



RESIDENTIAL LIGHTING PROGRAM PROCESS EVALUATION REPORT

April 7, 2017

Report prepared for:
CENTRAL HUDSON GAS & ELECTRIC CORPORATION

Energy Solutions. Delivered.

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EXECUTIVE SUMMARY

Applied Energy Group, Inc. (AEG) was retained by Central Hudson Gas & Electric Corporation (Central Hudson) to conduct a process evaluation of its Residential Lighting Program. The Residential Lighting Program provides incentives for the purchase of higher efficiency lightbulbs using an 'upstream' strategy that reduces the cost of qualifying light emitting diode (LED) lamps to consumers who purchase them at participating retailers. ICF International (ICF) is the implementer of this program.

AEG designed the 2016-2017 process evaluation for this program to examine both internal program processes and customer response to the program. The evaluation identifies the methods used to gather data and measure program results, and makes recommendations for program improvements.

Summary of Key Findings

The primary goal for Central Hudson's Residential Lighting Program in 2016 was to be responsible for 6,800 MWh in net energy savings. The program launched in May 2016. Despite slow sales in the summer months, Central Hudson provided incentives for the purchase of 165,574 LED lamps (or 65,691 packages of LED lamps),¹ which provided a calculated net savings of 5,860 MWh or 86% of the energy savings goals. Central Hudson spent only 46% of the total budget amount allocated for the program.

To arrive at its final recommendations, AEG reviewed program materials and the program tracking system. In addition, the AEG team conducted interviews with utility staff, representatives of the implementation contractor, and store managers, and conducted store intercept surveys with consumers. The process evaluation revealed the following program strengths and challenges.

Program Strengths

- Sales for the program are strong. In 2016, the program sold 165,574 LED lamps.
- Program processes appear to be running smoothly:
 - The relationship between Central Hudson and the program implementer, ICF, is very good. Central Hudson has found ICF to be very responsive and supportive of the program.
 - Twenty-one stores and five different retailers are involved in the program.
 - No problems were identified with program data or invoicing.
 - Effective QA/QC procedures are in place.
- There appears to be very little program leakage (with very few discounted lamps appearing to be installed in homes outside of the Central Hudson service territory).

Program Challenges

- While corporate commitment to the program is strong, interviews suggest that individual stores are not always highly invested in the program because the decision to participate is often made at the corporate level.
- The program appears to be primarily attracting customers who purchased LED lamps in the past, and those who say they would have purchased the same lamps without the discount.
- Forty-five percent of customers who purchased LEDs say they will be using the discounted lamps to

¹ LED lamp packages incentivized range from one to six bulb packages.

replace high efficiency lamps (e.g., LEDs and CFLs).

- Customers purchasing the discounted lamps do not appear to be aware of the program, or of Central Hudson's affiliation with the discounts, even though Central Hudson's sponsorship is communicated with in-store signage.

Recommendations

The evaluation team recommends the following actions which would likely serve to improve program operation and outcomes:

Obtain stronger local store commitment by conducting annual or bi-annual training events with local store personnel to discuss the program and educate sales associates about the benefits of LEDs. Sales staff that are invested in the program are likely to encourage more customers to buy LEDs, especially those customers who might not normally do so. Additionally, more invested sales staff could be more articulate and helpful in emphasizing Central Hudson's role in the program.

Improve point of sale (POS) displays. Since Central Hudson's sponsorship is going largely unnoticed, we recommend the following: make the Central Hudson logo larger, add brochures and pamphlets, and separate the discounted lamps from other LEDs when possible. More effective in-store sales materials will likely lead more customers who do not have prior experience with LED lamps to purchase the discounted lamps.

Hold customer education events at stores. Program staff identified an interest in, and need for, more customer education, specifically leveraging in-store promotional events. Such events are likely to increase awareness of LEDs among those customers with little or no prior experience with LEDs, and should reinforce the Central Hudson brand. It will be important for ICF to work with retailers to hold these events on known high-volume days, such as spring home makeover sales.

Hold turn-in events. Turn-in events (in which customers get an additional discount for turning in incandescent lamps) may be particularly useful because they are novel and might generate additional publicity for the program. Recall that forty-five percent of customers who purchased the discounted lamps said they would be using those lamps to replace other, already installed high efficiency lamps (e.g., LEDs and CFLs). A turn-in event could increase the number of incandescent lamps replaced by discounted LEDs, thereby reducing the total number of incandescent lamps in the service territory. Additionally, these types of events may provide additional encouragement to try LEDs for those people who have not installed any LEDs so far.

Abbreviations

AEG	Applied Energy Group, Inc.
CFL	Compact Fluorescent Light Bulb
EM&V	Evaluation, Measurement and Verification
LED	Light Emitting Diode
MOU	Memorandum of Understanding
NYSPSC	New York State Public Service Commission
POS	Point of Sale
QA/QC	Quality Assurance/Quality Control

Definitions

Memorandum of Understanding (MOU): A document that details the criteria that retailers and manufacturers must meet in order to participate in the program. Retailers entered into an MOU with Central Hudson for the Residential Efficient Products Program.

Free Riders: Customers who participate in energy efficiency programs who would have engaged in the efficient behavior in the absence of the program. Free riders, if not accounted for, tend to lead to an overestimation of the energy savings attributed to the program, and can also increase program costs.

Program Leakage: Savings that travel outside of the service territory, (e.g., someone buys a discounted LED at a retail store within the service territory, but installs that bulb in a home outside the service territory).

