808.41	136	\$1,790.17
76	Commercial	\$73,358.57	91	\$3,771.66
77	Commercial	\$169,848.11	78	\$6,448.47
78	Commercial	\$35,493.57	82	\$1,867.24
79	Commercial	\$61,185.08	107	\$2,585.58
80	Commercial	\$30,395.19	64	\$2,287.24
81	Commercial	\$65,121.39	80	\$2,776.84
82	Commercial	\$40,922.87	39	\$2,217.68
83	Commercial	\$18,352.85	50	\$1,366.58
84	Commercial	\$25,786.33	78	\$1,404.00
85	Commercial	\$120,113.02	121	\$5,350.04
86	Commercial	\$32,547.28	118	\$2,911.87
87	Commercial	\$19,614.25	113	\$1,897.26
88	Commercial	\$34,994.57	107	\$2,737.27
89	Commercial	\$38,757.79	139	\$4,117.32
90	Commercial	\$30,230.64	135	\$3,066.93
91	Commercial	\$45,067.92	86	\$2,187.95

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
92	Commercial	\$116,502.11	52	\$6,725.56
93	Commercial	\$15,476.86	145	\$1,380.93
94	Commercial	\$32,535.73	49	\$2,370.30
95	Commercial	\$66,411.50	109	\$4,019.61
96	Commercial	\$38,763.13	112	\$2,475.67
97	Commercial	\$38,595.15	74	\$2,155.96
98	Commercial	\$76,383.19	143	\$3,071.42
99	Commercial	\$28,476.50	86	\$2,065.60
0	Commercial	\$59,294.35	869	\$3,395.12
1	Industrial	\$42,812.12	10	\$1,206.30
2	Industrial	\$1,012,624.53	18	\$20,941.06
3	Industrial	\$169,941.98	10	\$6,748.99
4	Industrial	\$56,230.64	28	\$2,042.01
5	Industrial	\$295,514.23	13	\$11,147.91
6	Industrial	\$287,665.50	9	\$8,355.68
7	Industrial	\$200,792.54	11	\$6,119.33
8	Industrial	\$305,117.14	4	\$16,858.10
9	Industrial	\$1,999,251.97	4	\$37,664.39
10	Industrial	\$195,444.49	7	\$5,832.15
11	Industrial	\$250,349.07	10	\$14,367.73
12	Industrial	\$366,431.96	10	\$8,099.47
13	Industrial	\$206,235.88	6	\$5,634.33
14	Industrial	\$281,279.56	4	\$14,162.01
15	Industrial	\$189,815.56	15	\$5,476.31
16	Industrial	\$253,948.11	4	\$7,124.51
18	Industrial	\$2,404,379.29	2	\$82,703.66
19	Industrial	\$1,696,704.10	2	\$43,085.95
20	Industrial	\$183,566.92	11	\$6,673.93
21	Industrial	\$4,838,571.29	8	\$58,320.85
22	Industrial	\$248,059.24	10	\$8,703.92
23	Industrial	\$63,137.40	2	\$2,510.00
24	Industrial	\$311,236.83	17	\$9,201.84
25	Industrial	\$323,097.37	21	\$9,547.93
26	Industrial	\$162,458.29	13	\$5,609.46
27	Industrial	\$259,755.83	15	\$13,885.29
28	Industrial	\$20,433.57	5	\$2,035.26
29	Industrial	\$184,451.51	10	\$7,382.91
30	Industrial	\$32,667.75	5	\$1,273.40
31	Industrial	\$705,032.38	11	\$8,590.88

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
32	Industrial	\$13,457.63	2	\$400.00
33	Industrial	\$605,799.98	9	\$12,406.93
34	Industrial	\$1,539,258.04	5	\$1,205.34
35	Industrial	\$67,736.76	4	\$2,547.50
36	Industrial	\$649,161.73	8	\$11,174.15
37	Industrial	\$110,553.35	10	\$3,026.00
38	Industrial	\$95,997.49	11	\$3,287.23
39	Industrial	\$218,943.39	18	\$8,322.19
40	Industrial	\$23,895.77	9	\$1,742.86
41	Industrial	\$206,425.26	10	\$5,072.60
42	Industrial	\$237,496.51	14	\$6,584.27
43	Industrial	\$170,147.38	5	\$5,487.00
44	Industrial	\$373,292.90	5	\$20,826.48
45	Industrial	\$503,401.73	5	\$9,199.84
46	Industrial	\$86,117.67	6	\$3,216.44
47	Industrial	\$506,023.43	9	\$9,160.24
48	Industrial	\$326,194.41	4	\$9,914.75
49	Industrial	\$89,725.15	3	\$3,715.23
50	Industrial	\$316,795.16	11	\$9,347.77
51	Industrial	\$858,730.04	7	\$33,740.01
52	Industrial	\$118,447.51	8	\$5,973.10
53	Industrial	\$108,679.03	12	\$13,355.56
54	Industrial	\$235,116.67	16	\$8,549.43
55	Industrial	\$453,193.82	33	\$12,122.18
56	Industrial	\$641,904.50	12	\$4,759.25
57	Industrial	\$787,456.94	18	\$19,186.44
58	Industrial	\$55,224.87	11	\$2,285.73
59	Industrial	\$115,180.32	8	\$4,683.13
60	Industrial	\$302,774.98	10	\$9,137.38
61	Industrial	\$116,131.52	8	\$4,656.88
62	Industrial	\$149,886.78	4	\$3,770.61
63	Industrial	\$361,745.67	6	\$6,928.32
64	Industrial	\$52,789.71	2	\$1,512.00
66	Industrial	\$207,034.68	9	\$5,757.13
67	Industrial	\$191,515.89	6	\$7,815.33
68	Industrial	\$372,562.63	8	\$9,712.63
69	Industrial	\$154,210.72	11	\$12,641.03
70	Industrial	\$2,120,878.44	9	\$52,805.93
71	Industrial	\$215,135.11	12	\$5,765.43

Assembly District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
72	Industrial	\$200,716.05	8	\$6,056.22
73	Industrial	\$103,072.01	6	\$2,590.10
74	Industrial	\$102,658.40	10	\$1,901.56
75	Industrial	\$266,358.12	14	\$5,375.64
76	Industrial	\$557,407.87	3	\$10,069.13
77	Industrial	N/A	1	\$400.00
79	Industrial	\$97,920.29	9	\$4,777.34
80	Industrial	\$50,497.96	5	\$3,124.96
81	Industrial	\$405,016.21	10	\$16,695.84
82	Industrial	\$320,370.89	4	\$5,283.95
83	Industrial	N/A	4	\$1,383.95
84	Industrial	\$170,976.65	6	\$8,139.88
85	Industrial	\$609,588.11	13	\$19,854.81
86	Industrial	\$145,060.85	10	\$14,854.30
87	Industrial	\$10,036.48	4	\$1,080.30
88	Industrial	\$540,188.84	8	\$35,631.42
89	Industrial	\$777,229.95	13	\$17,481.94
90	Industrial	\$515,239.01	16	\$11,183.80
91	Industrial	\$192,071.91	5	\$4,820.58
92	Industrial	\$711,762.19	5	\$8,876.00
93	Industrial	\$24,482.25	3	\$891.67
94	Industrial	N/A	2	\$5,055.00
95	Industrial	\$378,058.49	7	\$12,559.14
96	Industrial	\$687,541.75	3	\$29,520.02
97	Industrial	\$153,416.71	4	\$6,085.45
98	Industrial	\$69,568.49	15	\$2,378.97
99	Industrial	\$128,379.19	5	\$3,458.96
0	Industrial	\$430,270.00	78	\$11,134.41

**Table E-3. Upstream Lighting Savings and Participation by Assembly District**

Assembly District	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
1	\$13.85	0.49	\$0.72
2	\$21.51	0.77	\$1.04
3	\$42.50	1.52	\$1.91
4	\$115.45	4.10	\$5.83
5	\$1.58	0.05	\$0.14
6	\$18.95	0.67	\$1.08
7	\$53.03	1.91	\$2.44



Assembly District	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
8	\$9.81	0.36	\$0.52
9	\$40.65	1.43	\$1.83
10	\$76.20	2.72	\$3.58
11	\$7.37	0.27	\$0.40
12	\$92.33	3.27	\$4.42
13	\$13.82	0.47	\$0.97
14	\$36.37	1.28	\$1.74
15	\$79.93	2.84	\$3.98
16	\$21.75	0.81	\$1.22
17	\$25.40	0.93	\$1.33
18	\$11.82	0.44	\$0.75
19	\$4.06	0.15	\$0.25
20	\$10.34	0.38	\$0.51
21	\$37.71	1.34	\$1.89
22	\$1.25	0.05	\$0.06
23	\$50.63	1.79	\$2.33
24	\$10.59	0.37	\$0.60
25	\$43.81	1.57	\$2.03
26	\$13.29	0.46	\$0.86
27	\$12.32	0.44	\$0.55
28	\$23.60	0.86	\$1.19
29	\$17.72	0.65	\$0.86
30	\$38.55	1.38	\$1.86
31	\$108.36	3.84	\$4.77
32	\$36.24	1.31	\$1.63
33	\$22.86	0.80	\$1.28
34	\$38.63	1.35	\$2.08
35	\$15.96	0.58	\$0.71
36	\$2.13	0.08	\$0.10
37	\$14.42	0.52	\$0.74
38	\$18.52	0.67	\$0.90
39	\$33.29	1.18	\$1.68
40	\$9.57	0.35	\$0.52
41	\$34.77	1.24	\$1.63
42	\$1.27	0.05	\$0.08
43	\$12.34	0.43	\$0.71
44	\$9.29	0.32	\$0.62
45	\$4.77	0.18	\$0.26

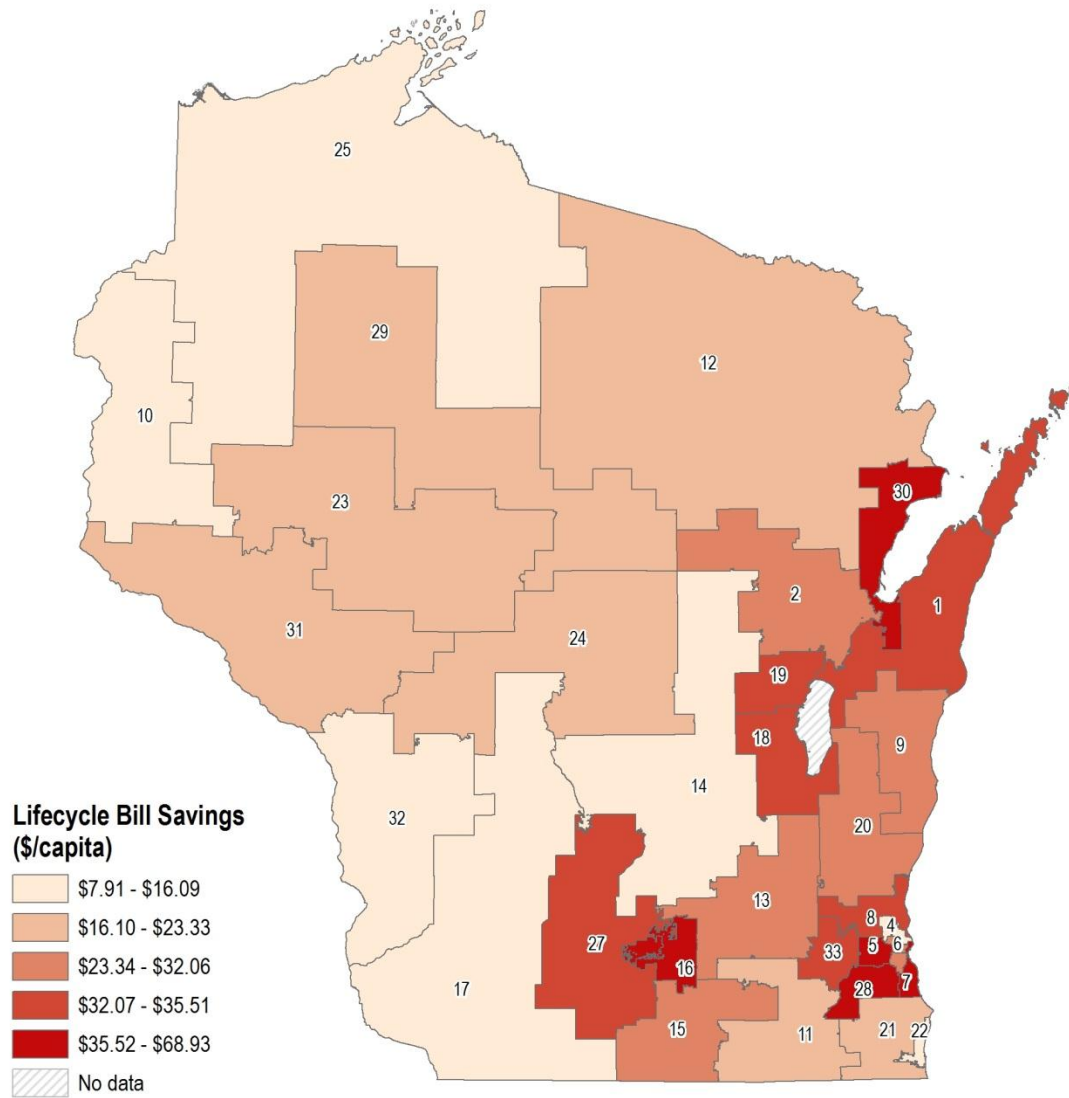
Assembly District	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
46	\$4.00	0.15	\$0.21
47	\$59.47	2.12	\$3.24
48	\$89.50	3.20	\$4.46
49	\$30.74	1.10	\$1.36
50	\$16.72	0.61	\$0.81
51	\$3.87	0.14	\$0.26
52	\$39.34	1.39	\$2.08
53	\$4.73	0.18	\$0.28
54	\$51.87	1.86	\$2.93
55	\$126.25	4.45	\$6.60
56	\$3.98	0.15	\$0.21
57	\$31.34	1.13	\$1.46
58	\$40.24	1.44	\$1.93
59	\$5.28	0.17	\$0.49
60	\$10.87	0.40	\$0.49
61	\$55.61	1.98	\$2.93
62	\$12.19	0.43	\$0.58
63	\$57.78	2.09	\$2.71
64	\$41.48	1.50	\$1.91
65	\$5.34	0.19	\$0.25
66	\$18.23	0.62	\$1.10
67	\$7.43	0.27	\$0.43
68	\$5.79	0.22	\$0.36
69	\$34.49	1.22	\$1.81
70	\$21.76	0.79	\$0.96
71	\$56.01	2.01	\$2.67
72	\$18.17	0.66	\$0.90
73	\$21.49	0.78	\$1.01
74	\$2.58	0.09	\$0.12
75	\$27.53	1.01	\$1.44
76	\$7.44	0.27	\$0.42
77	\$42.02	1.48	\$2.07
78	\$71.01	2.56	\$3.56
79	\$55.85	2.02	\$2.56
80	\$1.13	0.04	\$0.05
81	\$45.77	1.66	\$2.09
82	\$88.52	3.15	\$4.28
83	\$4.95	0.17	\$0.34

Assembly District	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
84	\$19.44	0.68	\$1.16
85	\$37.01	1.29	\$2.07
86	\$70.58	2.56	\$3.54
87	\$21.92	0.80	\$0.99
88	\$52.63	1.88	\$2.44
89	\$19.71	0.70	\$0.98
90	\$6.60	0.24	\$0.32
91	\$63.93	2.31	\$3.19
92	\$23.52	0.83	\$0.95
93	\$45.78	1.65	\$2.26
94	\$68.93	2.47	\$3.35
95	\$33.62	1.20	\$1.67
96	\$14.39	0.52	\$0.86
97	\$16.91	0.62	\$0.70
98	\$99.61	3.57	\$4.58
99	\$24.56	0.86	\$1.27

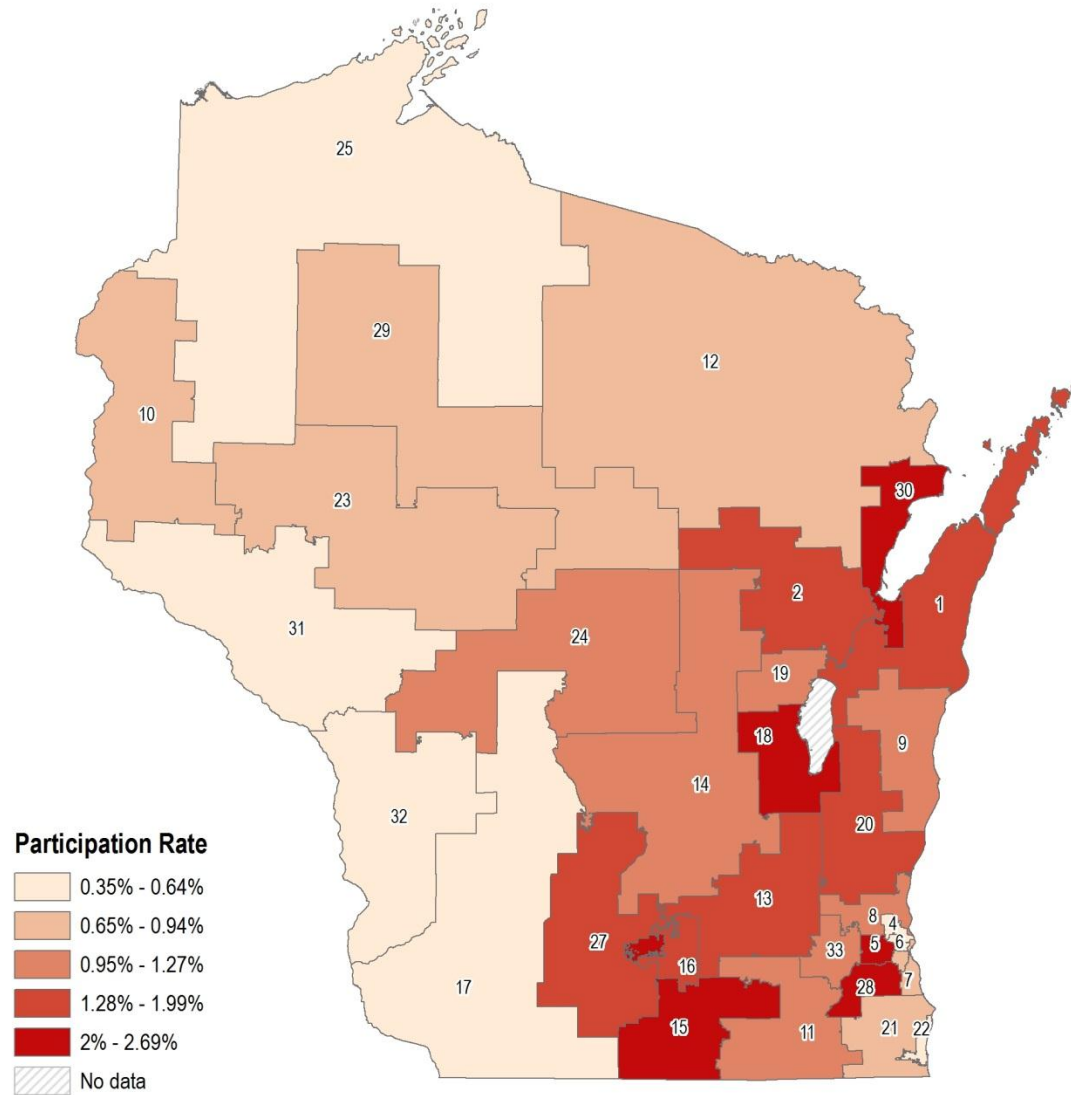
## 2013 Savings by Segment, by Senate District

### Residential

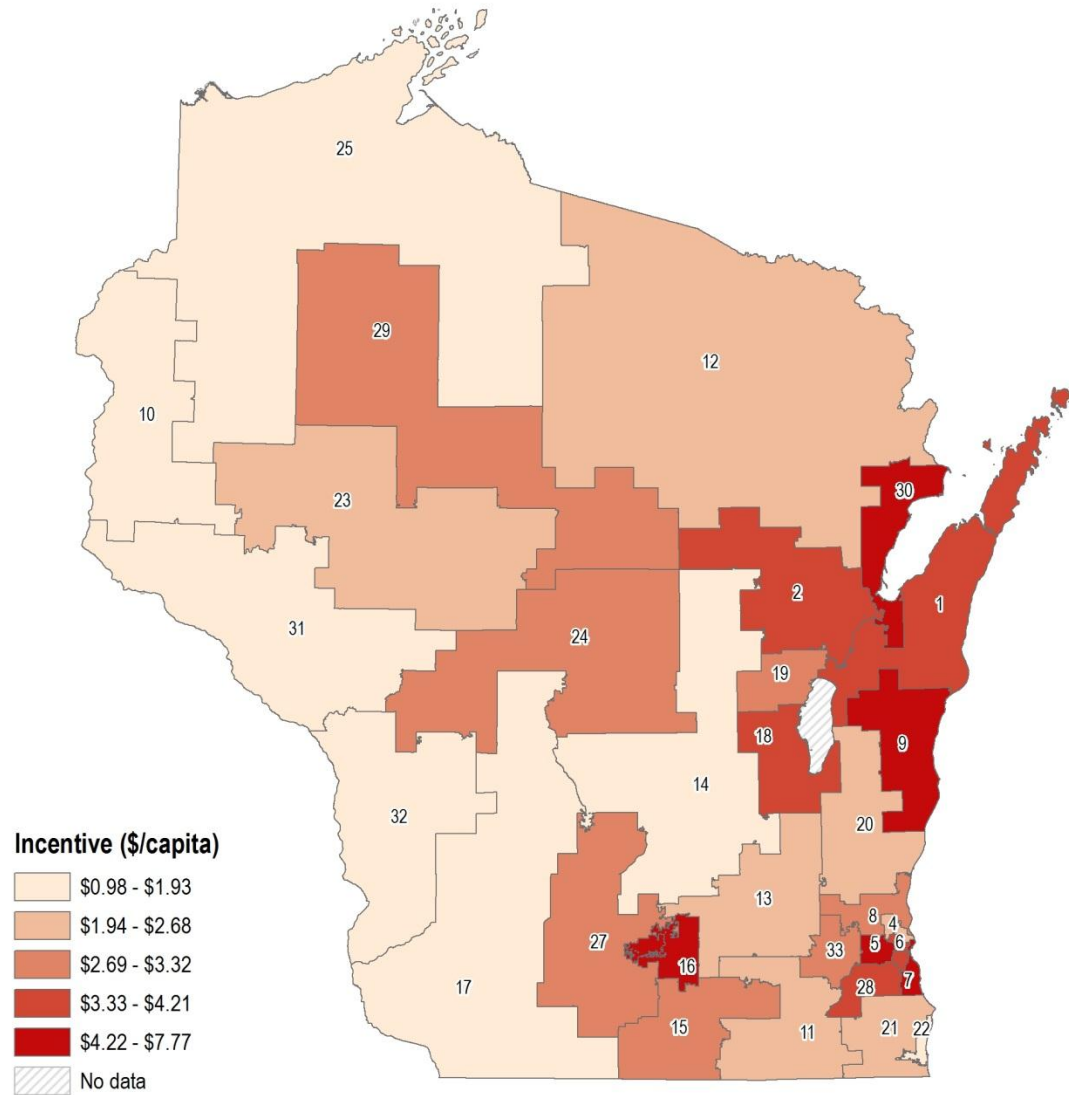
#### Residential Energy Bill Savings by Senate District



## Residential Participation by Senate Districts

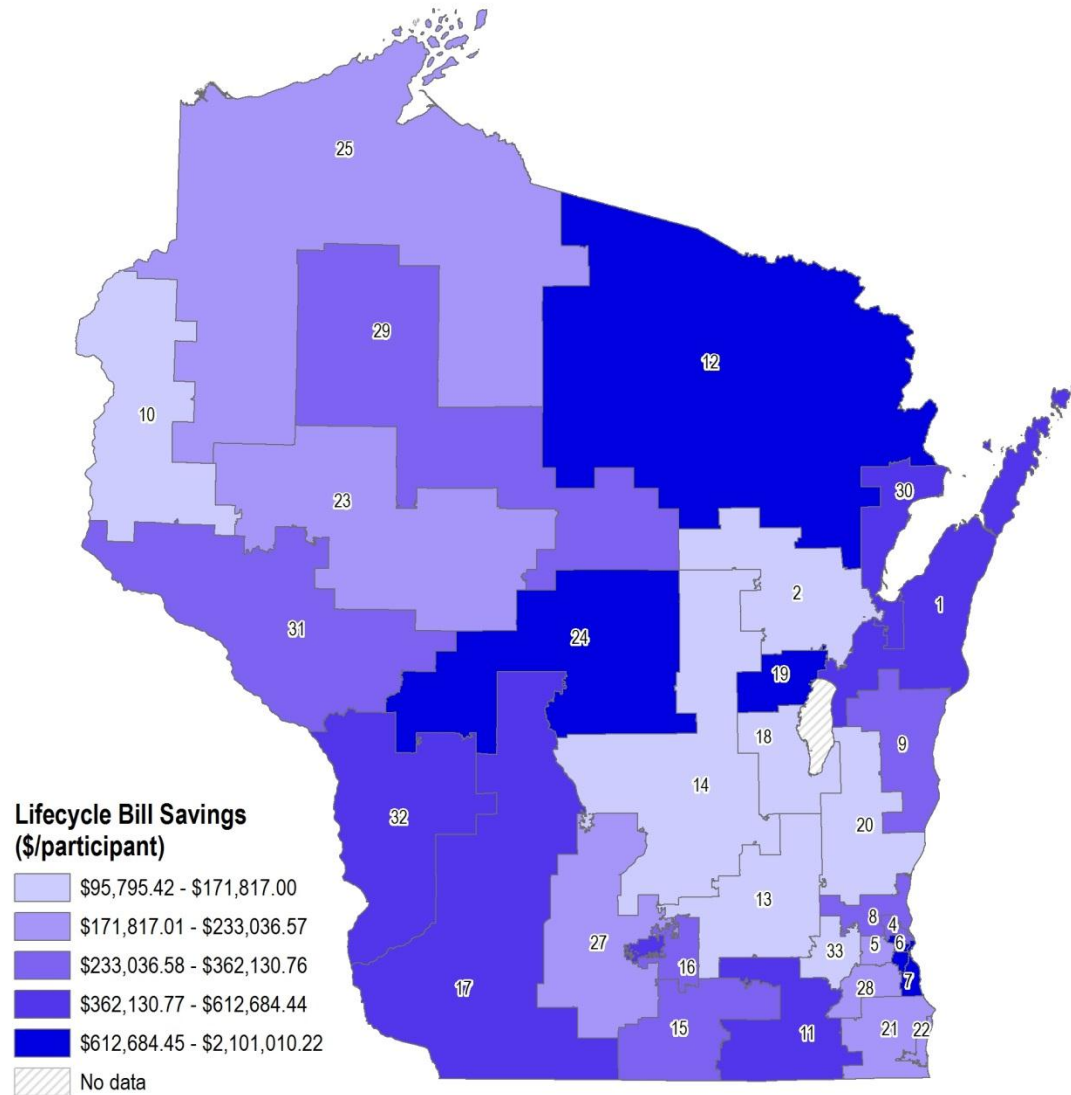


## Residential Incentive Dollars Awarded by Senate District

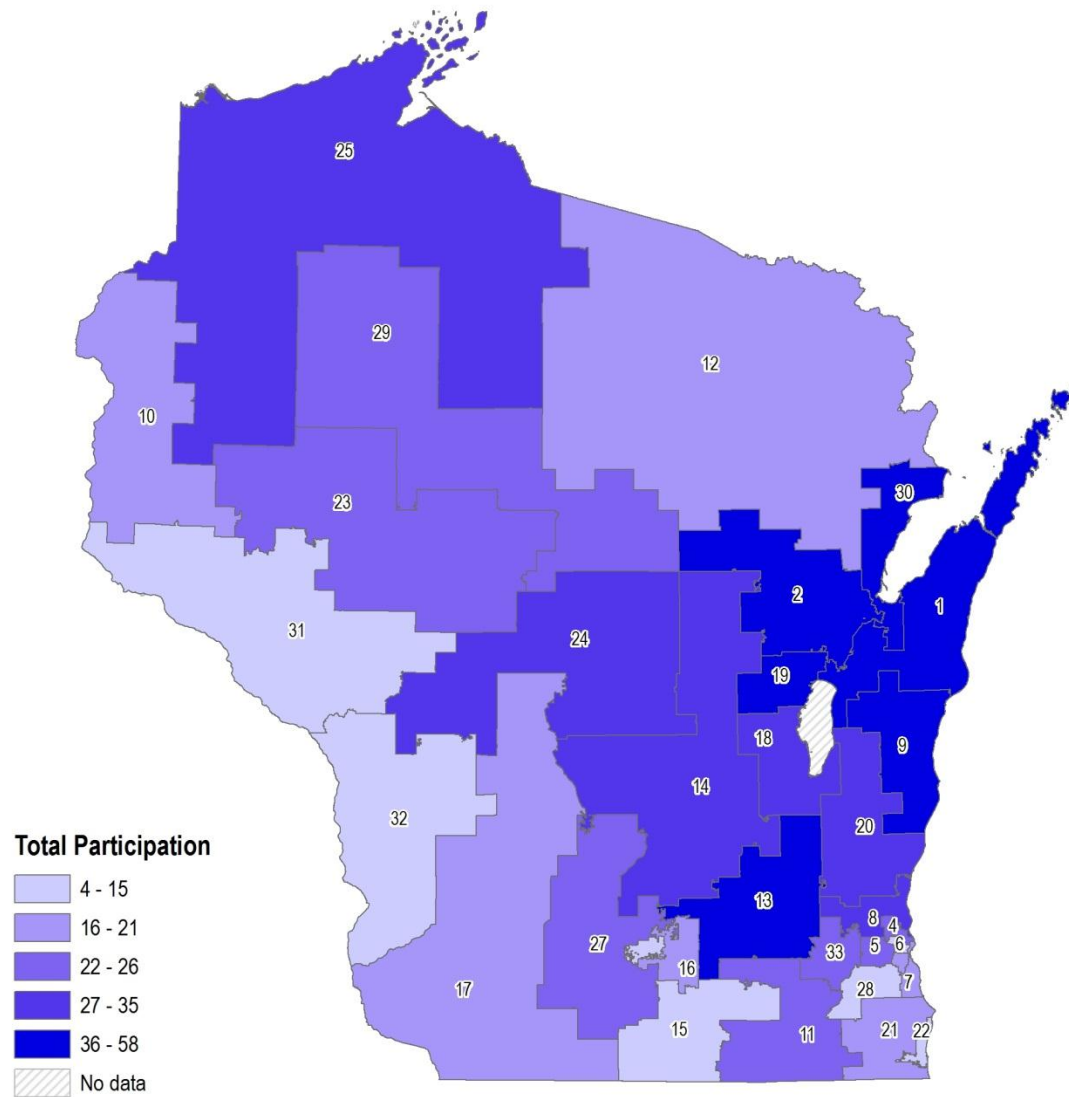


## Industrial

### Industrial Energy Bill Savings by Senate District

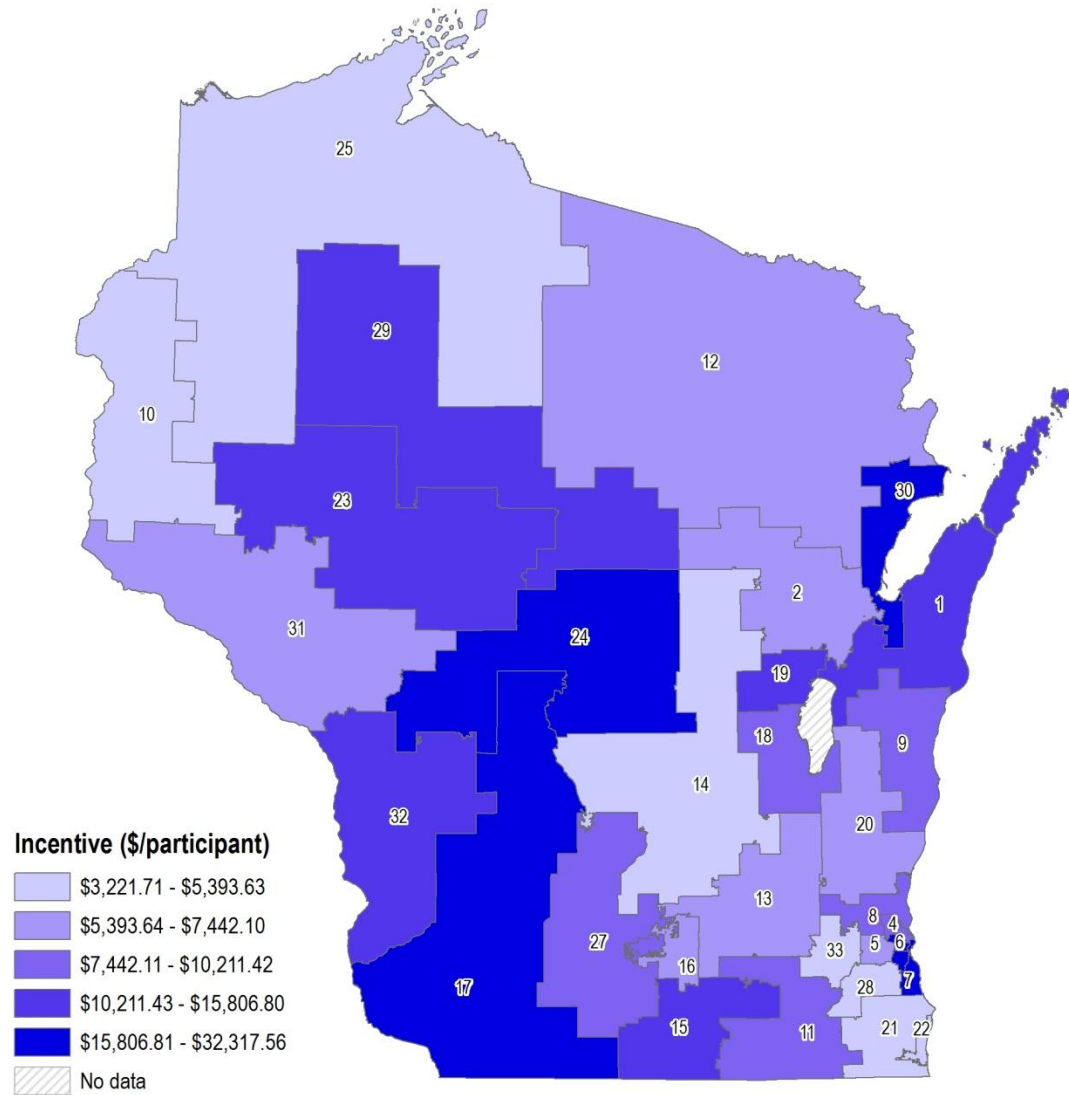


## Industrial Participation by Senate District



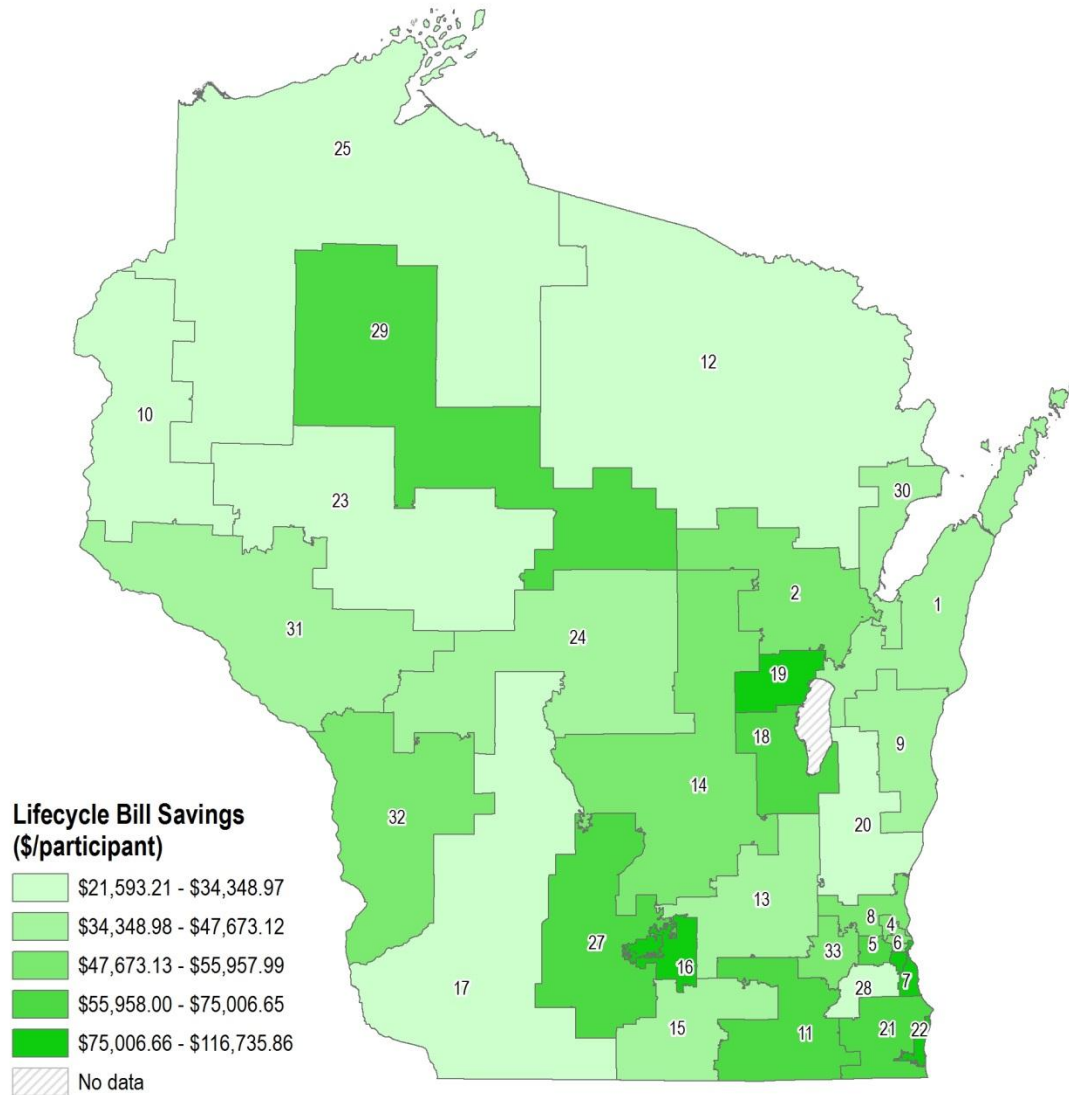


## Industrial Incentive Dollars Awarded by Senate District

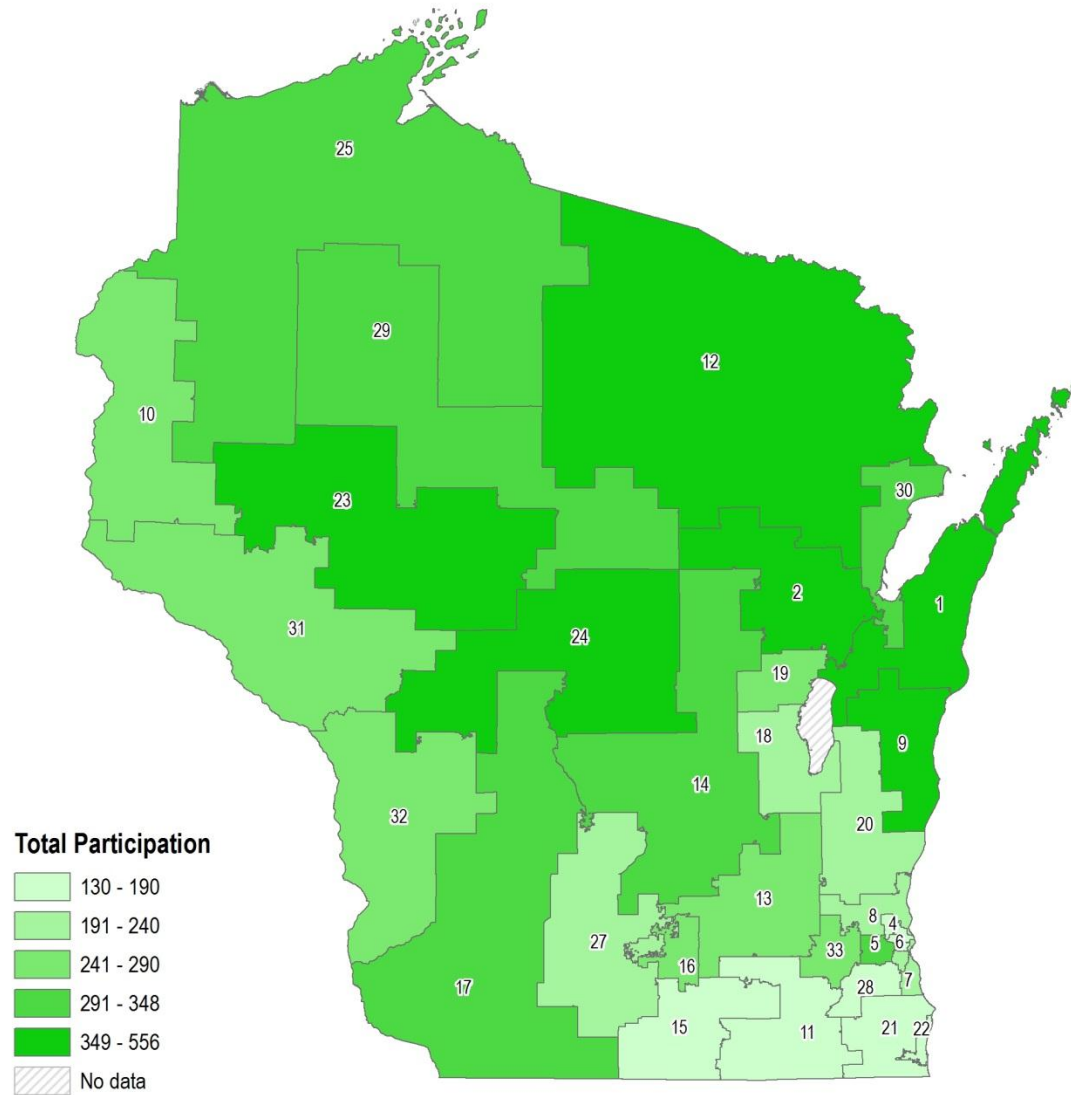


## Commercial

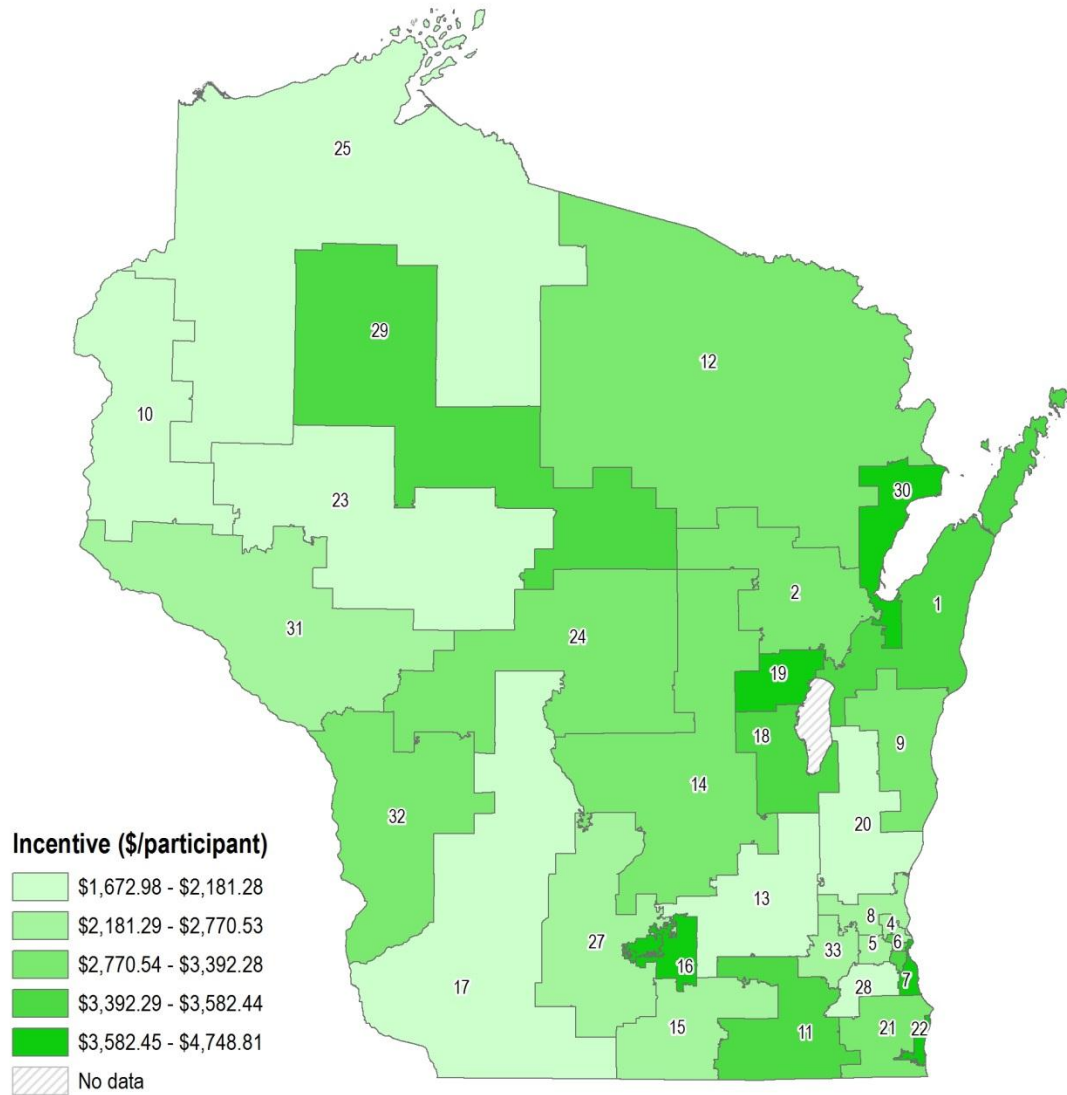
### Commercial Energy Bill Savings by Senate District



## Commercial Participation by Senate District

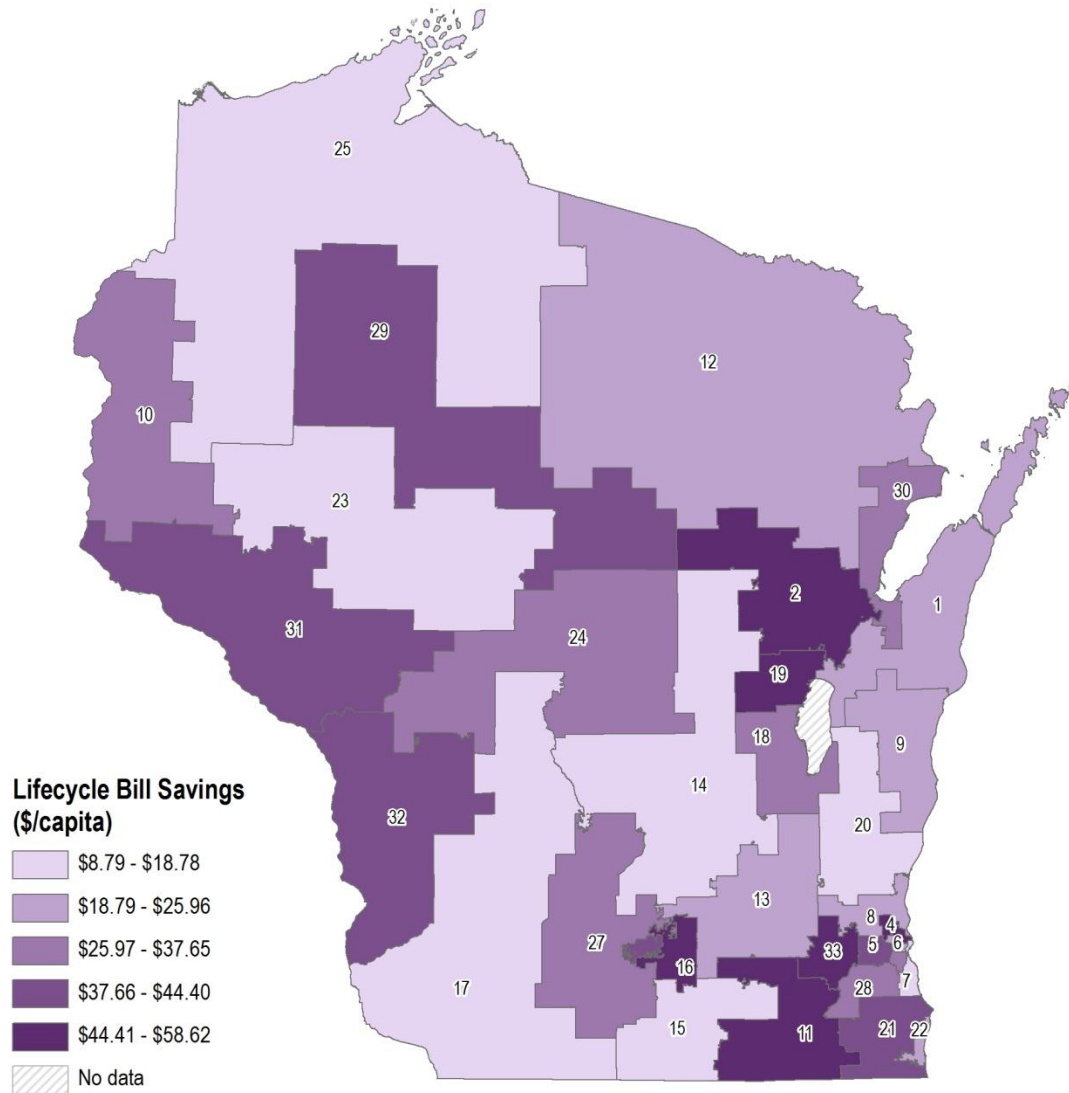


## Commercial Incentive Dollars Awarded by Senate District

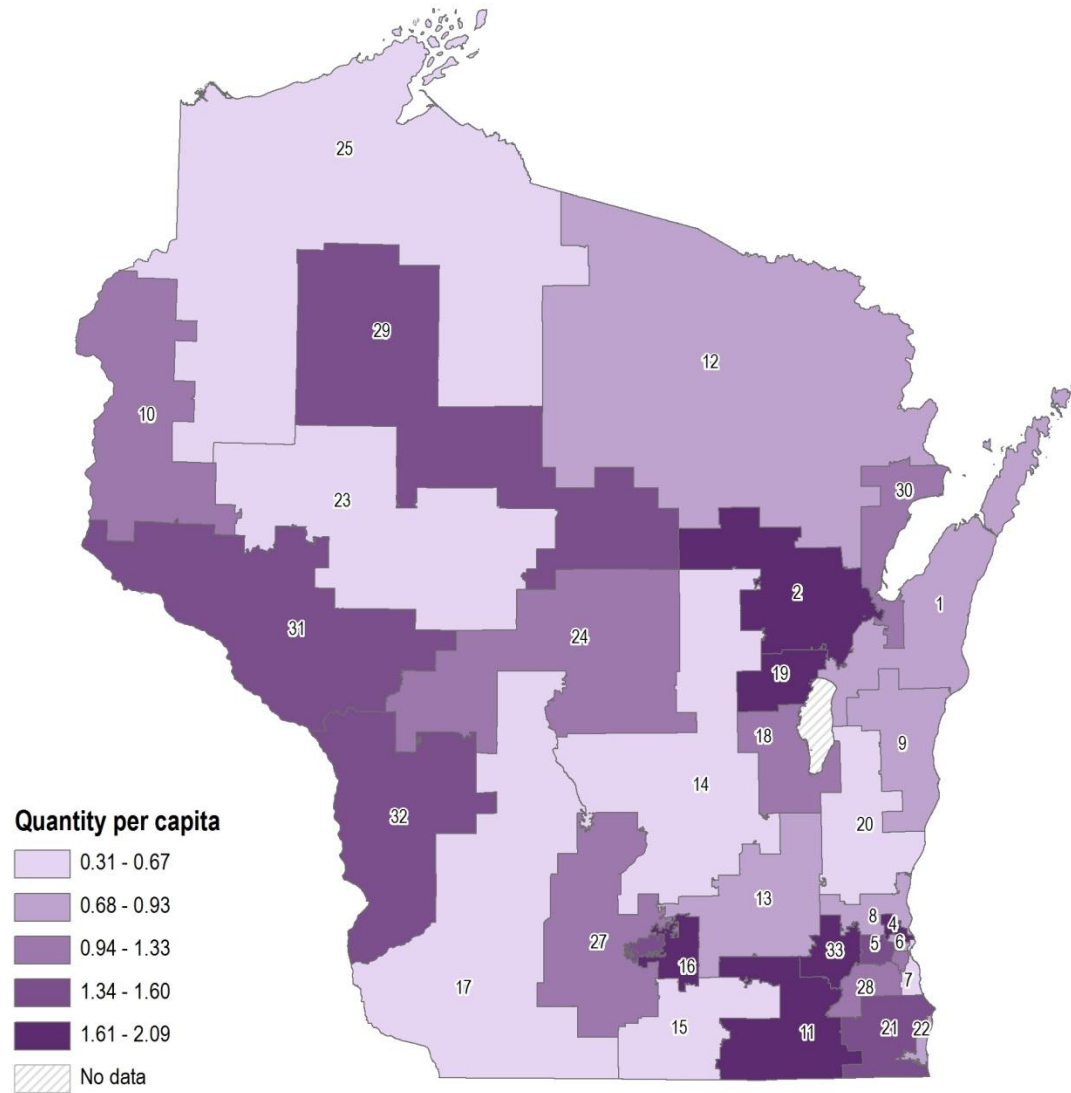


## Upstream Lighting

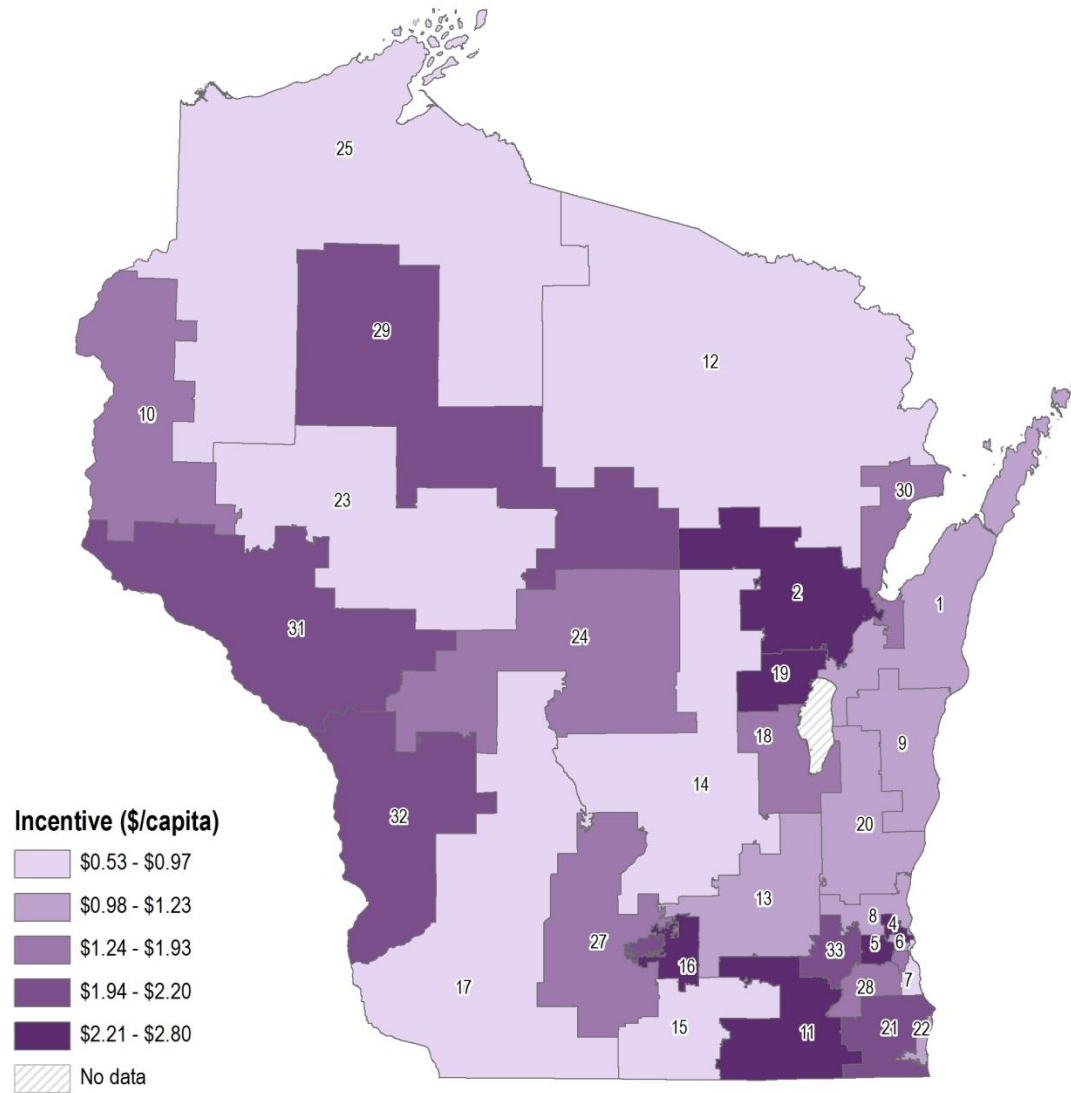
### Upstream Lighting Energy Bill Savings by Senate District