Spillover: Customers who engage in energy efficient behavior due to some influence of the program, but do not participate in the program directly.

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INTRODUCTION

Applied Energy Group, Inc. (AEG) was retained by Central Hudson Gas & Electric Corporation (Central Hudson) to conduct a process evaluation of its Residential Lighting Program. Central Hudson is a regulated transmission and distribution utility serving approximately 300,000 electric customers and 75,000 natural gas customers in New York State's Mid-Hudson River Valley, which extends from the suburbs of metropolitan New York City to the Capital District of Albany.

AEG designed the 2016-2017 process evaluation to examine internal program processes as well as customer response to the program. The evaluation identifies the methods used for gathering data and measuring program results and makes recommendations for program improvements. Evaluation, measurement and verification (EM&V) demonstrates the value of energy efficiency programs by providing accurate, transparent and consistent assessments of program performance and cost-effectiveness.

Process evaluations are intended to determine if key elements, such as incentive levels, program delivery methods, program tracking mechanisms and quality assurance/quality control (QA/QC) procedures are all performing as designed and intended. These evaluations also attempt to identify issues or opportunities to improve these or other important program elements. A comprehensive process evaluation has, as its core goals, to:

- Assist program implementers and managers in restructuring existing programs and/or designing new programs that will achieve cost-effective savings while maintaining high levels of customer satisfaction.
- Determine awareness levels as a baseline for refining marketing strategies and reducing barriers to participation.
- Provide recommendations for changing the program's structure, management, administration, design, delivery, operations or targets.
- Determine if specific, newly identified best practices should be incorporated.
- Integrate information from multiple sources in order to meet these goals

Report Structure

Following this introduction are the following chapters:

Chapter 1 – Program Characteristics: A description of the program and the program logic model.

Chapter 2 – Methods: Description of the evaluation approach and data collection process.

Chapter 3 – Evaluation Results: Findings from the process evaluation.

Chapter 4 – Conclusions and Recommendations: Conclusions reached based on the evaluation results, and recommendations to improve the program.

1

PROGRAM CHARACTERISTICS

Program Description

The Residential Lighting Program is a new offering for Central Hudson within the 2016 – 2018 program cycle, launched in April 2016. The Residential Lighting Program incentivizes the purchase of efficient lighting utilizing an ‘upstream’ strategy. The upstream strategy means that customers receive an instant discount at the point-of-purchase on qualifying LED lamps at participating retailers because Central Hudson works behind the scenes to provide retailers with money to discount the cost of the lamps. The program goal is to increase the penetration of efficient lighting in customer homes by incentivizing the purchase of efficient qualified LED lighting. The program targets all residential customers and works to make the discounted lamps available through local retailers. The program intends to:

- Help residential customers reduce their electricity bills
- Educate customers about the benefits of installing LED lamps
- Demonstrate persistent energy savings and provide other benefits (such as improved health, safety, and comfort) to customers
- Promote the installation of efficient lighting through the CHG&E service territory
- Encourage energy saving behavior and awareness of energy efficiency in general

Measure Listing and Rebate

The ultimate discounts provided to customers vary depending upon the type of lamp, the manufacturer, the associated retail cost, and the size of the lamp package the customer acquired (qualifying lamps could be purchased in packages of 1 to 6 lamps). Customers could acquire up to 10 discounted packages in a single purchase event.

Table 1-1 Average Incentive per Lamp

Average Incentive per Lamp	
LED Bulb	\$2.00
Specialty LED Bulb	\$3.00

Program Goals

Table 1-2 2016 Electric Savings Goals and Budget

Program	2016 Net MWh	2016 Budget
Residential Lighting	6,800	\$1,318,339

Implementation Contractor

Central Hudson has contracted with ICF International (ICF) to implement the Residential Lighting Program. The responsibilities of ICF include:

- Establish relationships with retailers throughout the Central Hudson service territory and facilitate the

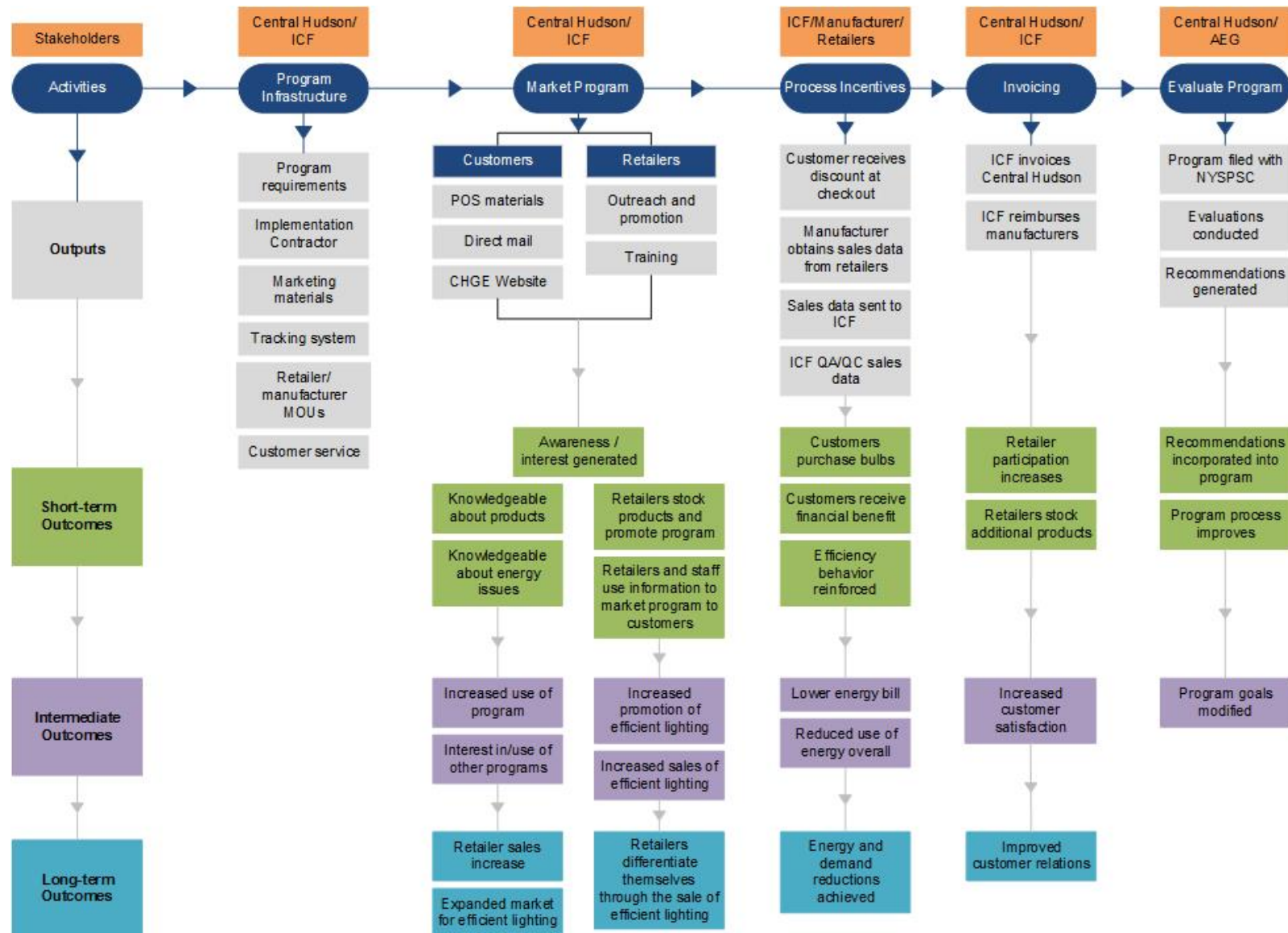
implementation of MOUs between participating retailers and participating manufacturers and Central Hudson.

- Track program performance by monitoring sales data, reviewing sales data for accuracy, and ensuring payments are made to retailers.
- Train merchandising representative.

Program Flow

The *New York State Process Evaluation Protocols* require that process evaluations assess program flow. A Program Logic Model is typically established as a basis for assessing program flow. A Program Logic Model is a graphic representation of a program and its processes, and has the goal of making the program's assumptions explicit by, for example, identifying the linkages that are assumed to exist among the problem or situation the program is designed to address, the intervention that is to be made (specifying both inputs and outputs), and the program's intended impact (including short, medium and long-term outcomes). Logic models also serve to identify processes and relationships critical to the program's performance.

Program Logic Model



Program Activities

The activities associated with the program, along with their corresponding outputs, help to establish linkages between the situation the program is designed to address and the program's intended outcomes. Key activities associated with the Residential Lighting Program include:

Provide Program Infrastructure

Activities conducted by Central Hudson in this area include developing overall program requirements, hiring an implementation contractor, and approving marketing materials. Central Hudson hired ICF as the implementation contractor and ICF is responsible for: preparing marketing materials (subject to Central Hudson's approval), maintaining the program tracking system, establishing relationships and memorandums of understanding (MOUs) with retailers and manufacturers, and providing customer service.

Market Program

ICF works with a merchandising representative who is responsible for in-store promotion. The merchandising representative does outreach and promotion with store personnel, makes sure the lamps are properly incentivized and conducts some customer education. The program is mainly marketed through point of sale materials, but is also marketed through direct mail and through the Central Hudson website.

Process Incentives

Incentives are processed in the form of discounts applied to the price of the LED bulb. Participating manufacturers receive sales data on the discounted lamps sold from the participating retailers. This information is provided to ICF for quality control and approval. Retailers invoice ICF based on actual sales of the discounted lamps.

Facilitate Invoicing

ICF processes the invoices in Virginia. A computer program is used to conduct quality and accuracy checks on the data and validates the data before sending the invoice to Central Hudson.

Evaluate Program

The program is filed with New York State Public Service Commission (NYSPSC) and Central Hudson has contracted with AEG to conduct evaluations of the program. The resulting evaluation report includes recommendations for improving the program.

Outcomes

Outcomes are the result of the way that program partners and target audiences respond to the outputs of the program. There are short-term, intermediate, and long-term outcomes of the program.

Short-term Outcomes

POS materials in the stores are designed to draw the customer's attention to LED lamps and the discounted price of specific lamps. Customers are expected to become more aware of the measure and more interested in the potential benefits. As a result, customers are expected to become more knowledgeable about the products and about energy efficiency issues in general. Ideally, customers are encouraged to purchase the lamps, at least in part, because of the discount. Customers receive the financial benefit of a less expensive, longer lasting bulb, and their energy efficiency behavior is reinforced.

The recommendations in the evaluation report should lead to improved program processes and increased participation and savings.

Intermediate Outcomes

Intermediate outcomes include the fact that program marketing and discounts are also intended to lead to increased overall customer interest in LED bulbs and to retailers responding to that broader interest by stocking more LEDs and promoting the program to more customers. As a result of this increased customer interest and sales related to LEDs, it is hoped that retailers will also stock more energy efficient products across the board.