## Upstream Lighting Participation by Senate District



## Upstream Lighting Incentive Dollars Awarded by Senate District



**Table E-4. Residential Savings and Participation by Senate District**

Senate District	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
1	Residential	\$35.38	1.99%	\$3.66
2	Residential	\$30.50	1.80%	\$4.21
3	Residential	\$24.32	0.84%	\$3.62
4	Residential	\$16.08	0.43%	\$2.62
5	Residential	\$43.08	2.00%	\$4.43
6	Residential	\$31.74	0.49%	\$3.53
7	Residential	\$43.29	0.86%	\$4.30
8	Residential	\$35.51	1.21%	\$3.32
9	Residential	\$32.06	1.26%	\$5.23
10	Residential	\$13.20	0.71%	\$1.93
11	Residential	\$21.01	1.06%	\$1.94
12	Residential	\$18.21	0.91%	\$1.98
13	Residential	\$27.87	1.35%	\$2.56
14	Residential	\$16.09	0.95%	\$1.62
15	Residential	\$27.50	2.11%	\$2.83
16	Residential	\$44.67	1.68%	\$4.49
17	Residential	\$15.99	0.64%	\$1.39
18	Residential	\$32.99	2.10%	\$3.70
19	Residential	\$32.51	1.27%	\$3.09
20	Residential	\$30.39	1.38%	\$2.68
21	Residential	\$23.33	0.81%	\$2.00
22	Residential	\$15.87	0.59%	\$1.52
23	Residential	\$18.23	0.93%	\$2.01
24	Residential	\$22.68	0.99%	\$2.93
25	Residential	\$7.91	0.35%	\$0.98
26	Residential	\$68.93	2.14%	\$7.23
27	Residential	\$33.89	1.48%	\$3.16
28	Residential	\$44.06	2.00%	\$3.87
29	Residential	\$16.79	0.94%	\$2.73
30	Residential	\$42.03	2.69%	\$7.77
31	Residential	\$18.18	0.52%	\$1.84
32	Residential	\$13.23	0.47%	\$1.52
33	Residential	\$33.76	1.02%	\$2.75



**Table E-5. Nonresidential Savings and Participation by Senate District and Segment<sup>1</sup>**

Senate District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
1	Commercial	\$43,589.98	556	\$3,582.44
2	Commercial	\$49,001.39	422	\$3,247.80
3	Commercial	\$83,549.71	199	\$3,432.52
4	Commercial	\$50,216.39	190	\$2,547.58
5	Commercial	\$57,315.99	346	\$2,402.18
6	Commercial	\$49,839.67	169	\$3,396.56
7	Commercial	\$106,777.29	197	\$4,185.58
8	Commercial	\$53,468.75	216	\$2,770.53
9	Commercial	\$46,487.63	386	\$3,329.93
10	Commercial	\$29,308.39	284	\$2,181.28
11	Commercial	\$75,006.65	130	\$3,435.00
12	Commercial	\$34,348.97	464	\$3,113.62
13	Commercial	\$43,982.73	256	\$2,130.50
14	Commercial	\$47,893.15	314	\$2,824.91
15	Commercial	\$47,673.12	137	\$2,454.12
16	Commercial	\$116,735.86	246	\$4,748.81
17	Commercial	\$29,629.24	310	\$1,889.35
18	Commercial	\$63,831.77	230	\$3,581.57
19	Commercial	\$88,813.59	269	\$3,683.55
20	Commercial	\$31,669.26	235	\$2,019.57
21	Commercial	\$72,681.91	184	\$3,392.28
22	Commercial	\$75,161.94	171	\$3,730.94
23	Commercial	\$26,071.14	351	\$1,919.26
24	Commercial	\$34,861.51	410	\$2,801.08
25	Commercial	\$21,593.21	307	\$1,783.04
26	Commercial	\$97,582.29	234	\$4,270.58
27	Commercial	\$57,090.86	240	\$2,688.28
28	Commercial	\$28,639.04	158	\$1,672.98
29	Commercial	\$60,739.42	339	\$3,555.59
30	Commercial	\$37,968.07	348	\$3,675.95
31	Commercial	\$44,608.41	273	\$2,703.76
32	Commercial	\$49,715.38	265	\$3,137.95
33	Commercial	\$55,957.99	290	\$2,677.23
0	Commercial	\$59,294.35	869	\$3,395.12
1	Industrial	\$535,652.17	38	\$12,012.95
2	Industrial	\$160,102.65	50	\$5,546.00
3	Industrial	\$672,129.08	17	\$16,788.39

Senate District	Segment	Per Participant Lifecycle Bill Savings (\$)	Participant Count	Per Participant Incentive (\$)
4	Industrial	\$289,843.14	26	\$10,211.43
5	Industrial	\$208,390.68	25	\$6,903.94
6	Industrial	\$970,758.50	6	\$32,317.56
7	Industrial	\$2,101,010.22	21	\$29,816.76
8	Industrial	\$272,341.15	29	\$8,568.64
9	Industrial	\$266,527.92	48	\$10,035.60
10	Industrial	\$111,053.78	19	\$4,756.44
11	Industrial	\$601,566.87	22	\$9,407.37
12	Industrial	\$774,148.88	17	\$6,212.34
13	Industrial	\$156,474.02	39	\$5,544.07
14	Industrial	\$169,826.24	33	\$4,805.80
15	Industrial	\$348,947.34	15	\$11,837.77
16	Industrial	\$335,562.87	19	\$7,442.10
17	Industrial	\$465,001.55	21	\$16,673.87
18	Industrial	\$171,817.00	35	\$9,852.64
19	Industrial	\$635,042.67	58	\$13,836.19
20	Industrial	\$162,738.07	28	\$5,499.35
21	Industrial	\$205,504.07	18	\$5,217.07
22	Industrial	\$178,990.14	11	\$4,985.29
23	Industrial	\$233,036.57	25	\$10,545.78
24	Industrial	\$831,259.13	28	\$21,174.58
25	Industrial	\$179,134.32	30	\$3,660.51
26	Industrial	\$420,527.94	4	\$7,651.85
27	Industrial	\$225,388.46	23	\$9,807.79
28	Industrial	\$173,968.36	14	\$5,393.63
29	Industrial	\$362,130.76	26	\$15,806.80
30	Industrial	\$612,684.44	37	\$18,682.63
31	Industrial	\$353,278.25	13	\$5,473.68
32	Industrial	\$420,055.10	12	\$15,548.67
33	Industrial	\$95,795.42	24	\$3,221.71
0	Industrial	\$430,270.00	78	\$11,134.41

<sup>1</sup>Participant count provided instead of customer participation rate (%) for Senate Districts as nonresidential business counts for senate districts have not been updated since 2011 redistricting.

**Table E-6. Upstream Lighting Savings and Participation by Senate District**

Senate District	Per Capita Lifecycle Bill Savings (\$)	Per Capita Quantity	Per Capita Incentive (\$)
1	\$25.96	0.93	\$1.23
2	\$45.33	1.61	\$2.35
3	\$34.53	1.24	\$1.60
4	\$58.62	2.09	\$2.80
5	\$43.35	1.53	\$2.23
6	\$19.65	0.73	\$1.10
7	\$17.37	0.62	\$0.88
8	\$20.85	0.74	\$1.00
9	\$23.11	0.82	\$1.14
10	\$26.61	0.96	\$1.30
11	\$55.72	1.98	\$2.56
12	\$18.90	0.67	\$0.97
13	\$22.07	0.79	\$1.11
14	\$15.21	0.55	\$0.74
15	\$8.79	0.31	\$0.53
16	\$51.00	1.82	\$2.64
17	\$17.09	0.62	\$0.81
18	\$31.98	1.14	\$1.76
19	\$53.83	1.91	\$2.76
20	\$18.78	0.67	\$0.97
21	\$41.89	1.50	\$2.08
22	\$21.66	0.77	\$1.09
23	\$15.95	0.57	\$0.87
24	\$31.98	1.16	\$1.51
25	\$17.20	0.63	\$0.85
26	\$40.14	1.44	\$2.02
27	\$34.22	1.24	\$1.57
28	\$37.65	1.33	\$1.93
29	\$43.18	1.55	\$2.20
30	\$26.30	0.94	\$1.24
31	\$44.40	1.60	\$2.14
32	\$38.95	1.39	\$1.96
33	\$47.07	1.68	\$2.19

## Appendix F. Summary of Savings by Segment and Utility Territory

The following section includes eighteen maps based on the results of the 2013 evaluation: three electric utility and three gas utility maps (per capita lifetime bill savings, total 2013 participation, and per capita incentive paid in 2013) each for three primary segments (residential, industrial, and commercial). Commercial maps include businesses, schools, government, and agricultural entities.

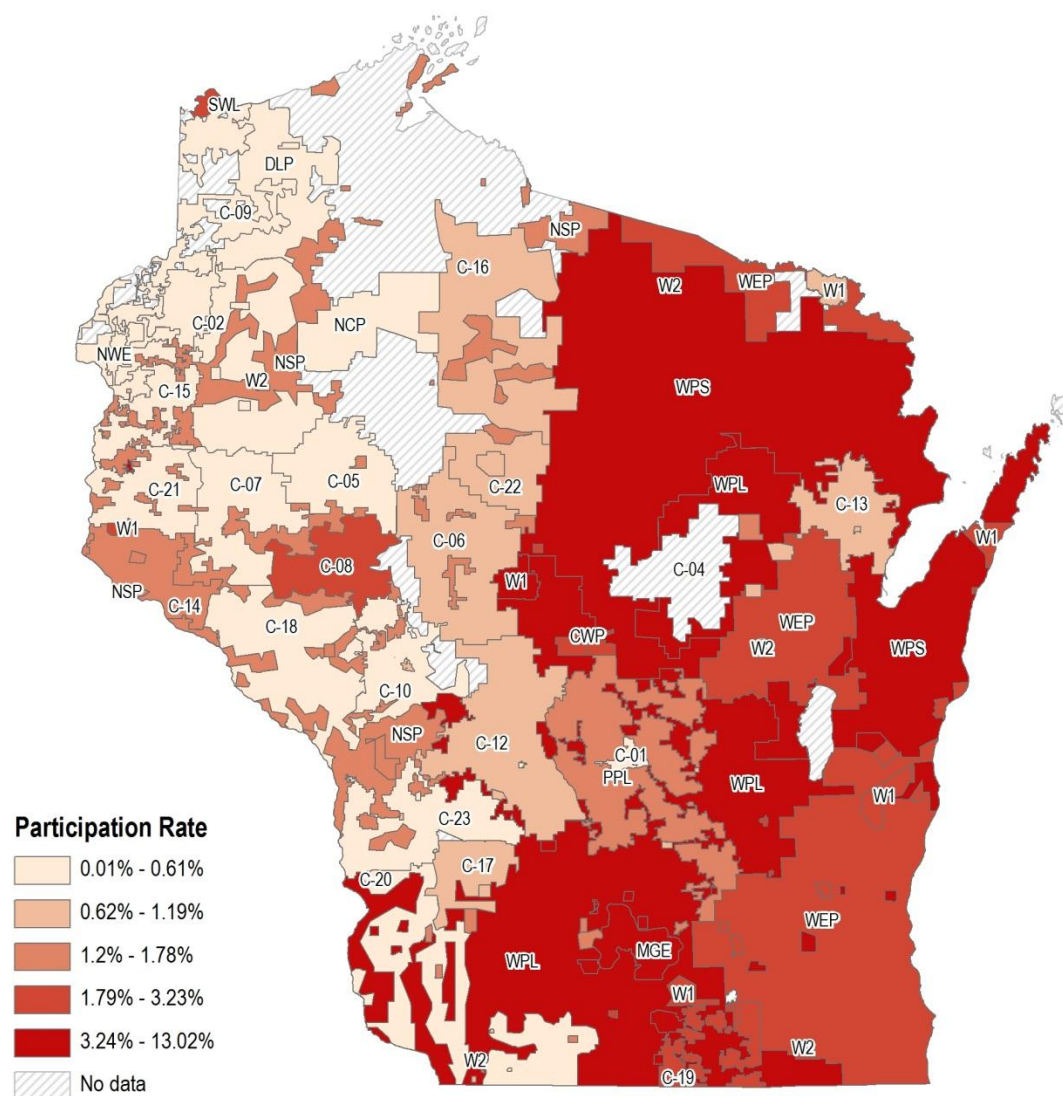
Similar to the 2011 and 2012 evaluation reports, the bill savings are defined as evaluated lifecycle verified gross energy savings multiplied by the retail rate of delivered energy in 2013 and normalized on a per capita basis. The incentive dollars and participation rates are also reported on a per capita basis.

The counts of eligible customers by segment from different sources are inconsistent due to varying definitions of those segments. The electric utility maps use counts of customers by segment from the EIA861 report (2012), which is based upon data provided by utilities. The differences between utility and Focus on Energy definitions for each segment result in noticeably high participation rates for the industrial segment in the following section.

Please note that due to the large number of electric cooperatives (Coops) and municipal utilities (Munis) the Evaluation Team chose to include only larger utility level labels for the preceding group of maps.

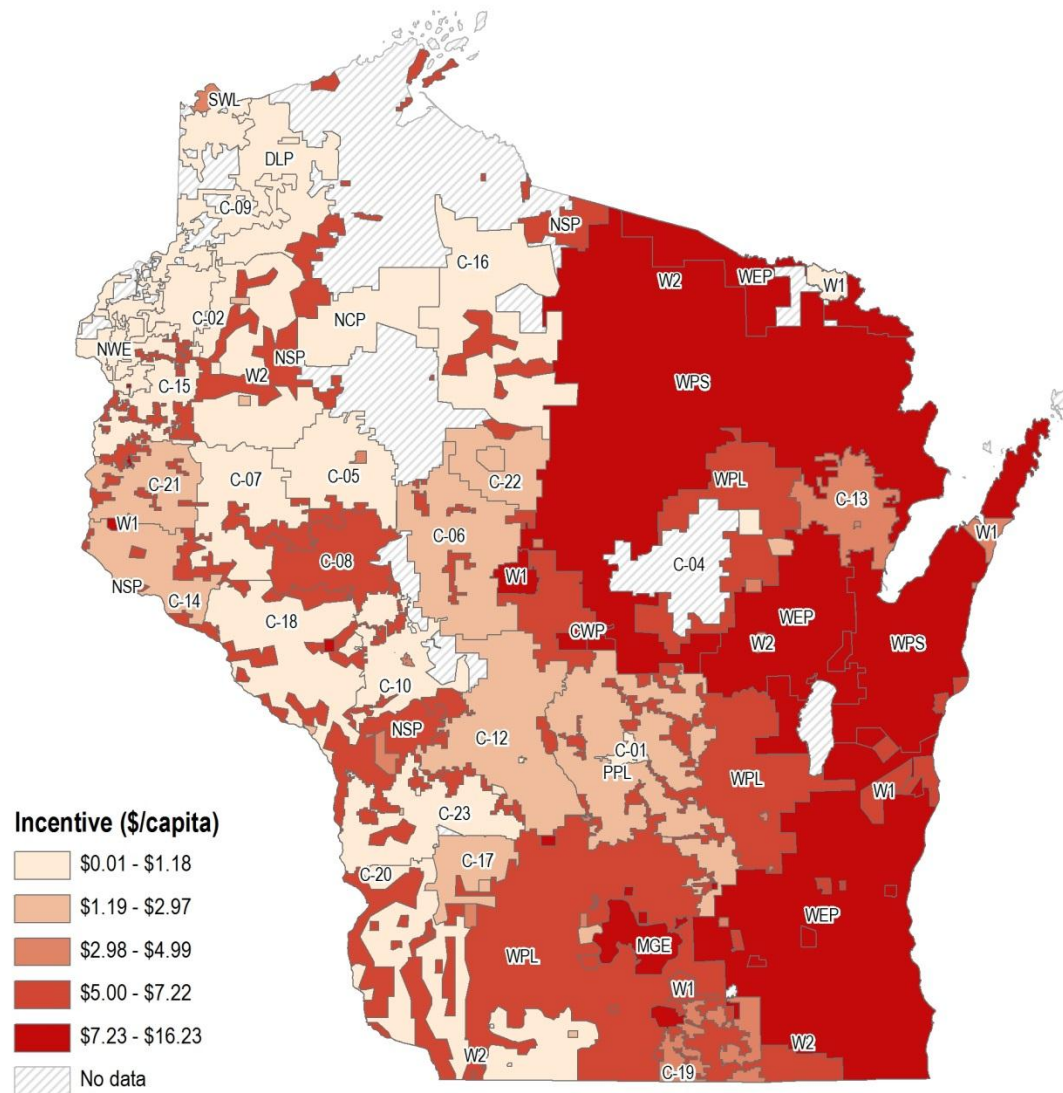


## Residential Participation Rate by Electric Territory



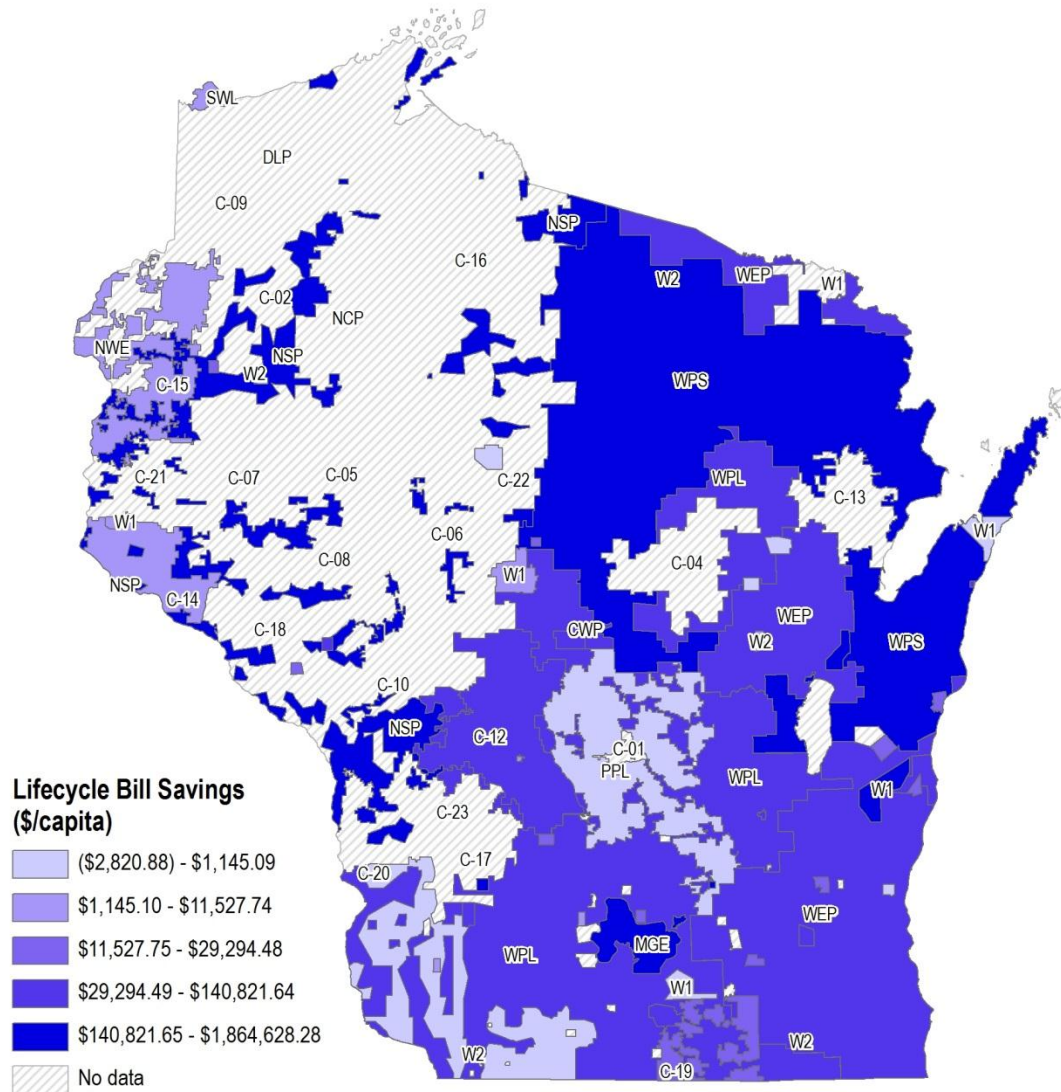


## Residential Per Capita Incentive Dollars Awarded by Electric Territory



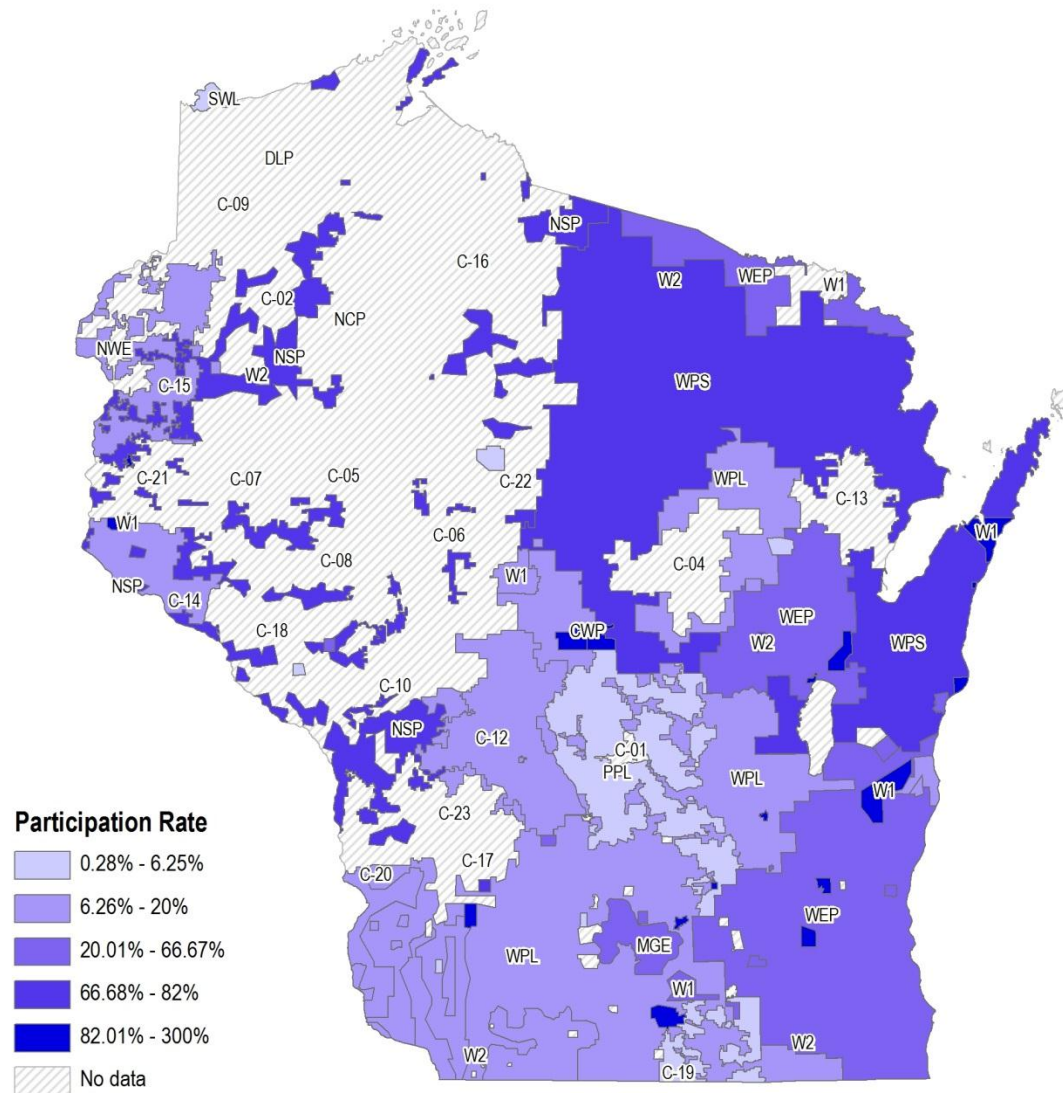
## Industrial - – Electric Territory

### Industrial Per Capita Energy Bill Savings by Electric Territory

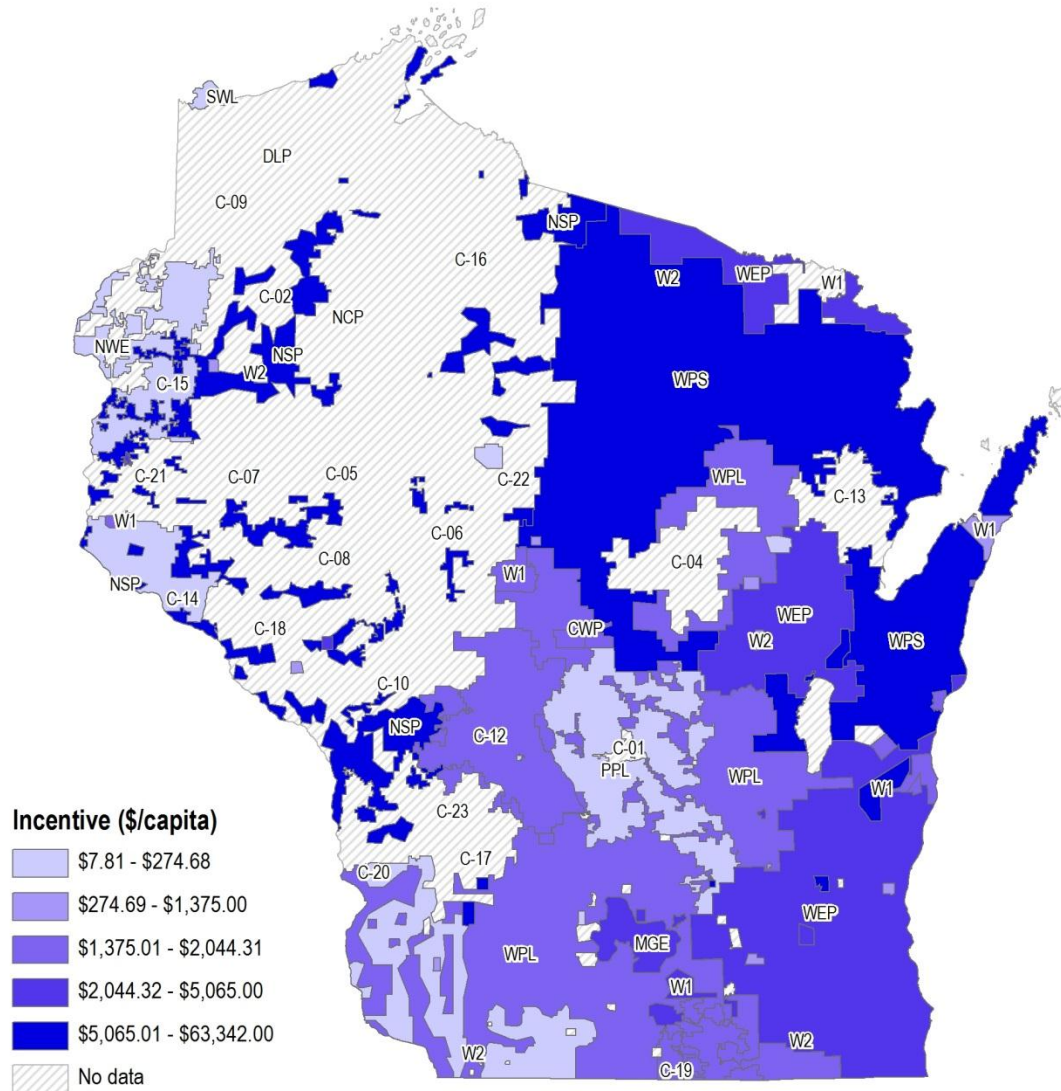




## Industrial Participation Rate by Electric Territory

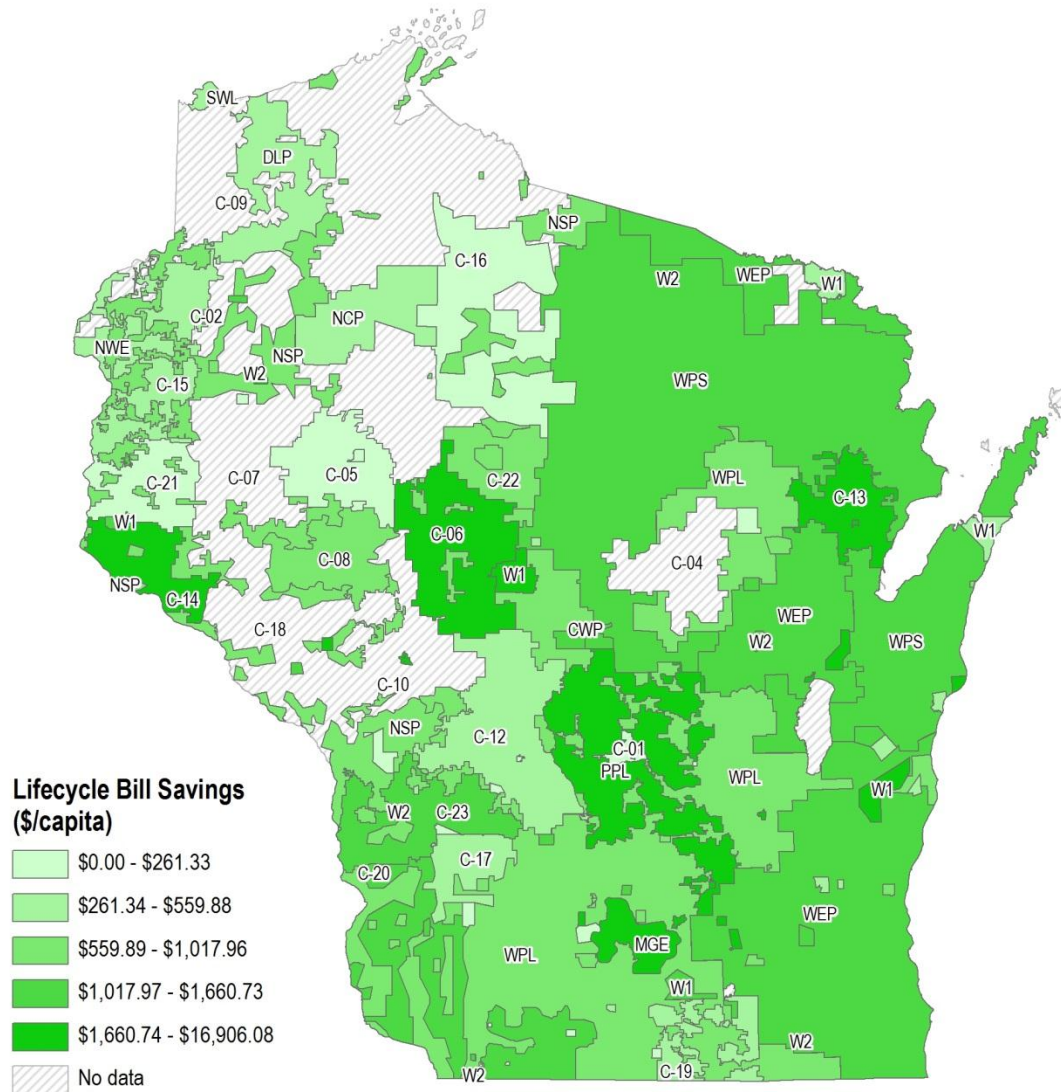


## Industrial Per Capita Incentive Dollars Awarded by Electric Territory

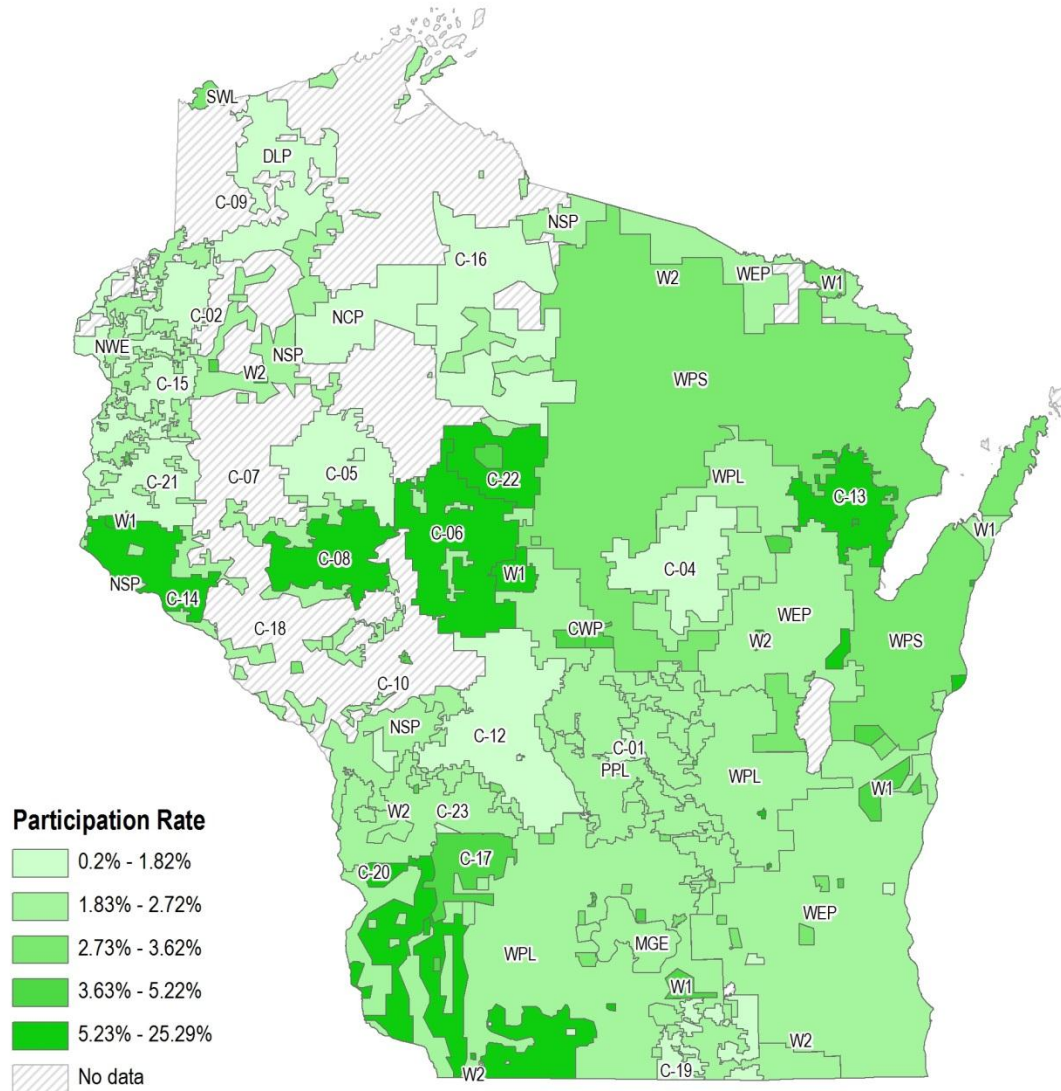


## Commercial – Electric Territory

### Commercial Per Capita Energy Bill Savings by Electric Territory

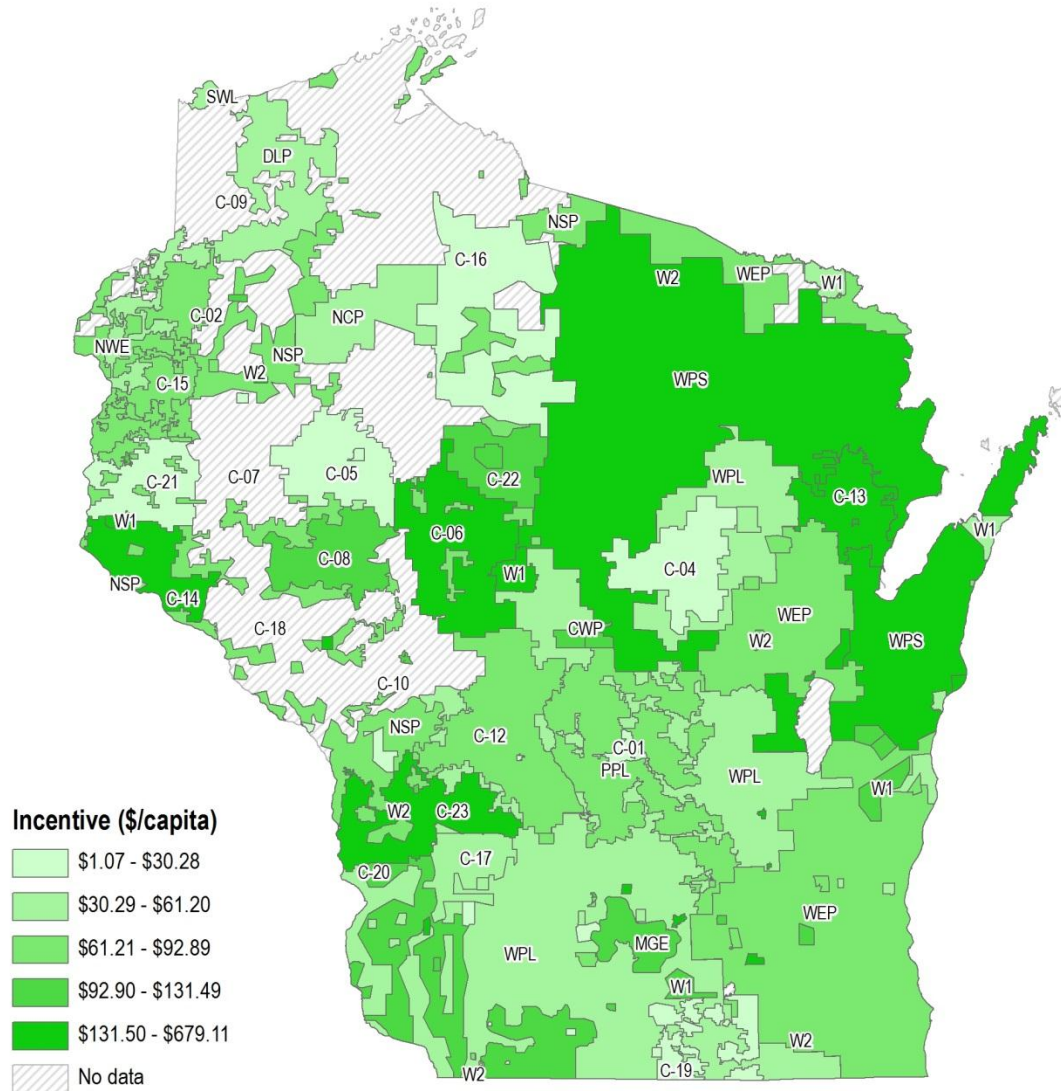


## Commercial Participation Rate by Electric Territory



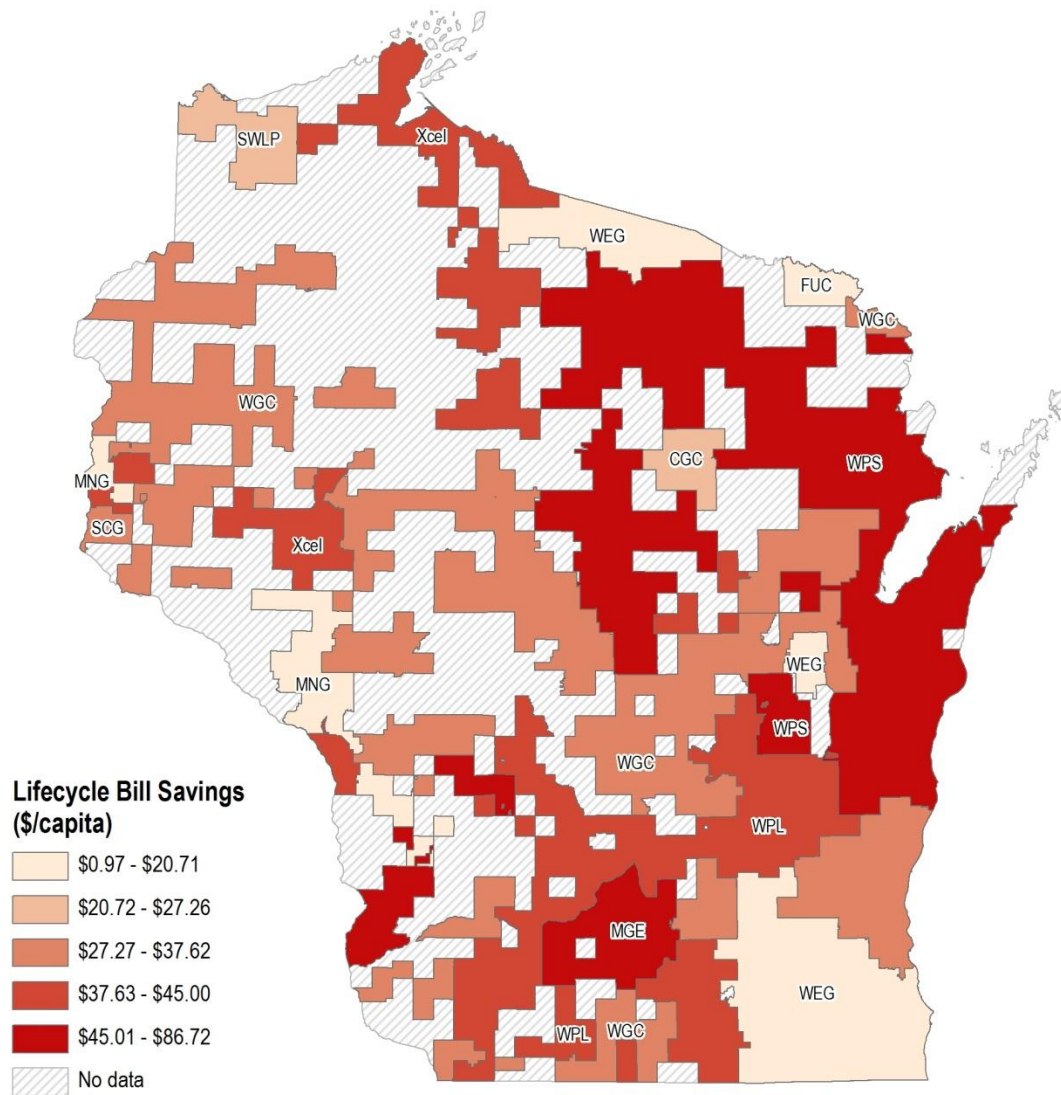


## Commercial Per Capita Incentive Dollars Awarded by Electric Territory

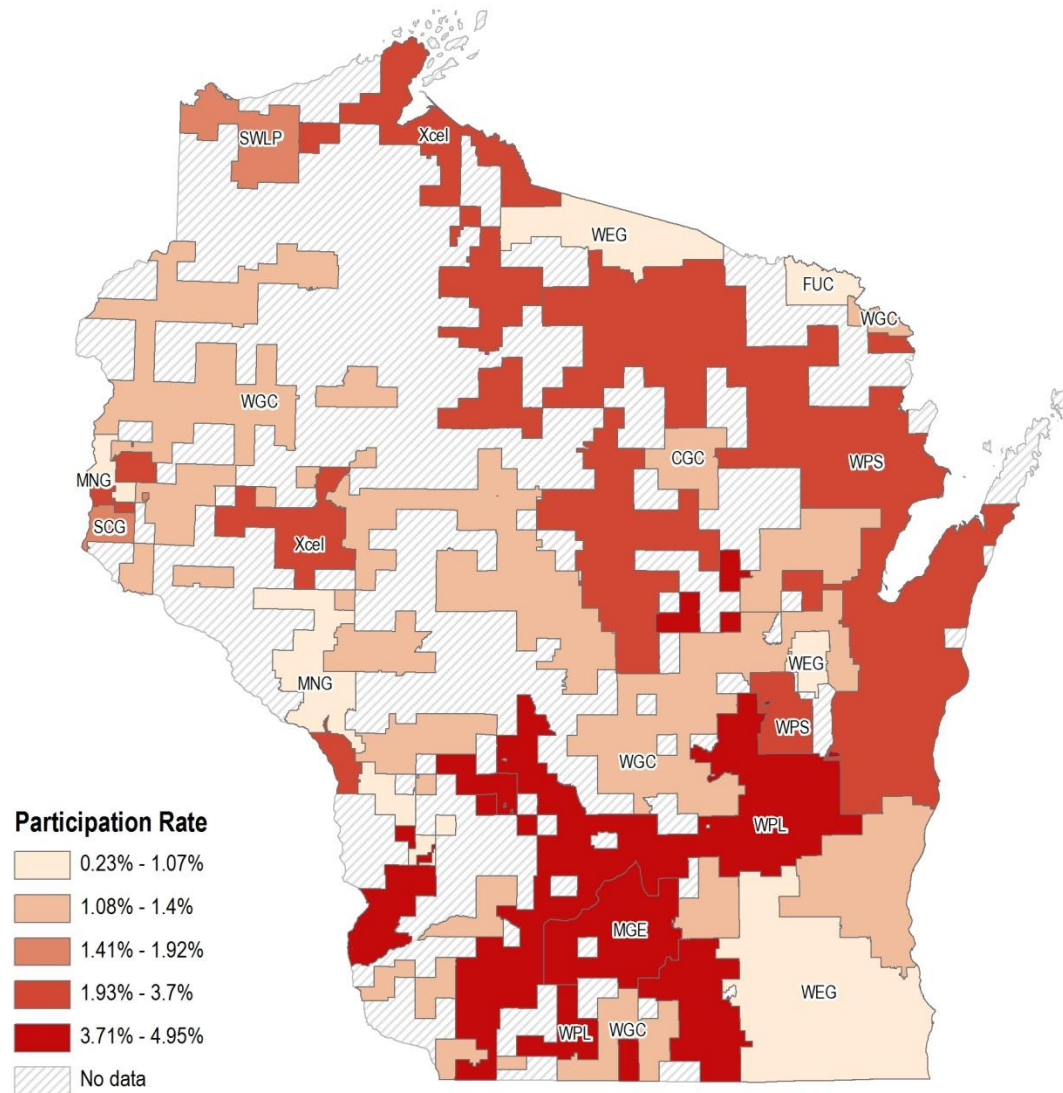


## Residential – Gas Territory

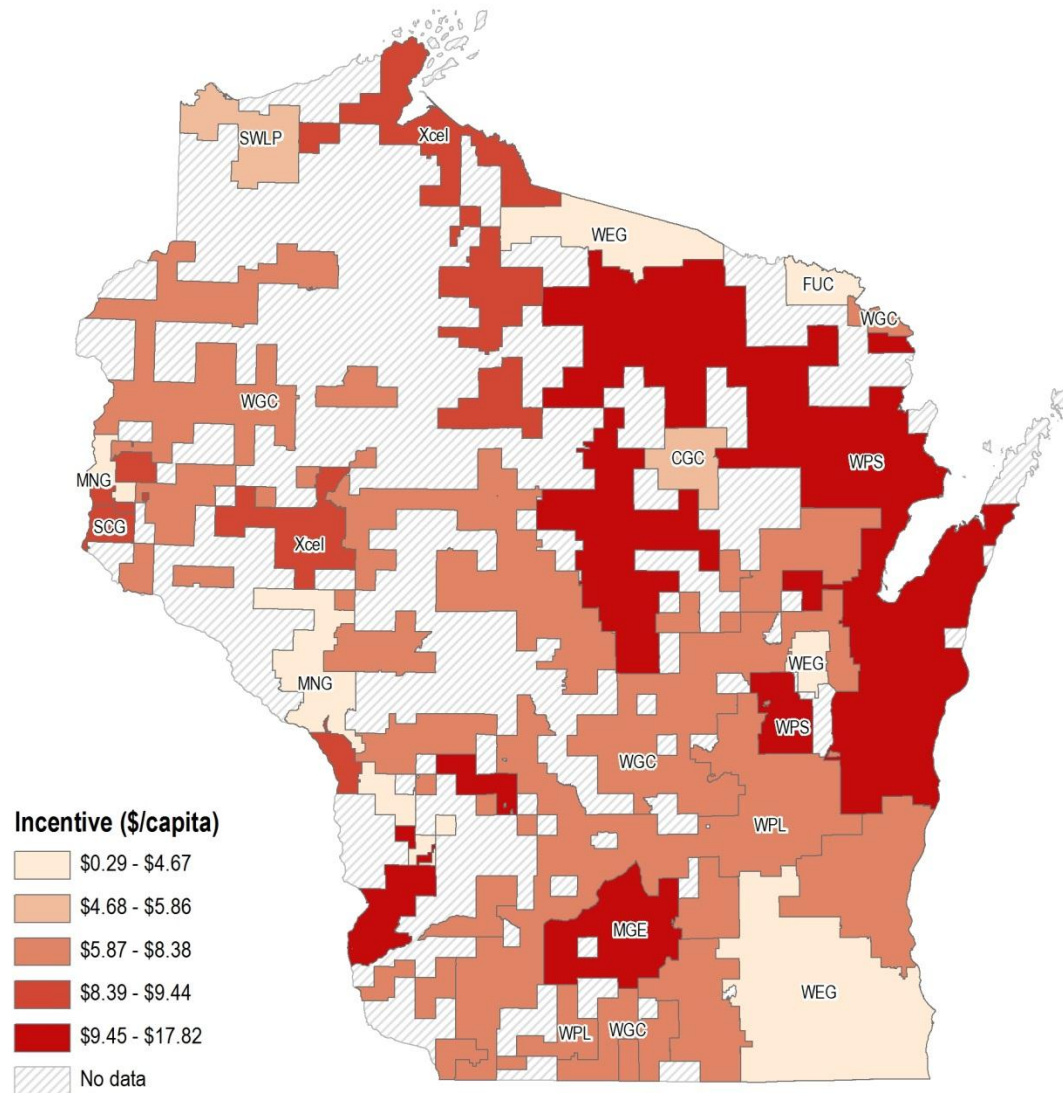
### Residential Per Capita Energy Bill Savings by Gas Territory



## Residential Participation Rate by Gas Territory



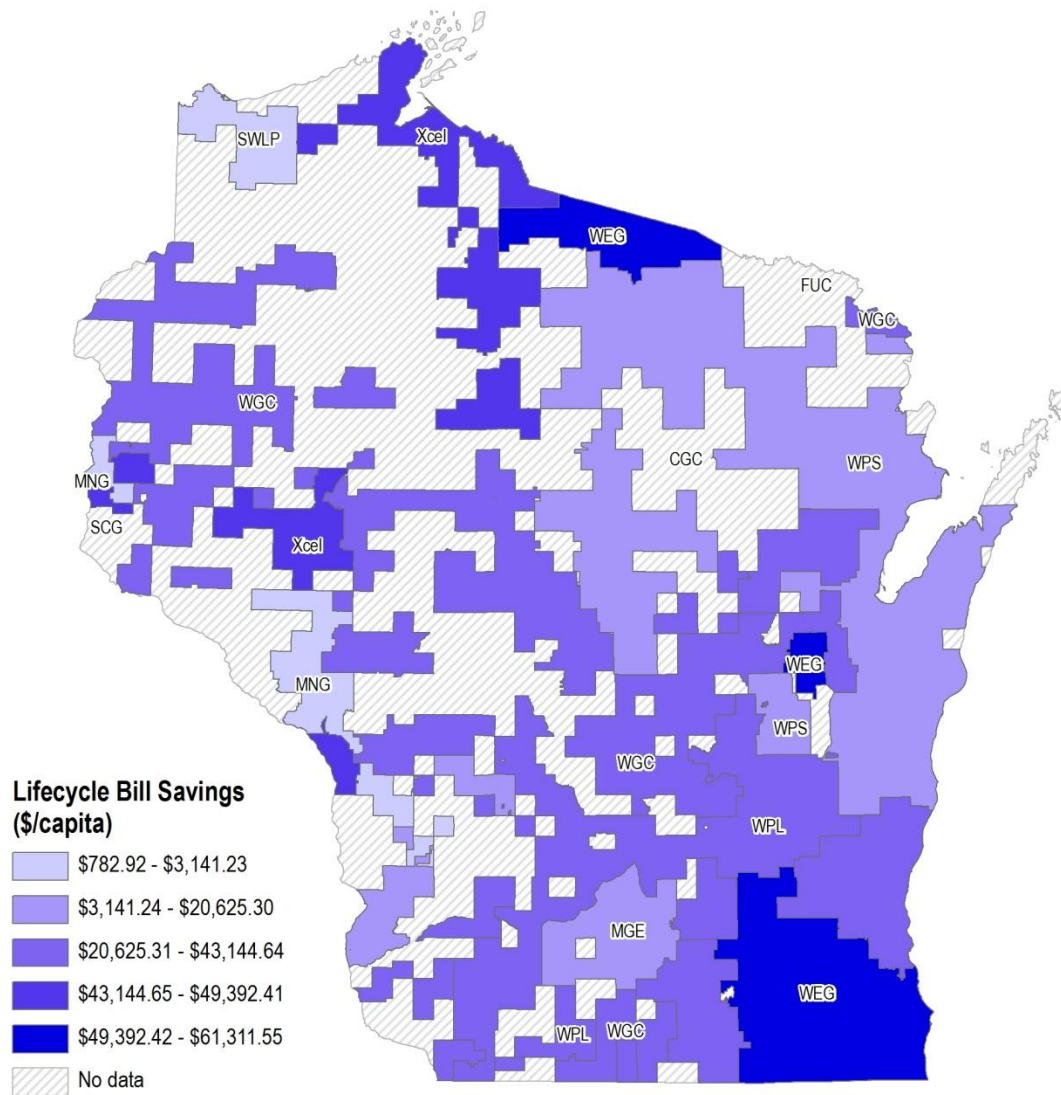
# Residential Per Capita Incentive Dollars Awarded by Gas Territory



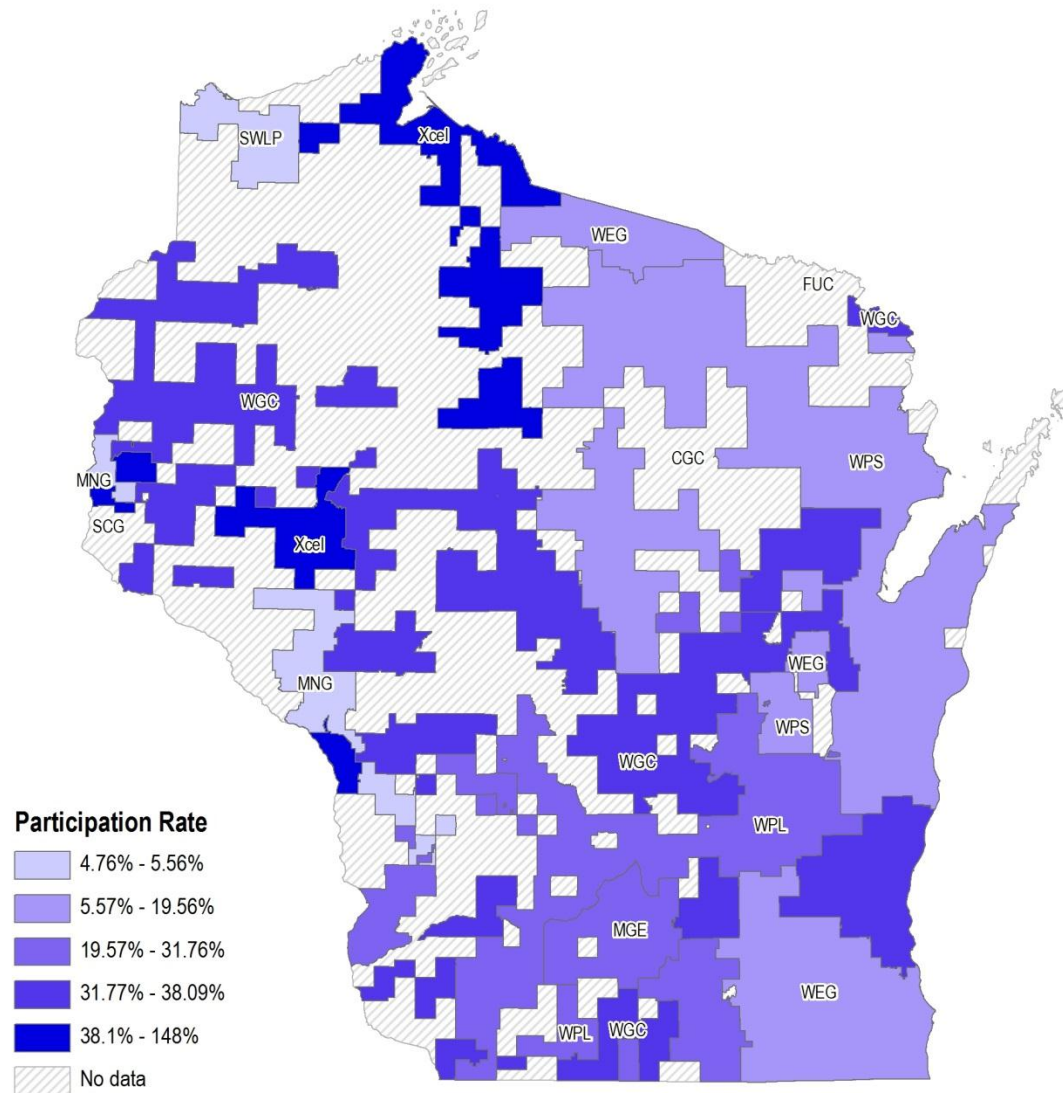


## Industrial – Gas Territory

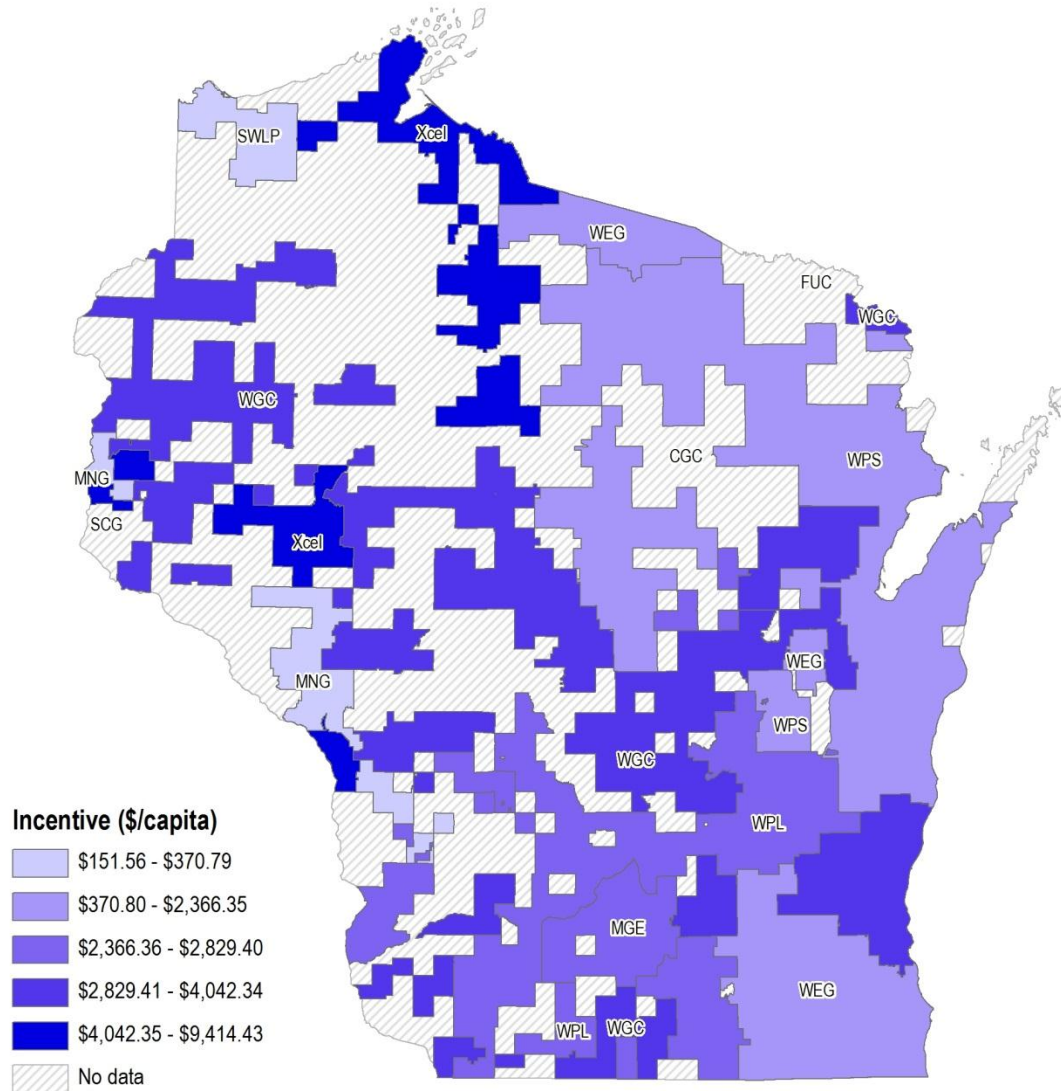
### Industrial Per Capita Energy Bill Savings by Gas Territory



## Industrial Participation Rate by Gas Territory

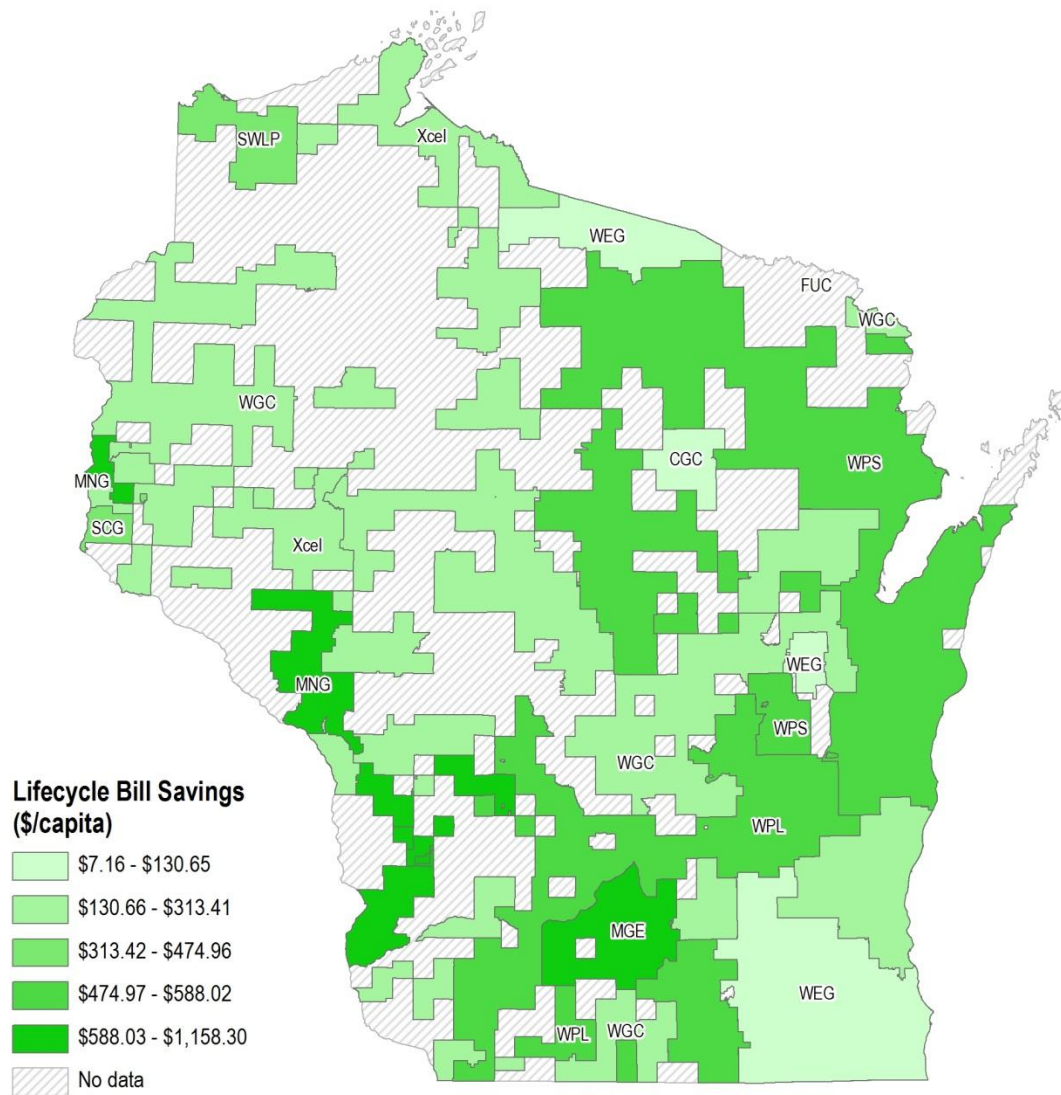


## Industrial Per Capita Incentive Dollars Awarded by Gas Territory



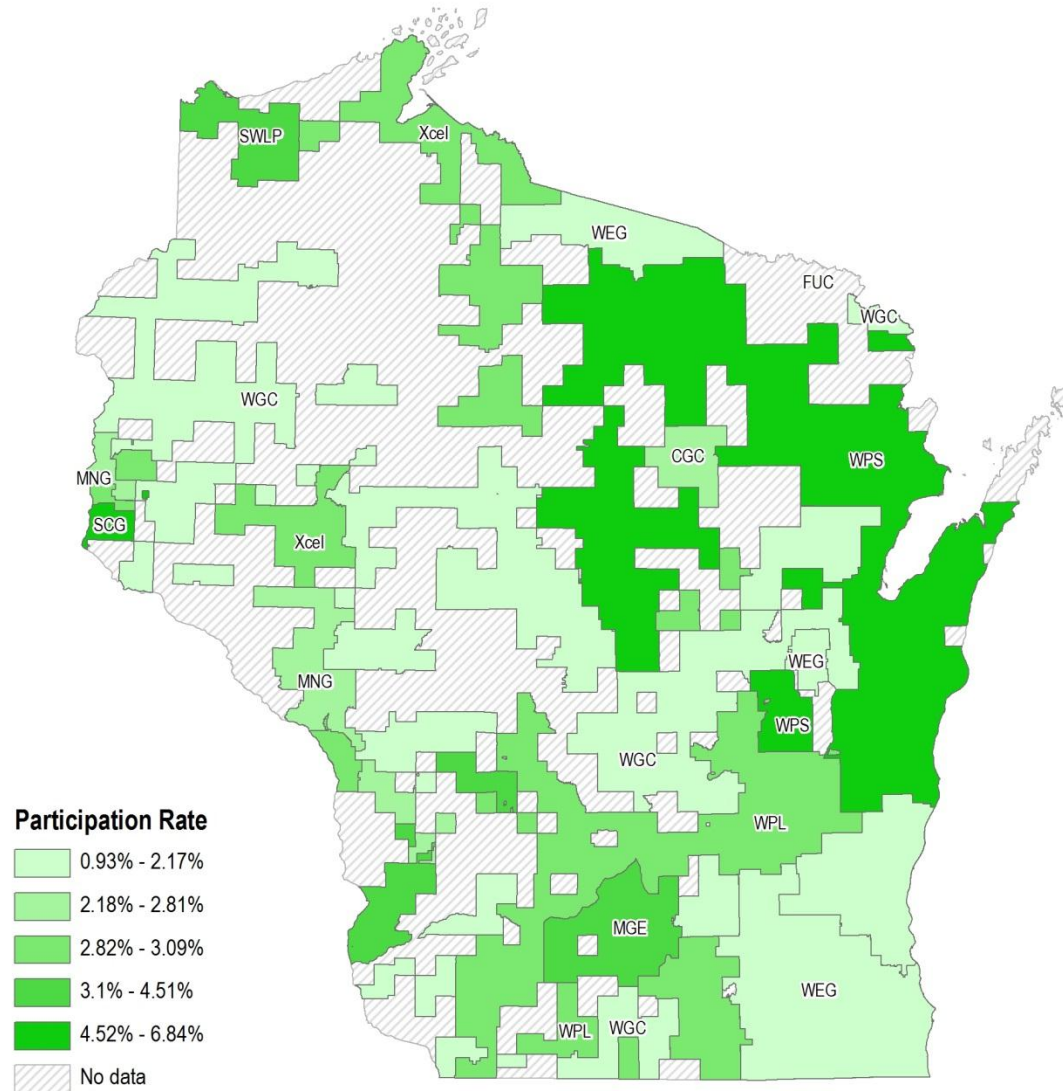
*Commercial – Gas Territory*

**Commercial Per Capita Energy Bill Savings by Gas Territory**

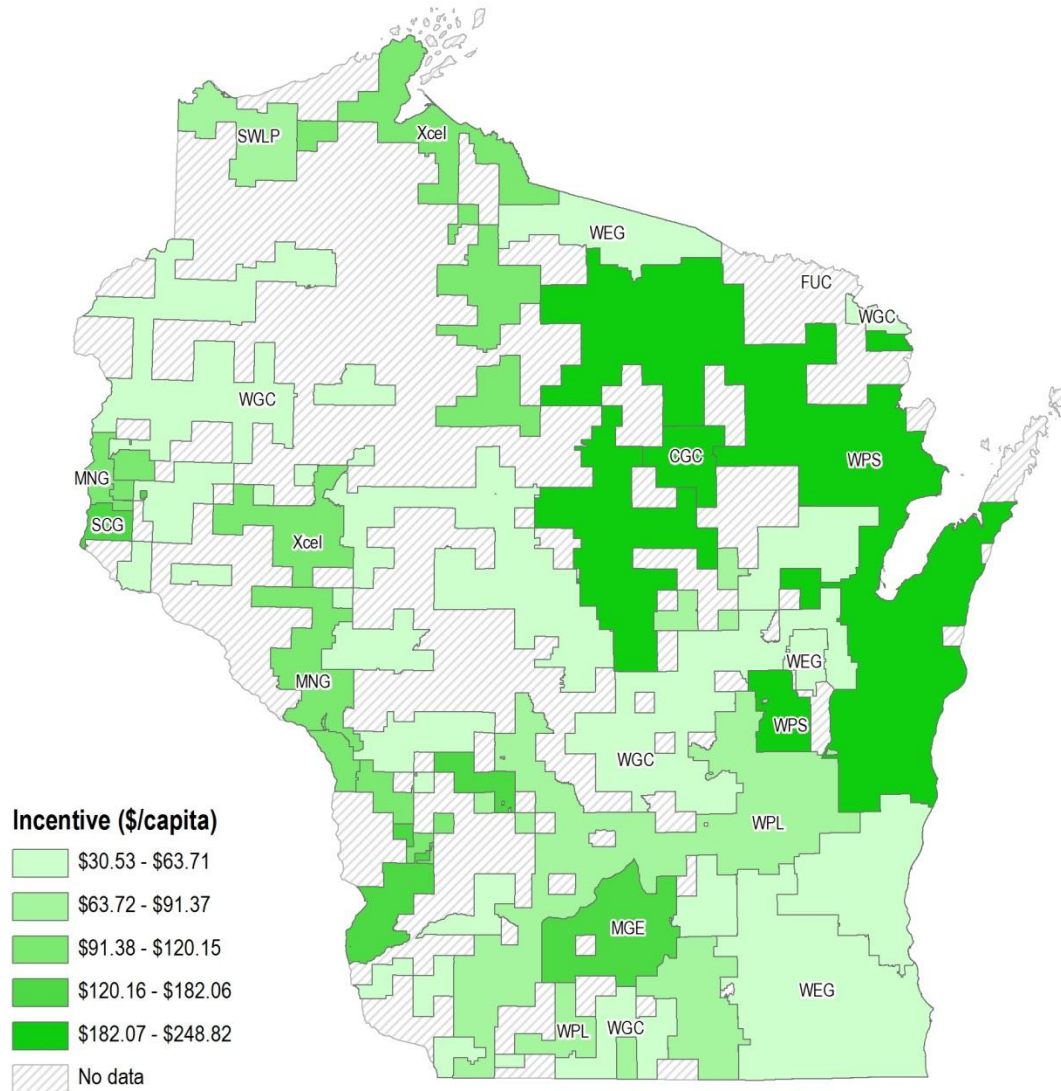




## Commercial Participation Rate by Gas Territory



## Commercial Per Capita Incentive Dollars Awarded by Gas Territory



**Table F-1. Savings and Participation by Electric Utility Territory and Segment**

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Adams-Columbia Electric Cooperative	Electric	Commercial	\$2,625.25	2.33%	\$67.96
Algoma Utility Commission	Electric	Commercial	\$860.81	7.93%	\$91.42
Arcadia Electric & Water Utility	Electric	Commercial	\$1,484.46	3.51%	\$72.22
Argyle Municipal Electric & Water Utility	Electric	Commercial	\$8.91	1.04%	\$2.86
Bangor Municipal Utility	Electric	Commercial	\$227.18	1.10%	\$15.74
Barron Electric Cooperative (Not Participating)	Electric	Commercial			
Barron Light and Water Utility	Electric	Commercial	\$157.28	2.28%	\$19.34
Belmont Municipal Water and Electric Utility	Electric	Commercial	\$210.64	1.49%	\$6.21
Benton Municipal Electric and Water Utility	Electric	Commercial	\$160.27	2.41%	\$48.48
Black Earth Electric Utility	Electric	Commercial	\$64.06	2.11%	\$13.89
Black River Falls Municipal Elec & Water	Electric	Commercial	\$1,906.26	4.84%	\$97.68
Bloomer City of Electric Utility	Electric	Commercial	\$632.68	2.87%	\$129.72
Boscobel Municipal Utilities	Electric	Commercial	\$1,216.85	7.94%	\$191.70
Brodhead Water and Light Commission	Electric	Commercial	\$204.37	2.58%	\$30.28
Cadott Light and Water Mun Utility	Electric	Commercial	\$199.78	5.15%	\$58.49
Cashton Municipal Electric and Water Utility	Electric	Commercial	\$311.35	4.03%	\$93.05
Cedarburg Light and Water Utility	Electric	Commercial	\$764.08	1.82%	\$46.07
Central Wisconsin Electric Cooperative (Not Participating)	Electric	Commercial		0.20%	\$1.07
Centuria Municipal Electric Utility	Electric	Commercial	\$798.52	4.17%	\$82.85
Chippewa Valley Electric Cooperative (Not Participating)	Electric	Commercial	\$0.00	0.21%	\$1.16
Clark Electric Cooperative	Electric	Commercial	\$1,871.00	25.29%	\$165.02
Clintonville Water & Electric Utility	Electric	Commercial	\$65.98	0.86%	\$14.85
Clintonville Water & Electric Utility	Electric	Commercial	\$1,283.04	1.29%	\$49.48
Columbus Water and Light Department	Electric	Commercial	\$2,416.38	3.33%	\$86.13
Consolidated Water Power Company	Electric	Commercial			
Cornell Municipal Water and Electric Utility	Electric	Commercial	\$261.33	1.40%	\$18.71
Cuba City Electric & Water Utility	Electric	Commercial	\$1,660.73	6.12%	\$73.17
Cumberland Municipal Utility	Electric	Commercial	\$1,002.42	3.62%	\$63.97
Dahlberg Light and Power Company	Electric	Commercial	\$483.93	1.50%	\$35.70

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Dunn Energy Cooperative (Not Participating)	Electric	Commercial			
Eagle River Light and Water Commission	Electric	Commercial	\$1,318.42	10.83%	\$146.03
East Central Energy Cooperative (Not Participating)	Electric	Commercial			
Eau Claire Electric Cooperative	Electric	Commercial	\$1,017.96	6.63%	\$114.25
Elkhorn Light and Water	Electric	Commercial	\$830.91	2.56%	\$58.62
Elroy Municipal Electric and Water Utility	Electric	Commercial	\$166.99	3.01%	\$34.17
Evansville Water & Light Department	Electric	Commercial	\$325.58	2.02%	\$29.56
Fennimore Water and Light Plant	Electric	Commercial	\$781.37	4.92%	\$111.85
Florence Utility Commission	Electric	Commercial	\$272.68	3.23%	\$32.55
Gresham Municipal Light and Power Utility	Electric	Commercial	\$226.84	2.37%	\$34.11
Hartford City of Utilities	Electric	Commercial	\$440.97	3.53%	\$73.66
Hazel Green Municipal Utility	Electric	Commercial			
Hustisford Utilities	Electric	Commercial	\$1,390.54	3.92%	\$92.89
Jackson Electric Cooperative (Not Participating)	Electric	Commercial			
Jefferson Water and Electric Department	Electric	Commercial	\$586.57	1.15%	\$142.30
Juneau Utility Commission	Electric	Commercial	\$1,079.91	8.76%	\$238.01
Kaukauna Utilities	Electric	Commercial	\$2,056.57	6.10%	\$150.89
Kiel Electric Utility	Electric	Commercial	\$544.90	3.49%	\$110.74
La Farge Municipal Electric Utility	Electric	Commercial	\$190.39	1.54%	\$34.65
Lake Mills Light and Water Department	Electric	Commercial	\$1,808.78	3.43%	\$91.02
Lodi Mun Light and Water Utility	Electric	Commercial	\$1,585.19	3.46%	\$170.52
Madison Gas and Electric Company	Electric	Commercial	\$2,046.23	2.03%	\$101.05
Manitowoc Public Utilities	Electric	Commercial	\$555.37	2.63%	\$56.40
Marshfield Utilities	Electric	Commercial	\$1,838.37	8.32%	\$185.88
Mazomanie Electric Utility	Electric	Commercial	\$5,956.70	3.54%	\$47.32
Medford Electric Utility	Electric	Commercial	\$798.43	5.03%	\$129.69
Menasha Electric & Water Utilities	Electric	Commercial	\$5,952.46	3.46%	\$158.63
Mount Horeb Electric Utility	Electric	Commercial	\$591.77	3.34%	\$92.89
Muscoda Light and Water Utility	Electric	Commercial	\$204.20	2.43%	\$20.53
New Glarus Light and Water Works	Electric	Commercial	\$481.62	5.56%	\$94.53
New Holstein Public Utility	Electric	Commercial	\$1,640.31	4.98%	\$131.49



Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
New Lisbon City of Elec & Water Utility	Electric	Commercial	\$96.39	1.19%	\$11.79
New London Electric & Water Utility	Electric	Commercial	\$1,168.44	6.41%	\$120.87
New Richmond Municipal Electric Utility	Electric	Commercial	\$1,355.94	4.83%	\$99.39
North Central Power Company Inc.	Electric	Commercial	\$559.88	1.15%	\$32.47
Northern States Power Company (Xcel Energy-Wis)	Electric	Commercial	\$988.14	2.72%	\$69.22
Northwestern Wisconsin Electric Co.	Electric	Commercial	\$655.54	2.13%	\$44.85
Oakdale Electric Cooperative	Electric	Commercial	\$420.57	1.72%	\$64.67
Oconomowoc City of Utilities	Electric	Commercial	\$1,548.12	3.62%	\$114.63
Oconto Electric Cooperative	Electric	Commercial	\$2,105.88	16.25%	\$273.97
Oconto Falls Water And Light Commission	Electric	Commercial	\$3,156.27	8.14%	\$179.39
Pardeeville Public Utilities	Electric	Commercial	\$566.41	2.96%	\$45.39
Pierce-Pepin Electric Cooperative	Electric	Commercial	\$2,969.22	19.25%	\$289.59
Pioneer Power and Light Company	Electric	Commercial	\$151.87	0.62%	\$6.89
Plymouth Utilities	Electric	Commercial	\$3,438.50	4.85%	\$118.10
Polk-Burnett Electric Cooperative	Electric	Commercial	\$376.93	1.01%	\$66.91
Prairie Du Sac Municipal Electric & Water	Electric	Commercial	\$752.78	3.76%	\$102.99
Price Electric Cooperative	Electric	Commercial	\$248.08	1.25%	\$16.11
Princeton Municipal Water & Electric Utility	Electric	Commercial	\$113.83	3.83%	\$21.20
Reedsburg Utility Commission	Electric	Commercial	\$1,197.83	3.16%	\$85.56
Rice Lake Municipal Water & Electric Utility	Electric	Commercial	\$1,695.02	6.94%	\$149.96
Richland Center Electric Utility	Electric	Commercial	\$619.03	2.54%	\$59.07
Richland Electric Cooperative	Electric	Commercial	\$340.06	3.67%	\$41.04
River Falls Municipal Utilities	Electric	Commercial	\$1,312.31	9.30%	\$142.75
Riverland Energy Cooperative (Not Participating)	Electric	Commercial			
Rock Energy Cooperative	Electric	Commercial	\$262.94	1.57%	\$22.13
Sauk City Municipal Water & Light Utility	Electric	Commercial	\$723.80	3.65%	\$86.40
Scenic Rivers Energy Cooperative	Electric	Commercial	\$1,650.16	7.27%	\$101.75
Shawano Municipal Utilities	Electric	Commercial	\$610.12	4.36%	\$89.66
Sheboygan Falls Utilities	Electric	Commercial	\$513.65	4.47%	\$91.92
Shullsburg Electric Utility	Electric	Commercial	\$110.05	2.60%	\$30.02
Slinger Utilities	Electric	Commercial	\$342.15	4.50%	\$61.20

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Spooner Municipal Utilities	Electric	Commercial	\$1,615.69	1.91%	\$95.52
St Croix Electric Cooperative	Electric	Commercial	\$101.35	0.75%	\$6.32
Stoughton Electric Utility	Electric	Commercial	\$1,146.34	4.98%	\$97.93
Stratford Water & Electric Utility	Electric	Commercial	\$384.62	3.13%	\$73.66
Sturgeon Bay Utilities	Electric	Commercial	\$463.44	2.62%	\$42.62
Sun Prairie Water & Light Commission	Electric	Commercial	\$4,011.81	2.88%	\$171.08
Superior Water Light and Power Co.	Electric	Commercial	\$375.99	2.91%	\$48.11
Taylor Electric Cooperative	Electric	Commercial	\$677.94	5.38%	\$103.04
Trempealeau Muni Electric & Water Utility	Electric	Commercial	\$142.92	1.18%	\$10.51
Two Rivers Water & Light Utility	Electric	Commercial	\$2,654.31	10.36%	\$295.26
Vernon Electric Cooperative	Electric	Commercial	\$1,273.39	1.98%	\$161.32
Viola Municipal Water and Electric Utility	Electric	Commercial	\$471.19	1.12%	\$28.09
Waterloo Water and Light Commission	Electric	Commercial	\$2,504.00	3.40%	\$114.63
Waunakee Water and Light Commission	Electric	Commercial	\$665.98	4.43%	\$55.36
Waupun Public Utilities	Electric	Commercial	\$2,603.99	7.31%	\$187.53
Westby (City of) Municipal Electric & Water Utility	Electric	Commercial	\$6,282.67	6.73%	\$429.86
Westfield Milling & Electric Light Company	Electric	Commercial	\$213.95	3.33%	\$16.13
Whitehall Municipal Electric Utility	Electric	Commercial	\$16,906.08	2.00%	\$679.11
Wisconsin Dells Municipal Electric Utility	Electric	Commercial	\$392.95	1.60%	\$44.66
Wisconsin Electric Power Company (WE Energies)	Electric	Commercial	\$1,401.95	2.48%	\$76.92
Wisconsin Electric Power Company (WE Energies)	Electric	Commercial	\$12.72	0.01%	\$0.53
Wisconsin Power and Light (Alliant)	Electric	Commercial	\$904.93	2.10%	\$58.90
Wisconsin Public Service Corporation	Electric	Commercial	\$1,582.80	3.49%	\$152.45
Wisconsin Public Service Corporation (Integrus Energy Group)	Electric	Commercial	\$10.67	0.04%	\$0.22
Wisconsin Rapids Waterworks & Light	Electric	Commercial	\$1,272.78	5.22%	\$113.13
Wonewoc Municipal Electric & Water Utility	Electric	Commercial	\$513.52	1.18%	\$20.04
City Gas Company	Gas	Commercial	\$7.16	2.71%	\$218.00
Ericksons Oil Products Inc	Gas	Commercial			
Florence Utility Commission	Gas	Commercial			

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Madison Gas and Electric Company	Gas	Commercial	\$1,158.30	3.50%	\$182.06
Midwest Natural Gas Incorporated	Gas	Commercial	\$785.47	2.81%	\$120.15
Northern States Power Company (Xcel Energy-Wis)	Gas	Commercial	\$313.41	3.09%	\$98.59
Roger Brandenburg	Gas	Commercial			
St Croix Valley Natural Gas Company Inc.	Gas	Commercial	\$474.96	6.84%	\$129.66
Superior Water Light and Power Co.	Gas	Commercial	\$332.68	4.51%	\$79.37
Wisconsin Electric Power Company (WE Energies)	Gas	Commercial	\$130.65	0.93%	\$30.53
Wisconsin Electric Power Company (WE Energies)	Gas	Commercial	\$0.38	0.00%	\$0.02
Wisconsin Gas LLC (WE Energies)	Gas	Commercial	\$179.71	2.17%	\$63.71
Wisconsin Power and Light (Alliant)	Gas	Commercial	\$588.02	2.89%	\$91.37
Wisconsin Public Service Corporation	Gas	Commercial	\$577.20	5.31%	\$248.82
Wisconsin Public Service Corporation (Integrus Energy Group)	Gas	Commercial	\$0.00	0.05%	\$0.34
Adams-Columbia Electric Cooperative	Electric	Industrial	\$343.58	0.28%	\$12.55
Algoma Utility Commission	Electric	Industrial	\$82,076.46	100.00%	\$1,900.00
Arcadia Electric & Water Utility	Electric	Industrial	\$29,294.48	3.77%	\$366.79
Argyle Municipal Electric & Water Utility	Electric	Industrial			
Bangor Municipal Utility	Electric	Industrial			
Barron Electric Cooperative (Not Participating)	Electric	Industrial			
Barron Light and Water Utility	Electric	Industrial			
Belmont Municipal Water and Electric Utility	Electric	Industrial			
Black Earth Electric Utility	Electric	Industrial			
Bloomer City of Electric Utility	Electric	Industrial			
Brodhead Water and Light Commission	Electric	Industrial			
Cadott Light and Water Mun Utility	Electric	Industrial			
Cedarburg Light and Water Utility	Electric	Industrial	\$0.00	50.00%	\$975.00
Central Wisconsin Electric Cooperative (Not Participating)	Electric	Industrial			
Chippewa Valley Electric Cooperative (Not Participating)	Electric	Industrial			
Clintonville Water & Electric Utility	Electric	Industrial			
Clintonville Water & Electric Utility	Electric	Industrial	\$1,145.09	18.18%	\$1,244.86

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Columbus Water and Light Department	Electric	Industrial	\$386,171.69	300.00%	\$8,100.00
Consolidated Water Power Company	Electric	Industrial	\$1,864,628.28	100.00%	\$63,342.00
Cornell Municipal Water and Electric Utility	Electric	Industrial			
Cumberland Municipal Utility	Electric	Industrial	\$14,163.39	13.04%	\$1,058.87
Dahlberg Light and Power Company	Electric	Industrial			
Dunn Energy Cooperative (Not Participating)	Electric	Industrial			
Eau Claire Electric Cooperative	Electric	Industrial			
Elkhorn Light and Water	Electric	Industrial	\$10,830.70	6.00%	\$327.49
Elroy Municipal Electric and Water Utility	Electric	Industrial			
Evansville Water & Light Department	Electric	Industrial	\$44,718.96	100.00%	\$2,082.39
Fennimore Water and Light Plant	Electric	Industrial	\$1,937.55	3.57%	\$392.86
Gresham Municipal Light and Power Utility	Electric	Industrial			
Hartford City of Utilities	Electric	Industrial	\$26,447.99	128.57%	\$5,187.89
Hazel Green Municipal Utility	Electric	Industrial			
Jackson Electric Cooperative (Not Participating)	Electric	Industrial			
Jefferson Water and Electric Department	Electric	Industrial	\$15,407.65	66.67%	\$788.33
Juneau Utility Commission	Electric	Industrial	\$693.62	50.00%	\$1,375.00
Kaukauna Utilities	Electric	Industrial	\$426,304.11	125.00%	\$16,080.66
Kiel Electric Utility	Electric	Industrial	\$24,165.09	31.25%	\$1,405.98
La Farge Municipal Electric Utility	Electric	Industrial			
Madison Gas and Electric Company	Electric	Industrial	\$152,793.74	47.83%	\$3,792.01
Manitowoc Public Utilities	Electric	Industrial	\$24,845.69	20.99%	\$1,407.56
Marshfield Utilities	Electric	Industrial	\$8,419.27	16.36%	\$2,044.31
Mazomanie Electric Utility	Electric	Industrial	\$3,367.19	5.88%	\$14.71
Medford Electric Utility	Electric	Industrial	\$186.91	4.05%	\$20.69
Menasha Electric & Water Utilities	Electric	Industrial	\$560,687.41	100.00%	\$26,167.46
Muscoda Light and Water Utility	Electric	Industrial	\$127,017.83	100.00%	\$14,125.00
New Lisbon City of Elec & Water Utility	Electric	Industrial	\$5,410.10	9.09%	\$242.05
New London Electric & Water Utility	Electric	Industrial	\$5,113.04	80.00%	\$395.40
New Richmond Municipal Electric Utility	Electric	Industrial	\$3,161.69	100.00%	\$3,598.38
North Central Power Company Inc.	Electric	Industrial			

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Northern States Power Company (Xcel Energy-Wis)	Electric	Industrial	\$174,768.33	82.00%	\$5,696.84
Northwestern Wisconsin Electric Co.	Electric	Industrial			
Oakdale Electric Cooperative	Electric	Industrial	\$56,887.42	10.00%	\$1,812.28
Oconomowoc City of Utilities	Electric	Industrial	\$56,196.40	116.67%	\$3,719.92
Oconto Electric Cooperative	Electric	Industrial			
Pardeeville Public Utilities	Electric	Industrial			
Pierce-Pepin Electric Cooperative	Electric	Industrial	\$1,754.22	11.11%	\$55.56
Pioneer Power and Light Company	Electric	Industrial			
Plymouth Utilities	Electric	Industrial	\$185,341.95	100.00%	\$7,996.75
Polk-Burnett Electric Cooperative	Electric	Industrial	\$1,464.03	20.00%	\$131.20
Prairie Du Sac Municipal Electric & Water	Electric	Industrial			
Princeton Municipal Water & Electric Utility	Electric	Industrial			
Reedsburg Utility Commission	Electric	Industrial	\$25,964.63	37.50%	\$1,666.48
Rice Lake Municipal Water & Electric Utility	Electric	Industrial	\$1,036.76	2.68%	\$126.41
Richland Center Electric Utility	Electric	Industrial	\$141,424.61	75.00%	\$9,981.25
River Falls Municipal Utilities	Electric	Industrial	\$11,527.74	100.00%	\$1,462.50
Rock Energy Cooperative	Electric	Industrial	\$29,139.14	2.86%	\$1,686.34
Sauk City Municipal Water & Light Utility	Electric	Industrial			
Scenic Rivers Energy Cooperative	Electric	Industrial	\$0.00	6.67%	\$80.00
Shawano Municipal Utilities	Electric	Industrial	\$601.34	2.41%	\$274.68
Sheboygan Falls Utilities	Electric	Industrial	\$17,441.28	7.14%	\$1,637.68
Shullsburg Electric Utility	Electric	Industrial			
Spooner Municipal Utilities	Electric	Industrial			
St Croix Electric Cooperative	Electric	Industrial			
Stoughton Electric Utility	Electric	Industrial	-\$2,820.88	66.67%	\$3,056.22
Stratford Water & Electric Utility	Electric	Industrial	\$12,268.96	20.00%	\$290.00
Sturgeon Bay Utilities	Electric	Industrial	\$0.00	100.00%	\$1,200.00
Sun Prairie Water & Light Commission	Electric	Industrial	\$146,790.21	200.00%	\$5,065.00
Superior Water Light and Power Co.	Electric	Industrial	\$2,919.32	5.22%	\$135.14
Two Rivers Water & Light Utility	Electric	Industrial	\$35,082.36	100.00%	\$2,400.19
Waunakee Water and Light Commission	Electric	Industrial	\$19,683.38	50.00%	\$3,389.00
Waupun Public Utilities	Electric	Industrial	\$140,821.64	150.00%	\$4,557.50

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Westfield Milling & Electric Light Company	Electric	Industrial	\$213.24	6.25%	\$7.81
Whitehall Municipal Electric Utility	Electric	Industrial	\$92,720.61	50.00%	\$4,875.00
Wisconsin Electric Power Company (WE Energies)	Electric	Industrial	\$134,812.00	41.91%	\$4,545.47
Wisconsin Electric Power Company (WE Energies)	Electric	Industrial	\$384.85	0.74%	\$11.32
Wisconsin Power and Light (Alliant)	Electric	Industrial	\$43,815.60	11.94%	\$1,873.62
Wisconsin Public Service Corporation	Electric	Industrial	\$233,753.62	79.07%	\$10,380.21
Wisconsin Public Service Corporation (Integrus Energy Group)	Electric	Industrial	\$601.06	0.93%	\$38.78
Wisconsin Rapids Waterworks & Light	Electric	Industrial	\$63,006.74	100.00%	\$1,722.40
Wonewoc Municipal Electric & Water Utility	Electric	Industrial			
City Gas Company	Gas	Industrial			
Madison Gas and Electric Company	Gas	Industrial	\$18,364.57	31.76%	\$2,620.76
Midwest Natural Gas Incorporated	Gas	Industrial	\$782.92	4.76%	\$370.79
Northern States Power Company (Xcel Energy-Wis)	Gas	Industrial	\$49,392.41	148.00%	\$9,414.43
Superior Water Light and Power Co.	Gas	Industrial	\$3,141.23	5.56%	\$151.56
Wisconsin Electric Power Company (WE Energies)	Gas	Industrial	\$61,311.55	19.56%	\$2,366.35
Wisconsin Electric Power Company (WE Energies)	Gas	Industrial	\$0.00	0.44%	\$0.40
Wisconsin Gas LLC (WE Energies)	Gas	Industrial	\$43,144.64	38.09%	\$4,042.34
Wisconsin Power and Light (Alliant)	Gas	Industrial	\$24,413.00	23.86%	\$2,829.40
Wisconsin Public Service Corporation	Gas	Industrial	\$20,625.30	10.40%	\$1,434.13
Wisconsin Public Service Corporation (Integrus Energy Group)	Gas	Industrial		0.11%	\$4.47
Adams-Columbia Electric Cooperative	Electric	Residential	\$23.27	1.22%	\$2.23
Algoma Utility Commission	Electric	Residential	\$47.10	2.92%	\$4.33
Arcadia Electric & Water Utility	Electric	Residential	\$15.66	0.58%	\$1.90
Argyle Municipal Electric & Water Utility	Electric	Residential	\$30.05	1.49%	\$2.97
Bangor Municipal Utility	Electric	Residential	\$24.71	1.20%	\$3.28
Barron Electric Cooperative (Not Participating)	Electric	Residential	\$0.72	0.04%	\$0.25
Barron Light and Water Utility	Electric	Residential	\$6.32	0.41%	\$1.47
Belmont Municipal Water and Electric Utility	Electric	Residential	\$8.66	0.96%	\$1.01

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Benton Municipal Electric and Water Utility	Electric	Residential	\$23.90	1.37%	\$5.61
Black Earth Electric Utility	Electric	Residential	\$15.05	1.40%	\$1.91
Black River Falls Municipal Elec & Water	Electric	Residential	\$21.26	0.87%	\$3.44
Bloomer City of Electric Utility	Electric	Residential	\$29.19	1.66%	\$3.97
Boscobel Municipal Utilities	Electric	Residential	\$42.22	1.48%	\$6.54
Brodhead Water and Light Commission	Electric	Residential	\$46.88	6.08%	\$5.70
Cadott Light and Water Mun Utility	Electric	Residential	\$26.47	1.38%	\$5.55
Cashton Municipal Electric and Water Utility	Electric	Residential	\$11.46	0.61%	\$1.12
Cedarburg Light and Water Utility	Electric	Residential	\$168.25	8.61%	\$14.95
Central Wisconsin Electric Cooperative (Not Participating)	Electric	Residential			
Centuria Municipal Electric Utility	Electric	Residential	\$33.60	0.80%	\$7.55
Chippewa Valley Electric Cooperative (Not Participating)	Electric	Residential		0.01%	\$0.11
Clark Electric Cooperative	Electric	Residential	\$24.28	1.19%	\$2.51
Clintonville Water & Electric Utility	Electric	Residential	\$16.30	0.13%	\$1.54
Clintonville Water & Electric Utility	Electric	Residential	\$11.51	0.61%	\$1.80
Columbus Water and Light Department	Electric	Residential	\$74.46	6.06%	\$7.29
Consolidated Water Power Company	Electric	Residential	\$49.81	3.26%	\$4.62
Cornell Municipal Water and Electric Utility	Electric	Residential	\$42.35	1.39%	\$4.99
Cuba City Electric & Water Utility	Electric	Residential	\$101.32	1.61%	\$6.02
Cumberland Municipal Utility	Electric	Residential	\$8.56	0.26%	\$1.01
Dahlberg Light and Power Company	Electric	Residential	\$6.41	0.28%	\$0.56
Dunn Energy Cooperative (Not Participating)	Electric	Residential		0.03%	\$0.09
Eagle River Light and Water Commission	Electric	Residential	\$37.41	1.30%	\$3.37
East Central Energy Cooperative (Not Participating)	Electric	Residential	\$0.11	0.02%	\$0.01
Eau Claire Electric Cooperative	Electric	Residential	\$88.85	2.27%	\$5.95
Elkhorn Light and Water	Electric	Residential	\$17.58	0.66%	\$1.97
Elroy Municipal Electric and Water Utility	Electric	Residential	\$10.83	0.71%	\$1.10
Evansville Water & Light Department	Electric	Residential	\$104.82	6.86%	\$10.29
Fennimore Water and Light Plant	Electric	Residential	\$42.65	1.24%	\$6.14



Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Florence Utility Commission	Electric	Residential	\$9.49	0.62%	\$0.70
Gresham Municipal Light and Power Utility	Electric	Residential	\$13.15	1.25%	\$1.07
Hartford City of Utilities	Electric	Residential	\$63.46	2.10%	\$5.65
Hazel Green Municipal Utility	Electric	Residential	\$24.70	0.74%	\$5.60
Hustisford Utilities	Electric	Residential	\$45.11	2.82%	\$3.35
Jackson Electric Cooperative (Not Participating)	Electric	Residential	\$1.70	0.10%	\$1.18
Jefferson Water and Electric Department	Electric	Residential	\$73.84	7.25%	\$8.71
Juneau Utility Commission	Electric	Residential	\$37.36	1.91%	\$3.72
Kaukauna Utilities	Electric	Residential	\$129.63	10.73%	\$15.57
Kiel Electric Utility	Electric	Residential	\$40.13	2.78%	\$5.71
La Farge Municipal Electric Utility	Electric	Residential			
Lake Mills Light and Water Department	Electric	Residential	\$55.55	3.11%	\$6.01
Lodi Mun Light and Water Utility	Electric	Residential	\$97.42	7.71%	\$10.20
Madison Gas and Electric Company	Electric	Residential	\$154.87	4.60%	\$15.77
Manitowoc Public Utilities	Electric	Residential	\$61.04	2.69%	\$6.25
Marshfield Utilities	Electric	Residential	\$84.24	8.64%	\$10.22
Mazomanie Electric Utility	Electric	Residential	\$40.20	1.49%	\$4.00
Medford Electric Utility	Electric	Residential	\$13.04	0.77%	\$2.32
Menasha Electric & Water Utilities	Electric	Residential	\$138.56	7.46%	\$12.30
Mount Horeb Electric Utility	Electric	Residential	\$70.60	4.05%	\$7.22
Muscoda Light and Water Utility	Electric	Residential	\$27.46	1.68%	\$3.40
New Glarus Light and Water Works	Electric	Residential	\$50.05	2.09%	\$5.70
New Holstein Public Utility	Electric	Residential	\$143.83	13.02%	\$16.23
New Lisbon City of Elec & Water Utility	Electric	Residential	\$10.19	0.60%	\$0.97
New London Electric & Water Utility	Electric	Residential	\$39.09	1.55%	\$4.90
New Richmond Municipal Electric Utility	Electric	Residential	\$58.82	4.07%	\$8.38
North Central Power Company Inc.	Electric	Residential		0.04%	\$0.04
Northern States Power Company (Xcel Energy-Wis)	Electric	Residential	\$51.83	1.68%	\$5.43
Northwestern Wisconsin Electric Co.	Electric	Residential	\$13.65	0.27%	\$1.07
Oakdale Electric Cooperative	Electric	Residential	\$13.88	0.96%	\$1.46
Oconomowoc City of Utilities	Electric	Residential	\$189.34	7.11%	\$14.65
Oconto Electric Cooperative	Electric	Residential	\$32.85	1.08%	\$3.01



Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Oconto Falls Water And Light Commission	Electric	Residential	\$45.53	1.12%	\$4.52
Pardeeville Public Utilities	Electric	Residential	\$27.72	1.06%	\$1.65
Pierce-Pepin Electric Cooperative	Electric	Residential	\$29.48	1.64%	\$2.92
Pioneer Power and Light Company	Electric	Residential	\$9.26	0.61%	\$0.83
Plymouth Utilities	Electric	Residential	\$44.37	2.35%	\$7.12
Polk-Burnett Electric Cooperative	Electric	Residential	\$2.16	0.06%	\$0.29
Prairie Du Sac Municipal Electric & Water	Electric	Residential	\$48.97	5.85%	\$6.07
Price Electric Cooperative	Electric	Residential	\$8.77	0.88%	\$0.87
Princeton Municipal Water & Electric Utility	Electric	Residential	\$12.17	1.04%	\$1.30
Reedsburg Utility Commission	Electric	Residential	\$72.29	4.13%	\$7.47
Rice Lake Municipal Water & Electric Utility	Electric	Residential	\$14.24	0.97%	\$2.45
Richland Center Electric Utility	Electric	Residential	\$26.01	0.94%	\$1.99
Richland Electric Cooperative	Electric	Residential	\$18.57	0.97%	\$2.26
River Falls Municipal Utilities	Electric	Residential	\$105.90	2.01%	\$15.12
Riverland Energy Cooperative (Not Participating)	Electric	Residential	\$4.22	0.12%	\$0.88
Rock Energy Cooperative	Electric	Residential	\$42.23	2.54%	\$3.99
Sauk City Municipal Water & Light Utility	Electric	Residential	\$63.00	4.75%	\$6.06
Scenic Rivers Energy Cooperative	Electric	Residential	\$7.89	0.60%	\$0.77
Shawano Municipal Utilities	Electric	Residential	\$15.68	0.69%	\$2.06
Sheboygan Falls Utilities	Electric	Residential	\$74.80	2.09%	\$9.32
Shullsburg Electric Utility	Electric	Residential	\$2.69	0.34%	\$0.39
Slinger Utilities	Electric	Residential	\$75.90	6.43%	\$7.22
Spooner Municipal Utilities	Electric	Residential	\$22.48	0.39%	\$1.95
St Croix Electric Cooperative	Electric	Residential	\$21.63	0.42%	\$1.70
Stoughton Electric Utility	Electric	Residential	\$57.22	2.83%	\$6.57
Stratford Water & Electric Utility	Electric	Residential	\$51.44	3.23%	\$4.99
Sturgeon Bay Utilities	Electric	Residential	\$34.16	2.04%	\$4.30
Sun Prairie Water & Light Commission	Electric	Residential	\$132.45	1.78%	\$7.67
Superior Water Light and Power Co.	Electric	Residential	\$35.28	1.78%	\$4.99
Taylor Electric Cooperative	Electric	Residential	\$20.46	0.90%	\$2.68
Trempealeau Muni Electric & Water Utility	Electric	Residential	\$20.73	1.55%	\$1.87
Two Rivers Water & Light Utility	Electric	Residential	\$50.55	2.60%	\$5.53

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Vernon Electric Cooperative	Electric	Residential	\$6.50	0.17%	\$0.88
Viola Municipal Water and Electric Utility	Electric	Residential		0.31%	\$0.16
Waterloo Water and Light Commission	Electric	Residential	\$42.24	2.98%	\$4.50
Waunakee Water and Light Commission	Electric	Residential	\$251.80	4.15%	\$11.93
Waupun Public Utilities	Electric	Residential	\$27.25	1.87%	\$3.69
Westby (City of) Municipal Electric & Water Utility	Electric	Residential	\$20.56	1.12%	\$2.41
Westfield Milling & Electric Light Company	Electric	Residential	\$6.08	0.34%	\$1.62
Whitehall Municipal Electric Utility	Electric	Residential	\$81.44	1.22%	\$10.34
Wisconsin Dells Municipal Electric Utility	Electric	Residential	\$30.64	1.32%	\$3.65
Wisconsin Electric Power Company (WE Energies)	Electric	Residential	\$78.68	2.48%	\$7.36
Wisconsin Electric Power Company (WE Energies)	Electric	Residential	\$0.50	0.00%	\$0.07
Wisconsin Power and Light (Alliant)	Electric	Residential	\$65.47	3.32%	\$6.61
Wisconsin Public Service Corporation	Electric	Residential	\$72.42	3.86%	\$10.15
Wisconsin Public Service Corporation (Integrus Energy Group)	Electric	Residential	\$0.38	0.00%	\$0.02
Wisconsin Rapids Waterworks & Light	Electric	Residential	\$65.83	2.97%	\$7.54
Wonewoc Municipal Electric & Water Utility	Electric	Residential	\$35.52	0.94%	\$2.65
City Gas Company	Gas	Residential	\$25.10	1.28%	\$5.02
Ericksons Oil Products Inc	Gas	Residential			
Florence Utility Commission	Gas	Residential	\$0.97	0.23%	\$0.29
Madison Gas and Electric Company	Gas	Residential	\$86.72	4.95%	\$17.82
Midwest Natural Gas Incorporated	Gas	Residential	\$20.71	1.07%	\$4.67
Northern States Power Company (Xcel Energy-Wis)	Gas	Residential	\$45.00	2.12%	\$9.24
Roger Brandenburg	Gas	Residential			
St Croix Valley Natural Gas Company Inc.	Gas	Residential	\$37.62	1.52%	\$9.44
Superior Water Light and Power Co.	Gas	Residential	\$27.26	1.92%	\$5.86
Wisconsin Electric Power Company (WE Energies)	Gas	Residential	\$12.43	0.73%	\$2.09
Wisconsin Electric Power Company (WE Energies)	Gas	Residential	\$0.01	0.00%	\$0.00

Territory	Utility Type	Segment	Per Capita Lifecycle Bill Savings (\$)	Customer Participation Rate (%)	Per Capita Incentive (\$)
Wisconsin Gas LLC (WE Energies)	Gas	Residential	\$33.70	1.40%	\$6.00
Wisconsin Power and Light (Alliant)	Gas	Residential	\$44.31	4.76%	\$8.38
Wisconsin Public Service Corporation	Gas	Residential	\$46.33	3.70%	\$14.68
Wisconsin Public Service Corporation (Integrus Energy Group)	Gas	Residential	\$0.38	0.00%	\$0.03

## Appendix G. CY 2013 Statewide Total Energy Efficiency Savings and Participation

Table G-1 presents CY 2013 Focus on Energy, Northern States Power, We Energies, Wisconsin Power and Light, as well as Wisconsin Public Service Energy Efficiency program savings and participation. Utilities may run voluntary programs, with authorization from the PSC, using additional funds to those they contribute to Focus on Energy.