The success of the residential lighting program may create interest in other energy efficiency programs; increased promotion and sales of non-discounted LED lamps; lower energy costs for customers, decreased energy use overall, and improved customer satisfaction.

Long-term Outcomes

The long-term outcomes may include increased retailer sales, an expanded market for the measure, retailers differentiating themselves in the market through efficient lighting sales, achieving demand and energy reductions, and improving customer relations.

External Factors

There are a variety of factors outside the control of Central Hudson and ICF that may influence the operation of the program and its impacts:

- Changes in political priorities (e.g. codes and standards, state and local regulations, federal policies, perceptions of energy and climate change)
- Rapid changes in the options available to customer in the high efficiency lighting market, along with declines in cost for many of those options
- Macro-economic conditions and associated impacts on customer actions
- Changes in energy prices
- Changes in utility rate structures
- Perceptions in the value of conservation
- Competing interests among customers

Documenting these factors can help to improve program planning by identifying important program partners, the portion(s) of the issue that the program can realistically influence, which evaluation measures will accurately reflect project outcomes, and other needs that must be met in order to address this issue.

Program's Place within the Energy Efficiency Portfolio

AEG examined the Residential Lighting Program within the context of Central Hudson's energy efficiency portfolio and found that it fits within New York's energy efficiency state policy goals. The program represents 15% of the portfolio savings and 7% of the portfolio's budget. It serves a niche not served by other residential lighting programs, such as the CenHub store, attracting customers who prefer to acquire at least some lighting products brick and mortar stores.

2

METHODS

AEG designed the process evaluation to examine internal program processes and customer response to the program. The focus of the process evaluation activities was to gain a better understanding of program operations, assess the overall effectiveness of program operations, and identify areas for program improvement. The process evaluation was designed to comply with the New York Evaluation Plan Guidance for EEPs Program Administrators and the New York State Process Evaluation Protocols. The evaluation was guided by the following key researchable questions:

- Do the retailers have sufficient resources to effectively implement the program?
- Is the tracking system effective for documenting and reporting program progress?
- Is the program achieving participation and energy savings goals?
- What marketing/promotional efforts resonate with customers?
- Are customers satisfied with the program?
- What are the areas for improvement?
- What are the barriers to program participation and where these exist? How can they barriers be minimized or overcome?
- Would customers recommend the program?
- Has program participation generated interest in other Central Hudson programs, and / or in other energy efficiency actions?

To arrive at the final recommendations in this report, AEG reviewed program materials and the program tracking system. The AEG team also conducted staff interviews, implementation contractor interviews, in-store intercept surveys with customers, and store manager interviews.

Program Materials

AEG reviewed current program documents and processes including, but not limited to, the 2016-2018 Energy Efficiency Transition Implementation Plan, third-party implementer processes, and program tracking data. The review served as the basis for understanding whether the program has been implemented as planned, and if it is on track to meet its energy savings goals.

Program Tracking System

AEG reviewed ICF's program tracking and reporting system. AEG also reviewed the elements of the Central Hudson tracking database and the reports submitted to the New York DPS.

Staff Interviews

AEG conducted a comprehensive, group interview with Central Hudson program staff in October 2016 to gather staff impressions of program implementation activities, program performance, program delivery issues, marketing and customer awareness, and opportunities for program improvements.

In October 2016, AEG also interviewed representatives of ICF who were involved in the Central Hudson program. The interview provided information on program implementation activities, tracking methods,

and program performance. AEG also conducted an interview with the merchandising representative contracted by ICF. Interview guides used to orient each of these sessions can be found in Appendix A.

Store Manager Interviews

AEG conducted interviews with store managers to learn more about their role in the program. AEG successfully interviewed five store managers at Walmart, Lowes, and Home Depot retailer locations.

Store Intercept Surveys

AEG administered in-person surveys to a sample of customers who purchased qualifying LED lamps in a participating store. Three members of AEG staff visited eight participating stores, all of which are within the Central Hudson service territory, from November 19 – 21st, 2016. Customers were approached by AEG staff in the lighting aisle of the store after they had placed Central Hudson discounted LEDs in their shopping cart. The table below shows the distribution of completed surveys by store location.

Table 2-1 Completed Surveys by Store Location

Completed Surveys	
Walmart Fishkill	0
Walmart Newburgh	1
Home Depot Kingston	3
Home Depot Poughkeepsie	8
Lowes Highland	3
Home Depot Leeds	2
Home Depot Newburgh	1
Lowes Poughkeepsie	4
TOTAL	22

Note that while AEG staff also visited Walmart Fishkill, the team was not able to complete any surveys at that store. Although a participating Target store was included in the original sample of stores, store management would not allow AEG staff to survey their customers. As a result, the Target store was replaced with a Home Depot store. The figure below shows a map of the stores where intercept surveys were conducted. A copy of the survey instrument used for these interviews can be found in Appendix B.

3

EVALUATION RESULTS

This section provides key process evaluation findings, including those related to program performance, program processes, program marketing, program effectiveness and customer satisfaction.

Program Performance

ICF acknowledged that there were “growing pains” associated with standing up a new program, and that as a result, summer sales were somewhat slower than they had anticipated. But even with that slow start, the program came very close to meeting its savings goal. The program achieved 86% of the targeted savings while only spending 46% of the program budget.