**Table G-1. CY 2013 Wisconsin Total Energy Efficiency Gross Annual Savings and Participation**

Program	Participation	kW	kWh	Therms
Focus on Energy	1,689,034 <sup>1</sup>	107,111	823,645,123	21,124,650
Northern States Power <sup>2</sup>	2,686	-	-	-
We Energies <sup>3</sup>	159	-	-	43,884
Wisconsin Power and Light <sup>4</sup>	25	747	9,359,878	-
Wisconsin Public Service <sup>5</sup>	1,606	931	4,885,474	105,904
<b>Total<sup>6</sup></b>	<b>16,893,505</b>	<b>108,789</b>	<b>837,890,475</b>	<b>21,274,438</b>

<sup>1</sup>Includes estimated Residential Lighting and Appliance Program participation estimate of 1,601,063.

<sup>2</sup>Northern States Power's Focus on Energy Bonus Programs (participation= 1,312), Natural Gas High-Efficiency Program (participation= 1,173), and Small Business Community Conservation Program (participation= 201). See Docket 4220-GF-123 for additional details. No Savings reported, as savings have been credited to Focus on Energy.

<sup>3</sup>We Energies' Residential Assistance Natural Gas Program. See Docket 6630-GF-123 for additional details.

<sup>4</sup>Wisconsin Power and Light's Shared Savings Program. See Docket 6680-GF-133 for additional details.

<sup>5</sup>Wisconsin Public Service's Territory Wide and Focus on Energy Bonus Programs. See Docket 6690-UR 119 for additional details. Does not include Focus on Energy Bonus Program Savings as they are reported by Focus on Energy.

<sup>6</sup>Does not double count Focus on Energy Bonus Programs in Northern States Power and Wisconsin Public Service territories.

## Appendix H. 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 H-1 lists first-year annual savings: gross claimed, gross verified, and verified net. In CY 2013, on an annual gross claimed basis prior to verification, Focus on Energy achieved a total of 823,645,123 kWh savings and 21,124,650 therm savings.

**Table H-1. CY 2013 First-Year Annual Savings by Segment<sup>1</sup>**

		Nonresidential	Residential	Total
Gross	kWh	383,937,330	439,707,793	823,645,123
	kW	38,371	68,740	107,111
	Therms	5,124,812	15,999,837	21,124,650
Verified Gross	kWh	375,444,357	465,825,160	841,269,517
	kW	47,762	78,381	126,143
	Therms	4,587,420	17,656,515	22,243,935
Verified Net	kWh	297,880,259	321,538,168	619,418,427
	kW	35,793	51,816	87,608
	Therms	3,412,565	14,064,701	17,477,267

<sup>1</sup> Totals may not match the sum of nonresidential and residential savings due to rounding.

Table H-2 summarizes the first-year annual savings for CY 2013, CY 2012, and CY 2011. The annual verified net electric, peak demand, and natural gas savings have increased from CY 2011 to CY 2013.

**Table H-2. First-Year Annual Verified Net Savings by Segment - CY 2011, CY 2012, and CY 2013<sup>1</sup>**

Calendar Year	Unit	Residential	Nonresidential	Total
2011	kWh	61,368,714	207,596,331	268,965,045
	kW	12,763	34,558	47,320
	Therms	2,088,348	9,163,081	11,251,429
2012	kWh	126,367,389	334,417,343	460,784,732
	kW	18,299	48,518	66,817
	Therms	3,273,440	13,203,348	16,476,788
2013	kWh	297,880,259	321,538,168	619,418,427
	kW	35,793	51,816	87,608
	Therms	3,412,565	14,064,701	17,477,267
Total	kWh	485,616,362	863,551,842	1,349,168,204
	kW	66,855	134,892	201,745
	Therms	8,774,353	36,431,130	45,205,484

<sup>1</sup> Includes Renewable Energy Measures. Totals may not match the sum of nonresidential and residential savings due to rounding.

Table H-3 presents the verified gross lifecycle savings achieved by Focus in CY 2011, CY 2012, and CY 2013. Lifecycle savings represent the savings the measures installed during CY 2013 will achieve during their useful lifetimes. Certain effective useful lifetimes (EULs) were carried forward from the 2011 and CY 2012 evaluations and verified in program tracking records. The Evaluation Team adjusted certain measure specific EULs per CY 2013 evaluation findings.

**Table H-3. CY 2011, CY 2012, and CY 2013 Verified Gross Life-cycle Savings by Segment <sup>1</sup>**

Calendar Year	Unit	Residential	Nonresidential	Total
2011	kWh	885,561,963	4,374,342,776	5,259,904,739
	kW	19,327	57,747	77,074
	Therms	60,435,758	185,735,647	246,171,405
2012	kWh	1,578,656,352	5,390,366,110	6,969,022,462
	kW	28,697	65,522	94,219
	Therms	80,249,406	273,269,275	353,518,681
2013	kWh	2,965,153,969	5,628,502,360	8,593,656,329
	kW	47,762	78,381	126,143
	Therms	90,424,987	227,669,922	318,094,910
<b>Total</b>	<b>kWh</b>	<b>5,429,372,284</b>	<b>15,393,211,246</b>	<b>20,822,583,530</b>
	<b>kW</b>	<b>95,786</b>	<b>201,650</b>	<b>297,436</b>
	<b>Therms</b>	<b>231,110,151</b>	<b>686,674,844</b>	<b>917,784,996</b>

<sup>1</sup>Includes Renewable Energy Measures. Totals may not match the sum of nonresidential and residential savings due to rounding.

## Summary of Savings by Program

Table H-4 summarizes the first-year annual savings by program.

**Table H-4. Summary of First-Year Annual Savings by Program, CY 2013<sup>1</sup>**

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
<b>Residential Programs</b>									
Multifamily Direct Install	4,190,116	220	214,182	4,066,166	214	207,637	4,066,166	214	207,637
Multifamily Energy Savings	8,037,638	1,008	374,445	8,037,638	1,008	374,445	6,075,125	751	261,427
Appliance Recycling	25,569,705	3,827	0	20,459,217	3,062	0	10,854,033	1,625	0
Residential Lighting and Appliance	314,956,253	24,724	89,482	311,837,741	34,685	105,447	253,757,862	27,699	31,441
Home Performance with ENERGY STAR	1,389,943	501	649,832	1,882,561	683	271,597	1,826,240	656	259,921
Assisted Home Performance with ENERGY STAR	395,178	173	212,403	400,803	173	212,309	400,803	173	212,309
New Homes	3,543,042	1,074	788,938	3,543,042	1,074	788,938	2,383,303	705	509,433
Residential Rewards	12,550,786	5,470	1,582,401	12,550,786	5,470	1,582,401	5,850,324	2,577	885,751
Enhanced Rewards	597,350	278	180,187	597,350	278	180,187	597,350	278	180,187
Express Energy Efficiency	12,707,319	1,096	1,032,943	12,069,052	1,116	864,461	12,069,052	1,116	864,461
<b>Residential Total</b>	<b>383,937,330</b>	<b>38,371</b>	<b>5,124,812</b>	<b>375,444,357</b>	<b>47,762</b>	<b>4,587,420</b>	<b>297,880,259</b>	<b>35,793</b>	<b>3,412,565</b>
<b>Nonresidential Programs</b>									
Business Incentive (New in CY 2013)	150,187,694	20,641	5,087,715	152,429,054	28,399	4,938,554	94,948,510	16,067	3,981,524
Business Incentive (Carryover)	24,004,623	4,470	1,453,315	24,055,036	4,713	1,454,468	25,524,978	5,001	1,543,347
Chain Stores and Franchises	53,206,722	9,077	1,176,558	53,495,479	9,031	1,144,921	28,544,068	4,765	575,922
Large Energy Users (New in CY 2013)	100,978,475	13,143	6,930,112	123,884,115	15,868	8,547,936	87,517,333	11,244	6,418,933
Large Energy Users (Carryover)	13,386,977	1,548	915,375	14,960,099	1,680	1,106,782	14,960,099	1,680	1,106,782
Small Business	92,429,075	18,120	130,132	92,455,544	18,021	131,421	66,033,437	12,433	111,766
Retrocommissioning	3,136,877	255	273,965	2,867,235	225	285,695	2,849,745	225	280,706
Design Assistance	1,065,500	120	11,405	1,065,500	120	11,405	524,216	65	9,082
Renewable Energy Competitive Incentive	1,311,849	1,367	21,261	613,099	323	35,332	635,784	335	36,639
<b>Nonresidential Total</b>	<b>439,707,793</b>	<b>68,740</b>	<b>15,999,837</b>	<b>465,825,160</b>	<b>78,381</b>	<b>17,656,515</b>	<b>321,538,168</b>	<b>51,816</b>	<b>14,064,701</b>
<b>Total All Programs</b>	<b>823,645,123</b>	<b>107,111</b>	<b>21,124,650</b>	<b>841,269,517</b>	<b>126,143</b>	<b>22,243,935</b>	<b>619,418,427</b>	<b>87,608</b>	<b>17,477,267</b>

<sup>1</sup> Includes legacy and carryover programs.

## Summary of Savings by Measure

Table H-5 summarizes CY 2013 residential savings by measure category.

**Table H-5. Summary of First-Year Annual Savings by Measure Category, Residential Sector <sup>1</sup>**

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Appliance Recycling	20,459,217	6.71%	3,045	9.12%	-	0.00%	\$1,172,550	4.04%
Boiler Controls	-	-	-	-	9,061	0.20%	\$1,600	0.01%
Boiler Equipment	-	-	-	-	266,388	5.92%	\$421,136	1.45%
Boiler Service	-	-	-	-	58,276	1.30%	\$17,573	0.06%
Bonus	1,422,375	0.47%	-	0.00%	472,412	10.50%	\$5,342,036	18.39%
Building Shell	741,270	0.24%	223	0.67%	21,412	0.48%	\$71,588	0.25%
CFL	269,654,992	88.46%	23,215	69.50%	-	0.00%	\$10,779,678	37.10%
Clothes Washer	1,077,597	0.35%	333	1.00%	30,507	0.68%	\$513,905	1.77%
Dishwasher	118,710	0.04%	-	-	6,595	0.15%	\$31,855	0.11%
Energy Recovery	-16,055	-0.01%	9	0.03%	9,854	0.22%	\$7,538	0.03%
Faucet Aerator	1,399,366	0.46%	-	0.00%	332,967	7.40%	\$183,432	0.63%
Furnace Equipment	11,320,600	3.71%	5,265	15.76%	1,593,829	35.44%	\$6,862,875	23.62%
Geothermal	714,982	0.23%	14	0.04%	4,297	0.10%	\$58,500	0.20%
HVAC Controls	333,596	0.11%	-	-	14,339	0.32%	\$42,442	0.15%
HVAC Equipment	358,336	0.12%	57	0.17%	-	-	\$43,392	0.15%
HVAC Other	184,164	0.06%	151	0.45%	33,436	0.74%	\$50,815	0.17%
HVAC Service	3,000	0.00%	-	-	-	-	\$80	0.00%
LED	2,650,499	0.87%	280	0.84%	-	0.00%	\$271,051	0.93%
Lighting Controls	299,598	0.10%	-	-	-	-	\$16,590	0.06%
Lighting Other	1,108,222	0.36%	114	0.34%	-	-	\$84,008	0.29%
Motors and Drives	360,536	0.12%	27	0.08%	-	-	\$25,139	0.09%
Other	-	0.00%	-	0.00%	-	0.00%	\$807,976	2.78%
Program Adjustment	-15,846,928	-5.20%	-953	-2.85%	23,600	0.52%	\$15,419	0.05%
Refrigeration Equipment	141,474	0.05%	18	0.05%	-	-	\$29,905	0.10%
Showerhead	2,776,950	0.91%	3	0.01%	698,284	15.53%	\$237,491	0.82%



Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Solar Electric	1,253,467	0.41%	523	1.57%	-	-	\$452,510	1.56%
Solar Thermal	26,898	0.01%	0	0.00%	2,623	0.06%	\$33,774	0.12%
T8/T5 Fluorescent	418,316	0.14%	49	0.15%	-	-	\$55,761	0.19%
Water Heater Controls	30,401	0.01%	-	0.00%	38,968	0.87%	-	0.00%
Water Heater Equipment	283,285	0.09%	13	0.04%	69,484	1.55%	\$154,245	0.53%
Water Heater Other	486,998	0.16%	-	0.00%	24,338	0.54%	\$141,989	0.49%
Whole Building	3,065,136	1.01%	1,015	3.04%	786,440	17.49%	\$1,128,050	3.88%

<sup>1</sup> Includes legacy and carryover programs.

Table H-6 lists CY 2013 nonresidential savings by measure category.

**Table H-6. Summary of First year Annual Savings by Measure Category, Nonresidential Sector <sup>1</sup>**

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Agriculture	782,168	0.17%	99.3	0.13%	161,068	0.92%	\$ 95,211	0.24%
Biogas	7,620,589	1.64%	862.8	1.10%	(8,111)	-0.05%	\$ 731,049	1.84%
Biomass	-	-	-	-	26,280	0.15%	\$ 12,100	0.03%
Boiler Controls	-	0.00%	-	0.00%	301,054	1.73%	\$ 95,480	0.24%
Boiler Equipment	-	0.00%	-	0.00%	470,341	2.70%	\$ 390,540	0.98%
Boiler Other	-73,726	-0.02%	16.1	0.02%	627,27	3.60%	\$ 286,207	0.72%
Boiler Service	-	0.00%	-	0.00%	3,421,56	19.65%	\$ 481,414	1.21%
Bonus	1,065,500	0.23%	120.0	0.15%	11,405	0.07%	\$ 6,208,923	15.61%
Building Shell	5,599,266	1.20%	1803.3	2.31%	1,322,192	7.59%	\$ 974,780	2.45%
CFL	43,939,920	9.44%	9678.7	12.38%	-	0.00%	\$ 1,997,499	5.02%
Compressor Controls	5,171,477	1.11%	811.5	1.04%	-	0.00%	\$ 47,600	0.12%
Compressor Equipment	12,325,978	2.65%	2051.1	2.62%	-	0.00%	\$ 931,446	2.34%
Compressor Other	9,035,397	1.94%	1182.8	1.51%	-	0.00%	\$ 365,568	0.92%
Compressor Service	22,465,479	4.83%	2066.8	2.64%	-	0.00%	\$ 381,228	0.96%
Design and Modeling	-	0.00%	-	0.00%	-	0.00%	\$ 144,920	0.36%
Dishwasher	310,395	0.07%	37.1	0.05%	4,711	0.03%	\$ 20,750	0.05%
Energy Recovery	3,148,557	0.68%	1545.9	1.98%	3,176,373	18.24%	\$ 1,655,832	4.16%
Faucet Aerator	1,425,350	0.31%	219.9	0.28%	28,230	0.16%	\$ 42,236	0.11%
Food Service	318,774	0.07%	65.5	0.08%	73,297	0.42%	\$ 82,701	0.21%
Furnace Equipment	207,867	0.04%	-	0.00%	1,881	0.01%	\$ 69,950	0.18%
Geothermal	-119,334	-0.03%	119.4	0.15%	32,815	0.19%	\$ 256,454	0.64%
Greenhouse	-	0.00%	-	0.00%	772	0.00%	\$ 454	0.00%
High Intensity Discharge (HID)	549,499	0.12%	119.4	0.15%	-	0.00%	\$ 38,805	0.10%
HVAC Controls	11,479,013	2.47%	501.1	0.64%	757,472	4.35%	\$ 943,675	2.37%
HVAC Equipment	10,513,807	2.26%	2638.3	3.37%	1,457,689	8.37%	\$ 2,070,164	5.20%
HVAC Other	15,189,352	3.26%	1700.6	2.18%	3,032,626	17.41%	\$ 1,435,681	3.61%
HVAC Service	3,136,818	0.67%	3430.4	4.39%	-	0.00%	\$ 207,692	0.52%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Information Technology	5,965,379	1.28%	238.9	0.31%	-	0.00%	\$ 237,401	0.60%
Laundry Other	58,936	0.01%	5.0	0.01%	56,995	0.33%	\$ 34,271	0.09%
LED	42,541,248	9.14%	5753.4	7.36%	-	0.00%	\$ 2,729,016	6.86%
Lighting Controls	12,010,284	2.58%	516.7	0.66%	-	0.00%	\$ 627,694	1.58%
Lighting Other	54,266,843	11.66%	11125.9	14.23%	-	0.00%	\$ 2,746,443	6.90%
Motors and Drives	54,793,695	11.77%	4296.0	5.49%	-	0.00%	\$ 1,921,302	4.83%
Other	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Oven and Furnace Other	1,745,694	0.37%	170.9	0.22%	1,606	0.01%	\$ 98,385	0.25%
Pools	105,181	0.02%	5.1	0.01%	10,170	0.06%	\$ 7,274	0.02%
Process	13,829,352	2.97%	1737.5	2.22%	2,132,510	12.24%	\$ 1,132,488	2.85%
Program Adjustment	-26,025	-0.01%	-150.7	-0.19%	2,270	0.01%	\$ 15,930	0.04%
Refrigeration Controls	3,602,034	0.77%	65.5	0.08%	-	0.00%	\$ 106,878	0.27%
Refrigeration Equipment	3,765,868	0.81%	413.1	0.53%	864	0.00%	\$ 219,453	0.55%
Refrigeration Other	6,691,233	1.44%	1054.9	1.35%	-	0.00%	\$ 406,657	1.02%
Refrigeration Service	5,322,928	1.14%	886.9	1.13%	-	0.00%	\$ 119,276	0.30%
Retrocommissioning	88,532	0.02%	-	-	20,761	0.12%	\$ 19,167	0.05%
Showerhead	1,215,004	0.26%	-	-	83,706	0.48%	\$ 29,480	0.07%
Solar Electric	675,183	0.15%	223.3	0.29%	-	-	\$ 627,746	1.58%
Solar Thermal	(5,518)	0.00%	-0.2	0.00%	7,580	0.04%	\$ 131,235	0.33%
T8/T5 Fluorescent	92,076,826	19.78%	21408.3	27.38%	-	0.00%	\$ 7,435,025	18.69%
Vending and Plug Loads	1,329,034	0.29%	-	0.00%	-	0.00%	\$ 121,825	0.31%
Waste Water Treatment	9,908,807	2.13%	1280.6	1.64%	30,923	0.18%	\$ 605,274	1.52%
Water Heater Equipment	501,222	0.11%	37.7	0.05%	15,054	0.09%	\$ 37,131	0.09%
Water Heater Other	940,837	0.20%	46.8	0.06%	155,399	0.89%	\$ 327,231	0.82%
Wind	108,580	0.02%	-	-	-	-	\$ 75,000	0.19%

<sup>1</sup> Includes legacy and carryover programs.

**Table H-7. Summary of First year Annual Savings by Measure Category, Residential and Nonresidential Sectors<sup>1</sup>**

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Agriculture	782,168	0.1%	99.26	0.1%	161,068	0.7%	\$ 95,211	0.1%
Appliance Recycling	20,459,217	2.7%	3,045	2.7%	-	0.0%	\$ 1,172,550	1.7%
Biogas	7,620,589	1.0%	863	0.8%	(8,111)	0.0%	\$ 731,048	1.1%
Biomass	-	-	-	-	26,280	0.1%	\$ 12,100	0.0%
Boiler Controls	-	0.0%	-	0.0%	310,115	1.4%	\$ 97,080	0.1%
Boiler Equipment	-	0.0%	-	0.0%	736,729	3.4%	\$ 811,676	1.2%
Boiler Other	(73,726)	0.0%	16	0.0%	627,277	2.9%	\$ 286,207	0.4%
Boiler Service	-	0.0%	-	0.0%	3,479,837	15.9%	\$ 498,987	0.7%
Bonus	2,487,875	0.3%	120	0.1%	483,817	2.2%	\$ 11,550,95	16.8%
Building Shell	6,340,536	0.8%	2,026	1.8%	1,343,604	6.1%	\$ 1,046,367	1.5%
CFL	313,594,912	40.7%	32,894	29.5%	-	0.0%	\$ 12,777,176	18.6%
Clothes Washer	1,077,597	0.1%	333	0.3%	30,507	0.1%	\$ 513,905	0.8%
Compressor Controls	5,171,477	0.7%	811	0.7%	-	0.0%	\$ 47,600	0.1%
Compressor Equipment	12,325,978	1.6%	2,051	1.8%	-	0.0%	\$ 931,445	1.4%
Compressor Other	9,035,397	1.2%	1,183	1.1%	-	0.0%	\$ 365,567	0.5%
Compressor Service	22,465,479	2.9%	2,067	1.9%	-	0.0%	\$ 381,227	0.6%
Design and Modeling	-	0.0%	-	0.0%	-	0.0%	\$ 144,920	0.2%
Dishwasher	429,105	0.1%	37	0.0%	11,306	0.1%	\$ 52,605	0.1%
Energy Recovery	3,132,502	0.4%	1,555	1.4%	3,186,227	14.5%	\$ 1,663,369	2.4%
Faucet Aerator	2,824,716	0.4%	220	0.2%	361,197	1.7%	\$ 225,668	0.3%
Food Service	318,774	0.0%	65	0.1%	73,297	0.3%	\$ 82,701	0.1%
Furnace Equipment	11,528,467	1.5%	5,265	4.7%	1,595,710	7.3%	\$ 6,932,825	10.1%
Geothermal	595,648	0.1%	134	0.1%	37,112	0.2%	\$ 314,954	0.5%
Greenhouse	-	0.0%	-	0.0%	772	0.0%	\$ 454	0.0%
High Intensity Discharge (HID)	549,499	0.1%	119	0.1%	-	0.0%	\$ 38,805	0.1%
HVAC Controls	11,812,609	1.5%	501	0.5%	771,811	3.5%	\$ 986,117	1.4%
HVAC Equipment	10,872,142	1.4%	2,695	2.4%	1,457,689	6.7%	\$ 2,113,556	3.1%
HVAC Other	15,373,516	2.0%	1,852	1.7%	3,066,062	14.0%	\$ 1,486,496	2.2%
HVAC Service	3,139,818	0.4%	3,430	3.1%	-	0.0%	\$ 207,771	0.3%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	Therms	Therms %		
Information Technology	5,965,379	0.8%	239	0.2%	-	0.0%	\$ 237,400	0.3%
Laundry Other	58,936	0.0%	5	0.0%	56,995	0.3%	\$ 34,270	0.1%
LED	45,191,747	5.9%	6,033	5.4%	-	0.0%	\$ 3,000,066	4.4%
Lighting Controls	12,309,882	1.6%	517	0.5%	-	0.0%	\$ 644,283	0.9%
Lighting Other	55,375,065	7.2%	11,240	10.1%	-	0.0%	\$ 2,830,450	4.1%
Motors and Drives	55,154,231	7.2%	4,323	3.9%	-	0.0%	\$ 1,946,441	2.8%
Other	-	0.0%	-	0.0%	-	0.0%	\$ 807,975	1.2%
Oven and Furnace Other	1,745,694	0.2%	171	0.2%	1,606	0.0%	\$ 98,385	0.1%
Pools	105,181	0.0%	5	0.0%	10,170	0.1%	\$ 7,274	0.0%
Process	13,829,352	1.8%	1,738	1.6%	2,132,510	9.7%	\$ 1,132,487	1.7%
Program Adjustment	(15,872,953)	-2.1%	(1,104)	-1.0%	25,869	0.1%	\$ 31,349	0.1%
Refrigeration Controls	3,602,034	0.5%	65	0.1%	-	0.0%	\$ 106,878	0.2%
Refrigeration Equipment	3,907,342	0.5%	431	0.4%	864	0.0%	\$ 249,357	0.4%
Refrigeration Other	6,691,233	0.9%	1,055	1.0%	-	0.0%	\$ 406,656	0.6%
Refrigeration Service	5,322,928	0.7%	887	0.8%	-	0.0%	\$ 119,276	0.2%
Retrocommissioning	88,532	0.0%	N/A	N/A	20,761	0.1%	\$ 19,166	0.0%
Showerhead	3,991,954	0.5%	3	0.0%	781,990	3.6%	\$ 266,971	0.4%
Solar Electric	1,928,650	0.3%	747	0.7%	-	-	\$ 1,080,256	1.6%
Solar Thermal	21,380	0.0%	0	0.0%	10,203	0.1%	\$ 165,008	0.2%
T8/T5 Fluorescent	92,495,142	12.0%	21,457	19.2%	-	0.0%	\$ 7,490,785	10.9%
Vending and Plug Loads	1,329,034	0.2%	-	0.0%	-	0.0%	\$ 121,825	0.2%
Waste Water Treatment	9,908,807	1.3%	1,281	1.2%	30,923	0.1%	\$ 605,273	0.9%
Water Heater Controls	30,401	0.0%	-	0.0%	38,968	0.2%	-	0.0%
Water Heater Equipment	784,507	0.1%	51	0.1%	84,538	0.4%	\$ 191,376	0.3%
Water Heater Other	1,427,835	0.2%	47	0.0%	179,738	0.8%	\$ 469,220	0.7%
Whole Building	3,065,136	0.4%	1,015	0.9%	786,44	3.6%	\$ 1,128,050	1.6%
Wind	108,580	0.0%	-	-	-	-	\$ 75,000	0.1%

<sup>1</sup> Includes legacy and carryover programs.

## Appendix I. Cost-Effectiveness Details

In the current quadrennial cycle the Program Administrator has, with Public Service Commission of Wisconsin (PSC) approval, elected to use a cost-effectiveness calculator for program planning purposes. Consistency between planning and evaluation approaches is critical for an effective understanding of program performance relative to expectations. As a result, the same calculator was used for evaluation.

As part of the 2013 evaluation activities, the Evaluation Team has reviewed the cost-effectiveness of the Focus on Energy programs. This section of the report presents the findings of a benefit cost analysis for Focus on Energy's 2013 program year. In the current quadrennial cycle the Program Administrator has, with PSC approval, elected to use a cost-effectiveness calculator for program planning purposes.

The benefit cost (B/C) test, also known as a cost-effectiveness test, is used to compare the benefits of a demand side management program with the costs of the program. There are several tests used for evaluating energy efficiency cost-effectiveness. The benefit/cost test, approved for Focus on Energy, is based upon the total resource cost (TRC) test, a commonly administered test in the energy industry. The goal of a TRC test is to help answer whether energy efficiency is cost-effective overall. The TRC test measures the net costs of an energy-efficiency program (and renewable program) as a resource option based on the total program costs, both to the participants and Focus on Energy. The modified TRC test is required by PSC Order, docket 5-GF-191 (PSC REF#:158228), for this evaluation. The test counts the avoided cost of supplying the displaced energy against the program implementation and participant costs. The purpose of the test is to determine whether the costs incurred by residents, businesses, and Focus on Energy for operating a program are outweighed by the benefits received by residents, businesses, and Focus on Energy. The TRC test used in this evaluation is typically applied to define what is cost-effective from a regulatory perspective.

The TRC is essentially the ratio of program benefits to program costs. A value greater than one translates into a program or portfolio of programs that is cost-effective (net benefits are positive—TRC benefits minus costs), whereas a value less than one is not cost-effective (net benefits are negative). From a TRC perspective, a conservation measure or practice “fails” if net benefits are negative, meaning the costs of achieving the savings outweigh the value of the savings achieved. The equation used for the TRC is as follows:

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

Where:

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

The TRC test provides a measure of the net direct economic impact on a population- i.e. a utility service territory, county, or political districts.

The source for electric energy avoided costs included in the 2013 evaluation comes from the annualization forecast avoided cost model as developed by Cadmus. This forecast relied on the Midwest Independent Transmission System Operator, Inc. (MISO), forecast of LMP for the years 2016, 2021, and 2026. The non-electric energy avoided costs were established by the Public Service Commission on January 13th, 2012, in PSC Order, docket 5-GF-191 (PSC REF#:158228).

The verified gross energy savings are decreased by the conventional attribution factor of net-to-gross to derive net savings. Net savings are then increased by the line loss factor of 8% to account for avoided distribution losses.

Emissions benefits are the only other benefit included in the TRC calculation. Determining the emissions benefits requires three key parameters: net energy savings, emissions factors, and the dollar value of the displaced emissions. Emissions factors are simply 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 (for electric it is tons/MWH and for gas it is tons/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.

### *Value of Avoided Emissions*

$$= [Net\ Saved\ Energy \times Emissions\ Factor \times Value\ of\ Emissions\ Allowance]$$

The emissions benefits require three key parameters: (1) life-cycle net energy savings, (2) emissions factors, and (3) the value of the reduced emissions. Emissions factors are simply the rate the criteria pollutants are emitted per unit of energy and are most often expressed in tons of pollutant per energy unit—for electric it is tons/megawatt hour (MWh) and for gas it is tons/mega therm (MThm).

The electric emissions factors were revised from the 2011 evaluation report in accordance with the forecasted 2012 estimates in the report, *Focus on Energy Evaluation Emission Factors Update*.<sup>1</sup> The gas emissions factors remained constant from the 2011 evaluation report. Table I-1 lists the emissions factors and allowance prices.

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<sup>1</sup> PA Consulting Group, December 22, 2009.



**Table I-1. Emissions Factors and Allowance Price**

Service Fuel Type	CO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>
Electric Emissions Factor (Tons/ MWh)	0.83000	0.0012	0.0008
Gas Emissions Factor (Tons / MThm)	5.85	N/A	N/A
Allowance Price (\$/Ton)	\$30	\$4.10	\$1.08

The Evaluation Team obtained the 2012 nitrogen oxides (NO<sub>x</sub>) and sulfur dioxides (SO<sub>2</sub>) emissions allowance prices from the Energy Information Administration (EIA).<sup>2</sup> Due to the continued decline in and uncertainty surrounding forecasted NO<sub>x</sub> and SO<sub>2</sub> allowance prices, the forecasted values remained constant at 2012 values. The Evaluation Team used the CO<sub>2</sub> emissions price in the Public Service Commission's Order, docket 5-GF-191 (PSC REF#:158228), which states, "A levelized carbon value of \$30 per ton shall be used in the benefit/cost modeling of energy-efficiency programs."

Table I-2 lists the emissions benefits for all programs by segment.

**Table I-2. Total Program Emissions Benefits by Segment**

Program Year	Nonresidential	Residential	Total
2013 Emissions Benefits	\$111,096,441	\$64,154,495	\$175,250,937
2012 Emissions Benefits	\$110,122,130	\$30,961,768	\$141,083,899
2011 Emissions Benefits	\$84,075,436	\$19,667,147	\$103,742,582

### **Program Costs**

The 2013 program costs were provided to the Evaluation Team from the accounting firm Wipfli. The program costs represent all costs associated with running the efficiency programs (including administration and delivery costs). Incentive costs are not included as program costs as they are deemed transfer payments.

### **Incremental Costs**

The gross incremental costs are the additional costs incurred by participants as a result of purchasing efficient equipment over and above a baseline non-qualified product. Gross incremental cost values used in this evaluation were derived from two primary sources: the Focus on Energy Benefit-Cost Analysis CY09 Evaluation Report (with the exception of renewable-based measures) and the program planning cost-effectiveness calculators.

All new CY2013 program measures were mapped to program planning measures and received incremental cost estimates from these calculators. The CY2011 incremental cost logic was applied to all CY2012 legacy and carryover-based program measures.

<sup>2</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=4830>

Similar to the 2011 and 2012 evaluation effort, the renewable energy projects were assigned actual project cost values from the program tracking databases.

The gross incremental costs, similar to the energy savings values used in the cost-effectiveness tests, required the application of attribution factors to account for freeridership. The values for attribution factors for all legacy and carry over program measures, namely the net-to-gross ratios, were derived from the 2010 evaluation and carried forward to the 2013 evaluation on a measure by measure basis. New CY2013 program measures received net-to-gross ratios according to reviews performed by the Evaluation Team.

## Appendix J. Cost-Effectiveness Analysis

The following tables provide the CY 2013 cost-effectiveness analysis by program. Table J-1 provides residential new program and carryover program cost-effectiveness analysis. Incentive costs are provided below but are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs.

Table J-1. Residential Programs Cost-Effectiveness Analysis

	Multifamily Direct Install	Multifamily Energy Savings	Appliance Recycling	Residential Lighting and Appliance	Home Performance Program	Assisted Home Performance	New Homes Program	Residential Rewards	Enhanced Rewards	Express Energy Efficiency
Incentive Costs	\$516,304	\$1,097,937	\$1,172,450	\$10,060,687	\$3,084,745	\$1,445,660	\$1,273,134	\$6,451,177	\$1,203,175	\$2,187,908
Admin Costs	\$103,092	\$310,636	\$744,880	\$1,005,154	\$378,373	\$138,670	\$284,881	\$1,197,152	\$207,913	\$383,826
Delivery Costs	\$235,095	\$708,388	\$1,698,657	\$2,292,199	\$862,860	\$316,230	\$649,656	\$2,730,040	\$474,133	\$875,295
Incremental Measure Costs	\$390,514	\$5,090,246	\$-	\$20,932,259	\$6,409,669	\$1,373,644	\$3,846,211	\$20,714,367	\$1,815,186	\$1,714,993
<b>Total Non-Incentive Costs</b>	<b>\$728,701</b>	<b>\$6,102,820</b>	<b>\$2,443,537</b>	<b>\$24,229,612</b>	<b>\$7,650,903</b>	<b>\$1,828,545</b>	<b>\$4,780,749</b>	<b>\$24,641,559</b>	<b>\$2,497,232</b>	<b>\$2,974,114</b>
Electric Benefits	\$1,510,285	\$5,835,689	\$5,324,835	\$103,518,361	\$1,415,415	\$610,159	\$3,999,342	\$10,934,108	\$1,171,779	\$4,308,900
Gas Benefits	\$1,860,489	\$4,457,639	\$0	\$197,197	\$4,928,248	\$4,016,790	\$10,387,502	\$13,259,582	\$3,256,975	\$6,586,073
Emissions Benefits	\$1,040,172	\$2,956,012	\$1,980,283	\$44,036,082	\$1,498,449	\$822,850	\$2,917,289	\$5,048,142	\$835,170	\$3,020,046
<b>Total TRC Benefits</b>	<b>\$4,410,945</b>	<b>\$13,249,340</b>	<b>\$7,305,118</b>	<b>\$147,751,641</b>	<b>\$7,842,111</b>	<b>\$5,449,799</b>	<b>\$17,304,133</b>	<b>\$29,241,832</b>	<b>\$5,263,923</b>	<b>\$13,915,020</b>
<b>TRC Benefits Minus Costs</b>	<b>\$3,682,245</b>	<b>\$7,146,520</b>	<b>\$4,861,581</b>	<b>\$123,522,029</b>	<b>\$191,209</b>	<b>\$3,621,254</b>	<b>\$12,523,385</b>	<b>\$4,600,273</b>	<b>\$2,766,691</b>	<b>\$10,940,905</b>
<b>TRC Ratio</b>	<b>6.05</b>	<b>2.17</b>	<b>2.99</b>	<b>6.10</b>	<b>1.02</b>	<b>2.98</b>	<b>3.62</b>	<b>1.19</b>	<b>2.11</b>	<b>4.68</b>

Table J-2 provides nonresidential new program and carryover program cost-effectiveness analysis. Incentive costs are provided below but are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs.

**Table J-2. Nonresidential Programs Cost-Effectiveness Analysis**

	Business Incentive Program	Chain Stores and Franchises Program	Large Energy Users Program	Small Business Program	Retro- commissioning	Design Assistance	Renewable Energy Competitive Incentive
Incentive Costs	\$12,260,785	\$3,266,932	\$8,419,578	\$10,966,286	\$279,846	\$247,088	\$935,744
Admin Costs	\$1,442,145	\$406,741	\$879,230	\$993,522	\$209,169	\$232,216	\$32,647
Delivery Costs	\$5,888,878	\$1,660,892	\$3,590,264	\$4,056,964	\$854,126	\$948,234	\$133,310
Incremental Measure Costs	\$51,108,316	\$10,333,749	\$26,227,257	\$23,973,682	\$576,024	\$147,195	\$2,870,888
<b>Total Non-Incentive Costs</b>	<b>\$58,439,338</b>	<b>\$12,401,381</b>	<b>\$30,696,752</b>	<b>\$29,024,169</b>	<b>\$1,639,319</b>	<b>\$1,327,645</b>	<b>\$3,036,845</b>
Electric Benefits	\$87,789,590	\$34,245,400	\$75,456,621	\$26,820,646	\$758,087	\$949,785	\$660,127
Gas Benefits	\$46,560,080	\$5,642,443	\$91,239,020	\$1,004,675	\$1,268,550	\$155,882	\$550,136
Emissions Benefits	\$40,403,913	\$14,452,645	\$45,053,415	\$10,007,622	\$561,316	\$391,985	\$225,546
<b>Total TRC Benefits</b>	<b>\$174,753,583</b>	<b>\$54,340,488</b>	<b>\$211,749,056</b>	<b>\$37,832,943</b>	<b>\$2,587,952</b>	<b>\$1,497,652</b>	<b>\$1,435,809</b>
<b>TRC Benefits Minus Costs</b>	<b>\$116,314,245</b>	<b>\$41,939,107</b>	<b>\$181,052,304</b>	<b>\$8,808,774</b>	<b>\$948,633</b>	<b>\$170,007</b>	<b>(\$1,601,036)</b>
<b>TRC Ratio</b>	<b>2.99</b>	<b>4.38</b>	<b>6.90</b>	<b>1.30</b>	<b>1.58</b>	<b>1.13</b>	<b>0.47</b>

## Appendix K. Summary of Confidence and Precision

### Evaluation and Confidence and Precision

The Focus on Energy evaluation period 2011–2014 set confidence and precision intervals at 90% level of confidence and  $\pm 10\%$  precision

As in previous evaluation reports, the Evaluation Team presents the verified gross and evaluated net findings with confidence and precision values to demonstrate a rigorous evaluation of the programs' reported savings was conducted. This CY2013 evaluation report describes several approaches for calculating savings values; for some, the methodologies have changed. For example, the net savings values changed from relying almost exclusively upon self-report data to incorporating standard market practice (SMP) approach. Standard Market Practice is described in further detail below, as well as in Appendix L. Such changes impact the meaning of confidence and precision; therefore, any calculated confidence and precision for the evaluation of CY2013 programs would not be directly comparable to previous reports, and likely not to future reports.

This appendix documents the rigor of the Evaluation Team's activities conducted for the quadrennial (2011-2014) to date. This documentation is in the form of detailed sample sizes associated with various data collection efforts for each program by measure type. The intent is that, regardless of the approaches used for future evaluations, accurate confidence and precision values can be computed over the relevant timeframe for any specific need. For example, should there be a need in the future to rely exclusively upon on-site measurements for calculating the savings associated with a particular program over the years 2012-2015, this appendix provides the detail to support that calculation.

### Standard Market Practice and Self-Report

The Evaluation Team altered its approaches to represent recent market effects and changes in Wisconsin. Specifically, for several program measures, the Evaluation Team has leveraged results of a baseline study as well as other program and secondary data, in order to estimate the average efficiencies of the equivalent products that are being sold to individuals or businesses not participating in the programs. The average efficiency of these measures is considered the "standard market practice," and the net savings achieved by the programs are computed as the difference in annual consumption of equipment installed through the programs relative to the SMP. The implications for confidence and precision are that the specific combination of SMP and self-report used this year vary from previous and future evaluations, which in turn reduces the probability of replication.

Data for Standard Market Practice is typically gathered through two methods: (1) site visits, during which evaluators confirm what is actually installed, and/or a panel study, at which evaluators assess what contractors are selling, and (2) self-report surveys, typically gathered over the phone with a sample of a particular program's participants. More information on these two methods can be found in the net-to-gross section.

## Sources of Uncertainty

Uncertainty, or the amount of doubt surrounding a measured or calculated value, can be caused by either random error (one that occurs by chance and is entirely attributable to using a sample rather than the whole population) or systematic error (such as non-response bias or self-report bias).

The distinction between the two types of error is critical because different measures are required to detect and mitigate each. Random errors are most typically mitigated through increased sample sizes. Systematic errors are often mitigated through the use of best possible methods and accurate instruments.

Reducing error requires additional budget and resources. The general precision equation can be written in this form:

$$\text{Precision} = \text{confidence level} \sqrt{\frac{\text{variance}}{\text{sample size}}}$$

The only factor under the analyst's control is the sample size. Precision is improved at a rate proportional to the square root of the sample size. Quadrupling the sample size only doubles the precision.

A confidence interval is calculated from the sample size, variance, and confidence level. A small confidence interval indicates that the true population score is very close to the evaluator's observations in the analysis of sample data.

## Sources of information

Almost all sources of information have some degree of variance, and in some cases, the variance may be unknown. Some calculations require the use of weighted averages, require observations by an evaluator, or rely on self-reports. These sources of information are described below, along with the variance or assumptions that may be involved with each data source.

### Surveys

Surveys are developed in order to capture information directly from a program participant. These data may contain both process and impact evaluation components. For impact evaluation purposes, the Evaluation Team used surveys to calculate self-report freeridership and spillover for net-to-gross estimates of programs that had non-SMP measures.

### Site Visits

In an effort to most accurately assess actions taken through a program, evaluators may conduct site visits in order to capture key data, such as:

- Location of installed equipment, also verifying proper installment.
- The name plate information of the installed measures.



- Customer operation procedures or usage patterns.

As well as any other measure specific data that may be beneficial to the analysis.

Some site visits may require metering in order to assess the run time or power draw from the new measure. Evaluators use all of these data to verify impact savings and assess customer uptake of efficiency measures.

## Panel Study

The panel study's methodology relied on business owner's self-reports, which included two major sources of variance.

The first source of variance comes from the individual vendors and their products. As one might suspect, the volume of products each individual vendor sells changes based on uncontrolled factors, such as the number of competitors, the selection at the store, and the area's population density.

The second source of variance comes from the number of vendors reporting on each measure. . In the CY2013 evaluation, for example, the sample of owners reporting on lighting sales (n=33) was much higher than those reporting on clothes washers (n=12). The confidence intervals derived from the panel study for each measure reflects the variance observed for both the measure's sample size and the number of products sold within a sample.

## Implementer Data

The Evaluation Team reviewed data from residential audits performed as part of the Home Performance with ENERGY STAR Program and Assisted Home Performance with ENERGY STAR Program. The implementer reported efficiency levels from the residential audits, which recorded observations of existing units prior to any Program upgrades or changes. The Evaluation Team used the implementer data to supplement the panel study data, particularly for any measures for which the panel study lacked sufficient responses to formulate the market baseline.

## Audits (Engineer Desk Reviews)

Engineering reviews are conducted using the best available data to calculate energy consumptions of varying efficiency levels for each measure. Measure-specific algorithms from an agreed-upon source, such as the soon to be finalized and published Wisconsin Technical Resource Manual (TRM), guide consumption calculations. The calculations use consumption for each efficiency level, in conjunction with information on the market and in-program distributions of efficiency levels, in order to calculate the energy savings specific to each measure.

### *Data Points Contributing to Each Evaluation by Source*

Table K-3 shows each program and the data sources (or activities) used in its evaluation based on population sizes. The Evaluation Team applied the data to verify gross and net savings. In the subsequent tables are details about how many occurrences each measure type was represented in the data set. Multiple observations may have occurred based on the data type because of the volume of data provided. For example, within one survey multiple lighting measure types may have provided, each lighting type was counted as an occurrence if each data point aided in evaluation findings.

**Table K-3. Programs by Data Source**

Program Name	Survey	Site Visits	Panel Study	Implementer Data	Audits/Desk Review
Residential Lighting and Appliance	491	134			
Multifamily Energy Savings	223		78		
Express Energy Efficiency	99	72			
Home Performance with Energy Star <sup>1</sup>	123	15			449
Assisted Home Performance with Energy Star	67				50
Appliance Recycling	193	28			
Enhanced Rewards	70			461	
Residential Rewards	140	110		461	
New Homes	89				
Chain Stores and Franchises	110	73			60
Small Business	69				668
Business Incentive	284	211			194
Retrocommissioning	13				10
Renewable Energy Competitive Incentive	7	11			4
Large Energy Users	82	88			87
Design Assistance	10				2

<sup>1</sup>Billing analysis for gas and electric services (265 and 184 respectively).

## Confidence by Program

### Multifamily Energy Savings Program and Multifamily Direct Install Program

**Table K-4. Multifamily Energy Savings Program and Multifamily Direct Install Data**

Measure Type	Survey (n)	Panel Study (n)	Observations from Site Visits (n)	Audits/Desk Review (n)
<b>Multifamily Energy Savings Program</b>				
Boilers	7	37	0	3
Boiler Tune Up	3	0	0	1
CFL Fixture	4	0	0	0
CFLs	6	0	11,821	2
Clothes Washer	1	1,396	0	3
Condensing Boiler	1	0	0	0
Dishwasher	2	0	0	1
Faucet Aerator	3	29	0	3
HID Lighting	3	0	0	1
Insulation	4	0	0	1
LED Exit Sign	6	0	0	0
LEDs	5	0	0	1
Linear Fluorescents	11	0	91,237	0
Misc. HVAC	1	0	0	0
Misc. Lighting	4	0	0	1
Modulating Boiler	5	0	0	0
Occupancy Sensor	3	616	0	0
Refrigerator	1	440	0	1
Steam Trap Repair	1	0	0	1
VFDs	1	0	0	0
Water Heater	3	475	0	2
Windows	1	0	0	0
<b>Multifamily Direct Install Program</b>				
CFLs	98	0	0	4
Faucet Aerator	102	0	0	4
Showerheads	75	0	0	2

## Appliance Recycling Program

**Table K-5. Appliance Recycling Program Data**

Measure Type	Survey (n)
Refrigerator	70
Freezer	65

## Residential Lighting and Appliance Program

**Table K-6. Residential Lighting and Appliance Program Data**

Measure Type	Survey (n)	Site Visits (n)	Price Response Model (n)	Audits/Desk Review (n)
All Lighting	474	134	4,052,990	248
Showerheads	0	0	0	0
Clothes Washers	17	0	0	0

## Home Performance with ENERGY STAR

**Table K-7. Home Performance with ENERGY STAR Program Data**

Measure Type	Survey (n)	Site Visits (n)	Billing Analysis (n)
Attic Insulation	42	15	449
Wall Insulation	26	15	449
Sill-Box Insulation	31	15	449
Foundation Insulation	10	15	449
Air Sealing	42	15	449

## Assisted Home Performance with ENERGY STAR

**Table K-8. Assisted Home Performance with ENERGY STAR Program Data**

Measure Type	Survey (n)
Lighting-CFLs	57
Building Shell-Project Completion	98
Faucet Aerator	26
Showerheads	14
Water Heater Pipe Insulation	2

## New Homes Program

**Table K-9. New Homes Program Data**

Measure Type	Survey (n)
Lighting	30
Building Shell	30
Space Heating	30
Water Heating	30
Renewable Energy	30

## Residential Rewards Program

**Table K-10. Residential Rewards Program Data**

Measure Type	Survey (n)	Site Visits (n)	Implementer Data (n)	Audits/Desk Review (n)
Boiler	6	0	37	3
Furnace with ECM	87	110	424	3
Water Heater	11	0	0	4
Furnace and AC	28	0	0	1
Duct Sealing	0	0	0	0
ECM (Standalone)	2	0	0	0
Heat Pump	4	0	0	2
Insulation	0	0	0	0
Renewable Energy	2	0	0	3

## Enhanced Rewards Program

**Table K-11. Enhanced Rewards Program Data**

Measure Type	Survey (n)	Implementer Data (n)
Furnace and AC	12	0
Furnace, Gas	49	424
Furnace, not Gas	6	0
Water Boiler	3	37

## Express Energy Efficiency Program

**Table K-12. Express Energy Efficiency Program Data**

Measure Type	Survey (n)	Site Visits (n)
Lighting	87	67
Aerator-Kitchen	81	40
Aerator-Bathroom		63
Showerheads	63	52
Water Heater Pipe Insulation	63	46
Water Heater Temp Turn Down	29	18

## Chain Stores and Franchises Program

**Table K-13. Chain Stores and Franchises Program Data**

Measure Type	Survey (n)	Site Visits (n)	Audits/Desk Review (n)
Lighting	48	35	21
Refrigeration	29	10	11
Domestic Hot Water	10	17	15
HVAC	16	1	2
Process	0	0	1
Other	7	10	10

## Small Business Program

**Table K-14. Small Business Program Data**

Measure Type	Site Visits (n)	Audits/Desk Review (n)
Domestic Hot Water	0	75
Lighting	172	564
Refrigeration	0	1
Vending & Plug Loads	0	15
Other	0	13

## Business Incentive Program

**Table K-15. Business Incentive Program Data**

Measure Type	Survey (n)	Site Visits (n)	Audits/Desk Review (n)
Boilers and Burners	41	21	39
Compressed Air	47	46	33
HVAC	68	56	54
Lighting	84	62	42
Other	30	17	18
Process	3	2	4
Refrigeration	10	7	3

## Retrocommissioning Program

**Table K-16. Retrocommissioning Program Data**

Measure Type	Survey (n)	Site Visits (n)	Audits/Desk Review (n)
Core Retrocommissioning – HVAC, Not Otherwise Specified	9	5	5
Retrocommissioning, Express Building Tune Up	7	5	5

## Renewable Energy Competitive Incentive Program

**TableK-17. Renewable Energy Competitive Incentive Program Data**

Measure Type	Survey (n)	Site Visits (n)	Audits/Desk Review (n)
Biogas	1	0	0
Biomass	1	0	0
Geothermal	1	0	3
Solar Photovoltaic	4	10	0
Solar Thermal	0	0	1
Wind	0	1	0



## Large Energy Users Program

**Table K-18. Large Energy Users Program Data**

Measure Type	Survey (n)	Site Visits (n)	Audits/Desk Review (n)
Process	16	19	12
HVAC	12	14	6
Compressed Air	20	12	7
Boilers and Burners	19	10	3
Lighting	15	55	36
Other	0	1	0

## Design Assistance Program

**Table K-19. Design Assistance Program Data**

Measure Type	Survey (n)	Audits/Desk Review (n)
Multifamily	1	1
School	1	1

## Appendix L. Net Savings Analysis Methodologies and Results

This appendix presents the three key analysis methodologies used to arrive at net savings results for the CY 2013 evaluation:

- Standard Market Practice
- Lighting Saturation and Market Effects Study
- Self-Report Net-to-Gross

As described in earlier sections, 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. Any adjustments based on these findings are applied, and the result is the verified gross savings.

Net savings are the final savings, as reviewed by an independent evaluator that are attributed to a program. Being attributable to a program means that the program is directly responsible for the savings, and the savings would not have been achieved in the absence of the program. In deriving this value, evaluators account for, and deduct, reported savings that are calculated from freeriders (participants who would have undertaken the same action and achieved the same savings in the absence of the program) and account for, and add, spillover savings (savings that are the result of program actions but for which no incentive was paid and for which the program reported no savings).

Net savings represent the total savings that are being achieved from the investment of ratepayer dollars into the Focus on Energy program. These net savings are the primary benefits that are factored into the benefit-cost analysis (Appendix I and J) that is used for designing programs and ensuring that they are operating in a manner that returns a net positive benefit to ratepayers. These net savings are also used for tracking the progress toward the commission established savings targets for Focus on Energy.

This appendix discusses the specific approaches used in deriving the net savings for the Calendar Year (CY) 2013 Focus on Energy Programs. Of particular note, beginning this year, the Focus on Energy Evaluation Team has begun the process of transitioning away from estimating net savings based exclusively upon the results of surveys to an approach that tries to measure the impact of the programs on the average efficiencies of measures sold and installed in Wisconsin – the Standard Market Practice approach. It is Focus on Energy’s long-term goal to use this approach as broadly as possible and to limit the use of self-reporting methodologies. The Evaluation Work Group (EWG) approved the use of this method and supports the long-term goal of increasing its use.

The Evaluation Team applied the SMP method for nine residential measure categories and four nonresidential measure categories, but did not apply the method for other measures. The Evaluation Team’s ability to apply the SMP method for a given measure category hinged on the availability of adequate baseline data, as described in greater detail in the Standard Market Practice Methodology section of this appendix. In some cases, the Evaluation Team applied a blended approach, combining measure level results from both the SMP and the self-report methods to determine weighted average program NTG ratios. This approach resulted in the most reliable results given the data available for each

measure category. However, future evaluations can enhance the uniformity of the approach by researching baseline data for additional measure categories.

Although the rigor of the SMP approach has been discussed and reviewed at length by the Evaluation Team and the EWG, any systematic change in approach introduces or eliminates systematic biases that cannot always be quantified. As a result, net-to-gross (NTG, or net savings divided by verified gross savings) ratios reported for the CY 2013 programs may not be directly comparable to those reported for CY 2012 in cases where the SMP approach was applied. Additionally, this approach diverges from the methods used in the design of the programs at the beginning of the present quadrennium; therefore, changes in NTG ratios may not be solely because of the effectiveness of the program design or implementation.

## ***Standard Market Practice Methodology***

Where adequate market baseline data were available, the Evaluation Team calculated net savings using a standard market practice (SMP) methodology. The SMP method uses program data and data collected through the evaluation process to define the average market baseline and average program-installed energy consumption (kWh and/or therm) of each measure category. In order to apply the SMP method, the Evaluation Team needed to have access to a representative sample of records showing existing efficiency levels of a particular equipment type outside of the Focus on Energy program. Market baselines include a range of varying efficiency levels (both inefficient and efficient levels) and represent the average efficiency being sold in Wisconsin during CY 2013. The SMP method calculates net savings as the difference the average market baseline and the average program-installed energy consumption, under the assumption that freeridership is captured in the baseline. To calculate the NTG ratio using the SMP method, the Evaluation Team compared the net savings determined through the SMP analysis to the verified gross savings.

The Evaluation Team used these sources to determine the baseline for each measure category based on three main sources of sales and installation data. These are:

- Baseline study, which included two distinct tasks:
  - CY 2013 panel study recording sales data
  - CY 2013 commercial site visits recording units installed within the past four years
- CY 2013 Home Performance with ENERGY STAR Program audit data

Table L-1 lists the measures included in the SMP analysis for CY 2013 and their corresponding baseline data sources.<sup>3</sup>

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<sup>3</sup> The Residential Lighting and Appliance Program used a similar but distinct method, which is described in the Lighting Saturation and Market Effects Study section of this appendix.

**Table L-1. Measures Assessed with Standard Market Practice Methodology**

CY 2013 SMP Measures	Baseline Data Source
<b>Residential (Mass Markets)</b>	
Clothes Washer	Panel study
Dishwasher	Panel study
Refrigerator	Panel study
Efficient Showerhead	Panel study
Faucet Aerator	Panel study
Water Heater	National efficiency shares for water heaters (2010, DOE)
Boiler	Home audit data collected for Home Performance Program
Furnace	Home audit data collected for Home Performance Program
Water heater turndown	Home audit data collected for Home Performance Program
<b>Nonresidential (Targeted Markets)</b>	
Boiler	Commercial site visits
Efficient lighting	Commercial site visits; Program data
Water Heater	Commercial site visits
Occupancy Sensors	Commercial site visits

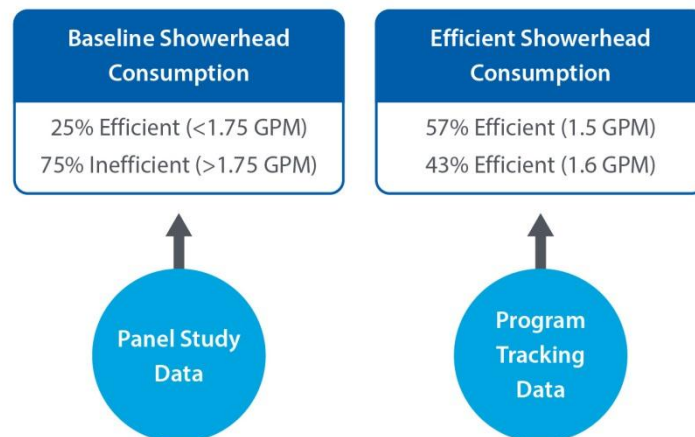
The following example illustrates how the Evaluation Team used the SMP method to calculate baseline and program-installed kWh and therm consumption for showerheads in order to determine net-of-freeridership savings for the high-efficiency showerheads sold through the Residential Lighting and Appliances Program. This example is generally representative of all SMP calculations, though some variations are described later in this appendix.

The efficiency level of a showerhead is determined by the gallons of water the unit provides per minute (gpm), commonly presented in discrete efficiency specifications (2.2, 1.75, 1.5, etc.). Efficient showerheads, as defined in Focus on Energy's programs, are rated with a gpm of less than 1.75. To define the market baseline efficiency for showerheads, the Evaluation Team used data collected through the evaluation panel study, which listed a sample of sales records of showerheads and their corresponding rated gpm's. The panel study found 25% of showerheads to be efficient (<1.75 gpm) and 75% to be inefficient ( $\geq 1.75$  gpm). Therefore, the market baseline is a combination of 25% efficient and 75% inefficient showerheads. The Evaluation Team calculated a weighted average market baseline consumption based on the distribution of gpm's among the products sold outside the Program.

As Step 1 of the SMP method, the Evaluation Team computed the baseline consumption as the weighted average of this efficiency distribution, according to the consumption algorithms in the Wisconsin TRM. The Team then calculated the program-installed consumption values for efficient showerheads as a weighted average of showerheads based on distribution of gpm's in program participation (57% 1.5 gpm, 43% 1.6 gpm).

Step 1 of the SMP method—computing the baseline and program-installed consumption values—is shown in Figure L-1.

**Figure L-1. SMP Method Step 1: Estimate Baseline and Program Energy Consumption**



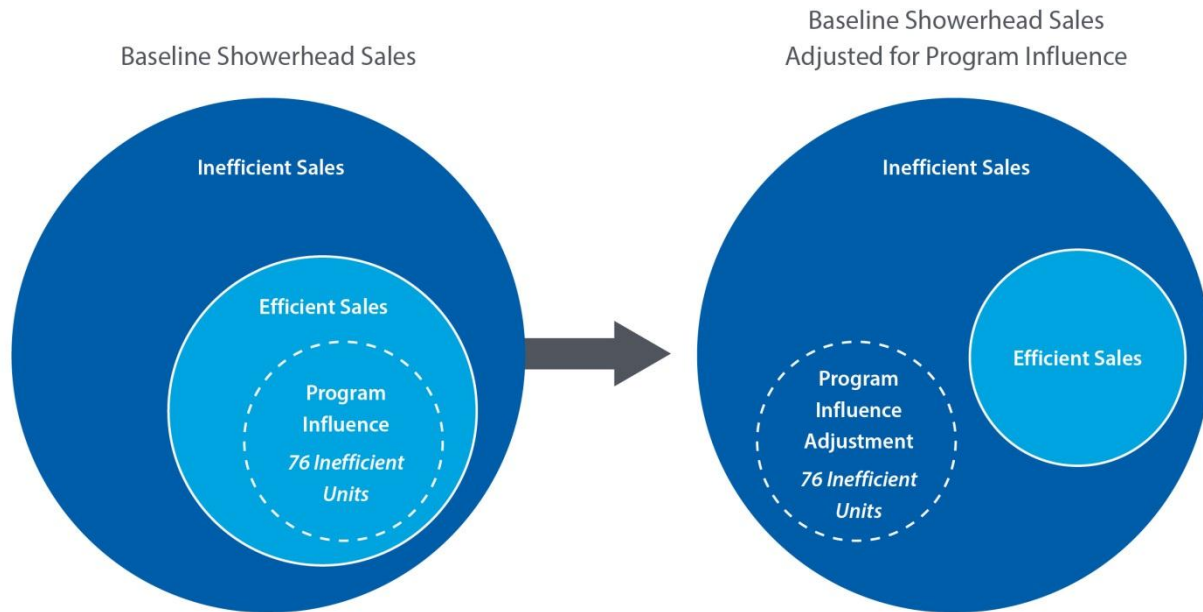
Step 2 of the SMP method—calculating net savings—involved adjusting for the influence of Focus on Energy’s program activity in Wisconsin. This program-influence adjustment removes a portion of the efficient units from the baseline, thereby accounting for the fact that Focus on Energy has an effect on purchases of efficient equipment outside of program participation. In other words, a portion of the sales and installation of efficient equipment that occurred in CY 2013 was induced by Focus on Energy program activity (such as energy education and awareness building), despite the purchasers not having participated in the program.

The Evaluation Team used participant spillover to make this program-influence effect. Participant surveys asked respondents a series of questions about additional purchases they made that were influenced by Focus on Energy but for which they did not receive an incentive. The Evaluation Team combined responses from all Focus on Energy programs, weighted responses in each measure category to reflect program populations, and extrapolated these quantities to apply to the total population of Wisconsin.

For example, the Evaluation Team used participant surveys to estimate that a total of 76 efficient showerheads were purchased in the state of Wisconsin in CY 2013 as a result of Focus on Energy but without receiving an incentive or discount. The Evaluation Team removed these 76 program-influenced efficient showerheads to establish the market baseline *absent* any program influence. To maintain the accuracy of the baseline, however, the Evaluation Team assumed the total number of showerheads sold would have remained the same. Thus these program-influenced efficient showerheads had to be replaced with 76 inefficient showerheads, which decreased the proportion of efficient showerheads in the baseline.

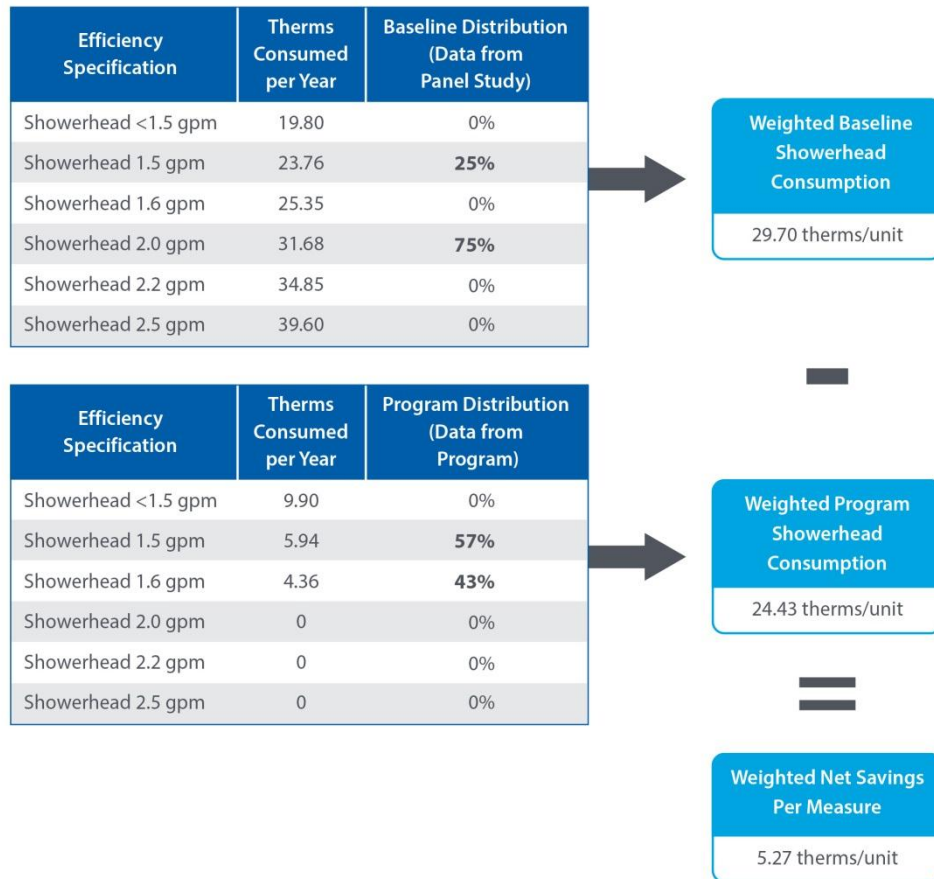
Step 2 of the SMP—adjusting the baseline to account for program influence—is shown in Figure L-2.

**Figure L-2. SMP Method Step 2: Adjust Baseline for Focus on Energy Program Influence**



Step 3 of the SMP method was to determine per-unit, net-of-freeridership savings for each measure category. After adjusting the baseline to account for program influence in Step 2, the Evaluation Team subtracted the weighted average program-installed consumption from weighted-average adjusted market baseline consumption to determine average per-unit net-of-freeridership savings, as shown in Figure L-3.

**Figure L-3. SMP Method Step 3: Compute Net-of-Freeridership Savings**



Finally, the Evaluation Team calculated total program net-of-freeridership savings for each measure category by multiplying average per-unit net-of-freeridership savings by the verified program participation. Again, using the example of efficient showerheads and applying it to the Residential Lighting and Appliances Program, the Evaluation Team multiplied the per-unit savings for showerheads by the number of total units sold through the Program then multiplied 5.27 therms saved per unit by the 4,619 units sold to verified Program participants living in homes with natural gas water heaters. This calculation is illustrated in Figure L-4. The Evaluation Team applied the same process to homes with electric water heaters.

**Figure L-4. SMP Method Step 4: Calculate Verified Total Program Net-of-Freeridership Savings**





## Variations in Calculating SMP

All net savings calculated through the SMP method involved defining a market baseline using the best data available from the panel study, program, or baseline data. The savings calculations also involved creating a weighted efficient consumption value based on program participation. The Evaluation Team made adjustments to account for Focus on Energy's influence on the market baseline as well.

The Evaluation Team employed three slightly different variations to calculate net savings, depending on the characteristics and/or availability of data for a particular measure. These are listed here and discussed in the following sections:

- Variation 1: Market baselines defined by discrete efficiency levels
- Variation 2: Market baselines defined by continuous efficiency levels
- Variation 3: Market baselines defined by a binary saturation approach

### *Variation 1: Market baselines defined by discrete efficiency levels*

Market baselines defined by discrete efficiency levels are for such measures as showerheads, faucet aerators, clothes washers, dishwashers, and commercial lighting. These measures have clear efficiency boundaries and sufficient data at the various efficiency levels. The showerhead example above fits into this category because the efficiency boundaries are defined as the standard GPM levels.

Baseline energy consumption values (kWh or therm) are calculated at each efficiency level and then weighted to produce a weighted baseline energy consumption value.

### *Variation 2: Market baselines defined by continuous efficiency levels*

Market baselines defined by continuous efficiency levels are for boilers, furnaces, and water heaters. These measures have a wide, continuous range of different energy use levels, rather than a limited number of levels. For example, determining the baseline for gas furnaces by following the approach described above for efficient showerheads would have required defining energy consumption at each observed efficiency level (Annual Fuel Utilization Ratio ranging from 0.64 to over 0.97).

The Evaluation Team first calculated weighted average baseline and program-installed efficiency levels based on one of the three baseline data sources (Home Performance Program data in the case of gas furnaces). The Evaluation Team then computed the weighted average efficiency of all units in the baseline data and applied this value as the baseline efficiency to calculate the average baseline consumption. Similarly, the Evaluation Team used the weighted average efficiency of all units in the program tracking database (program-installed average efficiency) to calculate the average program-installed energy consumption. The Evaluation Team also incorporated any Focus on Energy influence adjustments in the baseline.

Variation 2 differs from Variation 1 in that the weighting process takes place before calculating the consumption value. (In Variation 1, consumption value for each efficiency level is calculated, and then the baseline consumption is calculated as a weighted average.)

The Evaluation Team applied the same adjustments for applying single average net saving values to the program participant population.

### *Variation 3: Market baselines defined by a binary approach*

For some measures, there are no efficiency levels to consider, and instead the measure is simply either installed or not installed. Measures in this category are occupancy sensors and water heater setpoint turn-down. For these measures, the Evaluation Team determined the market baseline as an average saturation (percentage installed) for each measure, then calculated the measure's saturation in the general population using the appropriate baseline data source. For example, for occupancy sensors, site visits to commercial facilities determined that 6.7% of facilities in the nonparticipant population had installed occupancy sensors. Finally, the Evaluation Team adjusted consumption to reflect differences in the measure's impact between nonparticipants and program participants. For example, the Evaluation Team noted that the average wattage of lighting connected to an occupancy sensor differed between these populations: nonparticipants had an average of 284 connected Watts, while participants had an average of 335 connected Watts. Using these inputs, the Evaluation Team calculated an adjusted freeridership percentage of 5.68% following the equation:

$$FR_{adjusted} = (CW_n / CW_p) * S_n$$

Where:

- FR<sub>adjusted</sub> = Adjusted free ridership rate
- CW<sub>n</sub> = Connected Wattage (to occupancy sensor) among non-participants
- CW<sub>p</sub> = Connected Wattage (to occupancy sensor) among participants
- S<sub>n</sub> = Saturation of occupancy sensor installation among non-participants

### *Lighting Saturation and Market Effects Study*

For the CY 2012 evaluation, the Evaluation Team conducted a price-response analysis to assess freeridership in Focus on Energy's Residential Lighting and Appliance Program (the Program).<sup>4</sup> The Program also creates spillover and market effects by increasing availability and stocking of energy-efficient light bulbs among retailers and by educating customers about the benefits of using efficient lighting. For the CY 2013 evaluation, the Evaluation Team developed an approach to estimate these impacts, with the methodology and resulting estimates detailed in this appendix. The Evaluation Team's analysis assessed nonparticipant lighting and non-lighting spillover and market effects, all using a single method, which is not based on survey data. This differs from the existing program practice, which estimated spillover using survey data and did not include a saturation analysis. The approach also differs

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<sup>4</sup> The demand elasticity model is described in Focus on Energy Calendar Year 2012 Evaluation Report Volume II. [https://focusonenergy.com/sites/default/files/FOC\\_XC\\_CY%2012%20Report%20Volume%20II%20Final\\_08-28-2013.pdf](https://focusonenergy.com/sites/default/files/FOC_XC_CY%2012%20Report%20Volume%20II%20Final_08-28-2013.pdf)

from the standard SMP approach outlined above in that it reflects the particular market influences of an upstream program.

## Overview

Spillover can be defined as energy savings caused by (but not incented by) program activity during a program's implementation cycle. Spillover may occur from:

- Nonparticipants purchasing lighting products (for example, a customer indicating they purchased a non-incented specialty compact fluorescent lamp [CFL] after experiencing satisfaction with the performance of a three-pack of incented, standard CFLs).
- Nonparticipants purchasing non-lighting products (those purchasing additional energy-efficient measures because their actions were influenced by knowledge they received from the program).

Per industry standard practice, evaluators quantify and apply spillover, when possible, to program NTG ratios.

Market effects are systemic changes to standard business practices that are caused by program activities and tend to persist long after program interventions have ended. The potential for energy-efficiency programs to cause structural changes when intervening in a given market has become increasingly apparent as:

- Program delivery models have evolved (e.g., there are more upstream-focused programs).
- Energy-efficiency investment has grown dramatically.
- Programs have established long-term relationships with key market actors and trade allies.

The Program works closely with retailers and manufacturers to increase the availability and dedicated shelf space for efficient lighting products and to offer education to help retail staff communicate the value of efficient purchasing decisions to local consumers. These factors, combined with the Program's large presence throughout the state, contribute to its potential to generate market effects.

## Methodology

The Program spillover and market effects study relied on information from two research efforts:

- The Evaluation Team documented lighting inventories (not sales data) of one big box store from each chain in Focus on Energy's service territory (both participating and nonparticipating stores) to estimate lighting stocking practices.<sup>5</sup> The Evaluation Team collected inventory data from seven participating and two nonparticipating big box store retail chains in Focus on Energy territory.

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<sup>5</sup> All participating and nonparticipating retailers analyzed for this study list individual store inventories online via an "in store" search option.

- To assess energy-efficiency lighting saturation, the Evaluation Team conducted home inventories for a sample of 62 single-family and 72 multifamily homes.

## *Retailer Inventory Methodology*

The initial plan for this study was to request “snapshots” of lighting inventories from a sample of retail stores to estimate lighting stocking practices, particularly to explore differences in current stocking practices for energy-efficient products across Focus on Energy’s service territory and between retailers participating in Focus on Energy’s programs and those not participating. However, obtaining inventory data directly from participating and nonparticipating retailers was not possible. Instead, the Evaluation Team collected inventory data from eight stores using an “in store” search option via the retailers’ websites.

The Evaluation Team collected the following data which it plans to track over the next Program years to study market effects:

- Lighting categories:
  - CFLs
  - Light-emitting diodes (LEDs)
  - Fluorescents
  - Halogens
  - Incandescent
  - High-intensity discharge (HID) lamps
- Manufacturers
- Model numbers
- Number of bulbs in packs

## *Saturation Study Methodology*

The Evaluation Team conducted a saturation study of efficient lighting technologies through site visits to 62 single-family and 72 multifamily homes.<sup>6</sup> The study gathered information on the number, type, and location of all lights within a home (including those in storage). During each visit, the Evaluation Team conducted short interviews with residents then compared these data to 2008 results from a self-report phone survey of 345 customers performed by PA Consulting Group.<sup>7</sup> These phone surveys gathered information on the number and type of all lights, as well as socket type within a home.

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<sup>6</sup> For more detailed results on the site visit lighting inventory study, see Appendix N.

<sup>7</sup> PA Consulting. Focus on Energy Evaluation: Semi Annual Report (18 month Contract Period). April 8, 2009. [https://focusonenergy.com/sites/default/files/semiannualreport18monthcontractperiodfinalrevisedoctober192009\\_evaluationreport.pdf](https://focusonenergy.com/sites/default/files/semiannualreport18monthcontractperiodfinalrevisedoctober192009_evaluationreport.pdf)

## Spillover and Market Effects Methodology

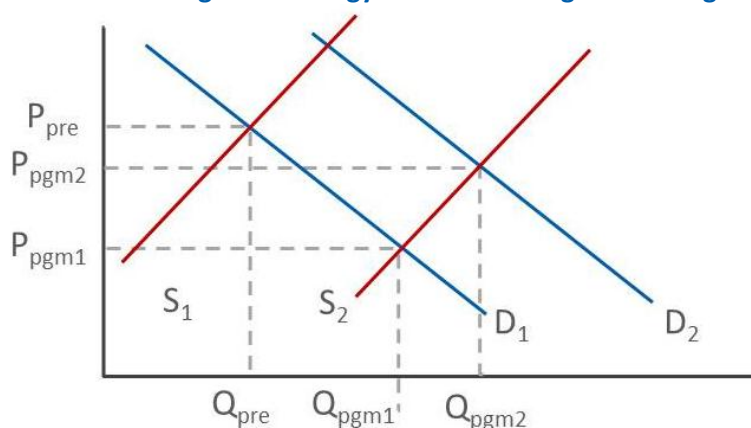
Figure L-5 illustrates the theory behind Energy Demand Management intervention in the market. Upfront prices most often limit or slow the adoption of energy-efficient technologies. Through the use of rebates or buy-downs, Energy Demand Management programs lower prices to a level presumed acceptable to consumers ( $P_{pgm}$ ) from those charged before intervention ( $P_{pre}$ ). At the same time, Energy Demand Management programs work directly with manufacturers and retailers to increase the supply of energy-efficient technologies.

In theory, lowering the price should, in the short run, increase the quantity demanded ( $Q_{pgm1}$ ) from before program intervention ( $Q_{pre}$ ).<sup>8</sup> If a program does not affect the market, its price returns to  $P_{pre}$  and quantity demanded returns to  $Q_{pre}$  once the intervention ends.

The more successfully the program raises consumer awareness of energy-efficiency benefits (as shown through increasing shelf space dedicated to energy-efficient products, engaging trade allies, or similar activities), the more likely the program will shift the demand (D) curve from  $D_1$  to  $D_2$ . Concurrently, the more successfully the program increases shelf space dedicated to energy-efficient products, engages trade allies, or accomplishes similar activities, the more likely the supply (S) curve will shift from  $S_1$  to  $S_2$ . If permanent, these shifts in supply and demand curves indicate market transformation. At the new demand curve, customers will purchase more CFLs *at all price levels*, and more CFLs will become available for purchase.

In other words, the program's direct impact can be measured as  $Q_{pgm1} - Q_{pre}$ , but its long-term market effects can be measured as  $Q_{pgm2} - Q_{pgm1}$ , as shown in Figure L-5.

**Figure L-5. Short- and Long-Term Energy Demand Management Programs Impacts**



<sup>8</sup> Economists call this "movement along the demand curve."

If sales data could be procured, quantification of observed long-term effects would be relatively straightforward. Retailers and manufacturers, however, consider these data proprietary; thus, the Evaluation Team estimated effects using retailer inventories and efficient bulb saturations.

## *Spillover and Market Effects Results*

The Evaluation Team's analysis determined the change in bulb sales between 2008 and 2013. Then, the Evaluation Team estimated spillover and market effects by subtracting Program bulbs from total bulbs sold during that period. The result was a percentage of spillover and market effects that the Evaluation Team applied to Program bulbs sold during CY13. A key input to the analysis was the freeridership level, which the Evaluation Team estimated separately using the price-response model.

Figure L-6, below, shows CFL saturations in all sockets in an average home, as determined through the 2008 phone surveys (19% of MSB sockets had CFLs). The 2013 home inventories found CFL saturations increased to 28.4%. If customers had just installed in their homes CFLs sold only through the Program between 2008 and 2013, the saturation would have increased only to 24.8%. In other words, 3.5% (28.4% to 24.8%) of the sockets contain CFLs from outside of the Program effort.

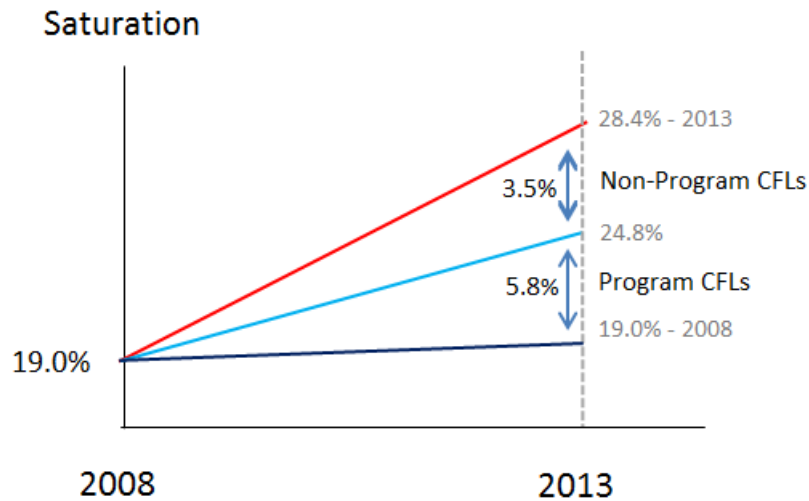
In estimating NTG (i.e., attribution), two questions arose:

- How much of the 5.8% (19.0% to 24.8%) increase in saturation through Program-incented bulbs would have been sold anyway (i.e., freeridership)?
- How much of the 3.5% sold outside of the Program resulted from the Program (spillover and market effects) versus naturally occurring market dynamics?<sup>9</sup>

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<sup>9</sup> Time presents the only difference between spillover and market effects: spillover usually occurs within the program cycle, while market effects result from structural changes and long-term impacts.

Figure L-6. CFL Market Saturations



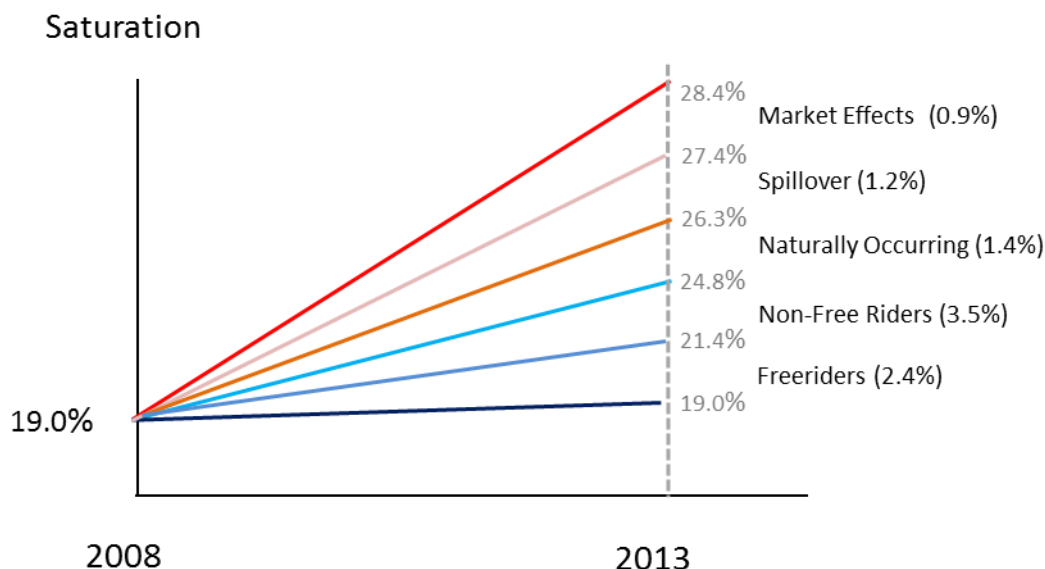
The Evaluation Team stipulated that there were five kinds of CFL and LED buyers collectively causing saturation increases:

- **Participant non-freeriders** would *not* have purchased a CFL or LED without the Program.
- **Participant freeriders** would have purchased a CFL or LED anyway.
- **Naturally occurring** are customers who purchased a CFL or LED outside of the Program. These customers very much resemble freeriders because they *did* purchase CFLs or LEDs without the Program (non-discounted). Freeriders would have purchased CFLs or LEDs without the Program (they just happened to find them discounted).
- **Spillover** describes customers who make purchases driven by increased awareness caused by the Program within the current year. They bought CFLs or LEDs from nonparticipating stores or purchased a particular CFL or LED, not discounted by the Program, from a participating store.
- **Market effects** describes those customers who are “converted” to purchasing CFLs or LEDs by learning of them through the Program and through increased availability on the store shelf. They bought the CFLs or LEDs, but they purchased them from nonparticipating stores, or they selected a non-Program CFL or LED at a participating retailer.

Figure L-7, below, illustrates the Evaluation Team’s attribution analysis approach (i.e., dividing the 9.3% rise in saturation into the five groups above). Analysis used the 41% freeridership estimate, determined through the demand elasticity model, to attribute how many program bulb purchases would be considered freeriders (would have occurred without the program) and how many were influenced by the program. The remainder of the increase in saturation due to Program CFLs reflects the effect of non-freeriders.



Figure L-7. Light Sales Attribution



Addressing the 3.5% of increased saturation occurring outside of the Program, the Evaluation Team assumed the same drivers occurring among freeriders and non-freeriders would occur among those non-Program buyers (where freeriders are synonymous with naturally occurring adoption and non-freeriders are synonymous with market effects and spillover). Thus, three groups account for the 3.5% of increased saturation outside the Program:

- **Naturally occurring** buyers buy CFLs due to natural market forces unrelated to the Program. These buyers would have purchased the CFLs, regardless of the current Program and discount. They account for about 41% of the 3.5% (or 1.4% of the total increase in saturation).
- **Spillover** buyers purchased non-discounted bulbs because of the Program's influence within the current Program year. This is a short-term phenomenon. This accounted for about 34% of the 3.5% (1.2%).
- **Market effects** describe buyers who are affected by the Program's influence on a long-term basis. This accounted for about 25% of the 3.5% (or 0.9%).

The Evaluation Team split shares of the group that would have purchased CFLs regardless of the current Program, per the available percentage of energy-efficient products stocked at the stores in the retailer panel. The study found that 45% of available lighting products in big box stores were energy efficient, but 55% were not, resulting in a market effects portion of 45% of the 2.1% (or 0.9%). Spillover was 55% of 2.1% (or 1.2%).

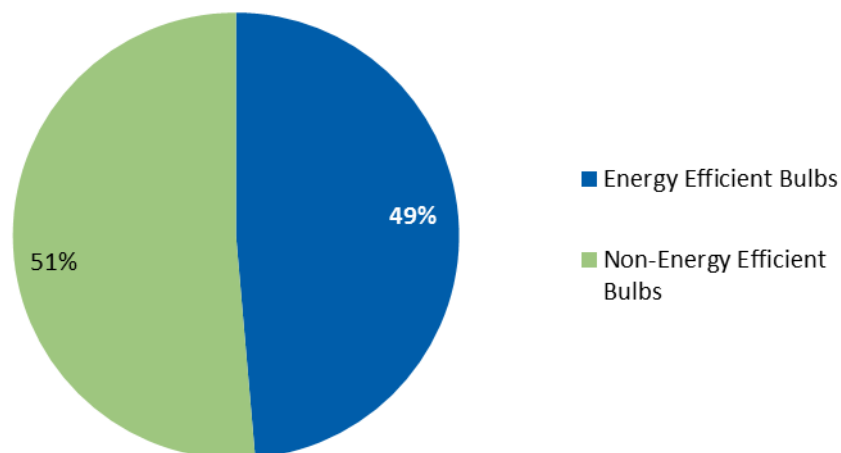
### Lighting Retailer Inventory Results

To establish a foundation for understanding market effects over time, the Evaluation Team analyzed several themes using the inventory stocking data described above. This study is concerned with proportions of energy-efficient bulb types.

First, the Evaluation Team used lighting category data to determine the proportions of energy-efficient bulbs (CFLs, LEDs, and fluorescents) overall, for both participant and nonparticipant stores, and bulb types by participant and nonparticipant stores. The Evaluation Team weighted these data by how many stores each the retailer had within Focus on Energy's territories, which was a clearer representation of the lighting market as a whole.

Figure L-8 and Figure L-9 present the percentage of energy-efficient light bulbs by participant and nonparticipant stores. For participant retailers, energy-efficient bulbs made up 49% of their lighting inventories, compared to 32% with nonparticipant retailers. Combining participant and nonparticipant stores (weighted by the number of stores in Focus on Energy's territory) resulted in an overall average of 48%.

**Figure L-8. Proportion of Energy-Efficient Bulbs  
Among Participant Stores**



**Figure L-9. Proportion of Energy-Efficient Bulbs  
Among Nonparticipant Stores**

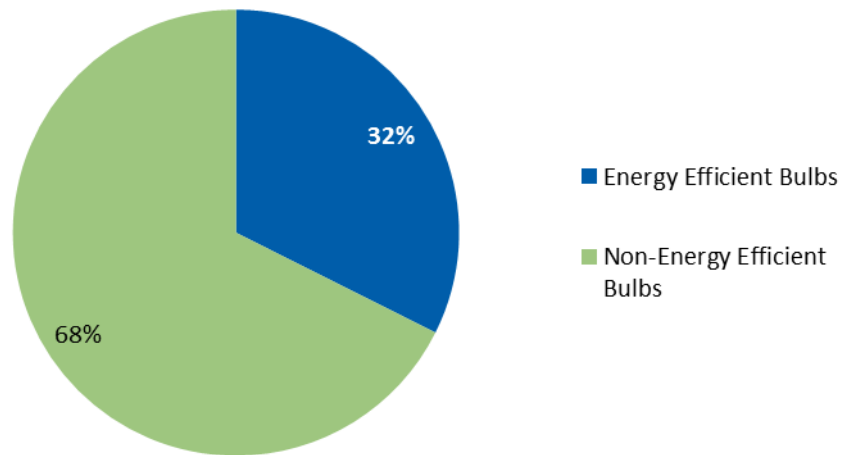
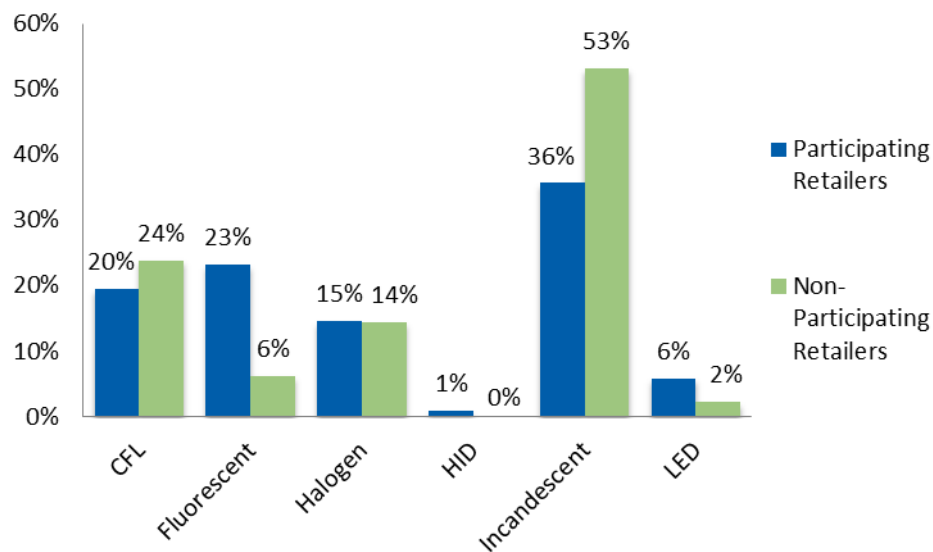


Figure L-10 compares the proportion of bulbs by type between participant and nonparticipant retailers. Incandescent bulbs made up the largest portion of participant and nonparticipant inventories, at 36% and 53%, respectively. For energy-efficient bulb types (CFLs, LEDs, and fluorescents), the two store types' inventories varied significantly for fluorescent bulbs, but not as much for CFLs and LEDs for both store types.

**Figure L-10. Proportion of Bulbs by Type  
Between Participant and Nonparticipant Retailers**



### ***Self-Report Net-To-Gross Analysis Approach***

Two components constitute NTG: freeridership and spillover. True freeriders are customers who would have purchased a measure without a program's influence. Spillover is the amount of additional savings obtained by customers investing in additional, energy-efficient measures or activities due to their program participation.

This section presents the approaches and detailed results of Residential and Nonresidential NTG estimates derived from the use of self-reports, procured through participant surveys. These results were applied to measure categories and programs for which adequate baseline data were unavailable. In some cases, the Evaluation Team applied a blended approach, combining measure level results from both the SMP and the self-report methods to determine weighted average program NTG ratios.

### **Survey Design**

For programs where participating customer surveys were conducted in the CY 2013 evaluation plans, the Evaluation Team asked a series of freeridership and spillover questions in the participant survey.

These freeridership questions were designed to elicit, to the best of the respondent's ability, the impact of the particular program on their decision to purchase the high-efficiency equipment. 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 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, then checking for consistent responses.

The Evaluation Team designed the survey questions to determine why customers installed a given measure and what influence the program had on their decisions. The survey sought to establish what decision makers might have done in the program's absence, using a set of core freeridership questions to address that issue. Programs can have an effect on more than a customer's decision to purchase an energy-efficient measure. They can influence a customer 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.

Basing freeridership estimates using a series of questions, rather than a single question, can help to recognize and minimize response biases. Not all questions are weighted equally. For example, if a respondent would not have installed the measure(s) to the same level of efficiency without the program, they are automatically a 0% freerider. If they would not have installed the measure(s) within two years without the program, they are automatically a 0% freerider.

Other questions included in the freeridership analysis are assigned partial weights for responses that are indicative of a non-freerider. Using this method does not allow for a respondent to be estimated as a 100% freerider based on a single answer to a single question; a customer would have to provide consistent responses across the relevant questions in the freeridership analysis.

The Evaluation Team designed survey questions to determine why customers installed a specific measure and what influence the program had on their decisions. The survey sought to establish what decision makers might have done in the program’s absence, using questions addressing five core freeridership dimensions for residential programs and six core freeridership dimensions for nonresidential programs:

- 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)

The survey design included several skip patterns, allowing interviewers to confirm answers previously provided by respondents by asking the same question in a different format. Specific freeridership questions used for the programs are presented within their analysis sections in this appendix.

## *Freeridership Methodology*

The Evaluation Team developed a score for all participants based on their responses to the freeridership questions. The Evaluation Team developed a probability matrix for assigning a single score to each participant, based on his or her objective responses to targeted survey questions.<sup>10</sup> Question response patterns existing in the probability matrix received freeridership scores, with confidence and precision estimates calculated on 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 incentive’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 a key advantage in introducing the concept of partial freeridership. Experience has shown program participants do not fall neatly into freerider and non-freerider categories. For example, the Evaluation Team assigned partial freeridership scores to participants who had plans to install a measure; though the program exerted some influence over their

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<sup>10</sup> Khawaja, S. *The NAFEE Handbook on DSM Evaluation*. 2007 edition, page 5-1.

decisions, other market characteristics outside the program also proved influential. Further, the Evaluation Team could assign partial credit to “don’t know” and “refused” responses, rather than removing respondents entirely from the analysis.

The Evaluation Team assessed freeridership at three levels:

- It converted each participant survey response into a freeridership matrix terminology.
- Each participant’s combination of responses received a score from the matrix.
- All participants were aggregated into an average freeridership score for the entire program category.

## *Convert Responses to Matrix Terminology*

The study independently evaluated each survey question’s response, assessing participants’ freeridership levels for each question, with each survey response option converted into the following 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, a freeridership matrix was created for each program, allowing each participant’s combined responses to be assigned a freeridership score. All combinations of survey question responses were considered in creating the matrix, with each combination receiving a freeridership score of 0% to 100%.

The Evaluation Team’s process for determining freeridership score is as follows:

- Customers were categorized as 0% freeriders in the following instances: (1) they had no plans to install the measure in 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; (2) they had specific plans to install the measure before learning about the program but would not have done so without program incentives; or (3) in absence of the 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, a higher freeridership percentage was applied.

## 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, respondents' freerider scores were individually weighted by estimated savings of equipment installed, using the following calculation:

$$\text{SavingsWeightedFreeridership} = \frac{\sum [\text{Respondent FR Score}] * [\text{Measure Energy Savings}]}{\sum [\text{All Respondents Measure Energy Savings}]}$$

## Spillover Methodology

Spillover refers to additional savings generated by program participants through program participation but not captured by program records. Spillover occurs when participants choose to purchase energy-efficient measures or adopt energy-efficient practices due a program's influence but do not participate (or otherwise cannot participate) in the program.

The Evaluation Team measured spillover by asking a sample of participants purchasing and receiving an incentive for a particular measure if, due to the program, they installed another efficient measure or undertook another energy-efficiency activity. Respondents were asked to rate the program's (and incentive's) relative influence (either highly, somewhat, or not at all influential) on their decisions to pursue additional savings.

## Participant Spillover Analysis

Calculating spillover savings used a top-down approach. Analysis began with a subset containing only survey respondents indicating they installed additional energy-saving measures after participating in the program. The Evaluation Team screened out any participants who received an incentive for these additional measures. Participants were also removed if they indicated the Program had little influence on their decisions to purchase additional measures, thus retaining only participants rating the Program as "highly influential."

The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their program participation.

The spillover percentage per program category was calculated by dividing the sum of additional spillover savings reported by respondents for a given program category by total incentivized gross savings achieved by all respondents in the program category:

$$\text{Spillover \%} = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$



## *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:

$$\text{NTG} = 1 - \text{Freeridership} + \text{Spillover}$$

## **Residential Rewards Self-Report NTG Methodology and Findings**

### *Freeridership Survey Questions*

The participant survey's freeridership section included 10 questions, addressing the five core freeridership dimensions. Freeridership questions (as asked in the survey format for gas furnaces) included:

- F1. Before you heard anything about the Focus on Energy Residential Rewards program, had you already purchased or installed the new furnace?
- F2. [Ask if question F1 is Yes] So just to be clear, you installed the new furnace before you heard anything about the Focus on Energy Residential Rewards program. Is that correct?
- F3. Before you heard about the Focus on Energy Residential Rewards program, had you already been planning to purchase a furnace?
- F4. Would you have installed the same furnace without the Cash-back Reward from Focus on Energy?
- F5. [Ask if question F4 is No] So I understand, would you have installed a different furnace without the Focus on Energy Cash-back Reward or would you have decided not to replace it?
- F6. When you say you would have installed a furnace without the Focus on Energy Cash-back Reward from Focus on Energy, would you have installed one that was at the same level of efficiency?
- F7. And, thinking about timing, without the Focus on Energy Cash-back Reward, would you have installed the furnace ... [READ LIST]
- F8. [Ask if question F5 is Don't Know or Refused] So just to confirm, you would not have replaced your furnace at all, without a Focus on Energy Cash-back Reward. Is that correct?
- F9. [Ask if question F8 is No] Without the Focus on Energy Cash-back Reward, would you have installed a furnace, but one that was not as energy-efficient?
- F10. [Ask if question F8 is No] And with respect to timing, would you have installed the furnace ... [READ LIST]

## Convert Responses to Matrix Terminology

Table L-2 illustrates how initial survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-2. Residential Rewards Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

F1. Before you heard anything about the Focus on Energy Residential Rewards program, had you already purchased or installed the new [MEASURE]?	F2. So just to be clear, you installed the new [MEASURE] before you heard anything about the Focus on Energy Residential Rewards program. Is that correct?	F3. Before you heard about the Focus on Energy Residential Rewards program, had you already been planning to purchase a [MEASURE]?	F4. Would you have installed the same [MEASURE] without the Cash-back Reward from Focus on Energy	F5. So I understand, would you have installed a different [MEASURE] without the Focus on Energy Cash-back Reward or would you have decided not to replace it?	F6. When you say you would have installed a [MEASURE] without the Focus on Energy Cash-back Reward from Focus on Energy, would you have installed one that was at the same level of efficiency?	F7. And, thinking about timing, without the Focus on Energy Cash-back Reward, would you have installed the [MEASURE] ...	F8. So just to confirm, you would not have replaced your [MEASURE] at all, without a Focus on Energy Cash-back Reward. Is that correct?	F9. Without the Focus on Energy Cash-back Reward, would you have installed a [MEASURE], but one that was not as energy-efficient?	F10. And with respect to timing, would you have installed the [MEASURE] ...
Yes (Yes)	Yes, that's correct (Yes)	Yes (Yes)	Yes (Yes)	I would have installed a different [MEASURE] (Yes)	Yes (Yes)	At the same time (Yes)	Yes (No)	Yes (No)	At the same time (Yes)
No (No)	No, that's not correct (No)	No (No)	No (No)	I would have decided not to replace it (No)	No (No)	Within the same year (Partial)	No (Yes)	No (Yes)	Within the same year (Partial)
Don't Know (No)	Don't Know (No)	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)
Refused (No)	Refused (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	More than two years out (No)	Refused (Partial)	Refused (Partial)	More than two years out (No)
						Never (No)			Never (No)
						Don't Know (Partial)			Don't Know (Partial)
						Refused (Partial)			Refused (Partial)

## Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on his or her responses to the ten questions as shown in Table L-3.

**Table L-3. Residential Rewards Freeridership Scoring Legend**

Q#	Decrement
<b>F1</b>	0% decrement for "No," Partial level not needed
<b>F2</b>	100% FR if "Yes," 0% decrement for "No" level, "Partial" level not needed
<b>F3</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F4</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F5</b>	0% decrement for "No," Partial level not needed
<b>F6</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F7</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F8</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F9</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F10</b>	100% decrement for "No," 25% decrement for "Partial"

Below, Table L-4 illustrates the unique response combinations from participants answering the Residential Rewards freeridership battery (actual responses mapped to “yes,” “no,” or “partial,” as indicative of freeridership), the freeridership score assigned to each combination, and the number of responses. This table includes only participants installing measures for which the Evaluation Team are applying self-report methodology, as some additional measures were assessed using the SMP method.

The Evaluation Team calculated a freeridership score for the program based on the distribution of scores within the matrix.

**Table L-4. Residential Rewards Frequency of Freeridership Scoring Combinations<sup>1</sup>**

F1. Before you heard anything about the Focus on Energy Residential Rewards program, had you already purchased or installed the new furnace?	F2. So just to be clear, you installed the new furnace before you heard anything about the Focus on Energy Residential Rewards program. Is that correct?	F3. Before you heard about the Focus on Energy Residential Rewards program, had you already been planning to purchase a furnace?	F4. Would you have installed the same furnace without the Cash-back Reward from Focus on Energy?	F5. So I understand, would you have installed a different furnace without the Focus on Energy Cash-back Reward or would you have decided not to replace it?	F6. When you say you would have installed a furnace without the Focus on Energy Cash-back Reward from Focus on Energy, would you have installed one that was at the same level of efficiency?	F7. And, thinking about timing, without the Focus on Energy Cash-back Reward, would you have installed the furnace ...	F8. So just to confirm, you would not have replaced your furnace at all, without a Focus on Energy Cash-back Reward. Is that correct?	F9. Without the Focus on Energy Cash-back Reward, would you have installed a furnace, but one that was not as energy-efficient?	F10. And with respect to timing, would you have installed the furnace ...	FR Score	Frequency
Yes	Yes	x	x	x	x	x	x	x	x	100%	8
Yes	No	Yes	Yes	x	Yes	Yes	x	x	x	100%	2
No	x	Yes	Yes	x	Yes	Yes	x	x	x	100%	36
No	x	Yes	Yes	x	Yes	Partial	x	x	x	75%	9
No	x	Yes	Yes	x	Partial	Yes	x	x	x	75%	2
No	x	Yes	Yes	x	No	x	x	x	x	0%	5
No	x	Yes	Partial	Yes	No	x	x	x	x	0%	1
No	x	Yes	Partial	Partial	x	x	x	x	x	75%	5
No	x	Yes	No	Yes	Yes	Yes	x	x	x	50%	1
No	x	Yes	No	Yes	Yes	No	x	x	x	0%	1
No	x	Yes	No	Yes	Partial	Yes	x	x	x	25%	1
No	x	Yes	No	Yes	Partial	Partial	x	x	x	12.5%	1
No	x	Yes	No	Yes	No	x	x	x	x	0%	10
No	x	Yes	No	Partial	x	x	x	x	x	50%	1
No	x	Partial	Yes	x	Yes	Yes	x	x	x	75%	1
No	x	No	Yes	x	Yes	Yes	x	x	x	50%	13
No	x	No	Yes	x	Yes	Partial	x	x	x	25%	1
No	x	No	Yes	x	Yes	No	x	x	x	0%	1
No	x	No	Yes	x	No	x	x	x	x	0%	4
No	x	No	Partial	Yes	Yes	Yes	x	x	x	25%	2
No	x	No	Partial	Yes	Yes	Partial	x	x	x	12.5%	1
No	x	No	Partial	Yes	Partial	Yes	x	x	x	12.5%	1
No	x	No	Partial	Partial	Partial	x	x	x	x	25%	2
No	x	No	Partial	No	x	x	Partial	No	x	0%	1
No	x	No	No	Yes	Partial	Yes	x	x	x	0%	1
No	x	No	No	Yes	No	x	x	x	x	0%	3
No	x	No	No	Partial	x	x	x	x	x	12.5%	1

<sup>1</sup> An 'x' in this table and subsequent tables indicates that the respondent was not asked that particular question. These questions were skipped intentionally based on customer responses, in order to avoid asking redundant questions.

## 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 Residential Rewards Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their Program participation, presented in Table L-6.

**Table L-5. Residential Rewards Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
Refrigerator	1	388,984
Clothes Washer	1	1,208,016
Insulation	1 project	10,543,556
Windows	2 projects	18,152,593

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 2.5% spillover estimate for the Residential Rewards program respondents (Table L-6).

**Table L-6. Residential Rewards Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	30,293,149
Program Savings	1,197,428,928
<b>Spillover Estimate</b>	<b>2.5%</b>

### Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the measure-level freeridership results to achieve the measure-level net-to-gross (NTG) ratios, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-7. Residential Rewards NTG Estimates**

Program Measure	n	FR*	SO	NTG
95% AFUE Furnace with EMC	70	57.7%	2.5%	44.9%
Furnace with efficient motor and air conditioning	28	47.8%	2.5%	54.8%
Furnace with Efficient Motor	17	70.6%	2.5%	31.9%

\* Weighted by gross evaluated energy savings

## Home Performance with ENERGY STAR Self-Report NTG Methodology and Findings

### *Freeridership Survey Questions*

The participant survey's freeridership section included six questions, addressing the five core freeridership dimensions. Freeridership questions (as asked in the survey format) included:

- G6. Before you heard about the Focus on Energy Home Performance with ENERGY STAR program, had you already been planning to purchase insulation?
- G7. Would you have installed the same type and amount of insulation without the incentive from Focus on Energy?
- G8. [Ask if question G7 is No] When you say you would have installed insulation without the Focus on Energy program, would you have installed insulation that was at the same level of efficiency?
- G9. And, thinking about timing, without the Focus on Energy program, would you have installed the insulation...
- G10. [Ask if question G6 is No, Don't Know, or Refused, or if question G9 is 'Never'] So just to confirm, you would not have added insulation at all, without the program. Is that correct?
- G11. Please tell me how important was the Focus on Energy program was in your decision to install the energy-efficient insulation? Would you say it was ...

### *Convert Responses to Matrix Terminology*

Table L-8 illustrates how initial survey responses are translated into whether the response is "yes," "no," or "partially" indicative of freeridership (in parentheses).

**Table L-8. Home Performance with ENERGY STAR Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

G6. Before you heard about the Focus on Energy Home Performance with ENERGY STAR program, had you already been planning to purchase insulation?	G7. Would you have installed the same type and amount of insulation without the incentive from Focus on Energy?	G8. When you say you would have installed insulation without the Focus on Energy program, would you have installed insulation that was at the same level of efficiency?	G9. And, thinking about timing, without the Focus on Energy program, would you have installed the insulation...	G10. So just to confirm, you would not have added insulation at all, without the program. Is that correct?	G11. Please tell me how important was the Focus on Energy program was in your decision to install the energy-efficient insulation? Would you say it was ...
Yes (Yes)	Yes (Yes)	Yes (Yes)	At the same time (Yes)	Yes (No)	Very important (No)
No (No)	No (No)	No (No)	Within the same year (Partial)	No (Yes)	Somewhat important (Yes)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	One to two years out (No)	Don't Know (Partial)	Not too important (Partial)
Refused (Partial)	Refused (Partial)	Refused (Partial)	More than two years out (No)	Refused (Partial)	Not important at all (Partial)
			Never (No)		Don't Know (Partial)
			Don't Know (Partial)		Refused (Partial)
			Refused (Partial)		

### Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on his or her responses to the six questions as shown in Table L-9.

**Table L-9. Home Performance with ENERGY STAR Freeridership Scoring Legend**

Q#	Decrement
<b>G6</b>	50% decrement for "No," 25% decrement for "Partial"
<b>G7</b>	50% decrement for "No," 25% decrement for "Partial"
<b>G8</b>	100% decrement for "No," 25% decrement for "Partial"
<b>G9</b>	100% decrement for "No," 25% decrement for "Partial"
<b>G10</b>	100% decrement for "No," 25% decrement for "Partial"
<b>G11</b>	50% decrement for "No," 25% decrement for "Partial"

Below, the Evaluation Team illustrate the unique response combinations from participants answering the Home Performance with ENERGY STAR insulation freeridership battery (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 L-10. Home Performance with ENERGY STAR Frequency of Freeridership Scoring Combinations**

G6. Before you heard about the Focus on Energy Home Performance with ENERGY STAR program, had you already been planning to purchase insulation?	G7. Would you have installed the same type and amount of insulation without the incentive from Focus on Energy?	G8. When you say you would have installed insulation without the Focus on Energy program, would you have installed insulation that was at the same level of efficiency?	G9. And, thinking about timing, without the Focus on Energy program, would you have installed the insulation...	G10. So just to confirm, you would not have added insulation at all, without the program. Is that correct?	G11. Please tell me how important was the Focus on Energy program was in your decision to install the energy-efficient insulation? Would you say it was ...	FR Score	Frequency
Yes	Yes	x	Yes	x	Yes	100%	2
Yes	Yes	x	Yes	x	Partial	75%	2
Yes	Yes	x	Yes	x	No	50%	1
Yes	Yes	x	Partial	x	No	25%	1
Yes	Yes	x	No	x	x	0%	5
Yes	Partial	x	No	x	x	0%	2
Yes	No	Yes	Yes	x	Partial	25%	1
Yes	No	Yes	Yes	x	No	12.5%	2
Yes	No	Partial	Partial	x	No	0%	1
Yes	No	No	Yes	x	Yes	25%	14
Partial	x	x	x	Yes	Yes	75%	1
Partial	x	x	x	No	x	0%	1
No	x	x	x	Yes	Partial	25.0%	1
No	x	x	x	Yes	No	12.5%	5
No	x	x	x	No	x	0%	9

## 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 Home Performance with ENERGY STAR Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-11.



**Table L-11. Home Performance with ENERGY STAR Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
Gas Tankless Water Heater	1	6,123,538
Gas Storage Water Heater	3	8,718,918
Clothes Washer	2	2,416,032
Refrigerator	1	388,984
Windows	1 project	9,076,297
Insulation	1 project	10,543,556

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 4.5% spillover estimate for the Home Performance with ENERGY STAR Program respondents who installed insulation (Table L-12).