Table 3-1 2016 Goals vs. Actual – Savings and Budget

Metric	Target	Actual	% Achieved
Net MWh Savings	6,800	5,860	86%
Program Expenditures	\$1,318,339	\$606,524	46%

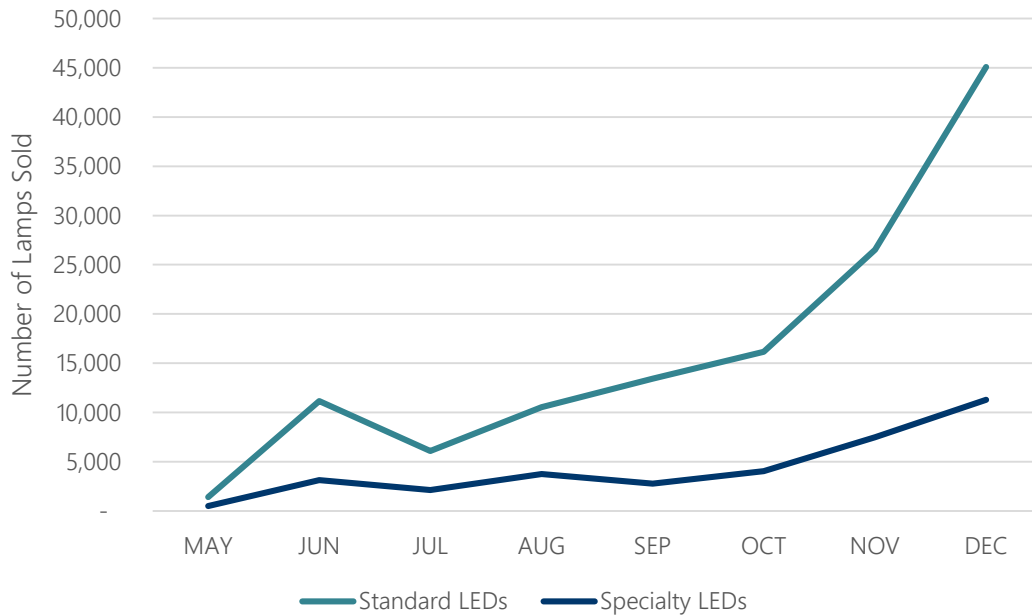
The program performed well in terms of lamps sold. An analysis of the program tracking data revealed that in 2016, 165,574 discounted LEDs were sold through the program. The LED lamps were most commonly sold in packages containing multiple lamps; a package could include from 1 to 6 standard LED lamps or 1 to 3 specialty lamps.

Table 3-2 Total Lamps and Packages Sold

Type of Bulb	Total Lamps Sold	Packages Sold
LED Standard	130,414	42,942
LED Specialty	35,160	22,749
Total	165,574	65,691

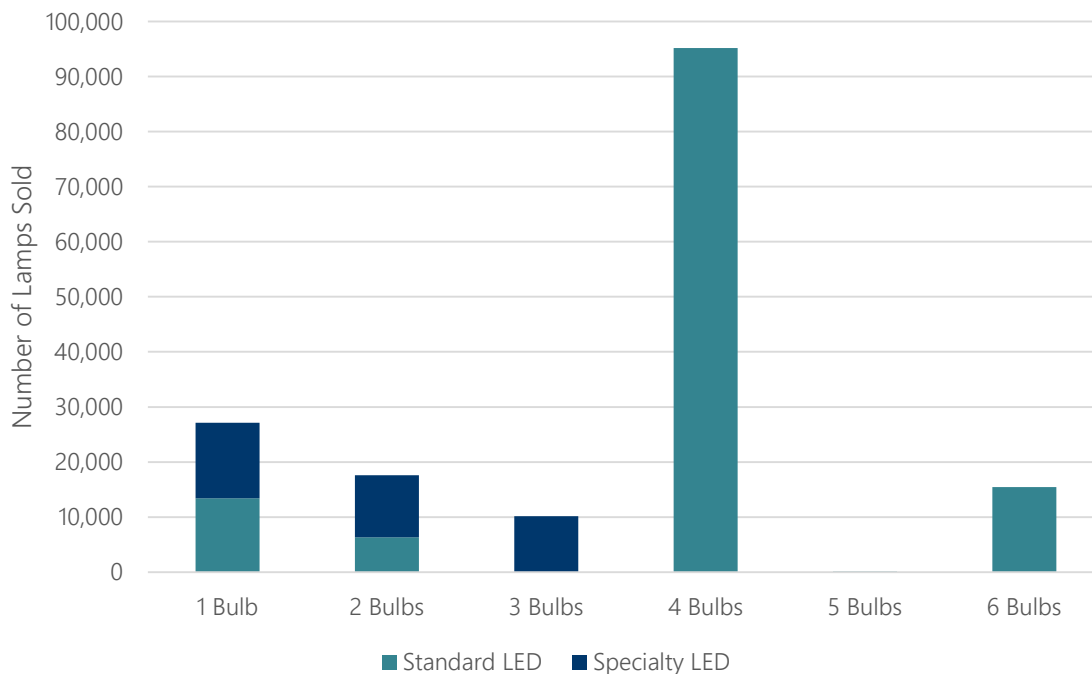
Summer LED lamp sales were slow but sales began to increase in the fall months, spiking in December 2016.

Figure 3-1 Number of Bulbs Sold per Month



Standard LEDs were most commonly sold in packages of four lamps. Specialty LEDs were almost equally sold as 1-package (39%), 2-package (32%) and 3-package (29%) lamps.

Figure 3-2 Packages Sold by Number of Bulbs per Package



The average incentive per lamp was \$1.83 for standard LEDs and \$2.99 for specialty LEDs.