**Table L-12. Home Performance with ENERGY STAR Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	37,267,325
Program Savings	833,116,032
<b>Spillover Estimate</b>	<b>4.5%</b>

### 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 L-13. Home Performance with ENERGY STAR Program Insulation NTG Estimate**

Program Measure	n	FR	SO	NTG
Insulation	47	10.9%	4.5%	93.6%

## Multifamily Energy Savings Program Self-Report NTG Methodology and Findings

### Freeridership Survey Questions

The participant survey's freeridership section included 11 questions, addressing the five core freeridership dimensions. Freeridership questions (as asked in the survey format) included:

- E1. If you had not had the items installed through the Focus on Energy program, would you have installed all, some, or none of the same energy efficiency equipment on your own?
- E2. Let me make sure I understand. When you say you would have installed the [E1KEEP] on your own, would you have installed equipment that was just as energy efficient, or would you have installed equipment that was somewhat less efficient than what Focus on Energy installed for you?
- E3. [Ask if QTY > 1] And would you have installed the same quantity of equipment on your own??
- E4. Without the program, when would you have installed the equipment on your own...?
- E5. Before you heard about the program, had you already purchased and installed the equipment?
- E6. Overall, would you say the Focus on Energy Multifamily Energy Savings Program was very important, somewhat important, not too important or not important at all in your decision to install the energy efficient equipment?
- E7. [Ask if question E1 is No] Let me make sure I understand. When you say you would not have installed the same equipment, do you mean you would not have installed the equipment at all?
- E8. [Ask if question E7 is No] Would you have installed the same types of equipment but they would have been at a lower level of efficiency?
- E9. [Ask if question E7 is No and if QTY > 1] Would it have been the same equipment but fewer of them?
- E10. [Ask if question E7 is No] And finally, when would you have installed the equipment...?
- E11. [Ask if question E7 is No] Before you heard about the program, had you already purchased and installed the equipment?

## *Convert Responses to Matrix Terminology*

Table L-14 illustrates how initial survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-14. Multifamily Energy Savings Program Frequency of Freeridership Scoring Combinations**

E1. If you had not had the items installed through the Focus on Energy program, would you have installed all, some, or none of the same energy efficiency equipment on your own?	E2. Let me make sure I understand. When you say you would have installed the equipment on your own, would you have installed equipment that was just as energy efficient, or would you have installed equipment that was somewhat less efficient than what Focus on Energy installed for you?	E3. [Ask if QTY >1] And would you have installed the same quantity of equipment on your own?	E4. Without the program, would you have installed the equipment on your own... (READ LIST)	E5. Before you heard about the program, had you already purchased and installed the equipment?	E6. Overall, would you say the Focus on Energy Multifamily Energy Savings Program was very important, somewhat important, not too important or not important at all in your decision to install the energy efficient equipment?	E7. [IF E1 = No] Let me make sure I understand. When you say you would not have installed the same equipment, do you mean you would not have installed the equipment at all?	E8. Would you have installed the same types of equipment but they would have been at a lower level of efficiency?	E9. [Ask if QTY > 1] Would it have been the same equipment but fewer of them?	E10. And finally, would you have installed the equipment... (READ LIST)	E11. Before you heard about the program, had you already purchased and installed the equipment?
Yes (Yes)	Yes (Yes)	Yes (Yes)	Within the same year? (Yes)	Yes (Yes)	Very important (No)	Yes, would not have installed any (No)	Yes (No)	Yes (No)	Within the same year? (Yes)	Yes (Yes)
No (No)	No (No)	No (No)	Within one to two years? (Partial)	No (No)	Somewhat important (Partial)	No, I only would have installed some of the measures (Yes)	No (Yes)	No (Yes)	Within one to two years? (Partial)	No (No)
Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (No)	Not very important (Partial)	Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (No)
Refused (No)	Refused (Partial)	Refused (Partial)	In more than five years? (No)	Refused (No)	Not at all important (Yes)	Refused (No)	Refused (Partial)	Refused (Partial)	In more than five years? (No)	Refused (No)
			Upon equipment failure? (No)		Don't Know (Partial)				Upon equipment failure? (No)	
			Don't Know (Partial)		Refused (Partial)				Don't Know (Partial)	
			Refused (Partial)						Refused (Partial)	

## Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on their responses to the six questions as shown in Table L-15.

**Table L-15. Multifamily Energy Savings Program Freeridership Scoring Legend**

Q#	Decrement
E1	50% decrement for "No," 25% decrement for "Partial"
E2	100% FR if "Yes," 25% decrement for "Partial"
E3	50% decrement for "No," 25% decrement for "Partial"
E4	50% decrement for "No," 25% decrement for "Partial"
E5	100% FR for "Yes," 0% decrement for "No," 0% decrement for "Partial"
E6	25% decrement for "No," 0% decrement for "Partial"
E7	100% decrement for "No," 25% decrement for "Partial"
E8	100% decrement for "No," 25% decrement for "Partial"
E9	50% decrement for "No," 25% decrement for "Partial"
E10	100% decrement for "No," 25% decrement for "Partial"
E11	100% FR for "Yes," 0% decrement for "No," 0% decrement for "Partial"

Below, the Evaluation Team illustrate the unique response combinations from participants answering the Multifamily Energy Savings Program freeridership battery (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 L-16. Multifamily Energy Savings Program Frequency of Freeridership Scoring Combinations**

E1. If you had not had the items installed through the Focus on Energy program, would you have installed all, some, or none of the same energy efficiency equipment on your own?	E2. Let me make sure I understand. When you say you would have installed the equipment on your own, would you have installed equipment that was just as energy efficient, or would you have installed equipment that was somewhat less efficient than what Focus on Energy installed for you?	E3. [Ask if QTY > 1] And would you have installed the same quantity of equipment on your own?	E4. Without the program, would you have installed the equipment on your own... (READ LIST)	E5. Before you heard about the program, had you already purchased and installed the equipment?	E6. Overall, would you say the Focus on Energy Multifamily Energy Savings Program was very important, somewhat important, not too important or not important at all in your decision to install the energy	E7. [IF E1 = No] Let me make sure I understand. When you say you would not have installed the same equipment, do you mean you would not have installed the equipment at all?	E8. Would you have installed the same types of equipment but they would have been at a lower level of efficiency?	E9. [Ask if QTY > 1] Would it have been the same equipment but fewer of them?	E10. And finally, would you have installed the equipment... (READ LIST)	E11. Before you heard about the program, had you already purchased and installed the equipment?	FR Score	Frequency
Yes	Yes	Yes	Yes	Yes	x	x	x	x	x	x	100%	1
Yes	Yes	Yes	Yes	No	Partial	x	x	x	x	x	100%	6
Yes	Yes	Yes	Partial	Yes	x	x	x	x	x	x	100%	1
Yes	Yes	Yes	Partial	No	No	x	x	x	x	x	50%	1
Yes	Yes	Yes	No	Yes	x	x	x	x	x	x	100%	1
Yes	Yes	Yes	No	x	x	x	x	x	x	x	0%	1
Yes	Yes	No	Yes	Yes	x	x	x	x	x	x	100%	1
Yes	Yes	No	Yes	No	No	x	x	x	x	x	25%	1
Yes	Yes	No	No	Yes	x	x	x	x	x	x	100%	1
Yes	Partial	Yes	Yes	No	No	x	x	x	x	x	50%	1
No	x	x	x	x	x	Yes	Yes	No	Yes	No	12.5%	1
No	x	x	x	x	x	Yes	No	x	x	x	0%	1
No	x	x	x	x	x	No	x	x	x	x	0%	16

## 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 Multifamily Energy Savings Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-17.

**Table L-17. Multifamily Energy Savings Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
Clothes Washers	75	82,953,585
Furnace	3	7,898,114
LED Lighting – Pool Area	6	8,004,884
Pipe Insulation	1 project	71,752,868
Windows	1 project	71,622,559

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 19.4% spillover estimate for the Multifamily Energy Savings Program respondents (Table L-18).

**Table L-18. Multifamily Energy Savings Program Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	242,232,009
Program Savings	1,248,112,628
<b>Spillover Estimate</b>	<b>19.4%</b>

One respondent attributed 72 additional clothes washer purchases to his or her participation in the Multifamily Energy Savings Program. If these 72 clothes washers were not attributed to Program spillover, the spillover estimate for the Multifamily Energy Savings Program would be 13.0%. The Evaluation Team believes the activity reported by this respondent to valid spillover activity and is attributing the energy savings from the purchases to Multifamily Energy Savings Program.

## 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:

$$\text{NTG} = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-19. Multifamily Energy Savings Program Insulation NTG Estimate**

Program Measure	n	FR	SO	NTG
Non-Direct Install	33	38.0%	19.4%	81.4%

## Business Incentive Program, Large Energy Users Program, and Chain Stores and Franchises Program Self-Report Freeridership Methodology

### Freeridership Survey Questions

The Business Incentive Program and Large Energy Users Program participant survey's freeridership section included two separate sets of 14 questions, addressing the six core freeridership dimensions. One set of freeridership questions was asked of participants who said they were the decision makers. A second set of freeridership questions was asked of participants whose contractor helped in the decision making. Participants were only asked one of the batteries of questions.

The two sets of freeridership questions are directly comparable; the difference is that one is oriented toward asking about counterfactual behavior without the program incentive and one is oriented toward asking about counterfactual behavior if there was no involvement from the contractors. Only the incentive-focused freeridership battery was asked to Chain Stores and Franchises Program participants because of the Program's design.<sup>11</sup> The freeridership questions about the program incentive (asked in the survey format) were:

- G1. At the time that you first heard about the financial incentive, had you already purchased the [MEASURE][s]?
- G2. Did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?
- G3. [Ask if question G2 is Yes] Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?
- G4. Would you have purchased and installed the same [MEASURE][s] without the incentive?

<sup>11</sup> Chain Stores and Franchises is an account-managed program with a lot of repeat participants and it is highly unlikely that the customers would not know they had participated in a program.

- G5. [Ask if question G4 is Don't Know or Refused] Would you have installed something without the incentive?
- G6. [Ask if G5 is Yes] 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 if QTY > 1 and question G4 is Yes or G5 is Yes] And without the incentive, would you have installed the same number of the [MEASURE]?
- G7b. [Ask if question G7 is No] Would you have installed fewer or more of the [MEASURE]?
- G8. Without the incentive for the [MEASURE][s], when would you have installed the [MEASURE][s]?
- G9. [Ask if question G4 is No or if G5 is No] When you say you would not have installed the same [MEASURE][s] without the incentive, would you have installed anything at all?
- G10. [Ask if question G9 is Yes] Without the incentive, would you have installed something that was just as energy efficient as the [MEASURE][s] you installed?
- G11. [Ask if QTY > 1 and G9 is Yes] And without the incentive, would you have installed the same number of [MEASURE]?
- G11b. [Ask if G11 is No] Would you have installed fewer or more of the [MEASURE]?
- G12. [Ask if G9 is Yes] And, when would you have installed the same [MEASURE][s]?

The freeridership questions oriented toward the involvement of the contractor (as asked in the survey format) included:

- H1. At the time that you first started working with your contractor on this project, had you already purchased 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 number of [MEASURE]?
- H7b. [Ask if question H7 is No] Would you have installed fewer or more of the [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 [MEASURE1 OR C\_MEASURE1][s] you installed?
- H11. [Ask if QTY > 1 and H11 is Yes] And without the contractor, would you have installed the same number of [MEASURE][s]?
- H11b. [Ask if H11 is No] Would you have installed fewer or more of the [MEASURE]?
- H12. [Ask if H9 is Yes] And, when would you have installed the same [MEASURE][s]?

## Convert Responses to Matrix Terminology

Table L-20 illustrates how initial incentive focused survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-20. Incentive - Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

G1. At the time that you first heard about the financial incentive, had you already purchased or installed the [MEASURE] ?	G2. Did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?	G3. Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?	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 if QTY > 1] And without the incentive, would you have installed the same number of:	G7b. Would you have installed fewer or more of the:	G8. Without the incentive for [MEASURE], 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 if QTY > 1] And without the incentive, would you have installed the same number of:	G11b. Would you have installed fewer or more of the:	G12. And, would you have installed the same [MEASURE1][s]...
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes (Yes)	Fewer (No)	Within the same year? (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes (Yes)	Fewer (No)	Within the same year? (Yes)
No (No)	No (No)	No (No)	No (No)	No, would NOT have installed anything (No)	No (No)	No (No)	More (Yes)	Within one to two years? (Partial)	No, would not have installed anything at all (No)	No (No)	No (No)	More (Yes)	Within one to two years? (Partial)
Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Yes)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Yes)	Don't Know (Partial)	Within three to five years? (No)
Refused (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Yes)	Refused (Partial)	In more than five years? (No)	Refused (Partial)	Refused (Partial)	Refused (Yes)	Refused (Partial)	In more than five years? (No)
								Don't Know (Partial)					Don't Know (Partial)
								Refused (Partial)					Refused (Partial)

Table L-21 illustrates how initial contractor focused survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-21. 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 the [MEASURE][s]?	H2. Did your organization have specific plans to install the [MEASURE][s] before you began working with your contractor?	G3. Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?	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 if QTY > 1] And without the incentive, would you have installed the same number of:	G7b. Would you have installed fewer or more of the:	G8. Without the incentive for [MEASURE], 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 if QTY > 1] And without the incentive, would you have installed the same number of:	G11b. Would you have installed fewer or more of the:	G12. And, would you have installed the same [MEASURE1][s]...
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes (Yes)	Fewer (No)	Within the same year? (Yes)	Yes, would have installed something (Yes)	Yes (Yes)	Yes (Yes)	Fewer (No)	Within the same year? (Yes)
No (No)	No (No)	No (No)	No (No)	No, would NOT have installed anything (No)	No (No)	No (No)	More (Yes)	Within one to two years? (Partial)	No, would not have installed anything at all (No)	No (No)	No (No)	More (Yes)	Within one to two years? (Partial)
Don't Know (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Yes)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (Partial)	Don't Know (Partial)	Don't Know (Yes)	Don't Know (Partial)	Within three to five years? (No)
Refused (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Yes)	Refused (Partial)	In more than five years? (No)	Refused (Partial)	Refused (Partial)	Refused (Yes)	Refused (Partial)	In more than five years? (No)
								Don't Know (Partial)					Don't Know (Partial)
								Refused (Partial)					Refused (Partial)

## Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on their responses to the 14 questions as shown in Table L-22.

**Table L-22. Freeridership Scoring Legend**

Q#	Decrement
<b>F1</b>	100% FR if "Yes," 0% decrement for "No" level, "Partial" level not needed
<b>F2</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F3</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F4</b>	25% decrement for "No," 0% decrement for "Partial"
<b>F5</b>	25% decrement for "No," 0% decrement for "Partial"
<b>F6</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F7</b>	0% decrement for "No," "Partial" level not needed
<b>F8</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F9</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F10</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F11</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F12</b>	0% decrement for "No," "Partial" level not needed
<b>F13</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F14</b>	100% decrement for "No," 25% decrement for "Partial"

## Business Incentive Program Findings

Below, the Evaluation Team illustrates the unique response combinations from participants answering the Business Incentive Program freeridership battery (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 L-23. Business Incentive Program Frequency of Incentive Freeridership Scoring Combinations**

G1. At the time that you first heard about the financial incentive, had you already purchased or installed the [MEASURE] ?	G2. Did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?	G3. Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?	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 if QTY > 1] And without the incentive, would you have installed the same number of:	G7b. Would you have installed fewer or more of the:	G8. Without the incentive for [MEASURE], 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 if QTY > 1] And without the incentive, would you have installed the same number of:	G11b. Would you have installed fewer or more of the:	G12. And, would you have installed the same [MEASURE1][s]...	FR Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	x	x	100%	5
No	Yes	Yes	Yes	x	x	Yes	x	Yes	x	x	x	x	x	100%	4
No	Yes	Yes	Yes	x	x	Yes	x	Partial	x	x	x	x	x	75%	1
No	Yes	Yes	Yes	x	x	No	No	Yes	x	x	x	x	x	50%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	No	x	x	x	0%	2
No	Yes	Partial	Yes	x	x	Yes	x	Yes	x	x	x	x	x	75%	1
No	Yes	Partial	No	x	x	x	x	x	Yes	No	x	x	x	0%	1
No	Yes	No	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	1
No	Yes	No	Yes	x	x	No	No	Yes	x	x	x	x	x	13%	1
No	Partial	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	75%	1
No	Partial	x	No	x	x	x	x	x	Yes	No	x	x	x	0%	1
No	Partial	x	No	x	x	x	x	x	No	x	x	x	x	0%	2
No	No	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	3
No	No	x	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	1
No	No	x	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	No	x	Partial	Yes	Yes	x	x	Yes	x	x	x	x	x	50%	1
No	No	x	No	x	x	x	x	x	No	x	x	x	x	0%	2

**Table L-24. Business Incentive Program Frequency of Contractor Freeridership Scoring Combinations (Part 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. 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?	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 if QTY > 1] And without assistance from your contractor, would you have installed the same number of:	H7b. Would you have installed fewer or more of the:	H8. Without the assistance from your contractor, would you have installed the [MEASURE][s]...	H9. When you say you would not have installed the same [MEASURE][s] without the assistance from your contractor, would you have installed	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE][s]	H11. [Ask if QTY > 1] And without the assistance from your contractor, would you have installed the same number of:	H11b. Would you have installed fewer or more of the:	H12. And, would you have installed the same [MEASURE1][s]...	FR Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	x	x	100%	5
No	Yes	Yes	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	2
No	Yes	Yes	Yes	x	x	No	No	Yes	x	x	x	x	x	50%	2
No	Yes	Yes	Yes	x	x	No	No	Partial	x	x	x	x	x	25%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	x	x	Yes	75%	5
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	x	x	Partial	50%	2
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	Yes	x	Yes	75%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Partial	x	x	Partial	25%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Partial	No	No	Yes	13%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	No	x	x	x	0%	6
No	Yes	Yes	No	x	x	x	x	x	No	x	x	x	x	0%	3
No	Yes	Partial	Yes	x	x	Partial	x	Yes	x	x	x	x	x	75%	1
No	Yes	No	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	9
No	Yes	No	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	2
No	Yes	No	No	x	x	x	x	x	Yes	Yes	x	x	Partial	13%	1
No	Yes	No	No	x	x	x	x	x	Yes	Yes	Yes	x	Yes	25%	1
No	Yes	No	No	x	x	x	x	x	Yes	Yes	No	Partial	Yes	13%	1
No	Yes	No	No	x	x	x	x	x	Yes	Yes	No	No	Partial	0%	1
No	Yes	No	No	x	x	x	x	x	Yes	No	x	x	x	0%	2
No	Yes	No	No	x	x	x	x	x	Partial	No	x	x	x	0%	1
No	Yes	No	No	x	x	x	x	x	No	x	x	x	x	0%	7

**Table L-25. Business Incentive Program Frequency of Contractor Freeridership Scoring Combinations (Part 2)**

H1. At the time that you first started working with your contractor on this project, had you already purchased or installed the [MEASURE] ?	H2. 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?	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 if QTY > 1] And without assistance from your contractor, would you have installed the same number of:	H7b. Would you have installed fewer or more of the:	H8. Without the assistance from your contractor, would you have installed the [MEASURE][s]...	H9. When you say you would not have installed the same [MEASURE][s] without the assistance from your contractor, would you have installed	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE][s]	H11. [Ask if QTY > 1] And without the assistance from your contractor, would you have installed the same number of:	H11b. Would you have installed fewer or more of the:	H12. And, would you have installed the same [MEASURE][s]...	FR Score	Frequency
No	Partial	x	No	x	x	x	x	x	Yes	Yes	x	x	Partial	25%	1
No	No	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	2
No	No	x	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	7
No	No	x	Yes	x	x	No	No	Yes	x	x	x	x	x	13%	1
No	No	x	Yes	x	x	No	No	Partial	x	x	x	x	x	0%	1
No	No	x	Partial	Yes	Yes	Yes	x	Yes	x	x	x	x	x	50%	1
No	No	x	Partial	Yes	Yes	No	No	Yes	x	x	x	x	x	13%	1
No	No	x	Partial	No	x	x	x	x	Yes	Yes	Yes	x	Yes	25%	1
No	No	x	Partial	No	x	x	x	x	No	x	x	x	x	0%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	x	x	Yes	25%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	x	x	Partial	13%	4
No	No	x	No	x	x	x	x	x	Yes	Yes	Yes	x	Yes	25%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	No	No	Partial	0%	1
No	No	x	No	x	x	x	x	x	Yes	Partial	x	x	Yes	13%	1
No	No	x	No	x	x	x	x	x	Yes	Partial	No	Partial	Yes	0%	1
No	No	x	No	x	x	x	x	x	Yes	No	x	x	x	0%	14
No	No	x	No	x	x	x	x	x	Partial	No	x	x	x	0%	1
No	No	x	No	x	x	x	x	x	No	x	x	x	x	0%	40

## Business Incentive Program 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 values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-26.

**Table L-26. Business Incentive Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
LED Lighting	237	201,360,714
Outdoor Lighting	20	43,300,077
Fluorescent Tube Lighting	1,806	1,371,734,164
High Efficiency Motor	1	3,739,025
Central AC	14	45,906,953
Variable Speed Drive	107	9,118,750,602
Boiler	1	191,754,215
Room Air Conditioner	80	381,695,811
HVAC Unit	3	9,837,204
Irrigation Equipment	1	108,195,599

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 16.6% spillover estimate for the Business Incentive Program respondents (Table L-27).

**Table L-27. Business Incentive Program Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	11,476,274,366
Program Savings	69,219,998,559
<b>Spillover Estimate</b>	<b>16.6%</b>

## Business Incentive Program Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the freeridership results to achieve net-to-gross (NTG) ratios, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$



**Table L-28. Business Incentive Program NTG Estimates**

Analysis Category	n	FR	SO	NTG	% of Total Survey Sample Savings
Incentive	29	40.8%	12.8%	72.0%	11%
Contractor	181	35.7%	17.0%	81.3%	89%
Overall	210	36.3%	16.6%	80.3%	100%

### ***Large Energy Users Program Findings***

Below, the Evaluation Team illustrate the unique response combinations from participants answering the Large Energy Users Program freeridership battery (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 L-29. Frequency of Incentive Freeridership Scoring Combinations**

G1. At the time that you first heard about the financial incentive, had you already purchased or installed the [MEASURE] ?	G2. Did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?	G3. Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?	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 if QTY > 1] And without the incentive, would you have installed the same number of:	G7b. Would you have installed fewer or more of the:	G8. Without the incentive for [MEASURE], 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 if QTY > 1] And without the incentive, would you have installed the same number of:	G11b. Would you have installed fewer or more of the:	G12. And, would you have installed the same [MEASURE1][s]...	FR Score	Frequency
Yes	Yes	No	No	x	x	x	x	x	Yes	Yes	Yes	x	Partial	100%	1
No	Yes	Yes	Yes	x	x	Yes	x	Yes	x	x	x	x	x	100%	2
No	Yes	Yes	Yes	x	x	Yes	x	Partial	x	x	x	x	x	75%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	No	x	x	x	0%	1
No	Yes	Partial	Yes	x	x	Yes	x	Partial	x	x	x	x	x	50%	1
No	Yes	No	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	Partial	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	75%	1
No	Partial	x	Partial	Partial	x	x	x	x	x	x	x	x	x	0%	1
No	No	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	2
No	No	x	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	No	x	Yes	x	x	No	No	No	x	x	x	x	x	0%	1
No	No	x	Partial	Yes	No	x	x	x	x	x	x	x	x	0%	1
No	No	x	Partial	No	x	x	x	x	No	x	x	x	x	0%	1
No	No	x	No	x	x	x	x	x	No	x	x	x	x	0%	4

**Table L-30. Frequency of Contractor 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. 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?	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 if QTY > 1] And without assistance from your contractor, would you have installed the same number of:	H7b. Would you have installed fewer or more of the:	H8. Without the assistance from your contractor, would you have installed the [MEASURE][s]...	H9. When you say you would not have installed the same [MEASURE][s] without the assistance from your contractor, would you have installed	H10. Without the assistance from your contractor, would you have installed something that was just as energy efficient as the [MEASURE][s]	H11. [Ask if QTY > 1] And without the assistance from your contractor, would you have installed the same number of:	H11b. Would you have installed fewer or more of the:	H12. And, would you have installed the same [MEASURE1][s]...	FR Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	x	x	100%	2
No	Yes	Yes	Yes	x	x	Yes	x	Yes	x	x	x	x	x	100%	3
No	Yes	Yes	Yes	x	x	Yes	x	Partial	x	x	x	x	x	75%	1
No	Yes	Yes	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	Yes	Yes	Yes	x	x	No	No	Yes	x	x	x	x	x	50%	1
No	Yes	Yes	Partial	Yes	Yes	Yes	x	Yes	x	x	x	x	x	100%	1
No	Yes	Yes	Partial	Yes	Yes	Yes	x	No	x	x	x	x	x	0%	1
No	Yes	Yes	Partial	Yes	Partial	No	No	Yes	x	x	x	x	x	25%	1
No	Yes	Yes	Partial	No	x	x	x	x	Yes	No	x	x	x	0%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	Yes	x	Yes	75%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	No	x	x	x	0%	1
No	Yes	Yes	No	x	x	x	x	x	No	x	x	x	x	0%	1
No	Yes	Partial	Yes	x	x	Yes	x	Yes	x	x	x	x	x	75%	1
No	Yes	Partial	Partial	Yes	No	x	x	x	x	x	x	x	x	0%	1
No	Yes	Partial	Partial	Partial	x	x	x	x	x	x	x	x	x	0%	1
No	Yes	No	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	1
No	Yes	No	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	Yes	No	No	x	x	x	x	x	Yes	Yes	No	Yes	Partial	13%	1
No	Partial	x	Yes	x	x	Partial	x	Yes	x	x	x	x	x	75%	1
No	Partial	x	Partial	Yes	Yes	Yes	x	No	x	x	x	x	x	0%	1
No	No	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	2
No	No	x	Partial	Yes	Partial	Yes	x	Yes	x	x	x	x	x	25%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	Yes	x	Yes	25%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	Yes	x	Partial	13%	1
No	No	x	No	x	x	x	x	x	Partial	Partial	Yes	x	Partial	0%	1
No	No	x	No	x	x	x	x	x	Partial	Partial	Partial	x	No	0%	1
No	No	x	No	x	x	x	x	x	No	x	x	x	x	0%	10

## Large Energy Users Program 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 Large Energy Users Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-31.

**Table L-31. Large Energy Users Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
LED Lighting	70	106,765,912
Fluorescent Tube Lighting	540	342,817,870
High Efficiency Motor	27	108,434,449
Canopy Lighting	14	6,947,120
Steam Trap	107	279,533,257

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 2.0% spillover estimate for the Large Energy Users Program respondents (Table L-32).

**Table L-32. Large Energy Users Program Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	844,498,607
Program Savings	43,067,009,715
<b>Spillover Estimate</b>	<b>2.0%</b>

## Large Energy Users Program Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the freeridership results to achieve NTG ratios, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-33. Large Energy Users Program NTG Estimates**

Analysis Category	n	FR	SO	NTG	% of Total Survey Sample Savings
Incentive	19	37%	1.8%	64.6%	40%
Contractor	40	21%	2.1%	81.3%	60%
Overall	59	27%	2.0%	74.6%	100%

## *Chain Stores and Franchises Program Findings*

Below, the Evaluation Team illustrate the unique response combinations from participants answering the Chain Stores and Franchises Program freeridership battery (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 L-34. Chain Stores and Franchises Program Frequency of Incentive Freeridership Scoring Combinations**

G1. At the time that you first heard about the financial incentive, had you already purchased or installed the [MEASURE] ?	G2. Did your organization have specific plans to install the [MEASURE][s] before learning about the incentive?	G3. Prior to learning about the incentive, was the purchase of the [MEASURE][s] included in your organization's capital budget?	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 if QTY > 1] And without the incentive, would you have installed the same number of:	G7b. Would you have installed fewer or more of the:	G8. Without the incentive for [MEASURE], 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 if QTY > 1] And without the incentive, would you have installed the same number of:	G11b. Would you have installed fewer or more of the:	G12. And, would you have installed the same [MEASURE1][s]...	FR Score	Frequency
Yes	x	x	x	x	x	x	x	x	x	x	x	x	x	100%	10
No	Yes	Yes	Yes	x	x	Yes	x	Yes	x	x	x	x	x	100%	6
No	Yes	Yes	Yes	x	x	Yes	x	Partial	x	x	x	x	x	75%	3
No	Yes	Yes	Partial	No	x	x	x	x	No	x	x	x	x	0%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	x	x	Yes	75%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	Yes	x	x	No	0%	1
No	Yes	Yes	No	x	x	x	x	x	Yes	No	x	x	x	0%	2
No	Yes	Yes	No	x	x	x	x	x	No	x	x	x	x	0%	1
No	Yes	No	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	1
No	Yes	No	Yes	x	x	Yes	x	No	x	x	x	x	x	0%	1
No	Yes	No	Partial	Yes	Yes	Yes	x	Yes	x	x	x	x	x	50%	1
No	Yes	No	No	x	x	x	x	x	Partial	No	x	x	x	0%	1
No	Yes	No	No	x	x	x	x	x	No	x	x	x	x	0%	1
No	Partial	x	Yes	x	x	Yes	x	Partial	x	x	x	x	x	50%	1
No	Partial	x	Partial	Partial	x	x	x	x	x	x	x	x	x	0%	1
No	Partial	x	No	x	x	x	x	x	Yes	Yes	x	x	No	0%	1
No	No	x	Yes	x	x	Yes	x	Yes	x	x	x	x	x	50%	2
No	No	x	Yes	x	x	Yes	x	Partial	x	x	x	x	x	25%	1
No	No	x	Yes	x	x	No	No	Partial	x	x	x	x	x	0%	1
No	No	x	Partial	Yes	Yes	x	x	Partial	x	x	x	x	x	25%	1
No	No	x	Partial	No	x	x	x	x	Yes	Yes	x	x	Yes	25%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	x	x	Partial	12.5%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	x	x	No	0%	1
No	No	x	No	x	x	x	x	x	Yes	Yes	No	No	No	0%	1
No	No	x	No	x	x	x	x	x	Yes	Partial	Yes	x	Partial	0%	1
No	No	x	No	x	x	x	x	x	Yes	No	x	x	x	0%	2
No	No	x	No	x	x	x	x	x	No	x	x	x	x	0%	5

## Chain Stores and Franchises Program 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 Chain Stores and Franchises Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-35.

**Table L-35. Chain Stores and Franchises Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
Fluorescent Tube Lighting	25	4,179,873
High Efficiency Motor	4	16,346,888

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 0.8% spillover estimate for the Chain Stores and Franchises Program respondents (Table L-36).

**Table L-36. Chain Stores and Franchises Program Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	20,526,762
Program Savings	2,621,918,600
<b>Spillover Estimate</b>	<b>0.8%</b>

## Chain Stores and Franchises Program Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the freeridership result to achieve the NTG ratio, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-37. Chain Stores and Franchises Program NTG Estimate**

n	FR	SO	NTG
50	51.3%	0.8%	49.5%

## Small Business Program Self-Report Freeridership Methodology and Findings

### *Freeridership Survey Questions*

The Small Business Program participant survey freeridership section included one set of 12 questions, addressing the six core freeridership dimensions. The freeridership questions oriented toward the effect of the energy assessment on the customer's purchasing decision (as asked in the survey format) included:

- H1. First, did your business have specific plans to install the energy-efficient equipment before your contractor conducted the free energy assessment?
- H2. Before you received the energy assessment, was the purchase of the energy-efficient equipment recommended by your contractor included in your organization's budget?
- H3. Had your organization already ordered or purchased the energy-efficient equipment before you received the recommendations in the energy assessment report?
- H4. Would you have purchased and installed the same equipment without the energy assessment report from your contractor?
- H5. [Ask if question H4 is Don't Know or Refused] Would you have purchased and installed something else, but not the recommended equipment, without the information you received in the energy assessment?
- H6. [Ask if H4 is Yes] When you say you would have purchased and installed the same equipment, would you have installed the same type that was just as energy efficient?
- H7. [Ask question H7 to H8 if question H4 is Yes OR question H5 = No ] And without the information you received in the energy assessment report, would you have purchased and installed the same amount of new equipment?
- H8. Without the information from the contractor's energy assessment, when would you have purchased and installed the recommended energy-efficient equipment?
- H9. [Ask question H9 to H12 if question H4 is No OR question H5 is No] When you say you would not have purchased and installed the same efficient equipment without the recommendations from the energy assessment, do you mean you would not have installed the equipment at all?
- H10. Without the information from the contractor's energy assessment report, would you have put in the same type of equipment but it would not have been as energy efficient?



- H11. Without the information from the contractor’s energy assessment, would you have purchased and installed a smaller number of efficient equipment?
- H12. And, when would you have purchased and installed the same equipment?

## *Convert Responses to Matrix Terminology*

Table L-38 illustrates how initial contractor focused survey responses are translated into whether the response is ‘yes,’ “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-38. Small Business Program Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

H1. First, did your business have specific plans to install the energy-efficient equipment before your contractor conducted the free energy assessment?	H2. Before you received the energy assessment, was the purchase of the energy-efficient equipment recommended by your contractor included in your organization's budget?	H3. Had your organization already ordered or purchased the energy-efficient equipment before you received the recommendations in the energy assessment report?	H4. Would you have purchased and installed the same equipment without the energy assessment report from your contractor?	H5. [ASK IF H4=DK OR RF] Would you have purchased and installed something else, but not the recommended equipment, without the information you received in the energy assessment?	H6. [ASK IF H4=Yes] When you say you would have purchased and installed the same equipment, would you have installed the same type that was just as energy efficient?	H7. [ASK H7-H8 IF H4=Yes OR H5=Yes ] And without the information you received in the energy assessment report, would you have purchased and installed the same amount of new equipment?	H8. Without the information from the contractor's energy assessment, would you have purchased and installed the recommended energy-efficient equipment...	H9. [ASK H9 TO H12 IF H4=No OR H5= No] When you say you would not have purchased and installed the same efficient equipment without the recommendations from the energy assessment, do you mean you would not have installed the equipment at all?	H10. Without the information from the contractor's energy assessment report, would you have put in the same type of equipment but it would not have been as energy efficient?	H11. Without the information from the contractor's energy assessment, would you have purchased and installed a smaller number of efficient equipment?	H12. And, would you have purchased and installed the same equipment. . . [READ LIST AND RECORD ONE RESPONSE]
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have installed something else (Yes)	Yes (Yes)	Yes (Yes)	Within the same year? (Yes)	Yes (No)	Yes (No)	Yes (No)	In 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 (Yes)	No (Yes)	No (Yes)	In 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)	Don't Know (Partial)	In 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)	Refused (Partial)	More than five years? (No)
							Don't Know (Partial)				Don't Know (Partial)
							Refused (Partial)				Refused (Partial)

## Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on their responses to the 12 questions as shown in Table L-39.

**Table L-39. Small Business Program Freeridership Scoring Legend**

Q#	Decrement
H1	50% decrement for "No," 25% decrement for "Partial"
H2	50% decrement for "No," 25% decrement for "Partial"
H3	100% FR if "Yes," 0% decrement for "No" level, "Partial" level not needed
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"

## Small Business Program 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 values to the spillover measures that customers said they installed as a result of their program participation, presented in Table L-40.

**Table L-40. Small Business Program Participant Spillover Measures and Savings**

Spillover Measure	Quantity	Total BTU Savings Estimate
LED Lighting	12	12,979,787

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 0.3% spillover estimate for the Small Business Program respondents (Table L-41).

**Table L-41. Small Business Program Participant Spillover Percent Estimate**

Variable	Total BTU Savings Estimate
Spillover Savings	12,979,787
Program Savings	4,808,223,222
<b>Spillover Estimate</b>	<b>0.3%</b>

### *Small Business Program Net-to-Gross Analysis*

The Evaluation Team combined this spillover information with the freeridership result to achieve the net-to-gross (NTG) ratio, using the following calculation:

$$\text{NTG} = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-42. Small Business Program NTG Estimate**

n	FR	SO	NTG
64	15.2%	0.3%	85.0%

## **Renewable Energy Competitive Incentive Program Self-Report NTG Methodology and Findings**

### *Freeridership Survey Questions*

The participant survey's freeridership section included 8 questions, addressing the five core freeridership dimensions. Freeridership questions (as asked in the survey format for gas furnaces) included:

- F1. First, would your organization have installed the [INSERT PROJECT] without the incentives offered through the RECIP program?
- F2. I will read four statements and would like you to select the one that best describes where you were in the planning of your project's installation when you first learned of Focus on Energy's RECIP program. [READ ALL AND SELECT ONE]
- F3. Prior to participating in the RECIP, was the [INSERT PROJECT] included in your organization's capital or operating budget?
- F4. [Ask if Yes to question F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]
- F5. [Ask if Yes to question F1] Without the RECIP incentive, would you have installed the renewable energy project... [READ LIST; WHEN RESPONSE SELECTED, SKIP TO SECTION G]
- F6. [Ask if No to question F1] To confirm, when you say you would not have installed the same [INSERT PROJECT], do you mean that without the incentive from RECIP, that you would not have installed [INSERT PROJECT] at all?

- F7. [Ask if No to question F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]
- F8. [Ask if No to question F1] Any finally, would you have installed the [INSERT PROJECT], .... [READ LIST AND SELECT ONE]

## Convert Responses to Matrix Terminology

Table L-43 illustrates how initial survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of freeridership (in parentheses).

**Table L-43. RECIP Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

F1. First, would your organization have installed the [INSERT PROJECT] without the incentives offered through the RECIP program?	F2. I will read four statements and would like you to select the one that best describes where you were in the planning of your project's installation when you first learned of Focus on Energy's RECIP program. [READ ALL AND SELECT ONE]	F3. Prior to participating in the RECIP, was the [INSERT PROJECT] included in your organization's capital or operating budget?	F4. [IF YES TO F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]	F5. [IF YES TO F1] Without the RECIP incentive, would you have installed the renewable energy project... [READ LIST; WHEN RESPONSE SELECTED, SKIP TO SECTION G]	F6. [ASK IF NO TO F1] To confirm, when you say you would not have installed the same [INSERT PROJECT], do you mean that without the incentive from RECIP, that you would not have installed [INSERT PROJECT] at all?	F7. [ASK IF NO TO F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]	F8. [ASK IF NO TO F1] Any finally, would you have installed the [INSERT PROJECT], .... [READ LIST AND SELECT ONE]
Yes (Yes)	We had no formal plans for the project (No)	Yes (Yes)	The same size system (Yes)	Within the same year (Yes)	Yes (No)	The same size system (Yes)	Within the same year (Yes)
No (No)	We had already spoken to installation contractors but had not received any quotes for the project (Partial)	No (No)	A smaller system (No)	In one to two years (Partial)	No (Yes)	A smaller system (No)	In one to two years (Partial)
Don't Know (Partial)	We had already spoken to installation contractors and had received a quote (Yes)	Don't Know (Partial)	No new system at all (No)	In three to five years (No)	Don't Know (Partial)	No new system at all (No)	In three to five years (No)
Refused (Partial)	We had received a quote and decided upon the renewable energy system we wanted to install (Yes)	Refused (Partial)	Don't Know (Partial)	Don't Know (Partial)	Refused (Partial)	Don't Know (Partial)	Don't Know (Partial)
	Don't Know (Partial)		Refused (Partial)	Refused (Partial)		Refused (Partial)	Refused (Partial)
	Refused (Partial)						

## RECIP Participant Freeridership Scoring

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on his or her responses to the eight questions as shown in Table L-44.

**Table L-44. RECIP Freeridership Scoring Legend**

Q#	Decrement
<b>F1</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F2</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F3</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F4</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F5</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F6</b>	100% decrement for "No," 25% decrement for "Partial"
<b>F7</b>	50% decrement for "No," 25% decrement for "Partial"
<b>F8</b>	100% decrement for "No," 25% decrement for "Partial"

Below, Table L-45 illustrates the unique response combinations from participants answering the RECIP freeridership battery (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 L-45. RECIP Frequency of Freeridership Scoring Combinations<sup>1</sup>**

F1. First, would your organization have installed the [INSERT PROJECT] without the incentives offered through the RECIP program?	F2. I will read four statements and would like you to select the one that best describes where you were in the planning of your project's installation when you first learned of Focus on Energy's RECIP program. [READ ALL AND SELECT ONE]	F3. Prior to participating in the RECIP, was the [INSERT PROJECT] included in your organization's capital or operating budget?	F4. [IF YES TO F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]	F5. [IF YES TO F1] Without the RECIP incentive, would you have installed the renewable energy project... [READ LIST]	F6. [ASK IF NO TO F1] To confirm, when you say you would not have installed the same [INSERT PROJECT], do you mean that without the incentive from RECIP, that you would not have installed [INSERT PROJECT] at all?	F7. [ASK IF NO TO F1] Without the RECIP program, would you have installed... [READ LIST AND SELECT ONE]	F8. [ASK IF NO TO F1] Any finally, would you have installed the [INSERT PROJECT], .... [READ LIST AND SELECT ONE]	FR Score	Frequency
No	Yes	Yes	x	x	Yes	No	Partial	0%	1
No	Yes	Yes	x	x	No	x	x	0%	1
No	Yes	Partial	x	x	Yes	No	Partial	0%	1
No	Partial	No	x	x	No	x	x	0%	1
No	No	No	x	x	No	x	x	0%	1

<sup>1</sup> An 'x' in this table and subsequent tables indicates that the respondent was not asked that particular question. These questions were skipped intentionally based on customer responses, in order to avoid asking redundant questions.

### 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 RECIP

Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they installed as a result of their Program participation, presented in Table L-46.

**Table L-46. RECIP Participant Spillover Measures and Savings**

Measure Name	Quantity	Per-Unit kWh Savings	Total Spillover kWh Savings	Total Spillover MMBtu Savings
LED Outside Wall Packs	14	784	10,976	37.5
<b>Total</b>	<b>14</b>	<b>-</b>	<b>10,976</b>	<b>37.5</b>

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 4% spillover estimate for the RECIP program respondents (Table L-47).

**Table L-47. RECIP Participant Spillover Percent Estimate**

Spillover MMBtu Savings	Program MMBtu Savings <sup>1</sup>	Spillover Percentage
37.5	5,624	4%

<sup>1</sup> CY 2013 evaluated gross energy savings.

### RECIP Net-to-Gross Analysis

The Evaluation Team combined this spillover information with the measure-level freeridership results to achieve the measure-level net-to-gross (NTG) ratios, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-48. CY 2013 RECIP Program Freeridership, Spillover, and Net-to-Gross Estimates<sup>1</sup>**

Freeridership	Spillover	Net-to-Gross
0%	0.5%	104%

<sup>1</sup> The Evaluation Team weighted the overall value by the distribution of evaluated gross energy savings for the Program population.

## Retrocommissioning Self-Report NTG Methodology and Findings

### Freeridership Survey Questions

The participant survey's freeridership section included 12 questions, addressing the five core freeridership dimensions. Freeridership questions (as asked in the survey format for gas furnaces) included:

- FR0a. First, did your organization have specific plans to retrocommission the building before learning about the Focus on Energy Retrocommissioning Program incentive?
- FR0b. Prior to participating in the incentive program, were retrocommissioning activities included in your organization's capital or operating budget?
- FR1. Focus on Energy's Retrocommissioning Program (provided an incentive of [\$XX])/(is likely to provide an incentive of approximately [\$XX]). Would your organization have conducted the retrocommissioning without receiving this incentive?
- [Ask if question FR1 is Don't Know or Refused]  
FR1a. Would you have done something without the incentive program?
- FR2. Let me make sure I understand. Would you have made exactly the same type of improvements that were included in Focus on Energy's proposal?
- FR3. And would you have made the same number of improvements?
- FR4. And would you have conducted the retrocommissioning...
- FR5. So, you would not have retrocommissioned the building at all. Is that correct?
- FR6. Again, help me understand. Would you have performed some general operations and maintenance, but not made the same type of improvements?
- FR7. Would you have made some improvements, but fewer of them?
- FR8. And finally, would you have retrocommissioned the building...
- FR9. Before participating in the Program, had you ever retrocommissioned this building or another [COMPANY NAME] facility?

### Convert Responses to Matrix Terminology

Table L-49 illustrates how initial survey responses are translated into whether the response is "yes," "no," or "partially" indicative of freeridership (in parentheses).



**Table L-49. Retrocommissioning Raw Survey Response Translation to Freeridership Scoring Matrix Terminology**

FR0a. First, did your organization have specific plans to retrocommission the building before learning about the Focus on Energy Retrocommissioning Program incentive?	FR0b. Prior to participating in the incentive program, were retrocommissioning activities included in your organization's capital or operating budget?	FR1. Focus on Energy's Retrocommissioning Program (provided an incentive of [\$XX])/(is likely to provide an incentive of approximately [\$XX]). Would your organization have conducted the retrocommissioning without receiving this incentive?	[ASK IF FR1=DON'T KNOW OR REFUSED] FR1a. Would you have done something without the incentive program?	[ASK FR2-FR4 IF FR1 or FR1a=YES] FR2. Let me make sure I understand. Would you have made exactly the same type of improvements that were included in Focus on Energy's proposal?	FR3. And would you have made the same number of improvements?	FR4. And would you have conducted the retrocommissioning...	FR5. So, you would not have retrocommissioned the building at all. Is that correct?	FR6. Again, help me understand. Would you have performed some general operations and maintenance, but not made the same type of improvements?	FR7. Would you have made some improvements, but fewer of them?	FR8. And finally, would you have retrocommissioned the building...	FR9. Before participating in the Program, had you ever retrocommissioned this building or another [COMPANY NAME] facility?
Yes (Yes)	Yes (Yes)	Yes (Yes)	Yes, would have done something (Yes)	Yes (Yes)	Yes (Yes)	Within the same year? (Yes)	Yes/correct, would not have installed anything without the program incentive (No)	Yes (No)	Yes (No)	Within the same year? (Yes)	Yes (Yes)
No (No)	No (No)	No (No)	No, would not have installed anything (No)	No (No)	No (No)	Within one to two years? (Partial)	No/not correct, would have done something without the incentive (Yes)	No (Yes)	No (Yes)	Within one to two years? (Partial)	No (No)
Don't Know (Partial)	Don't Know (Partial)	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)	Don't Know (Partial)	Within three to five years? (No)	Don't Know (Partial)
Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	Refused (Partial)	In more than five years? (No)	Refused (Partial)	Refused (Partial)	Refused (Partial)	In more than five years? (No)	Refused (Partial)
						Don't Know (Partial)				Don't Know (Partial)	
						Refused (Partial)				Refused (Partial)	

## *Retrocommissioning Participant Freeridership Scoring*

Each participant freeridership score starts with 100%, which the Evaluation Team decremented based on his or her responses to the eight questions as shown in Table L-50.

**Table L-50. Retrocommissioning Freeridership Scoring Legend**

Q#	Decrement
<b>FR0a</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR0b</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR1</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR1a</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR2</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR3</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR4</b>	100% decrement for "No," 25% decrement for "Partial"
<b>FR5</b>	100% decrement for "No," 25% decrement for "Partial"
<b>FR6</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR7</b>	50% decrement for "No," 25% decrement for "Partial"
<b>FR8</b>	100% decrement for "No," 25% decrement for "Partial"
<b>FR9</b>	25% decrement for "No," 0% decrement for "Partial"

Below, Table L-51 illustrates the unique response combinations from participants answering the retro commissioning freeridership battery (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 L-51. Retrocommissioning Frequency of Freeridership Scoring Combinations<sup>1</sup>**

FR0a. First, did your organization have specific plans to retrocommission the building before learning about the Focus on Energy Retrocommissioning Program incentive?	FR0b. Prior to participating in the incentive program, were retrocommissioning activities included in your organization's capital or operating budget?	FR1. Focus on Energy's Retrocommissioning Program (provided an incentive of [\$XX])/(is likely to provide an incentive of approximately [\$XX]). Would your organization have conducted the retrocommissioning without receiving this incentive?	[ASK IF FR1=DON'T KNOW OR REFUSED] FR1a. Would you have done something without the incentive program?	[ASK FR2-FR4 IF FR1 or FR1a=YES] FR2. Let me make sure I understand. Would you have made exactly the same type of improvements that were included in Focus on Energy's proposal?	FR3. And would you have made the same number of improvements?	FR4. And would you have conducted the retrocommissioning...	FR5. So, you would not have retrocommissioned the building at all. Is that correct?	FR6. Again, help me understand. Would you have performed some general operations and maintenance, but not made the same type of improvements?	FR7. Would you have made some improvements, but fewer of them?	FR8. And finally, would you have retrocommissioned the building...	FR9. Before participating in the Program, had you ever retrocommissioned this building or another [COMPANY NAME] facility?	FR Score	Frequency
Yes	Yes	Partial	Yes	Partial	Yes	Partial	x	x	x	x	No	12.5%	1
Yes	Yes	Partial	Yes	No	No	Partial	x	x	x	x	No	0%	2
Yes	No	Yes	x	Yes	Yes	Yes	x	x	x	x	No	25%	1
No	x	Partial	Yes	No	No	Partial	x	x	x	x	No	0%	1
No	x	Partial	Partial	No	No	No	x	x	x	x	No	0%	1
No	x	No	Yes	No	No	No	x	x	x	x	No	0%	1
No	x	No	x	x	x	x	Yes	No	No	No	No	0%	2
No	x	No	x	x	x	x	No	x	x	x	No	0%	7

<sup>1</sup> An 'x' in this table and subsequent tables indicates that the respondent was not asked that particular question. These questions were skipped intentionally based on customer responses, in order to avoid asking redundant questions.

## *Retrocommissioning Participant Spillover Analysis*

Based on interviews with staff during site visits, the Evaluation Team did not credit any spillover to the Program. Several respondents reported that following their participation in the Program they have pursued other Focus on Energy programs, but any associated energy savings will be captured in these programs and therefore do not qualify as spillover.

## *Retrocommissioning Net-to-Gross Analysis*

The Evaluation Team combined this spillover information with the measure-level freeridership results to achieve the measure-level net-to-gross (NTG) ratios, using the following calculation:

$$\text{NTG} = 1 - \text{Freeridership} + \text{Spillover}$$

**Table L-52. CY 2013 Retrocommissioning Program Freeridership, Spillover, and Net-to-Gross Estimates<sup>1</sup>**

Measure Type	Freeridership	Spillover	Net-to-Gross
Overall	1.6%	0%	98.4%

<sup>1</sup> The Evaluation Team weighted the overall value by the distribution of evaluated gross energy savings for the Program population.

## Appendix M. Multifamily Energy Savings Program Prescriptive Measure Incentive Offerings Benchmarking

The Evaluation Team benchmarked the Multifamily Energy Savings Program measures and incentive amounts to those offered through other multifamily prescriptive programs around the country in CY 2013, shown in Table M-1. Many factors contributed to program design differences, including climate, cost-effectiveness requirements, and baseline technologies.

**Table M-1. Benchmarked Prescriptive Programs**

Utility	Location	Program Type
Midwestern Utility A	Michigan	Prescriptive and Direct Install
Midwestern Utility B	Illinois	Prescriptive and Direct Install
Midwestern Utility D	Iowa	Prescriptive
Southern Utility C	Texas	Prescriptive
Western Utility A	Washington	Prescriptive
Western Utility B	California	Prescriptive

As shown in Table M-2, overall, the Multifamily Energy Savings Program offered similar or more heating and cooling measures than the other programs reviewed, but unlike the other programs it did not offer programmable thermostats. The Multifamily Energy Savings Program also did not offer as many building envelope measures as other programs; these are offered through its custom path. The Program offered similar lighting options to the other programs reviewed, but the incentives for those measures varied significantly within and between each program.

The Multifamily Energy Savings Program was one of few programs to offer water heating measures through its prescriptive path. The Program's appliance incentives were similar to those offered by other programs, although Focus on Energy offered a lower incentive for clothes washers than the other two programs offering this incentive. The Multifamily Energy Savings Program was the only benchmarked program to include an incentive for parking garage exhaust controls.

**Table M-2. Benchmarking of Multifamily Prescriptive Incentive Offerings**

Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility D	Southern Utility C	Western Utility A	Western Utility B
<b>HVAC</b>							
<b>Boiler</b>	\$1.50 - \$5/MBh \$500	\$3-\$4.50/MBh	\$3.00 per 1,000 BTU/ hour, up to \$1,200 per building	\$400			
<b>Boiler Controls</b>	\$100	\$0.35/MBh					
<b>Furnace</b>	\$125-\$275	\$80-\$120	\$4.50 per 1,000 BTU/hour, up to \$1,800 per building	\$400			
<b>Heat Pump</b>	\$100 (package terminal)	\$50 (package terminal)	\$150 - \$600 (air source) \$600 (geothermal)	\$400 (air source)	\$250-\$350		\$400-\$500 (with central AC) \$100 (with packaged terminal AC)
<b>Air Conditioning</b>	\$100-\$200 (split system)	\$6-\$15/ton \$20 (room AC)	\$100 - \$350	\$200 \$25 (room AC)	\$200-\$300		\$650-\$1,100 (central) \$50 (room AC)
<b>Boiler Tune-Up</b>	\$50-\$100 (limit 50% of service cost)	\$0.20- \$0.25/MBh					
<b>Furnace Tune-Up</b>		\$30-\$60 or \$0.50/MBh					
<b>Chiller Tune-Up</b>	\$2.00/ton (limited to 50% of service cost)	\$15/ton					

Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility D	Southern Utility C	Western Utility A	Western Utility B
Steam Trap	\$25-\$50 (limited to 50% of service cost)	\$100					
Programmable Thermostat		\$10	\$25	\$25		\$30	
<b>Building Envelope</b>							
Insulation	Offered through custom path	\$10-\$40 /1,000 square feet.	Attic Insulation: \$0.70/ square foot, up to \$3,500 /building Wall Insulation: \$1.20/ square foot, up to \$6,000 /building	70% up to \$750	\$.05-.15/ square feet.	\$0.50-\$0.75/ square feet	
Window	Offered through custom path	\$0.25/ square feet		\$25	\$1-\$2/ square feet	\$6-\$8/ square feet	
Infiltration		\$2.50-\$20/1,000 square feet		70% up to \$200			
Duct Sealing		\$6/1,000 square feet	\$0.50/CFM, up to \$5,000 per building		\$0.20-\$1.75 per linear square feet.		
Door		\$10		\$50			
Airtight Canned Lighting		\$5					

Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility D	Southern Utility C	Western Utility A	Western Utility B
<b>Lighting</b>							
<b>Lamps</b>	\$2-\$5	\$1-\$11	CFLs: \$1.50 Modular CFLs: \$23-\$26 T8 Lamps: \$7- \$12, depending on ballast and wattage	50% of purchase price	\$3-\$11	\$8-\$45	
<b>Fixtures</b>	\$15-\$75	\$7.50-\$40		\$20	\$9-\$35	\$15-\$30	
<b>Occupancy Sensors</b>	\$15-\$30	\$40-\$100	\$25	\$40	\$5-\$32	\$20	
<b>LED Exit Signs</b>	\$10	\$12.50	\$22			\$35	
<b>Water Heating</b>							
<b>Water Heaters</b>	Storage water heater: \$50 Tankless water heater: \$100 Condensing water heater: \$150	Tank-style water heater: \$200 Indirect water heating: \$0.75- \$2.25/MBh Instant water heater: \$175 Infrared heater: \$5/MBh		Electric: \$25 Gas: \$50			Solar water heater: \$1,000- \$1,500
<b>Other Water Heating</b>	Indirect water heater with modulating boiler: \$200 DHW Plan: \$1.00/MBh (limited to \$1,500)	Common area pipe wrap: \$2.5- \$6/foot Common area pipe insulation: \$1/foot					



Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility D	Southern Utility C	Western Utility A	Western Utility B
<b>Specialty</b>							
<b>Appliances</b>	Clothes washer: \$25-\$50 Other appliances: \$25			Clothes washers: \$100 Dishwashers: \$20 Refrigerators: \$50 Freezers: \$25			Clothes washers: \$100-\$200 Dishwashers: \$25-\$75
<b>Vending</b>	\$15-\$100/ machine	\$50		\$50			
<b>Other</b>	Variable- frequency drive: \$60 Parking garage exhaust control:\$150	Variable- frequency drive: \$60-\$100/HP Pool boiler: \$2/MBh Pool cover: \$0.50/ square feet			Roof coating: \$0.15 per square feet		Cool roof: \$0.10- \$0.20/ square feet

## Appendix N. Residential Rewards Prescriptive Measure Incentive Benchmarking

In an effort to compare the Residential Rewards Program offerings to the measures and incentives offered through other programs around the country, the Evaluation Team conducted a benchmarking review of similar residential prescriptive programs in 2013, which are listed in Table N-1.

**Table N-1. Benchmarked Programs**

Utility	Location	Type of Prescriptive Program
Midwestern Utility A	Ohio	Gas
Midwestern Utility B	Illinois	Gas and electric
Midwestern Utility C	Indiana	Electric
Midwestern Utility D	Minnesota	Gas and electric
Western Utility A	Washington	Gas and electric
Western Utility B	Idaho	Gas and electric
Southern Utility A	Arkansas	Electric
Southern Utility B	Arkansas	Electric

As shown in Table N-2, the Residential Rewards Program offered more diverse measure categories than most other programs, particularly for water heating and renewables. The Residential Rewards Program was the only one to offer solar measures and one of only two to offer geothermal measures.

However, several programs offered more measure diversity in the building envelope category, and some offered additional measures such as appliances.<sup>12</sup>

The incentive amounts varied between programs. Specifically, Focus on Energy offered slightly lower rewards overall for boilers, furnaces, and heat pumps but similar rewards for water heating. For building envelope, the Residential Rewards Program reward amounts for duct sealing were consistent with other incentive amounts and the insulation rewards were higher than the one other program that offered an incentive as a percentage of the cost.

Focus on Energy offered a similar reward for the geothermal measure as the one other program that offered the same measure.

<sup>12</sup> Focus on Energy offers incentives for appliances through the Appliance and Lighting Program.

**Table N-2. Measure and Incentive Benchmarking to Similar Programs**

Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility C	Midwestern Utility D	Western Utility A	Western Utility B	Southern Utility A	Southern Utility B
<b>HVAC</b>									
Boiler	\$300-\$400	\$500	\$400-\$500		\$100				
Furnace	\$125-\$275	\$300	\$200-\$300	\$150-\$250	\$50-\$300		\$200		
Electronically Commutated Motor	\$125			\$60	\$100				
Heat Pump	\$300			\$400		\$150-\$170	\$600-\$750	\$100-\$660	Up to \$809
Air Conditioning	\$400 (furnace/ AC bundle)			\$300		\$250	\$250	\$100-\$640	Up to \$593
<b>Water Heating</b>									
Water Heater	\$50-\$100	\$50-\$150				\$75	\$50-\$150	\$40	
<b>Building Envelope</b>									
Insulation	75% of cost, up to \$300			40% of cost, up to \$450		\$0.30-\$0.45 per square foot	\$0.15-\$0.65 per square foot	\$0.10-\$0.20 per square foot	\$0.23-\$0.90 per square foot
Duct Sealing	\$375			\$400		\$100-\$375	\$150-\$400	\$180-\$240	
Infiltration								\$80-\$120	\$0.17 per CFM50
Windows						\$0.75-\$2.50 per square foot of window	\$1.50-\$3 per square foot of window	\$0.40-\$1.60 per square foot of window	

Measure	Focus on Energy CY 2013	Midwestern Utility A	Midwestern Utility B	Midwestern Utility C	Midwestern Utility D	Western Utility A	Western Utility B	Southern Utility A	Southern Utility B
<b>Renewables</b>									
<b>Geothermal</b>	\$650		\$600						
<b>Solar Hot Water</b>	\$6 per therm or \$0.35 per kWh, up to \$1,200								
<b>Solar Electric System</b>	\$600 per 1 kW of direct current, \$2,400 max								
<b>Specialty</b>									
<b>Other</b>		Programmable thermostat: \$20				Appliances: \$20-\$50 <sup>1</sup>	Appliances: \$20-\$50 <sup>1</sup>		

<sup>1</sup> Appliances included refrigerators, freezers, dishwashers, clothes washers, room air conditioners, evaporative coolers, and light fixtures.

## Appendix O. Lighting Use Findings

This document provides the findings from two lighting audit studies the Evaluation Team<sup>13</sup> conducted to obtain information about the energy used for lighting in Wisconsin homes. The first study, which took place in December 2012, focused on lighting use in single-family homes;<sup>14</sup> The second study, which took place in July 2013, focused on lighting use in multifamily homes (defined as buildings with four or more units).

### Sampling Design

The Evaluation Team accomplished recruitment for both studies through a telephone survey, which included an offer of two incentives: \$50 for installing light loggers in participant homes and \$50 for removing the installed light loggers, (\$100 total for customer participation). Telephone survey respondents who indicated interest and reported having at least one CFL installed before the study were re-contacted by the Evaluation Team to participate in the on-site study.<sup>15</sup>

This initial screening for at least one CFL per site ensured that the Evaluation Team would be engaging with respondents and participants who were likely to have participated in Focus on Energy's upstream Residential Lighting and Appliance Program. Further, this screening ensured that the Evaluation Team would capture hours-of-use data specific to CFL lighting technology.

In each study, after the Evaluation Team completed 223 in-depth phone surveys, the Evaluation Team switched to a recruitment script to achieve the targeted lighting audit participants. So that the resulting estimates achieved a  $\pm 10\%$  precision level with 90% confidence (assuming a coefficient of variation [CV] of 0.5), the Evaluation Team selected 70 participants to be metered in each study.<sup>16</sup> Ultimately, 69 single-family customers and 72 multifamily customers participated in each metering study.<sup>17</sup>

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<sup>13</sup> In November 2011, the Public Service Commission of Wisconsin (PSC) contracted with a team of energy consulting and market research firms to evaluate the Focus programs during the quadrennial cycle (2011-2014). These firms, collectively referred to as the Evaluation Team (or the Team), are Cadmus; Nexant, Inc.; TecMarket Works; and St. Norbert College Strategic Research Institute.

<sup>14</sup> In order to remove the light loggers that had been installed in single-family during the first visit in December 2012, the Evaluation Team re-visited in July 2013. During the second visit, the Evaluation Team confirmed audit data for quality assurance purposes.

<sup>15</sup> Due to this initial screening, the populations represented within the studies might be more prone to early adoption of energy efficient technologies which may affect audit estimates such as penetration and saturation as well as any resulting projections of market potential.

<sup>16</sup> The CV is the ratio of standard deviation to the mean of a variable, measuring the data variability. This is equivalent to  $\pm 10\%$  relative precision with 90% confidence (one-tailed).

<sup>17</sup> While the target for each audit study was 70, the team only reached 69 single family homes, due to unforeseen cancellations. Of the 69 sites visited, only 62 sites yielded usable data due to data collection difficulties. The team reached 72 multifamily homes to prevent similar recruiting attrition and data issues.

St. Norbert College Strategic Research Institute conducted the telephone survey calls and recruited participants for the site visits. The call lists were compiled from a variety of sources to ensure comprehensiveness and randomness, including:

- 6,000 Yellow Page Listings
- Utility connects and disconnects
- Government new business filings
- Tourism directories
- Corporate store directories and web compilations
- Postal address hygiene and national change of address

## *Summary of Key Findings*

- LEDs comprise 2% of the single-family lighting load and 1% of the multifamily load; they represent a very small load segment.
- An LED bulb is more likely to be found in a single-family home than in a multifamily home. LED in single-family home penetration is twice that of multifamily home penetration (18% vs. 7%). Eighteen percent of single-family homes and 7% of multifamily homes had at least one LED bulb installed.
- Residents most commonly installed LED bulbs in closets (8% of installed bulbs) and kitchens (5% of installed bulbs).
- Residents installed CFLs in 33% of all socket types. This number represents an increase in nearly 10% of over the 2009 Wisconsin study, which found CFL saturation to be 23.7% (NMR 2010).
- Residents most frequently installed CFLs in living room sockets (40%) and bedroom sockets (35%). They also typically installed CFLs in torchiere fixtures (50%), medium screw-base sockets (40%), and three-way switch sockets (36%).
- There were two multifamily homes that had only energy-efficient lighting technologies installed—no incandescent bulbs. While this percentage of the multifamily population is very small (3%), this is the first study in any state that shows less than 100% penetration for incandescent bulbs.
- The majority of CFLs in use (62%) are 13-watt bulbs. Most of the remaining CFLs found in the study ranged from 15 to 26 watts.
- The Evaluation Team found that 62% of installed bulbs still have the technical potential to be captured by energy-efficient lighting technologies. The technical potential represents the current lighting market share that is replaceable by either CFLs or LEDs. However, technical potential excludes circline, halide, linear fluorescent, and neon bulbs and discounts other nontechnical factors such as appearance or customer preference.

## Audit Findings

In December 2012 and July 2013, the Evaluation Team collected the following lighting information from 134 Wisconsin homes:

- Room types (e.g., living area, kitchen, bedroom)
- Fixture types (e.g., table lamp, ceiling fixture, recessed fixture)
- Bulb type (e.g., CFL, incandescent, light-emitting diode [LED])
- Bulb shape (e.g., twister, A-lamp, globe)
- Bulb wattages
- Specialty features (e.g., three-way functionality, dimmability)
- Socket types (e.g., medium screw base, candelabra, pin-base).

To combine the data for single-family homes with the data for multifamily homes, the Evaluation Team weighted each study's results by the proportional size of each housing population. According to the 2009 Residential Energy Consumption Survey (RECS), 73.9% of Wisconsin homes are single family and 26.1% are multifamily.<sup>18</sup>

Table O-1 shows the penetration rate (that is, the proportion of participating homes where residents installed at least one bulb of a specified type) of various bulb types. As determined through the Evaluation Team's initial screening, all homes whose residents were surveyed or received a site visit had at least one CFL installed.

**Table O-1. Bulb Penetration (n=62, 72 sites)<sup>19</sup>**

Bulb Type	Penetration		
	SF	MF	Weighted
CFL	100%	100%	100%
Halogen	10%	25%	14%
Incandescent	100%	97%	99%
LED	18%	7%	15%
Linear Fluorescent	68%	68%	68%

All single-family homes and nearly all multifamily homes (97%) had incandescent bulbs installed. Just over two-thirds of all homes had linear fluorescent bulbs installed, and 15% of the weighted population had at least one LED bulb installed. Residents in single-family homes were more likely to install LED bulbs than residents in a multifamily home.)

<sup>18</sup> 2009 RECS: <http://www.eia.gov/consumption/residential/data/2009/>

<sup>19</sup> Throughout this paper, "n" is represented with the single-family population first, followed by the multifamily population, unless otherwise specified.

Table O-2 shows various bulb saturations (the proportion of total installed bulbs attributable to a particular bulb type) in all sockets and in medium screw-based (MSB) sockets only.

**Table O-2. Bulb Saturation (n=62, 72 sites)**

Bulb Type	Saturation - All			Saturation - MSB Only		
	SF	MF	Weighted	SF	MF	Weighted
CFL	32.8%	35.0%	33.4%	41.4%	42.9%	41.8%
Halogen	0.5%	2.8%	1.1%	0.3%	0.8%	0.5%
Incandescent	56.1%	52.0%	55.0%	57.5%	54.9%	56.8%
LED	1.6%	1.4%	1.5%	0.4%	0.9%	0.5%
Linear Fluorescent	9.1%	8.8%	9.0%	0.4%	0.5%	0.4%

Incandescent bulbs represented more than half the bulbs installed in all socket types, with a weighted average of 27 incandescent bulbs installed per site. Residents installed CFLs in 33% of all socket types, for a weighted average of 16 CFLs per site.

As Table O-3 shows, these numbers represent an increase from a 2010 study that showed CFL saturation to be from 15% to 26%. Residents still installed incandescent bulbs in the majority of Wisconsin's sockets. However, CFLs have gained ground, averaging one in three bulbs in use in all socket types, and averaging an even higher percentage (42%) in MSB sockets.

LEDs continue to represent a small portion of Wisconsin sockets: 2% of single-family sockets and 1% of multifamily sockets.

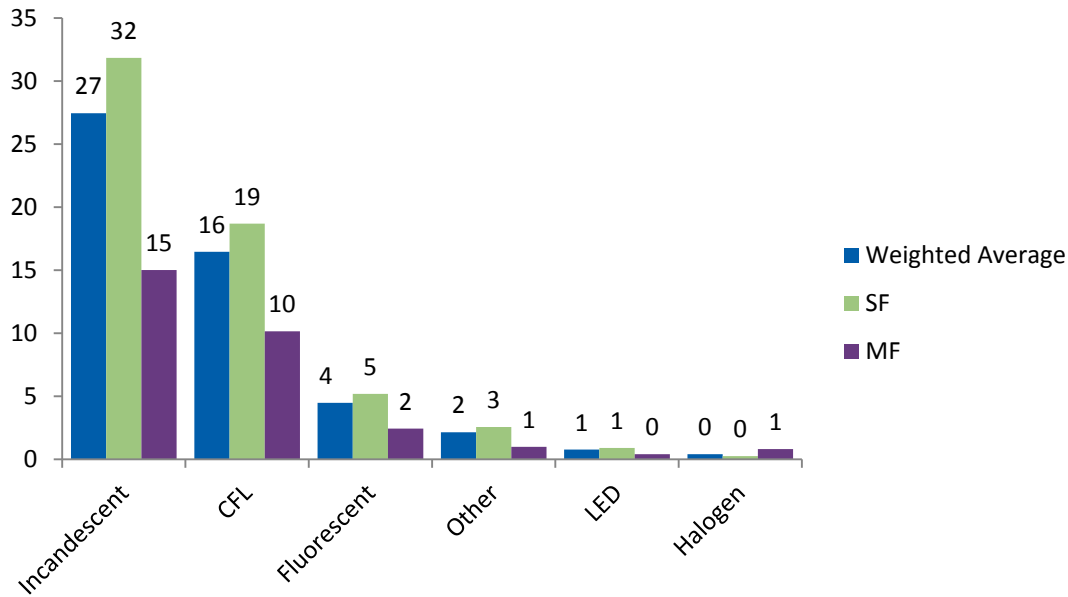
**Table O-3. Comparison of Historical Bulb Saturations**

Source	Data Collection Method	Reported Year	CFLs
Wisconsin's Focus On Energy 2013 Evaluation	Primary: Site visits	2013	33%
Residential Multistate CFL Modeling Effort	Primary: Site visits	2010	24%
The Market for CFLs in Wisconsin	Primary: Site Visits	2010	20%
Renewable Impact Evaluation Report	Self-reporting: 345 lighting surveys	2008	19%

Figure O-1 compares the average numbers of bulb types per home. A typical Wisconsin household has 16 CFLs and 27 incandescents installed.



**Figure O-1. Average Bulbs per Home by Type (n=62, 72 sites)**



n=3,686, 2,112 bulbs

As shown in Table O-4, for each of the 62 single-family homes, the Evaluation Team found an average of 36 fixtures and 60 individual sockets. Multifamily homes had almost half the quantity of fixtures and sockets as single-family homes.

**Table O-4. Socket and Fixture Summary (n=62, 72 sites)**

Socket Fixture Summary	Total	
Population	SF	MF
Total Sites	62	72
Total Fixtures	2,218	1,330
Average Fixtures/Site	36	18
Total Sockets	3,715	2,147
Average Sockets/Site	60	30
Sockets/Fixture	2	2
Total Bulbs Installed	3,686	2,112
Bulbs/Fixture	2	2
Empty Sockets	29	35

As Table O-5 shows, while the average number of sockets is consistent with what was found in previous studies across the country, the average number of CFLs per home is slightly larger. Specifically, the Evaluation Team found an average of 16 CFLs, as compared to the largest average amount previously found (15), which was determined during a study for Efficiency Maine in 2012.

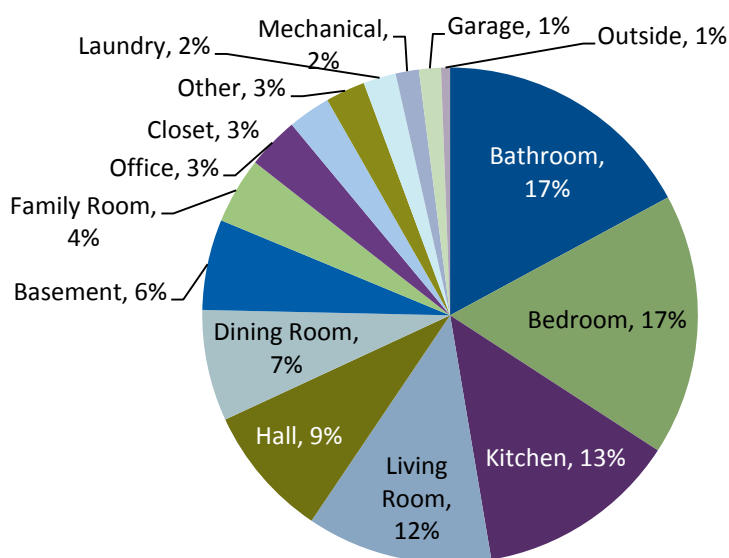
**Table O-5. Comparison of Average Bulbs per Home\***

Source	Reported Year	Average # Sockets	Average # CFLs
Wisconsin's Focus on Energy	2013	52	16
Efficiency Maine	2012	41	15
EmPOWER Maryland	2011	70	14
Midwest Utility	2010	55	13
Midwest Utility	2010	68	11
Midwest Utility	2011	64	9
Michigan Public Service Commission	2011	53	8
Midwest Utility	2010	55	7

\* Certain sources referred to in this table are kept as anonymous as their studies are not publicly available.

As shown in Figure O-2, more than one-half (weighted by home type) of the 5,862 sockets in both studies were in high-use rooms such as: bathrooms (17%), bedrooms, (17%), kitchens (13%), and living areas (12%).<sup>20</sup> In contrast, low-use rooms (such as closets, garage, and laundry) contained very small percentages of total sockets.

**Figure O-2. Socket Types by Room, Weighted by Home Type (n=62, 72 sites)**



n=3,715, 2,147 sockets

<sup>20</sup> Classification of rooms as “high use” was based on multiple lighting studies conducted by Cadmus for utilities in the Midwest, the Mid-Atlantic, and the Great Lakes regions.

Generally, the distribution of socket types by room was similar for both the single-family and the multifamily populations.

As shown in Table O-6, of the 4,240 sockets in high-use locations identified during both the lighting audits, CFLs were installed in about a third (32%), weighted by home type. CFLs were most prevalent in living room sockets (40%) and bedroom sockets (35%).

**Table O-6. CFLs in High-Use Areas, Weighted by Home Type (n=62, 72 sites)**

Room Type	CFLs as Percentage of	
	Sockets per Room	Total High-Use Sockets
Bathroom	31%	7%
Bedroom	35%	8%
Dining Room	29%	3%
Family Room	31%	2%
Kitchen	26%	5%
Living Room	40%	7%
<b>Total</b>	<b>32%</b>	<b>32%</b>

The distribution of CFLs in high-use areas is mostly similar for both single-family and multifamily homes, as shown in Table O-7 and Table O-8.

**Table O-7. CFLs in Single-Family High-Use Areas (n=62 sites)**

Room Type	Total Sockets	Total CFLs	CFL as Percentage of	
			Sockets per Room	Total High-Use Sockets
Bathroom	591	178	30%	7%
Bedroom	611	206	34%	8%
Dining Room	226	61	27%	2%
Family Room	191	65	34%	3%
Kitchen	449	116	26%	5%
Living Room	450	166	37%	7%
<b>Total</b>	<b>2,518</b>	<b>792</b>	<b>31%</b>	<b>31%</b>

However, CFLs were installed in a smaller percentage of living room sockets in single-family homes (37%) than in multifamily homes (47%).

**Table O-8. CFLs in Multifamily High-Use Areas (n=72 sites)**

Room Type	Total Sockets	Total CFLs	CFL as Percentage of	
			Sockets per Room	Total High-Use Sockets
Bathroom	440	143	33%	8%
Bedroom	404	157	39%	9%
Dining Room	227	77	34%	4%
Family Room	43	9	21%	1%
Kitchen	348	92	26%	5%
Living Room	260	122	47%	7%
<b>Total</b>	<b>1,722</b>	<b>600</b>	<b>35%</b>	<b>35%</b>

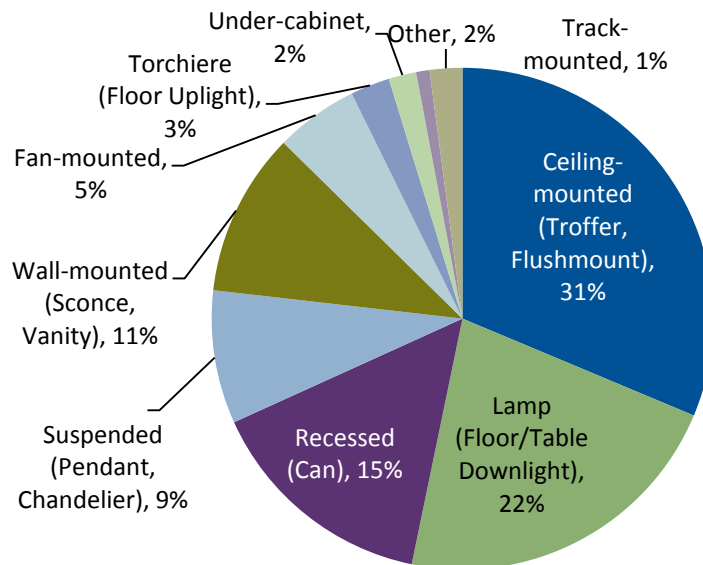
During the lighting audits, the Evaluation Team noted the fixture types for each socket. Table O-9 shows the penetration of fixture types. Ceiling fixtures had the highest penetration of fixture types, as they were found in all single-family homes, 96% of multifamily homes, and 99% of all homes (weighted by home type).

**Table O-9. Fixture Type Penetration (n=62, 72 sites)**

Socket Type	Penetration		
Population	SF	MF	Weighted
Ceiling-mounted (Troffer, Flushmount)	100%	96%	99%
Lamp (Floor/Table Downlight)	94%	96%	94%
Wall-mounted (Sconce, Vanity)	90%	97%	92%
Suspended (Pendant, Chandelier)	90%	47%	79%
Recessed (Can)	68%	39%	60%

As shown in Figure O-3, ceiling fixtures also comprised 31% of total sockets (weighted by home type), lamp fixtures (such as floor, table, or downlight) comprised approximately 22% of sockets, and recessed (can) fixtures comprised 15% (weighted by home type).

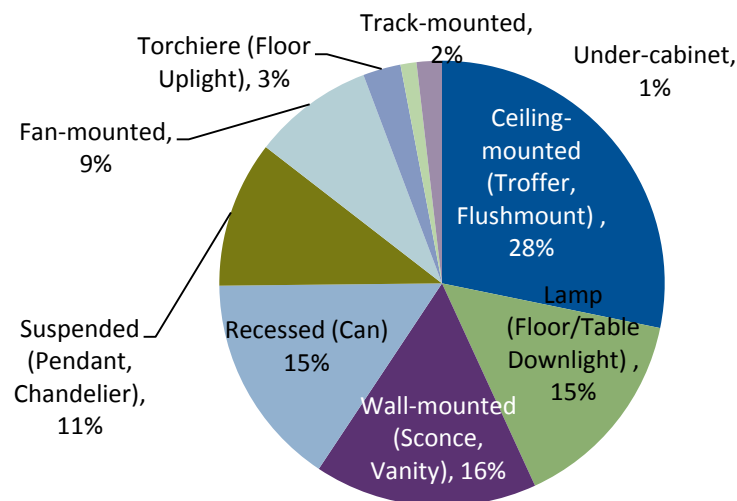
**Figure O-3. Fixture Types, Weighted by Home Type (n=62, 72 sites)**



n=2,218, 1,330 fixtures

Generally, fixture-type distributions were similar between single-family and multifamily populations. Also, when segmenting by installed wattage, the Team found that similar distributions exist for fixture types, as shown in Figure O-4.

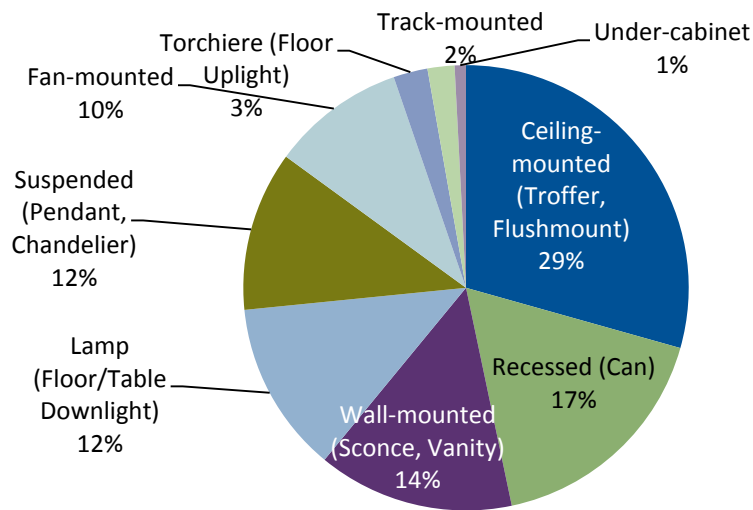
**Figure O-4. Fixture Types by Installed Wattage, Weighted by Home Type (n=62 sites)**



n=2,218, 1,330 fixtures

When comparing single-family and multifamily populations, there were slight differences between distributions, as shown in Figure O-5 and Figure O-6. Most distinctly, recessed fixtures comprise the second largest share of installed wattage (17%) in single-family homes, but this fixture is noticeably less common in multifamily homes (10%).

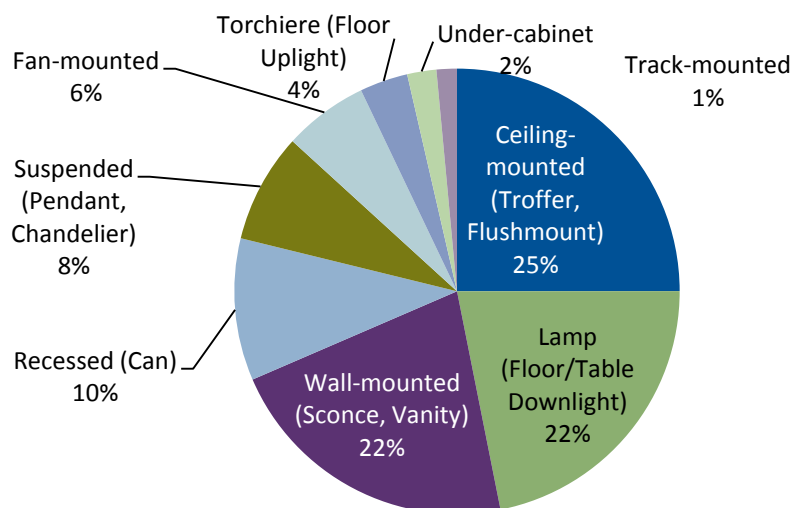
**Figure O-5. Fixture Types by Installed Wattage, Single Family (n=62 sites)**



n=2,218 fixtures

Conversely, lamp fixtures comprise the second largest share of installed wattage (22%) in multifamily homes but only the fourth largest share of installed wattage (12%) in single-family homes.

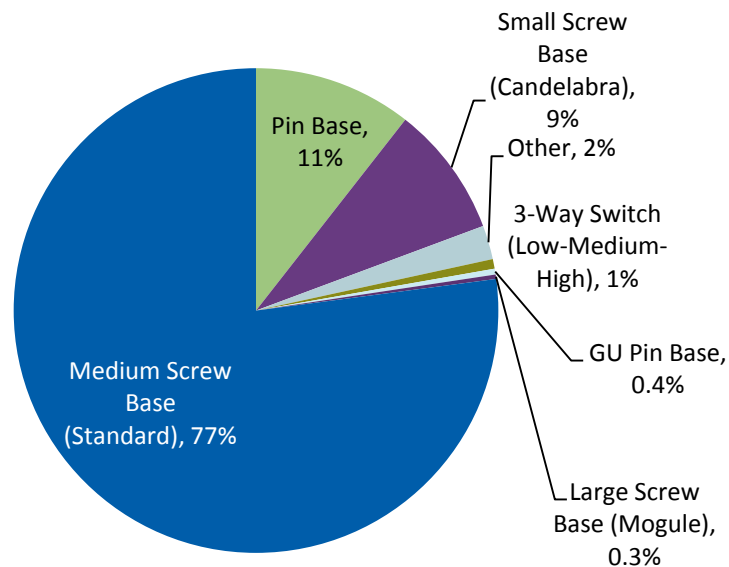
**Figure O-6. Fixture Types by Installed Wattage, Multifamily (n=72 sites)**



n=1,330 fixtures

Medium screw-base or standard sockets made up 77% of total sockets (weighted by home type). Pin-base sockets made up 11% (used for linear fluorescent tubes, halogen linear lamps, or circline fluorescent tubes). Small screw base or candelabra sockets accounted for 9% of total sockets. The remaining sockets included: 3-way switch; GU pin base (interchangeable base to accommodate multiple pin-base bulb types); and large screw-base, as shown in Figure O-7.

**Figure O-7. Socket Types, Weighted by Home Type (n=62, 72 sites)**



n=3,715, 2,147 sockets

Generally, socket type distributions were similar for both the single-family and the multifamily populations.

As Table O-10 shows (on average and weighted by home type), each home had the following sockets: 40 medium screw-base, five small-screw base, and five pin-base. On average, single-family homes had nearly twice as many medium screw-base sockets as did multifamily homes.

**Table O-10. Average Socket Type Per Site (n=62, 72 sites)**

Socket Type	Average Socket/Site		
	SF	MF	Weighted
Medium Screw Base (Standard)	46.2	22.9	40.1
Small Screw Base (Candelabra)	5.5	2.2	4.7
Pin Base	6.1	3.5	5.4
3-Way Switch (Low-Medium-High)	0.2	0.4	0.3
GU Pin Base	0.2	0.2	0.2
Large Screw Base (Mogule)	0.2	0.0	0.2

Overall, as a percentage of total bulbs for each room type, incandescents were the most frequently installed bulbs (Figure O-8). Incandescents represented at least 50% of installed bulbs in all rooms, except basements, laundry rooms, closets, mechanical rooms, and offices.

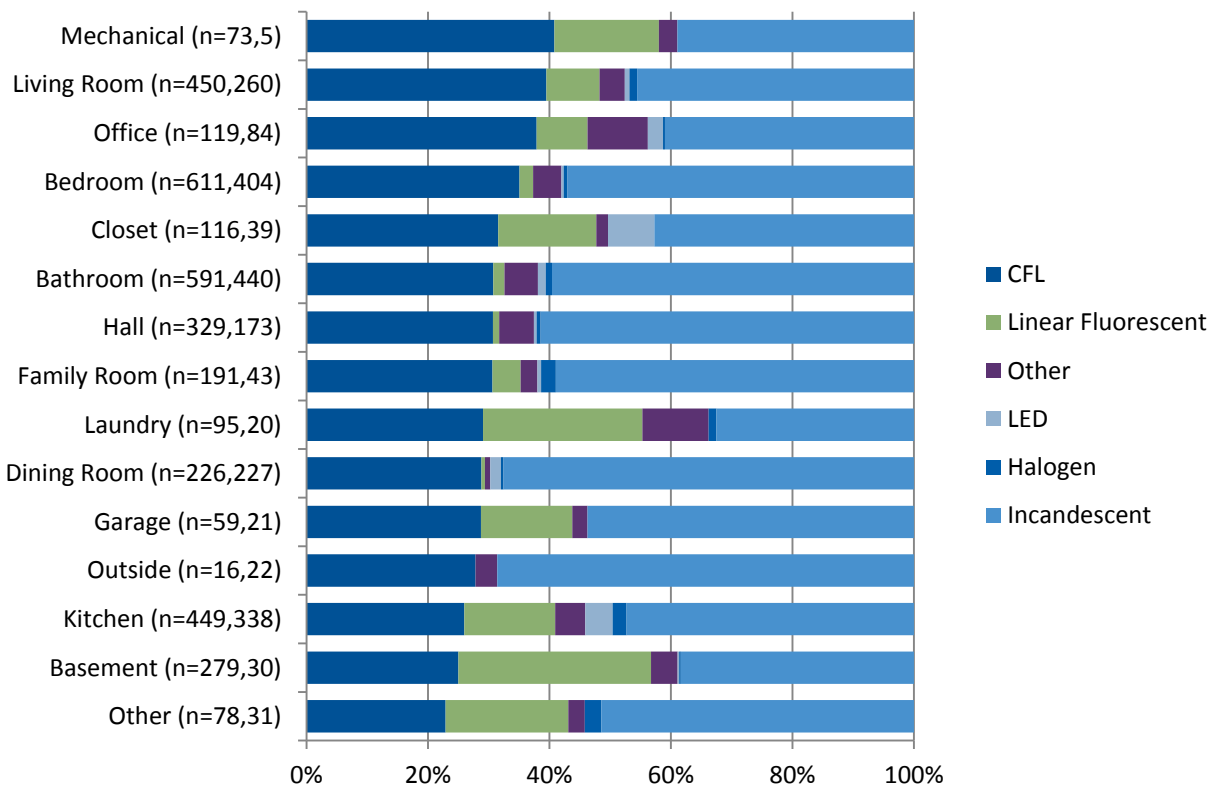
CFLs and linear fluorescents, however, also comprised significant distributions of bulbs installed in each room type.

- CFLs consistently comprised from 25% to 41% of installed bulbs in all room types.
- Linear fluorescents were most common in the laundry room and the basement (26%, and 32% respectively).

LEDs were a small percentage of overall bulbs per room, and they were most commonly found in closets and kitchens (8% and 5% respectively).



**Figure O-8. Bulb Type Distribution by Room Type, Weighted by Home Type (n=62, 72 sites)**



When analyzed by socket type, the types of bulbs installed varied considerably, as shown in Figure O-9.

- Nearly all small screw-base sockets and large screw-base sockets contained incandescent bulbs. Incandescents also comprised the majority of medium screw-base sockets (64%) and three-way switch sockets (55%).
- CFLs were most commonly found in medium screw-base sockets (40%) and three-way switch sockets (36%).
- Linear fluorescents were most prominent in pin-base sockets, comprising approximately three quarters of total installed bulbs (76%).

LEDs were most commonly found in pin-base sockets (7%), and small percentages were found in small screw-base sockets.

**Figure O-9. Bulb Type Distribution by Socket Type, Weighted by Home Type (n=62, 72 sites)**

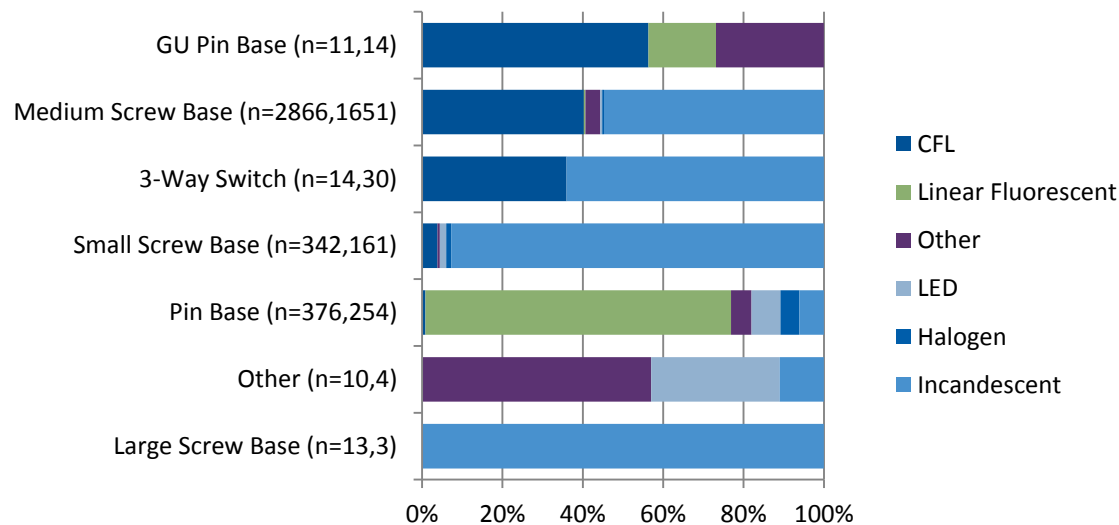
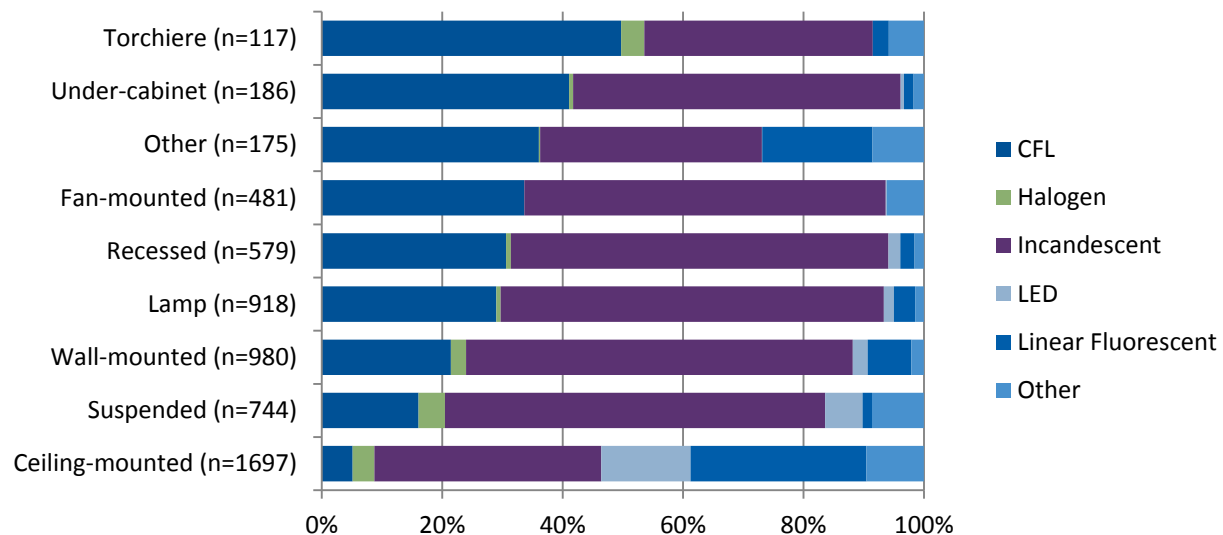


Figure O-10 shows bulb type distributions by fixture types. Overall, incandescents were the most frequently installed bulbs as a percentage of total bulbs for each fixture type except torchieres. CFLs were most commonly installed in torchiere (floor uplight) fixtures, comprising 50% of bulbs found.

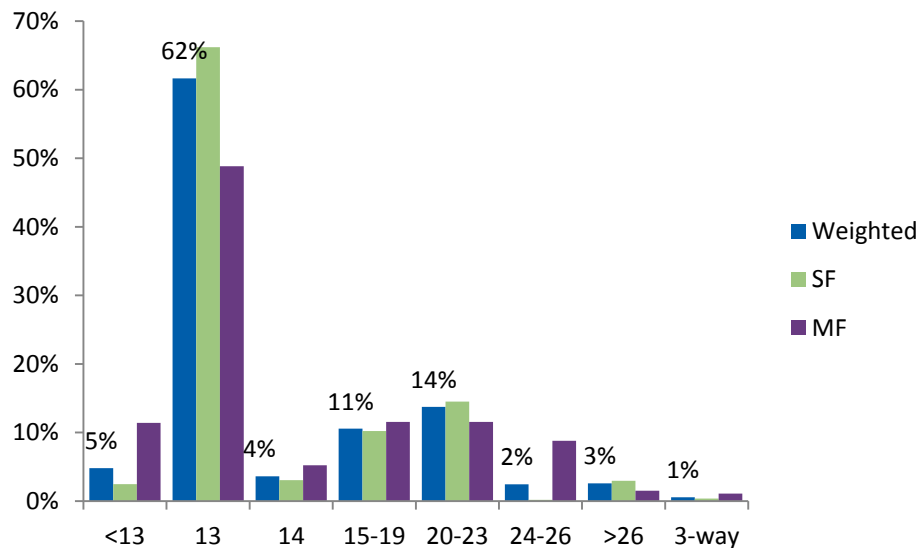
**Figure O-10. Bulb Type Distribution by Fixture Type, Weighted by Home Type (n=62, 72 sites)**



Approximately one-third (ranging from 29% to 34%) of the bulbs found in under-cabinet, fan-mounted, recessed (can), and lamp fixtures were CFLs. CFLs were least likely to be found in wall-mounted (sconce or vanity) fixture or in suspended or ceiling-mounted fixtures. Linear fluorescents and LEDs were most commonly found in in ceiling-mounted fixtures, comprising 29% and 15%, respectively, of those installed bulbs.

Figure O-11 through Figure O-14 show the distribution of wattages for each bulb type. As shown, the majority of CFLs in use were 13-watt bulbs, with most of the remaining bulbs ranging from 15 to 26 watts. Also, multifamily homes had a smaller proportion of 13-watt bulbs than did single-family homes.

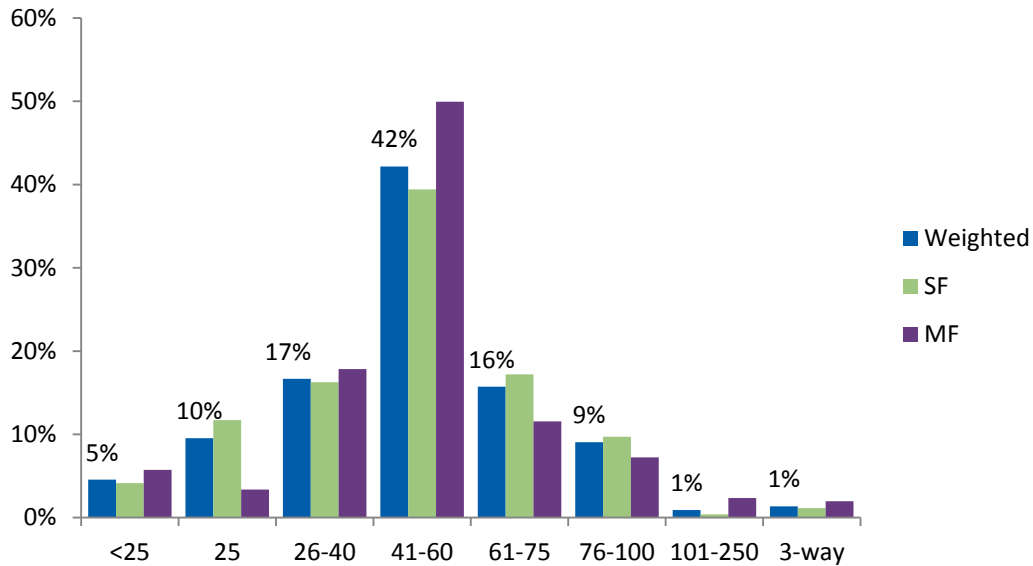
**Figure O-11. Distribution of CFLs by Wattage (n=62, 72 sites)**



Note: Due to space restrictions, the percentages are shown only for the value weighted by home type. n=1,047, 727 bulbs

Figure O-12 shows that most (75%) of the incandescent bulbs range in wattage from 26 to 75, and majority of incandescent bulbs in use range in wattage from 41 to 60. These incandescent wattages are mostly consistent with the trend observed for CFLs, as 13-watt CFLs often replace 60-watt incandescents.

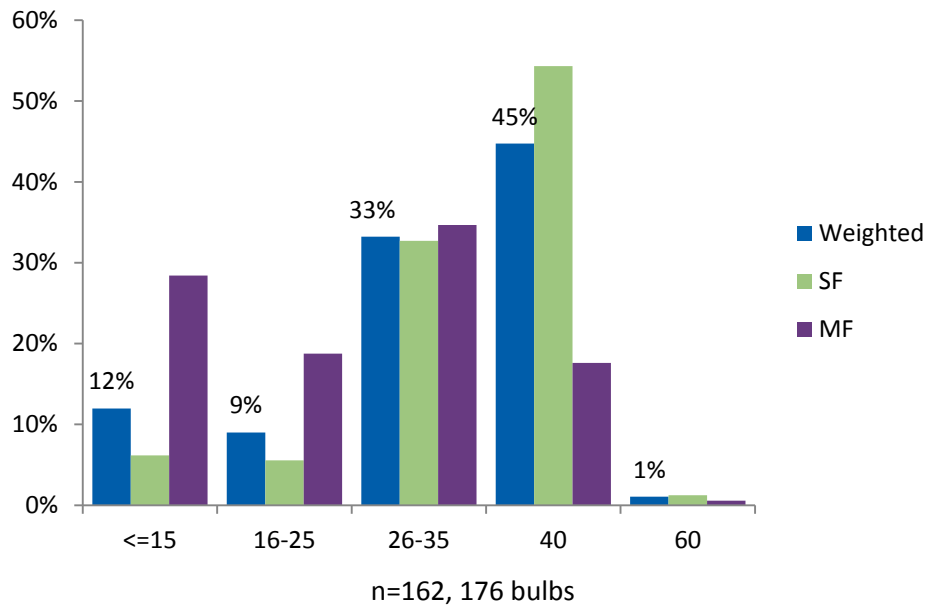
**Figure O-12. Distribution of Incandescents by Wattage (n=62, 72 sites)**



Note: Due to space restrictions, the percentages are shown only for the value weighted by home type. n=1,494, 1,065 bulbs

As shown in Figure O-13, linear fluorescent bulbs in multifamily homes varied vastly in wattage, while most linear fluorescents in single-family homes were mainly in the 26-watt to 40-watt range.

**Figure O-13. Distribution of Linear Fluorescents by Wattage (n=62, 72 sites)**

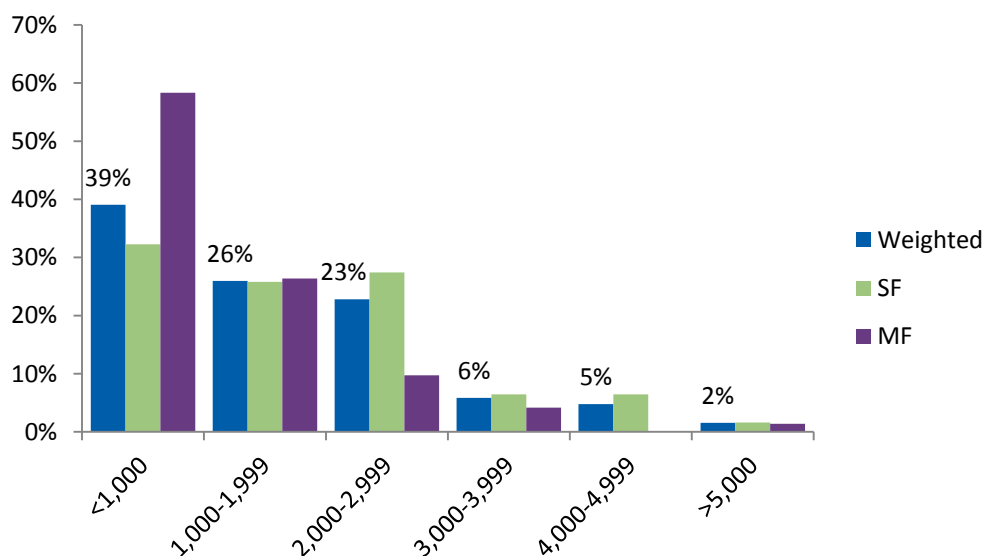


The total wattage of installed lights ranged from less than 1,000 watts per home to more than 5,000 watts (Figure O-14).

- Among single-family homes, the installed wattage tended to be distributed evenly within the range of less than 1,000 watts to 2,999 watts.
- Among multifamily homes, the majority (58%) had less than 1,000 watts installed (which was about one-third of the wattage installed in single-family homes).

This is consistent with expectations, as larger housing units require more lighting. According to the 2009 RECS Survey Data, the average square footage in a single-family home in the Midwest is 2,721, which is approximately three times as much square footage as the average found in multifamily housing units (957).<sup>21</sup>

**Figure O-14. Total Percentage of Installed Wattage (n=62, 72 sites)**



As Table O-11 shows, the installed wattage averaged 1,668 per single-family home; 1,195 watts per multifamily home; and 1,545 watts per site (weighted by home type).

**Table O-11. Average Installed Wattage Per Site (n=62, 72 sites)**

Average Installed Wattage			
Population	SF	MF	Weighted
Average Wattage	1,668	1,195	1,545

<sup>21</sup> 2009 Residential Energy Consumption Survey (RECS):  
<http://www.eia.gov/consumption/residential/data/2009/>

### *Growth Opportunities for Efficient Lighting Technologies*

Table O-12 shows the energy-efficient market share, organized by socket and fixture type. The table also shows the corresponding technical potential, which represents the current lighting market share that is technically replaceable by either CFLs or LEDs. However, technical potential excludes circline, halide, linear fluorescent, and neon), and it discounts other nontechnical factors (such as appearance or customer preference).

Energy-efficient lighting technologies (either CFLs or LEDs) comprise 38% (weighted by home type) of all installed bulbs that are CFL or LED replaceable found during the site visits. This implies that 62% of installed bulbs could be replaced with energy-efficient lighting technologies.

**Table O-12. Growth Opportunities (n=62, 72 sites)**

Market	Energy Efficient	
	Current Share	Technical Potential
Population	Weighted	Weighted
<b>All bulbs</b>	<b>35%</b>	<b>65%</b>
CFL/LED-Replaceable Bulbs	38%	62%
Standard	43%	57%
Specialty	10%	90%
<b>By Socket</b>		
MSB	42%	58%
SSB	5%	95%
LSB	0%	100%
Pin Base	44%	56%
GU Pin Base	100%	0%
<b>By Fixture</b>		
Ceiling Mounted	49%	51%
Lamp Mounted	43%	57%
Recessed Can	26%	74%
Suspended	32%	68%
Wall-mounted	33%	67%
<b>Total CFL Potential</b>	<b>37%</b>	<b>63%</b>

Energy-efficient bulbs comprise 43% of installed standard bulbs but only 9% of specialty bulbs. While energy-efficient bulbs comprise a significant percentage of medium screw-base sockets (42%) and pin-base sockets (44%), the majority of installed bulbs in those sockets (58% and 56%) still remain uncaptured. This is significant because, of the sockets noted by the Evaluation Team, the most common (77%) were medium screw-base and the second most-common were pin-base (11%). Even larger opportunities exist for other socket sizes, since energy-efficient technologies currently comprise only 5% of the bulbs in small screw-base sockets and 0% in large screw-base sockets.

The Evaluation Team also analyzed—by fixture type—where the greatest technical opportunities were. Energy-efficient bulbs comprise almost 50% of both ceiling-mounted and lamp-mounted fixtures and approximately one-third of suspended and wall-mounted fixtures. The greatest opportunities exist for recessed fixtures, which comprise the second largest share of total installed wattage (17%) for single-family homes found in the study.<sup>22</sup> Currently, energy-efficient technologies only comprise 26% of recessed can fixtures in the weighted population.

Given that the population represented within the study might be more prone to early adoption of technology, the total technical potential may even be greater than 62%—or any of the other estimates shown by socket and fixture. Thus, the Evaluation Team considers these estimates to be conservative and, therefore, a reasonable approach for assessing at market potential.

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<sup>22</sup> Ceiling-mounted fixtures comprise the largest share of installed wattage, making up 29% of total installed wattage.

## Appendix P. Residential Lighting and Appliance Impact Benchmarking References

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## Appendix Q. Home Performance with ENERGY STAR Billing Analysis

This appendix describes methodological detail supporting the Home Performance with ENERGY STAR billing analysis.

### PRISM Modeling Approach

The Evaluation Team estimated PRISM models for pre- and post-installation billing data. These models provided weather-normalized pre- and post-installation annual usage for each account and an alternate check to savings obtained from the fixed-effects model.

The PRISM electric model used the following specification:

$$ADC_{it} = \alpha_i + \beta_1 AVGHDD_{it} + \beta_2 AVGCDD_{it} + \varepsilon_{it}$$

Where for each customer ‘i’ and calendar month ‘t’:

$ADC_{it}$	=	Average daily kWh consumption in the pre-/post-installation period
$\alpha_i$	=	Participant intercept; represents the average daily kWh base load
$\beta_1$	=	Model space heating parameter value
$\beta_2$	=	Model cooling parameter value
$AVGHDD_{it}$	=	Base 45-85 average daily HDDs for the specific location
$AVGCDD_{it}$	=	Base 45-85 average daily CDDs for the specific location
$\varepsilon_{it}$	=	Error term

Using this model, the evaluation team computed weather-normalized annual consumption (NAC) for each heating and cooling reference temperature, as follows:

$$NAC_i = \alpha_i * 365 + \beta_1 LRHDD_i + \beta_2 LRCDD_i + \varepsilon_i$$

Where for each customer ‘i’:

$NAC_i$	=	Normalized annual kWh consumption
$\alpha_i$	=	Intercept is the average daily or base load for each participant; it represents the average daily base load from the model
$\alpha_i * 365$	=	Annual base load kWh usage (non-weather sensitive)
$\beta_1$	=	Heating parameter value; in effect, this is usage per heating degree day from the model above
$LRHDD_i$	=	Annual, long-run HDDs of a typical meteorological year (TMY3) in the 1991–2005 series from NOAA, based on the home location
$\beta_1 * LRHDD_i$	=	Weather-normalized annual weather sensitive heating usage, also known as HEATNAC

$\beta_2$	=	Cooling parameter value; in effect, this is usage per CDD from the model above
$LRCDD_i$	=	Annual, long-run CDDs of a typical meteorological year (TMY3) in the 1991–2005 series from NOAA, based on home location
$\beta_2 * LRCDD_i$	=	Weather-normalized annual weather sensitive cooling usage, also known as COOLNAC
$\varepsilon_i$	=	Error term

Furthermore, if the heating and cooling models above yielded negative intercepts, negative heating parameters, or negative cooling parameters, the Evaluation Team estimated additional models that included only the cooling usage (cooling only models) or the heating usage (heating only models). From these models with correct signs on all of the parameters, the best model chosen for each participant for the pre- and post-installation periods was the model that had the highest R-square.