Table 3-3 2016 Incentives

Type of Bulb	Average Incentive per Lamp
LED Standard	\$1.83
LED Specialty	\$2.99

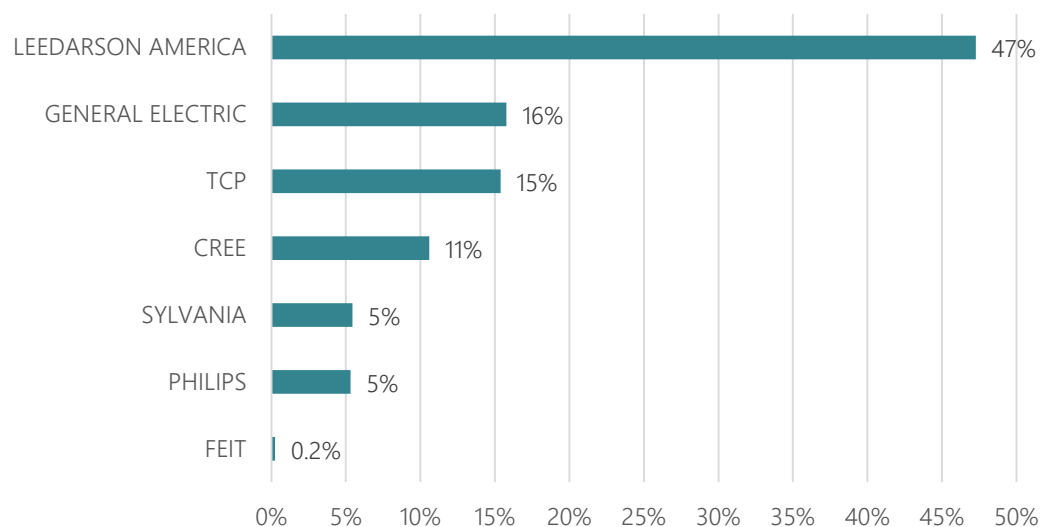
Five different retailers (and a total of 21 individual stores) participated in the program. Home Depot sold the most lamps across six individual stores. Target sold the fewest lamps across three participating stores.

Table 3-4 Sales by Retailer

Retailer	Number of Participating Stores	Lamps Sold	Packages Sold
Home Depot	6	104,593	40,187
Sam's Club	2	21,007	4,831
Walmart	5	28,725	10,479
Lowes	5	9,402	9,205
Target	3	1,847	989
Total	21	165,574	65,691

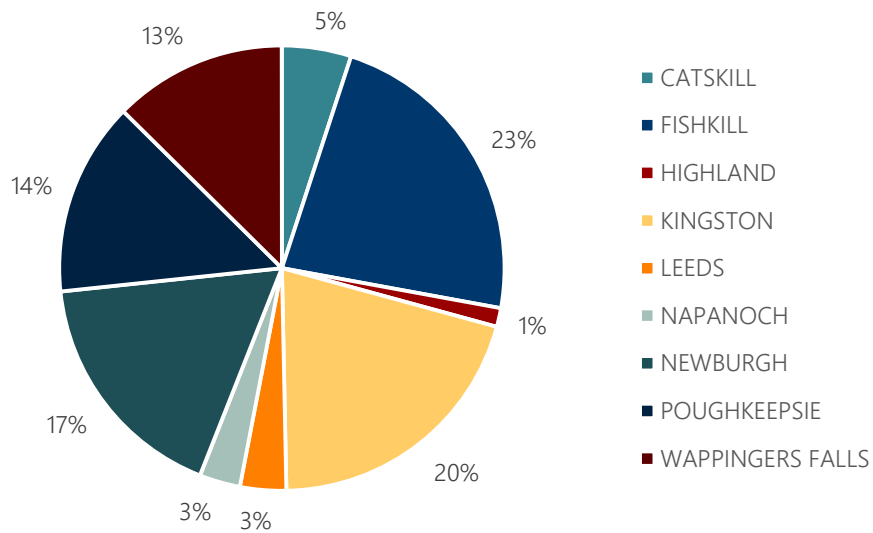
The program provides discounts on lamps from seven different manufacturers. Almost half of the lamps sold (47%) were made by Leedarson America. Sixteen percent of the lamps sold were manufactured by General Electric and 15% were manufactured by TCP.

Figure 3-3 Total Lamp Sales by Manufacturer



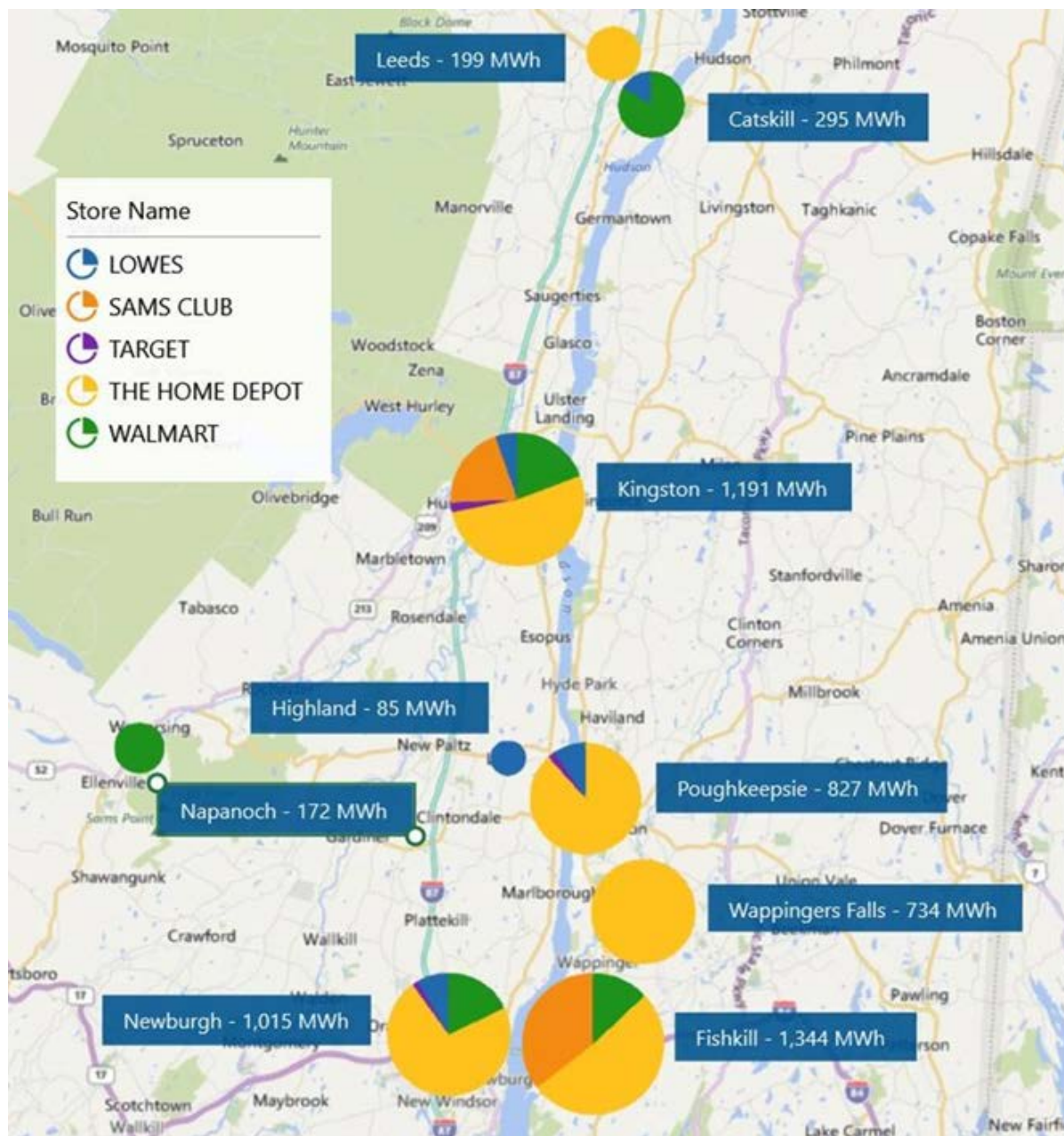
Stores were selected for the program based on their location well inside the Central Hudson service territory (to avoid leakage of discounted bulbs being installed outside the service territory). Approximately one quarter of the lamps were sold in Fishkill with an additional 20% sold in Kingston. Relatively few lamps were sold in Naponoch, Highland, or Leeds.

Figure 3-4 Location of Lamps Sold



The map below describes the energy savings achieved by location and store type. The locations and stores with the highest sales have the greatest energy savings. More than half of the net energy savings were achieved at Home Depot in Fishkill and Kingston.

Figure 3-5 Map of Net Energy Savings by Location and Store



Program Processes

Interviews with Central Hudson, ICF, the merchandizing representative, and store department managers assessed how well the program is performing in terms of staffing resources, communication, and quality assurance and quality control.

The relationship between Central Hudson and ICF is very good. Central Hudson has found ICF to be very responsive and supportive of the program. ICF has established relationships nationally with manufacturers and retailers and was able to leverage those relationships to get participation and agreements in place in the Central Hudson service territory.

ICF subcontracts with a merchandising representative who is in charge of visiting the stores on a regular basis to check the products and signage and to provide information and support to sales associates at the stores. The store department managers interviewed were generally satisfied with the merchandising representative. She visits stores on a regular (weekly) basis to verify prices on rebated lamps, set up signage, and resolve issues as they arise.

Central Hudson would prefer to see more interaction between ICF and their store personnel, rather than relying solely on the merchandising representative. ICF acknowledges that it is somewhat difficult to get all the various sales associates trained.

"It's a numbers game. There are too many different sales associates who could be selling lamps to customers. Our next step is to target store managers to better disseminate the information." – ICF

Sales managers also feel that all sales associates are not fully aware of the program.

"As of right now, I am the only one knowledgeable about the program. Trying to get a hold of the associates and explain the benefits of the program has been hard. I'm trying to get the whole store involved" –Store Manager

Despite this challenge, ICF is very confident in the abilities of the merchandising representative and feels she is doing a great job building relationships in the stores. A channel of communications is not currently in place at the store manager/district manager level and ICF hopes to see improvement in that area as the program matures. One reason for this gap is that the decision to participate in the program is made at the corporate level rather than the store level.

Another challenge facing the program is that store product / pricing resets happen frequently and quickly (manufacturer pricing changes lead to retailer price changes which mean that new product stickers must be created). As a result, the merchandising representative spends most of her time on QA/QC -- making sure the packages are properly labeled, rather than interacting with store personnel and customers.

Program Tracking Database

ICF tracks data for the program in Vision DSM. Central Hudson submits a monthly, quarterly and annual scorecard report to the New York DPS with progress to-date, including program participation, energy savings and budget.