The PRISM gas models used the following specification:

$$ADC_{it} = \alpha_i + \beta_1 AVGHDD_{it} + \varepsilon_{it}$$

Where for each customer ‘i’ and calendar month ‘t’:

$ADC_{it}$	=	Average daily therms consumption in the pre/post Program period
$\alpha_i$	=	Participant intercept; represents the average daily therms base load.
$\beta_1$	=	Model space heating parameter value
$AVGHDD_{it}$	=	Base 45-85 average daily HDDs for the specific location
$\varepsilon_{it}$	=	Error term

Using this model, the evaluation team computed weather-normalized annual consumption (NAC) for each heating and cooling reference temperature, as follows:

$$NAC_i = \alpha_i * 365 + \beta_1 LRHDD_i + \varepsilon_i$$

Where for each customer ‘i’:

$NAC_i$	=	Normalized annual therms consumption
$\alpha_i$	=	Intercept is the average daily or base load for each participant; it represents the average daily base load from the model
$\alpha_i * 365$	=	Annual base load therms usage (non-weather sensitive)
$\beta_1$	=	Heating parameter value; in effect, this is usage per heating degree day from the model above
$LRHDD_i$	=	Annual, long-run HDDs of a typical month year (TMY3) in the 1991–2005 series from NOAA, based on the home location

$$\begin{aligned} \beta_1 * LRHDD_i &= \text{Weather-normalized annual weather sensitive heating usage, also known as HEATNAC} \\ \varepsilon_i &= \text{Error term} \end{aligned}$$

Once the pre- and post-installation usages were obtained for each customer, the Evaluation Team applied other PRISM based screening steps to remove to ensure the highest precision:

- Accounts where the post-installation weather-normalized (POSTNAC) usage was 70% higher or lower than the PRENAC usage. Such large changes could indicate property vacancies when adding or removing other electric equipment (such as pools or spas) that are unrelated to the Program.
- Accounts that had missing PRENAC or POSTNAC estimates (because of negative heating/cooling slopes or negative intercepts) were excluded from the analysis because they likely indicated problems with the billing data.
- Accounts that received additional measures through other programs.
- Electric accounts where PRENAC or POSTNAC was less than 500 kWh or more than 80,000 kWh.
- Gas accounts where PRENAC or POSTNAC was less than 200 therms or more than 5,000 therms.

Finally, the Evaluation Team performed a billing data screen that examined the gas and electric monthly billing data for one customer at a time and plotted average monthly usage. To avoid confounding the billing analysis, the Evaluation Team removed accounts with outliers, vacancies, seasonal usage, and equipment changes in the pre- or post-installation periods.

Following these screens, the electric model analysis group included 184 participants (14%), and the gas model analysis group included 265 participants (20%). From the above PRISM models, the average Difference in Normalized Annual Consumption (DNAC = PRENAC – POSTNAC) yielded the average Program savings. The PRISM method was also used to obtain the weather normalized pre-installation period usage (PRENAC) that is used to determine the percent savings.

## **Fixed Effects Modeling Approach**

To formulate its estimate of Program energy savings, the evaluation team also conducted pre- and post-installation fixed-effects modeling. This method used pooled monthly time-series (panel) billing data. The fixed-effects modeling approach corrected for differences between participants in pre- and post-installation weather conditions and in consumption by the inclusion of a separate intercept for each participant.

This modeling approach ensured model savings estimates would not be skewed by unusually high-usage or low-usage participants.

The following model specification determined electric savings:

$$ADC_{it} = \alpha_i + \phi_i AVGHDD_{it} + \lambda_i AVGCDD_{it} + \beta_1 POST_i + \varepsilon_{it}$$

Where for participant 'i' and monthly billing period 't':

$ADC_{it}$	=	Average daily kWh consumption during the pre- or post-installation Program period
$\alpha_i$	=	Average daily kWh base load intercept for each participant (this is part of the fixed-effects specification)
$\phi_i$	=	Heating kWh usage per HDD for each participant
$AVGHDD_{it}$	=	Average daily base 65 HDDs, based on home location
$\lambda_i$	=	Cooling kWh usage per CDD for each participant
$AVGCDD_{it}$	=	Average daily base 65 CDDs, based on home location
$\beta_1$	=	Average daily kWh savings for Program measures
$POST_i$	=	Indicator variable that is 1 in the post-period (after the measure installations), and 0 in the pre-weatherization period (April 2011 through March 2012)
$\varepsilon_{it}$	=	Modeling estimation error

The following model specification determined gas savings:

$$ADC_{it} = \alpha_i + \phi_i AVGHDD_{it} + \beta_1 POST_i * AVGHDD_{it} + \varepsilon_{it}$$

Where for participant 'i' and monthly billing period 't':

$ADC_{it}$	=	Average daily therms consumption during the pre- or post-installation Program period
$\alpha_i$	=	Average daily therms base load intercept for each participant (this is part of the fixed-effects specification)
$\phi_i$	=	Heating therm usage per HDD for each participant
$AVGHDD_{it}$	=	Average daily base 65 HDDs, based on home location
$\beta_1$	=	Average daily therms savings per HDD for Program measures.
$POST_i * AVGHDD_{it}$	=	Indicator variable that is 1 in the post-period (after the measure installations), and 0 in the pre-weatherization period (April 2011 through March 2012) interacted with average daily base 65 HDDs (AVGHDD)
$\varepsilon_{it}$	=	Modeling estimation error

Of the two savings estimation methods, the Evaluation Team chose the fixed-effects method over the PRISM method model approach since it had slightly better precision for the savings estimate.<sup>23</sup> In a further refinement of the analysis, the Evaluation Team also used the analysis to estimate the gross savings by pre-installation period usage quartiles.

## *Electric and Gas Billing Analysis Models Output and Parameters*

Table Q-1 and Table Q-2 show detailed output and parameters of the billing analysis models.

**Table Q-1. Electric Billing Analysis Model Output and Parameters**

Descriptive Measure					
Root Mean Squared Error (MSE)	4.590				
Dependent Mean	25.198				
Coefficient of Variation	18.217				
R-Square	0.935				
Source	Parameter Estimates				
	DF	Parameter Estimates	Standard Error	t value	Prob. t
Intercept <sup>1</sup>	184	19.342	0.099	195.86	<.0001
AvgHdd <sup>1</sup>	184	0.186	0.001	164.70	<.0001
AvgCdd <sup>1</sup>	184	1.921	0.004	468.47	<.0001
POST	1	-2.1111	0.2511	-8.41	<.0001

<sup>1</sup> All models were estimated with a fixed-effects specification, which is a separate intercept for each customer. Due to the large amount of output from showing the model coefficients for each of the 184 intercepts, and their interactions with AVGHDD and AVGCDD, only the average of all separate intercepts, and their interactions are included in the output.

<sup>23</sup> The electric fixed-effects specification had savings of 771 kWh  $\pm$ 20% at the 90% confidence level, slightly better than the overall PRISM models that showed similar savings of 761 kWh  $\pm$ 21%. The gas fixed-effects specification yielded gas savings of 132 therms  $\pm$ 11% at the 90% level of confidence, very similar to the PRISM method that yielded savings of 139 therms  $\pm$ 11%.

**Table Q-2. Gas Billing Analysis Model Output and Parameters**

Descriptive Measure					
Root MSE	0.521				
Dependent Mean	2.151				
Coefficient of Variation	24.228				
R-Square	0.948				
Source	Parameter Estimates				
	DF	Parameter Estimates	Standard Error	t value	Prob. t
AVGHDD <sup>2</sup>	265	0.118	0.001	175.96	<.0001
<b>POST</b>	<b>1</b>	<b>-0.0175</b>	<b>0.0012</b>	<b>-15.10</b>	<b>&lt;.0001</b>

<sup>2</sup>All models were estimated with a fixed-effects specification, which is a separate intercept for each customer interacted with heating degree days (AVGHDD). Due to the large amount of output from showing the individual model coefficients for each of the 265 intercepts and interactions of AVGHDD, only the average of all separate intercepts and interactions are included in the output.

## Appendix R. Comparative Review of Nonresidential Program Application Review and Approval Process

### Introduction

During the CY 2012 and CY 2013 evaluations of Focus on Energy's nonresidential programs, the Evaluation Team found customers, Trade Allies, and Focus on Energy program staff were dissatisfied with the length of time and effort required to preapprove applications and process incentive requests for nonresidential projects. The Evaluation Team examined the implementation processes within Focus on Energy's nonresidential programs and compared them with processes implemented by other statewide and multistate energy-efficiency programs, with an emphasis on the review process for preapproving projects. This appendix presents the findings and recommendations resulting from these analyses.

The Evaluation Team's review of program processes used the Business Incentive Program (Program) as the focal point for comparison, although many of the processes are the same or similar across the three core nonresidential programs (Business Incentive, Chain Stores and Franchises, and the Large Energy Users Programs).

Though the Program Administrator and Business Incentive Program Implementer had already introduced changes that began to improve these processes in CY 2013, the Evaluation Team identified additional opportunities to make the application review and approval processes simpler and more efficient. Examples follow this section and discuss how comparable programs have made changes to:

- Simplify application forms
- Use data-entry controls to improve completeness of forms submitted
- Use technology to reduce errors and enable faster processing and enhanced communications
- Reduce the number of reviews required based on:
  - Project complexity and risk
  - Reviewer training and quality assurance procedures encyclopedia

This appendix presents a summary of the methodology used to conduct this study, which is followed by an overview of the current application and review processes as implemented for the Business Incentive Program. It then summarizes the types of actions other program managers took to improve the efficiency and ease of use for their application and review processes. The appendix includes a list of opportunities and recommendations the Evaluation Team identified to help Focus on Energy improve these processes within its nonresidential programs. Finally, this appendix concludes with several detailed comparisons of processes used in the Business Incentive Program to processes used in other programs.



## Methodology

The Evaluation Team conducted interviews and secondary research to compare the application review and approval processes across large-scale, statewide and multistate nonresidential, energy-efficiency programs.

To understand the steps and reviewers involved in the Business Incentive Program's application review process, the Evaluation Team analyzed the Program Operations Manual (versions 3.0 and 6.0) and discussed process steps with the Program Administrator and Program Implementer.

For the comparison group, the Evaluation Team selected utilities and program administrators offering mature programs that had either undergone process improvements or the improvements were in progress. The Evaluation Team interviewed five program representatives and examined five programs in depth.<sup>24</sup> A contracted program implementer delivered four of the five programs, with the fifth program managed and delivered by a utility program manager responsible for several states. The interviews explored the following topics:

- Steps, roles, and responsibilities in the application review process
- Guidelines for escalating applications to more in-depth reviews
- Technology used in the application process
- Time allowed or targeted for the review and approval process
- Actions taken to streamline or improve the quality of the review process

The Evaluation Team also examined the program websites for 10 additional programs, including those discussed in interviews, to assess:

- Organization and accessibility of application forms
- Assistance available online or offered through other communication channels
- Communication of the preapproval and incentive approval process requirements

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<sup>24</sup> As requested by the interviewees, the Evaluation Team has presented findings anonymously. However, each individual is willing to respond to a direct call from Focus on Energy to provide further information or demonstration of program processes. The Evaluation Team will provide contact information upon request.

Table R-1 lists the characteristics of the five primary comparison programs included in the analysis.

**Table R-1. Characteristics of Comparison Programs**

Program	Program Budget	Gross GWh Savings Target	Number of Projects Annually	Maximum Incentive	Minimum Simple Payback
Business Incentive Program	\$18M	175	6,000	50% of project cost	One and half years
Program A	\$12M	190	2,000	50% of project cost	-
Program B	\$16M	100	N/A	70% of project cost	One year
Program C	\$50M	300	N/A	50% of project cost <sup>1</sup>	N/A
Program D	\$10M	41	5,500	50% of project cost	Six months to one year <sup>2</sup>
Program E	\$50M	400	500 to 1,000 preapprovals; 8,500 projects	60% of incremental project cost	Nine months to one year <sup>3</sup>

<sup>1</sup>Custom projects only

<sup>2</sup>Varies by industry sector (six months for manufacturing and data centers)

<sup>3</sup>Varies by state jurisdiction

## Overview of Current Focus on Energy Processes

The Evaluation Team focused its review on the application preapproval and the incentive approval processes. Focus on Energy provides project application forms on its website. When the Evaluation Team reviewed the forms in December 2013, there were 24 different forms available. Only 10 of these forms were available in PDF format, which the applicant could fill in and save. There were no options for online application submission.

In the most recent review (March 2014), the Evaluation Team found that within the business tab on the website, a user selecting the “Access all Business Applications” link will go to a Trade Ally page that begins with links to nonresidential applications. This website presents seven links to agricultural applications, 23 links to commercial and industrial applications and related forms, and three links to program-specific custom applications. All of the applications request the same or very similar customer information, site information, and payment information. The Evaluation Team reviewed a sample of applications and found they ranged from two to 11 pages, with some forms including data fields for possible product options included within certain technologies.

## Application Preapproval Process

Participants in Focus on Energy’s nonresidential programs must submit an application for preapproval to receive incentives if:

- Estimated incentives for the project exceed \$25,000
- The project includes any custom measures

Table R-2 lists the number and proportion of CY 2013 projects that required preapproval<sup>25</sup> in Focus on Energy's core programs (Business Incentive, Chain Stores and Franchises, and Large Energy Users). Although the percentage of preapproval applications is less than 10% of the total core program applications, these projects represent about half of the therm savings and incentives Focus on Energy paid, and nearly one-quarter of the kWh savings.

**Table R-2. CY 2013 Completed Core Program Projects Requiring Preapproval**

Type of Project <sup>1</sup>	Number of Projects	% of Projects <sup>2</sup>	% of Incentives Paid	% of kWh Savings	% of Therm Savings
Custom Measures	760	8.6%	37.5%	13.9%	40.8%
Incentive >\$25,000 <sup>3</sup>	93	1.1%	14.3%	5.4%	4.9%
<b>Total Preapproved Projects</b>	<b>853</b>	<b>9.7%</b>	<b>51.8%</b>	<b>19.3%</b>	<b>45.8%</b>

<sup>1</sup> Based on projects completed during CY 2013. This includes applications processed in CY 2012 and does not include applications processed in CY 2013 but not yet completed.

<sup>2</sup> The percentage of projects is based on the count of all distinct applications for the Business Incentive, Chain Stores and Franchises, and Large Energy Users Programs. All other percentages (incentives paid, kWh savings, therm savings) are based on all Focus on Energy programs (including residential).

<sup>3</sup> Hybrid or prescriptive measures

The preapproval process includes operational, technical, and management reviews. Additional engineers and management staff will review the application if the incentive amount exceeds defined thresholds, with the total number of reviews ranging from two to 10.

The Evaluation Team reviewed the Business Incentive Program preapproval requirements shown in Table R-3.<sup>26</sup> As a project exceeds each threshold, SPECTRUM routes the project to the next reviewer. For projects with an expected incentive of \$30,000 and higher, the Program Implementer will perform two technical reviews and three management reviews, and the Program Administrator will conduct one additional technical review and one to two management reviews (for a total of seven to eight reviews for each project). Each reviewer has two to five days to complete the application review. Thus, the preapproval process can take from 20 to 25 working days, or four to five weeks, to complete. Neither version of the Operation Manual defined expected turnaround times for the two additional review levels required for projects with an incentive value exceeding \$100,000.

<sup>25</sup> Customers or Trade Allies may also request preapproval to confirm the level of incentives expected for a project.

<sup>26</sup> Procedure Number PM-003 (posted on Focus on Energy Program Administration SharePoint site).

**Table R-3. Business Incentive Program Preapproval Requirements**

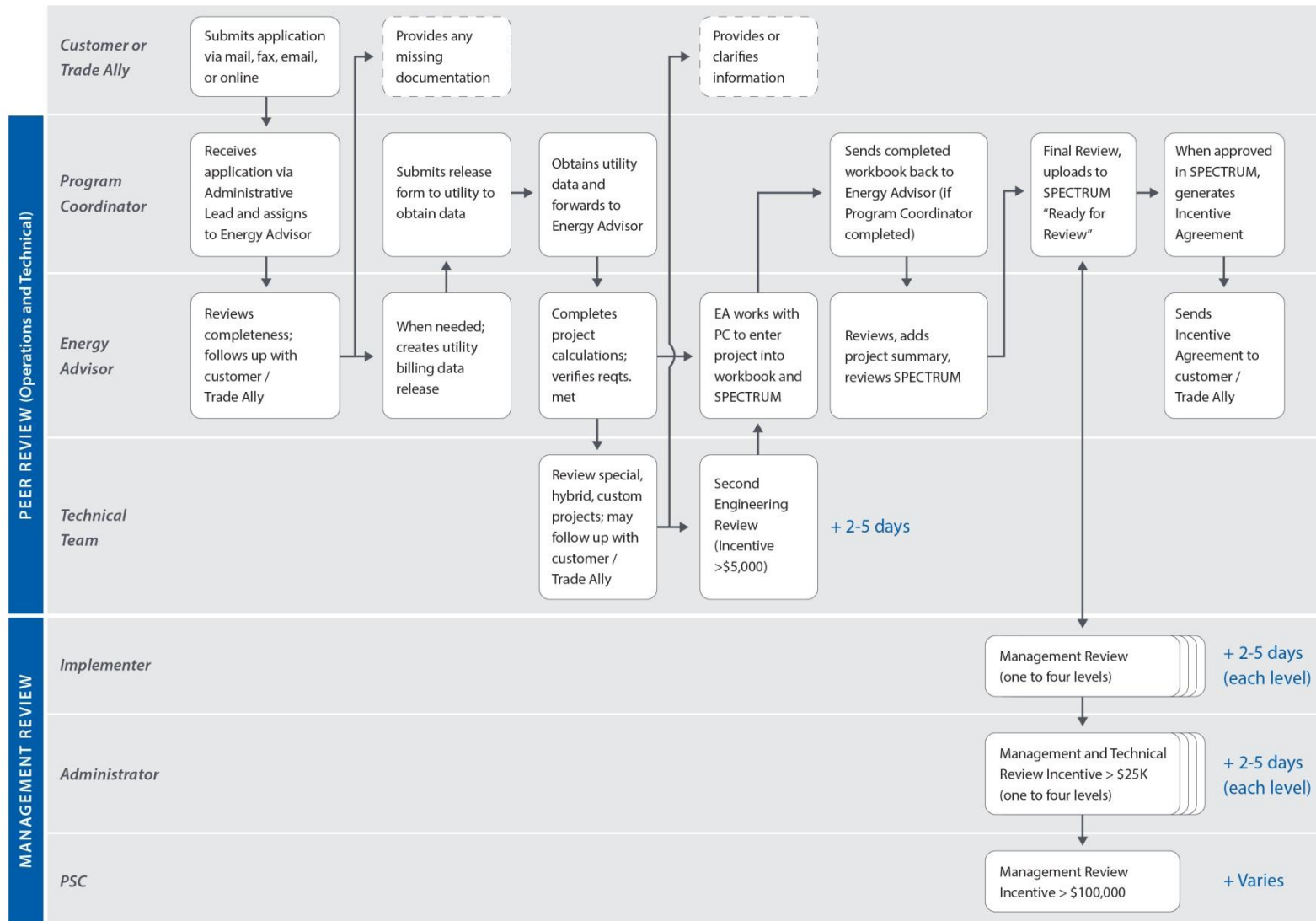
Incentive Amount (\$)		Program Implementer <sup>1</sup>	Program Administrator				PSC
Prescriptive	Custom		Program Lead	Engineer	Director of Energy Portfolios	Director of Operations	
<\$25	<\$40	✓					
\$25-100	\$40-100	✓	✓	✓	✓		
>100	>100	✓	✓	✓	✓	✓	✓

<sup>1</sup>Each nonresidential Program Implementer defines its own internal review process. For the Business Incentive Program, there are additional levels of management review for projects over \$5,000, \$10,000, and \$40,000 and additional technical reviews for some projects using a particular type of technology or application.

Figure R-1 shows a diagram charting the workflow of the Business Incentive Program preapproval process. SPECTRUM manages the workflow sequentially and routes applications to specific individuals for review, with the following exceptions:

- SPECTRUM workflow does not submit projects to the Project Administrator unless the incentive level exceeds \$40,000. SPECTRUM routes projects between \$25,000 and \$40,000 directly to the Administrator's Program Lead, who then forwards the projects for subsequent technical/engineering and management reviews.
- SPECTRUM does not route projects outside of the predefined workflow. According to the Business Incentive Program Implementer, it would use additional technical resources to assist with the reviews at times (for example, a Lighting Lead); however, the Implementer had to manage projects outside of the predefined workflow manually.

**Figure R-1. Business Incentive Program Custom Application Preapproval Process**



The Program Administrator and Business Incentive Program Implementer identified additional challenges to reducing the time required for preapproval reviews including:

- Staff designated as reviewers in the SPECTRUM workflow were not available due to workload or time away from work.
- Turnover in staff resulted in the need for training, revisiting expectations and the division of responsibilities, and reestablishing trust among the reviewers.
- Applicants frequently submitted incomplete applications. This required that Implementer staff follow up with the customer or Trade Ally to obtain missing information, which could increase the review times if they had to wait for a response.

One Program Implementer reported it had two very experienced engineers conducting preapproval reviews for projects, assessing all energy-efficiency measures. However, these engineers were nearing retirement and the Program Implementer was not certain it could replace the engineers with equally experienced staff.

## ***Actions Taken by Other Programs***

In talking to managers of other energy-efficiency programs of similar scale and maturity to Focus on Energy programs, the Evaluation Team found all of these managers had taken actions to improve their application review and approval processes. The program managers implemented the changes discussed in this section either within the last two years, the 2013/2014 fiscal year, or were in process of introducing the changes when the Evaluation Team spoke with them. Each manager reported their customers and Trade Allies also expressed frustration about the processes prior to initiating these changes. Some reported measurable improvements, while others provided qualitative feedback that suggested customers and staff members found the experience much improved.

The program managers identified the following objectives for the process changes they made:

- Improve customer and Trade Ally satisfaction
  - Make it easier and faster to complete the application process
  - Reduce redundant requests for information
  - Improve communication about project status
  - Reduce the number of follow-up contacts required for incomplete applications
- Optimize the review process from submission to approval while maintaining the appropriate depth and number of reviews to minimize risk

The following sections discuss each of the two major changes the program managers implemented.

## Changes to Improve Customer and Trade Ally Experiences

Program managers said they primarily focused on the application form and the submittal step to improve participant experience and satisfaction and then concentrated on reducing the overall processing time and communicating project status.

The Evaluation Team identified two types of strategies that program managers took to improve customer and Trade Ally experiences with the application process:

- **Redesigned the Application Forms.** Several program managers had recently redesigned and implemented their application forms and submission processes. These program managers changed the forms to reduce the amount of information required from participants while still obtaining sufficient data to assess a project for approval and support evaluation needs.
- **Provided Online Application Systems.** Several large program managers using Excel spreadsheets and PDF-based applications for programs with incentives wanted to make it easier for applicants to properly complete the application forms for both prescriptive and custom incentives. Each program manager implemented an online application system that customers and Trade Allies could use to submit applications. Program managers reported that most applications now go through online systems that have received very positive feedback from users, and they require less time for processing applications.

Please see the Detailed Examples and Comparisons section of this appendix for examples demonstrating these two strategies.

## Changes to Optimize the Review Process

Program managers also described the steps and staff involved in the review process and how they used technology to facilitate the process (in addition to the online application system). The Evaluation Team identified the following examples of how program managers implemented processes to reduce the number of reviews required, ensure quality reviews, and reduce the overall processing time:

- Assigned reviewers based on technology and complexity
- Engaged external reviewers for projects exceeding risk thresholds
- Implemented a quality assurance process, including training of new reviewers and continuous improvement procedures
- Used technology to speed-up communications
- Minimized the number of review levels required for each project

Table R-4 in the Detailed Examples and Comparisons section lists an example of each of these practices from across the programs the Evaluation Team reviewed.

## *Opportunities and Recommendations*

Based on a review of Focus on Energy's processes, and a comparative review of other program processes, the Evaluation Team developed the following opportunities and recommendations for its nonresidential programs.

**Opportunity 1. Simplify application forms and information requested.** Currently, a potential applicant must find the correct form and then enter the same data (customer and site information) on each form if including multiple technologies in a project. For some technologies, the applicant must determine which of many sections are applicable to their project. Focus on Energy is currently developing online forms and registration options.

**Recommendation 1. Determine if Focus on Energy can accelerate its transition to an online application system.** An online application system appears to offer the most benefits in making it easier for applicants to prepare and submit applications. With data-entry validation and checklists for attachments incorporated, an online system could also alleviate or reduce the problems Focus on Energy currently experiences with incomplete applications that require follow up and consume staff time. In preparing for a transition to an online system, invest in training for Trade Allies, customers (particularly large energy users), and utility account executives. Also, anticipate the need for higher levels of user support during the initial rollout of the system and plan accordingly.

**Opportunity 2. Decrease the number of reviews.** Focus on Energy's nonresidential projects require substantially more potential reviews than projects in similar programs, including programs with separate program administrator and implementer structures. The number of reviews currently required slows the preapproval process and response to applicants. The process can be further delayed when reviewers have a heavy workload or they are out of the office.

**Recommendation 2. Develop strategies to achieve the desired level of confidence and risk management in fewer steps.** Revisit the objectives of each step in the review process to determine what is driving multiple levels of review, and then assess opportunities to:

- Skip interim levels of review for projects exceeding higher thresholds and route the application directly from the initial reviewer to a senior or technology-specific expert reviewer.
- Engage an external engineering firm to validate reviews or conduct reviews for higher-risk projects to reduce levels of reviews required or address concerns with staff turnover.
- Develop a reviewer training and certification program.
- Develop defined checklists for reviewers to use, with a continuous improvement process to update and enhance the checklists.
- Implement quality assurance reviews using a random sampling approach to verify accuracy and identify areas where additional protocols or training are needed.

**Opportunity 3. Increase the depth and flexibility of expert reviewers.** SPECTRUM does not have the flexibility to reassign a review if a reviewer is unavailable, there is a high volume of applications for



review, or if a specialized expertise is required. Some additional technical expertise is available within the Business Incentive Program Implementer’s organization (for example, a lighting specialist); however, the automated workflow management in SPECTRUM does not allow staff to route applications with specialized technologies or high incentives for review within the system. The Program Implementer routes some projects (where incentives exceed \$25,000) for additional technical review outside the SPECTRUM system, which makes it more difficult to track timing and status of the reviews.

**Recommendation 3. Adapt SPECTRUM to better manage and track workflow.** Consider expanding the pool of reviewers to include both generalists for frequently repeated technology applications and specialized experts for more complex technologies. This will require adding functionality to SPECTRUM or creating processes to enable routing or reassigning a review to technical experts.

## *Detailed Examples and Comparisons*

These detailed case studies and comparisons provide further detail about how similar programs changed and improved application processes.

### **Redesigned the Application Forms**

#### ***Case Study 1: Minimized Form Requirements and Created an Application Based on User Input Situation***

After recognizing stakeholder and customer frustration with the custom application forms, a Midwestern multistate utility formed a cross-functional working group with representatives from engineering, sales, and rebate operations. The group met weekly for over six months to “tear apart” each section of the custom application and isolate the necessary information. The working group learned that data collected in the applications for some departments were not actually used by those departments.

#### **Action**

The utility streamlined the application form to include only the required information across all types of projects. This included:

- Premise and account information (completed by the utility account manager)
- Customer and facility information
- Alternative rebate recipient
- Equipment supplier contact information
- Project description
- Existing equipment (lower-efficiency option and higher-efficiency option)
- Submission instructions
- Rules and requirements

The utility also created an accompanying efficiency workbook in Excel to facilitate input for specific types of energy-efficiency measures. The workbook begins with instructions and a general information worksheet and then automatically opens technology spreadsheets based on the technology an applicant selects. Once open, the forms automatically populate using the initial information an applicant enters about the project. Data validation controls help to ensure applicants complete a form (i.e., the applicant cannot save the workbook without providing data in the required fields, and key fields must contain approved options from pull-down menus). The program manager said this addressed several prior challenges such as:

- Customers not knowing which form to use
- Illegible hand-written entries
- Incomplete data

The utility trained customer-facing staff on what to expect, showing them examples of forms correctly and incorrectly filled out, and how to help customers and Trade Allies learn to use the form and workbook.

Additionally, the technology spreadsheets readily export data in the workbook to engineering tools and models used to evaluate the project for preapproval. The technology spreadsheets cover a wide range of measures including anti-sweat heater controls, boilers, dry coolers, elevators, energy recovery ventilators, high-speed doors, Illuminating Engineering Society of North America backup, lighting, motors, variable-frequency drives (VFDs) non-fluid based VFDs, roofing, VFDs on chillers, and windows.

## Results

- The utility reduced the portion of the general application form it required the applicant to fill out from three pages to one and a half pages, including equipment details.
- The applicant does not need to search for or collect various technology-specific forms; the correct spreadsheet automatically opens within the efficiency workbook after the applicant selects the technology. The applicant only sees the fields and forms they need to complete based on previously entered information.<sup>27</sup>

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<sup>27</sup> The Evaluation Team encountered Excel version problems when testing this tool. The applicant must still enter some customer and project information twice, in the application form and in the efficiency workbook. Data validation controls ensured applicants entered data but did not detect inaccurate or incomplete information.

- With complete technical information provided in useable format, the typical custom project timeframe for an engineering review of a submitted application is 10 business days.<sup>28</sup> The program manager said the review and approval process used to take 14 to 20 days, but now it typically requires less than a week.<sup>29</sup>

## *Case Study 2: Created a Master General Application*

### **Situation**

A multistate utility simplified its overall program design to offer one comprehensive business program with prescriptive and custom incentives across a wide variety of energy-efficiency measures. After consolidating programs, the program management wanted to create one application form. However, the utility ran in two complications when designing a single form: (1) the complexity of preapproval requirements, and (2) specific data needs for some measures.

### **Action**

The utility developed a general application for all measures, with technical supplements for some of the individual measures. The general application collects customer information, project site data, a brief description of the project scope and schedule, incentive assignment (to someone other than the participant), and a signature acknowledging that the applicant provided accurate information and understood the terms and conditions. The general application is one page, with the terms and conditions included on the back of the page. Technical supplements are relatively short and use checkboxes and tables where possible to make the forms easier to complete.

### **Results**

- Applicants only need to enter customer information once, regardless of how many energy-efficiency measures they include in their projects.
- Customers or Trade Allies can submit the general application early (before finalizing a project), creating an opportunity to consult with utility staff and ensure they understand specifications or are aware of more efficient alternatives.

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<sup>28</sup> The utility communicates expected processing time to applicants in writing on the application form. The form also states that larger, complex projects may require a longer timeframe.

<sup>29</sup> This program operator also conducts a maximum of four levels of reviews, with projects escalated based on complexity and total energy savings. An external engineering firm reviews higher-risk projects.

## Provided Online Application Systems

### *Case Study 3: Developed a User-Friendly Online Application System to Ensure Properly Completed Applications*

#### **Situation**

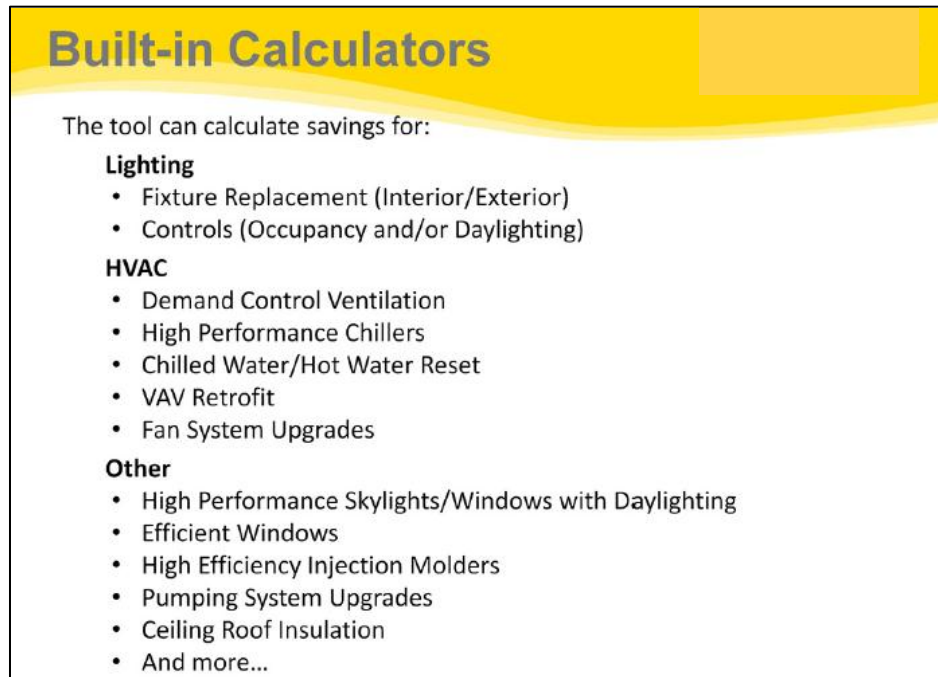
Several large program managers using Excel spreadsheets and PDF-based applications for programs with incentives wanted to make it easier for applicants to properly complete the application forms for both prescriptive and custom incentives. Properly completed forms would result in fewer rejected applications and staff would spend less time reprocessing corrected applications and supporting the applicants. In addition, they wanted to enable customers and Trade Allies to easily check the status of their applications at any time.

#### **Action**

Each program manager implemented an online application system that customers and Trade Allies can use to submit applications. Different vendors developed each system, but all of the systems offer some common functionality and benefits for users such as:

- User registration and password access that allow users to enter general information only once, complete an application in stages, and check the status of the application later.
- Built-in validations of entered data that provide immediate feedback if an entry is missing or not an eligible response or use drop-down menus with eligible responses.
- Automated population of fields with deemed savings based on user inputs.
- Built-in calculators for many customized solutions that can take the place of developing an energy model or engineering calculations (and expedite the engineering review).

Figure R-2. Examples of Built-in Calculators in an Online Application System



- Authorization of an agent (such as a Trade Ally) to access specific project applications or receive the incentive.
- Online submission of electronic copies of required documentation.
- An electronic signature and online submission of the application.

Other benefits offered include links to useful information and online help or a “wizard” to help applicants understand what information they need to include in their applications. Figure R-3 presents a screenshot from one of the systems. The screenshot includes a graphic at the top showing the steps in the overall application process and which step the applicant is on. This system also has a “bonus checklist” that automatically updates as the applicant completes the application; the checklist shows what measures they qualify for and verifies they have met the minimum requirements.

Figure R-3. Screen Shot from an Online Application Tool

**Attachments Tab**

Your Progress (63%)

App Setup Customer Site Solutions **Attachments** Summary Payee Signature

**Attach A File**

Application: 10th Street Building- Lighting and HVAC

If Already Installed, Please Include The Following With Express Solutions:

- Invoice Receipt(s)
- Specification sheet(s) for each installed solution from vendor

Please Include The Following With Your Application:

- A W-9 and a CA-596 by the Payee (company or person receiving the incentive check, only if not on file). If Payee an S-C Partnership partner, only submit a W-9, if not on file.
- A completed Customer's Authorized Agent Agreement form, only if not on file.

Attach a new file:

[Choose File] No file chosen

Select Attachment Type: --- Please Select ---

Brief description of attachment:

**Upload**  
(Up to 25 MB per file)

Name	Type	Added	
Form_W-9.pdf	PDF	1/22/2013 9:55:00 AM	Delete

22

The program managers offer webinars and, in some cases, in-person trainings that teach customers and Trade Allies how to use the online application system. For applicants who are not comfortable online, one program manager reported that its staff will enter information on the customer's behalf. One program manager provides a highly illustrated 94-page user guide to their system that the applicant can download and use to walk the through the application process or reference for help with advanced functionality of the system (e.g., sharing applications, transferring applications, using a solutions library tool).

## Results

- Most applications now go through an online system (in one case, just over one year after implementation) and the systems have received very positive feedback from users.
- Program managers require less time for processing applications. One program manager reported the processing time is fewer than 20 days if the applicant includes all of the requested documentation, and another said staff can typically complete preapproval reviews for custom projects within two weeks.<sup>30</sup>

<sup>30</sup> This program administrator and implementer conduct a maximum of three levels of review, with escalation to higher levels of review driven by project complexity or inclusion of equipment that the program operator has not reviewed before.

## Optimized the Review Process

The Evaluation Team selected brief examples (rather than case studies) of several practices that optimized the review processes across the programs it reviewed (see Table R-4).

**Table R-4. Examples of Practices to Optimize Application Review Processes**

Process Practice	Examples
Assign reviewers <sup>31</sup> based on technology and complexity	<ul style="list-style-type: none"> <li>Lighting and other more “repeatable” technologies are routed to a junior engineer. Based on complexity, projects are assigned to a more experienced engineer and may require approval by a senior engineer or manager.</li> <li>Reviewers participate in measure-specific training with the implementer’s subject matter experts and vendors. Each has assigned products they specialize in, but will also receive cross-training to develop expertise in new areas. Engineers can add a new technology once they pass a demonstrated level of proficiency (initially, all work is reviewed).</li> </ul>
Engage external reviewers for projects exceeding risk thresholds	<ul style="list-style-type: none"> <li>The engineering team responsible for reviews sends a sample to an external engineering firm to confirm the reviews were done properly. The program manager said the junior engineers are assigned more reviews. In addition, the external firm reviews custom applications with more than one GWh savings.</li> <li>The state commission randomly selects projects for review, requiring submission of all associated forms. The program manager reported 12 projects were reviewed the prior year.</li> </ul>
Implement quality assurance procedures	<ul style="list-style-type: none"> <li>Technical specialist pulls 10% of projects randomly each week to double check the technical review and calculations. For less common or complex measures, additional technical experts may be asked to conduct a final review.</li> <li>New staff members work in a buddy system during their first four to six weeks on the job until an experienced reviewer approves their ability to work independently.</li> <li>A checklist is used to review each project application. If subsequent evaluation activities identify any problems with the review, the situation is diagnosed to evaluate what should be added to avoid repeating the problem in the future. The checklist is updated continuously, as needed.</li> </ul>
Use technology to speed-up communications	<ul style="list-style-type: none"> <li>Reduced preapproval process time from one to two weeks to 48 hours using an access database developed in-house, plus Salesforce for workflow. <ul style="list-style-type: none"> <li>Instant transfer of information</li> <li>Automatically generates preapproval letter and notification</li> </ul> </li> <li>As one program manager stated, “Our online intake tool collects application information and submits it through an interface to VisionDSM<sup>32</sup> to store all application information and supporting documents.”</li> </ul>

<sup>31</sup> These examples typically involved a pool of potential reviewers, none of whom the program managers assigned to this task full-time.

<sup>32</sup> More information available at: <http://www.appliedenergygroup.com/visiondsm>

## *Managed Workflow Based on Depth or Scope of Technical Reviews*

Across the programs, the Evaluation Team found strong similarities in the scope of the technical reviews conducted for preapproval of project applications including:

- A staff member who performs an initial check of the application, often an account representative or available member of the review team, to make sure the applicant included all required documents and data.
- An assigned reviewer who checks to ensure the project meets program requirements and examines the operating parameters to see if the data provided supports the claimed estimates and is typical for the type of business operation. The reviewer may enter or transfer data into standardized spreadsheet calculators or a model to assess the accuracy of calculations, evaluate consistency in analysis across projects, and/or determine if the project passes payback requirements or resource cost tests.
- Under certain conditions, the assigned reviewer may escalate the application review to a more senior engineer or technology expert. The conditions, or basis for escalation, varied across the different programs. Program managers considered several factors when escalating an application for review. Some examples include:
  - Value of expected incentives
  - Expected incentives close to maximum pay-out limits
  - Magnitude of energy savings
  - Complexity of project or uncertainty in savings values related to specific technologies (for technologies reviewed less frequently or with higher variability)

## *Reduce Review Times*

The program manager with the most efficient throughput time for preapproval of project applications had implemented the following process changes within the last two years to improve their process:

- Reduced information collected on a general application form
- Created an Excel-based workbook that adds technology pages based on user inputs, so the users only see the data fields they must complete. The workbook also included:
  - Data entry controls to assist with completeness
  - Data organized for easy export to engineering review models (One program manager stated, “Our engineers are not doing data entry.”)
- Implemented a CRM system (SalesForce) to manage workflow, communication, and documentation.



- Created an internal tool to manage workload and assign reviews to engineers. The tool ensures that when an account manager submits an application it reaches an assigned engineer within one day. The system typically assigns simple prescriptive projects to entry-level engineers for review, while it assigns large cooling and more complex projects to an engineer with specific knowledge and experience in the technology.
- Revised targets for processing time engineering reviews from one to two weeks to 48 hours.

These changes reduced review time from 14 to 20 days to typically less than one week.

The Evaluation Team found that while the new processes transfer more responsibility for a correctly completed application to the applicant through the use of the Excel workbook with data controls, the account representative still provides support and an initial review of completeness. This support occurs outside the tracked and reported processing times. This program manager does not have a separate organization involved in administration or implementation of the program; however, it conducts business in multiple states and is subject to randomly selected project reviews conducted by state auditors. The program manager also works with an external engineering firm to review a sample of projects and complex custom projects to provide additional quality assurance.

### **Comparison of Preapproval Times and Processes**

The Evaluation Team found greater differences in the number of reviews required for preapproval of project applications. Although most preapproval for project applications would typically go through a minimum of one to two levels of reviews, the maximum number of reviews ranged from three to five. Focus on Energy conducts a maximum of 10 reviews for preapproval of project applications.

The Evaluation Team also found that the program manager with the most efficient processing had a larger pool of initial reviewers available than the Business Incentive Program (15 in comparison to two, although this pool supports multiple states). All reviewers were engineers, with some that had specialized expertise in certain technologies. None of the engineers reviewed projects full-time. However, the program manager did develop a workload management system to assign staff to project reviews.

Other program managers reporting efficient processing times (typically fewer than 20 days) received most project applications through an online application system and also had a larger pool of technical reviewers available. Only one program manager indicated management-level reviews were conducted with high-risk applications. All of the program managers had quality assurance programs that included external engineering firms or state auditors reviewing randomly selected or complex projects. Table R-5 lists a summary of the process steps for two of the more efficient program review processes in comparison to those implemented for the Focus on Energy Business Incentive Program. The primary differences between these programs are the number of review levels an application may undergo if deemed high risk and the basis on which “high risk” is assigned.

**Table R-5. Examples of Preapproval Review Processes Compared to the Business Incentive Program**

Business Incentive Program	Most Efficient Process Time (Typically less than one week)	Very Efficient Process Time (14 to 20 days)
1. Administrative Lead receives an application via mail, fax, e-mail or online and sends it to the Program coordinator.	1. Account representative receives the application, checks and submits it to the product management team in the CRM system (application and Excel workbook). <sup>1</sup>	1. Application and documentation received from online application system collected in master database.
2. Program coordinator assigns an application to an Energy Advisor.	2. Product management team member checks the application for completeness and then forwards it for engineering review. <sup>2</sup>	2. Program implementer team member checks for completeness and assigns the application to a technical reviewer. <sup>3</sup>
3. Energy Advisor reviews the application for completeness, checks the project calculations, and verifies the project meets Program requirements, and submits to a technical team member.	3. Engineer checks the operating parameters, loads data for modeling via macro, runs a model to estimate savings and cost-effectiveness, and completes the framework for an approval letter (e.g., expected savings, incentive level, and expiration date).	3. Technical reviewer checks material submitted and determines if the application meets program requirements and if escalation is needed.
4. Technical team member reviews the application to determine if the savings estimates are appropriate, recalculates energy engineering, performs minor simulation and modeling, and checks the operating parameters.	4. Application is escalated to higher level engineer or manager based on complexity and magnitude of savings. <i>(Maximum four levels of review.)</i>	4. Application is escalated to a specialist for all custom non-lighting, complex projects, or equipment not reviewed previously. <i>(Maximum three levels of review.)</i>
5. For projects with incentive values exceeding thresholds of \$5,000, \$10,000, \$25,000, \$40,000 and \$100,000, other technical team members and management staff conduct additional reviews. <i>(Ten levels of review maximum.)</i>	5. An M&V plan is required for projects with greater than one GWh savings projected, which may include pre-inspection.	5. Field inspection scheduled if deemed necessary (a high percentage of custom lighting is inspected if the program is near its cap for rebates)
6. Focus on Energy requires pre-and post-inspections for specified products or when determined by the Energy Advisor for complex projects.	6. "Press a button" to generate preapproval or rejection letter via CRM system, which is sent to the account representative to notify customer.	6. Preapproval or rejection letter is generated and sent to applicant by team member.
7. Program coordinator generates an incentive agreement.	N/A	N/A
8. Energy Advisor sends an incentive agreement to the customer or Trade Ally.	N/A	N/A

<sup>1</sup>This organization plans to develop online application forms and processes in the future.

<sup>2</sup>There is a pool of 15 engineers available to conduct project reviews. An internal system evaluates workload and assigns reviews based on the availability and engineering specialization if required.

<sup>3</sup>The program administrator is not directly involved in the review and approval process, other than in an outside advisory role. A pool of 12 technical reviewers are available (none full-time for this role) plus more specific technology resources in the implementer's organization).

## Appendix S. Retrocommissioning Program Challenges, Solutions, and Benchmarking

### *Detailed Delivery Challenges and Solutions*

**Workbook Efficacy.** The Program Administrator reported that the workbook approval process for core projects did not go smoothly. The Administrator attributed this, in part, to miscommunication with Program Implementer staff and the fact that the Implementer had hired a subcontractor, Quest, to design the workbook and provide technical services for energy-savings calculations approval. The Program Administrator was not satisfied with Quest's quality of work and requested that CLEAResult, as Program Implementer, bring these technical services in house.

The Program Administrator cited the following concerns with the workbook process and content:

- Gaps in the necessary data inputs
- Unclear sources for the underlying assumptions used in baselines and forecasted savings
- Inadequate QA/QC process with an approval process that was too "loose"
- Overlapping savings between programs and lack of communication between the Program Implementer and other Focus on Energy implementers, such as Franklin Energy, about measure appropriateness

During the interview in August 2013, the Program Administrator reported significant improvement since the Implementer took over technical services. The Implementer was continuing to improve quality, communication, and efficiency to smooth the process and eliminate workbook revisions.

**Program approval.** The Program Administrator also reported postponement of the launch of the Express Building Tune-Up path due to delayed approval of the revised design and expedited workbook tool. The interim solution was to simply use the workbook template and procedures for the core path so participation was not held up. However, using the core path workbook affected the Express Building Tune-Up path's roll-out, communication to Trade Allies, and ability to approve smaller projects quickly.

**Incentive structure.** The Program Implementer reported that, with the help of Retrocommissioning Service Providers, it identified two market barriers to customer participation in the core path of the Program: (1) lack of funding to help cover the cost of an in-depth audit and (2) customers being skeptical about their ability to achieve savings. To mitigate these barriers, the Program Implementer created an Enhanced Opportunity Assessment and distributed 50% of the forecasted incentive after the completion of the audit.

**Program Marketing and Outreach.** The Program Implementer and the Program Administrator agreed the Program needed to do more to engage Trade Allies, other Focus on Energy implementers, and utility Key Account Managers in outreach activities that would boost participation. They implemented several methods to coordinate with these stakeholder groups.

**Market Factors.** Implementer staff reported that heavy seasonal workflow and business development factors affected their ability to expand participation in the Express Building Tune-Up path. One staff member said: *“We’re highly dependent on Trade Allies to execute. During the months of June and into July, we had an unseasonably warm period of weather, which meant mechanical contractors were very busy fixing HVAC systems. Getting their attention on this new program was just competing with their time.”*

Related to these challenges was how to communicate the value proposition of the Express Building Tune-Up concept and the Program specifically to Technical Service Providers so that they, in turn, could market it to their customers. Implementer staff described the Express Building Tune-Up path as a “new tool” for contractors, requiring them to figure out how to use it and fit it in with their existing portfolio of services. Implementer staff also said contractors had to learn which measures qualified for the Program and which did not.

## Additional Benchmarking Findings

### Feedback from Retrocommissioning Service Providers in Other Programs

- One ComEd retrocommissioning service provider noted that his company spent more time and money to *“frontload the work in the planning phase...and less during the actual implementation.”* Another reported that the process had multiple unnecessary review points that could be streamlined.
- Both Rocky Mountain Power and ComEd retrocommissioning service providers described the administrative requirements of the program, including the level of required documentation, as *“cumbersome,” “painful,”* and *“confusing and burdensome.”*
- All five of the retrocommissioning service providers interviewed for the Southwest utility program evaluation reported having some difficulties with the planning stage, particularly with finalizing the energy calculations, and all suggested streamlining this component of the program.

### Challenges with Launching the Programs

**Long project timelines.** Almost all evaluations reported that long project timelines—due to the in-depth studies, customer-directed implementation, and retrocommissioning verification—caused lags in claimed savings. ComEd projects took 10 to 12 months to complete, and retrocommissioning service providers suggested that the program’s timelines to recruit and finish projects within a year was too aggressive for the complexity of retrocommissioning work. The Southwest utility program took, on average, up to six months to complete each project phase, meaning some projects took over a year to complete. Other challenges were related to the free retrocommissioning study and subsequently encouraging customers to act in a timely fashion to implement measures.

Focus on Energy has avoided this challenge with the performance-based incentive structure that pays participants after installation and verification.

**Market readiness.** ComEd Program staff reported that it took some time for new service providers to fully understand the program's processes and requirements. The more projects a service provider performed, the better they became at understanding, explaining, and performing retrocommissioning services.

One program administrator at San Diego Gas & Electric thought that program startup took longer than anticipated, in part due to the process of making customers aware of the program and communicating the value. She said:

*"It takes time to build relationships with large building owners and property management firms and sell retrocommissioning up in these organizations. Often the sale is made to several individuals beginning with the facilities staff, then up to the financial decision maker. This multi-tiered sales process, along with the long project time that retrocommissioning requires, is a challenge under short timeline programs. Creating good relationships is the key to program success. There is a need for a lot of one-on-one attention."*

Implementers for the San Diego Gas & Electric program reported that establishing clear and consistent protocols, creating a useful workbook, and providing good training for retrocommissioning service providers would help to overcome some initial barriers during program startups.

**Strict eligibility requirements.** The studies reviewed showed that strict eligibility requirements on project size and building vintage inhibited participation for several programs. After the first year of the program, the Southwest utility program reduced the 150,000-square-foot requirement to 100,000 square feet. It also removed the five-year building-vintage requirement after the second year of the program. These program changes seemed to improve participation. San Diego Gas & Electric also reduced the building square-footage requirement following feedback from participants. The Focus on Energy Retrocommissioning Program has already addressed this barrier by establishing flexible eligibility requirements as well as an alternative path for small facilities (the Express Building Tune-Up path).

**Program design.** The San Diego Gas & Electric program did not initially offer a free engineering study in the first year of the program. Retrocommissioning Service Provider feedback indicated that customers were complaining about the upfront cost for the retrocommissioning investigation and about the program feature that prohibited them from receiving reimbursement after the investigation was completed. San Diego Gas & Electric attributed the program's slow start to this obstacle, and it changed its design to offer a free study.

Some retrocommissioning service providers in the Rocky Mountain Power program reported the implementation phase revealed a "gap" between the services required and the services available for retrocommissioning that caused more project delays and reduced project-level savings. They reported that most participants did not have the internal resources to effectively manage the implementation or relied too heavily on controls contractors who the service providers perceived were underqualified. In

some cases, where the service provider had left the implementation entirely up to the client, it was necessary to perform rework to achieve the savings

### Customer Outreach and Retrocommissioning Service Provider Network

For some programs, the outreach strategy changed over time:

- For ComEd, service provider recruitment and training did not occur in the first year (a pilot year), which resulted in the implementer performing most of the customer recruitment and on-site work. During the second year, service providers were relied on more for recruitment.
- For San Diego Gas & Electric, marketing was originally planned to be a utility function through direct customer contact with the utility key account managers. However, implementers found that engaging key account managers to market the program was a challenge. The implementer took on the role of recruiting participants, which gradually shifted to service providers as the program matured.
- San Diego Gas & Electric also reported that various marketing strategies were tested in the first program year with mixed success. The least successful was a mass mailing of information to building owners and managers. Paid advertisements in local journals also did little to recruit participants. Program staff found that the most successful marketing was face-to-face meetings and pursuing networking opportunities through the Chamber of Commerce or other similar organizations. Implementers partnered with the San Diego Regional Energy Office to get the word out about the program, and this office was the source of most leads San Diego Gas & Electric received.

## Appendix T. State of Wisconsin Reporting Data

### Legislative Report

This appendix is a compilation of frequently requested data, being presented in one location for ease of use by interested parties. This appendix does not contain any unique information; all information below is already presented elsewhere in the evaluation report.

**Table T-1. CY 2013 Renewable Measures Installed<sup>1</sup>**

Residential	Nonresidential	Total
307	22	329

<sup>1</sup>Includes Solar Photovoltaic, Solar Thermal, Wind, and Geothermal measures for the Multifamily Energy Savings Program, New Homes Program, Residential Rewards Program, Business Incentive Program, Large Energy Users Program, and the Renewable Energy Competitive Incentive Program.

**Table T-2. CY 2013 Participants in Renewables Programs<sup>1</sup>**

Residential	Nonresidential	Total
-	21	21

In CY 2013 there were 21 participants who completed projects for the Renewable Energy Competitive Incentive Program.

## Appendix U. Survey Instruments

This appendix is provided separately from this document. The separate appendix includes a sample survey/script for the following programs in Focus on Energy's residential and nonresidential sectors as well as a residential marketing awareness survey:

### *Residential Programs*

- Multifamily Energy Savings Program and Multifamily Direct Install Program
- Appliance Recycling Program
- Residential Lighting and Appliance Program
- Home Performance with ENERGY STAR and Assisted Home Performance with ENERGY STAR (Participant and Audit-Only Participant)
- New Homes Program (Participant and Nonparticipant, Building Performance Consultant Participant and Nonparticipant, and Builder)
- Residential Rewards Program
- Enhanced Rewards Program
- Express Energy Efficiency Program

### *Nonresidential Programs*

- Business Incentive Program
- Chain Stores and Franchises
- Large Energy Users
- Small Business Program
- Retrocommissioning Program (Core Participants, Core Trade Allies, and Express Building Tune-Up)
- Design Assistance Program
- The Renewable Energy Competitive Incentive

### *Market Awareness and Understanding Survey*



Each survey in this appendix includes:

- Table outlining the researchable questions the survey investigates
- Participant quota
- Sample of the script surveyors used to interview participants

Special text indicates the following throughout all of the survey scripts:

- **Green text: Interviewer instructions**
- **Red text: CATI programming instructions**
- **Asterisk (\*):** Survey questions labeled with an asterisk are core questions that will be asked across all Focus on Energy phone surveys, where appropriate.