AEG developed a program tracking data checklist based on the Uniform Methods Project Residential Lighting Protocols. ICF collects all of the data recommended on this checklist except for the date of the retail sale. The invoice date is provided, however, which can serve as a proxy for any analysis requiring the time period sold.

Table 3-5 Program Tracking Checklist for Upstream Residential Lighting Programs

Data Required	Tracked in Database
Bulb Type	✓
Wattage	✓
Style and Features of Bulb	✓
Manufacturer or Product Identifier	✓
Rated Lumens	✓
Date of Retail Sale	O
Number of Products Incented	✓
Date Incentive Paid	✓
Dollar Value of Incentive	✓
Retail Price	✓
Retailer Name	✓
Retailer Location	✓
Retailer Contact	✓
Baseline Wattage	✓
Estimated kWh Savings	✓

Quality Control/Quality Assurance Procedures

There are several points in the program processes where quality assurance and control procedures are utilized:

- MOUs are in place stating that the manufactures must ensure that all lighting products sold to the retailers for the program will comply with the current ENERGY STAR certifications and are listed on the ENERGY STAR web-site.
- MOUs are in place stating that the manufacturers must ensure all such lighting product packages are labeled with the ENERGY STAR label and an approved Central Hudson logo.
- The merchandizing representative conducts site visits to the stores on a weekly or bi-weekly basis. She checks all products involved in the promotion to ensure that they are priced appropriately and have a program sticker.
- ICF has an app that is used to identify issues in the stores and identify areas for improvement.
- Retailers invoice ICF on a regular basis and ICF processes the invoices in Virginia. A computer program is used to conduct quality and accuracy checks on the data and validates the data before sending the invoice to Central Hudson.

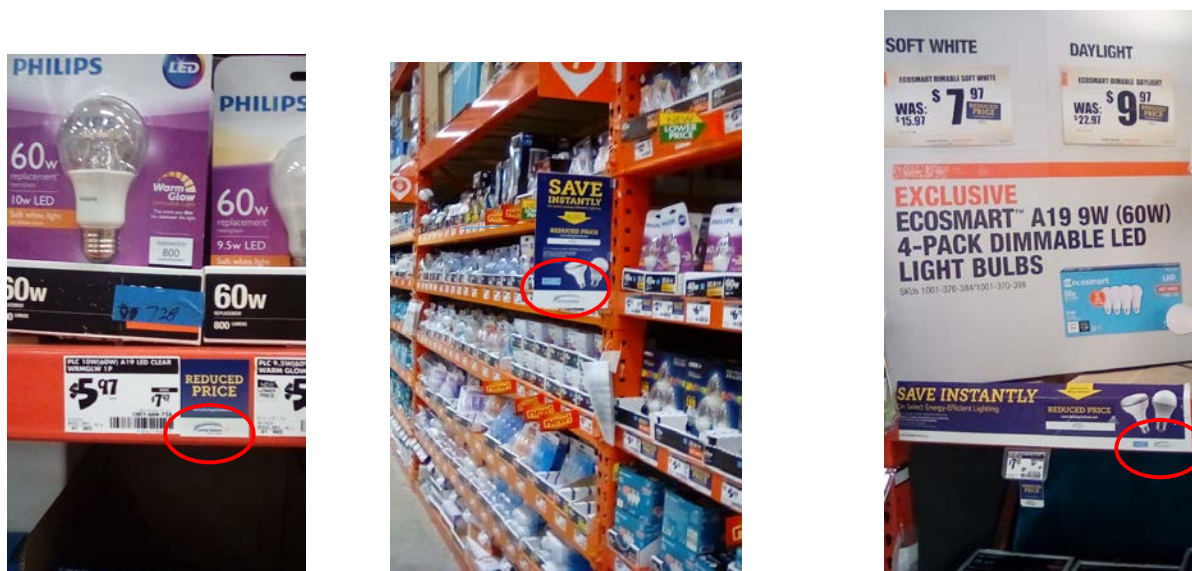
Program Marketing

During the store intercept surveys, customers who purchased discounted lamps were asked about their awareness of the Central Hudson program and their reason for purchasing the lamps. Marketing was also addressed in the program staff, implementer and store manager interviews.

Awareness of the Central Hudson Program

None of the 22 customers interviewed were aware that the LED lamps they purchased were discounted by Central Hudson. AEG team members observed and took pictures of the signage at the stores. Figure 3-4 shows some examples of the in-store displays and signage. On the displays and signs, the Central Hudson logo is small compared to other text on the label and was not readily apparent. The two Target stores visited by AEG staff had very sparse displays and one type of bulb that was part of the MOU was not discounted and did not have any relevant signage.

Figure 3-6 Examples of Store Signage



In the stores visited by AEG, the LEDs that were discounted by Central Hudson were included in large light bulb displays, in which LEDs made up the majority of the lighting stock. Discounted LEDs were often shelved right next to non-discounted LEDs making it difficult to discern which lamps are incentivized at a glance. Several people who purchased LEDs chose lamps that were not discounted by Central Hudson. In some cases, this may have been due to brand preference and / or price. For example, a discounted Cree bulb was more expensive than an adjacent Phillips bulb, although the Phillips name may be a more familiar brand to the customer.

The merchandizing representative stated that she spends considerable time checking that the discounted lamps have the Central Hudson sticker prominently displayed. If customers are looking at lamps while she is visiting the store, she takes the time to educate them on the different lighting types. She feels that additional double sided signs and program brochures should be available. She makes recommendations about signage and displays for each store but it is up to the individual stores to determine which promotional materials are on display.

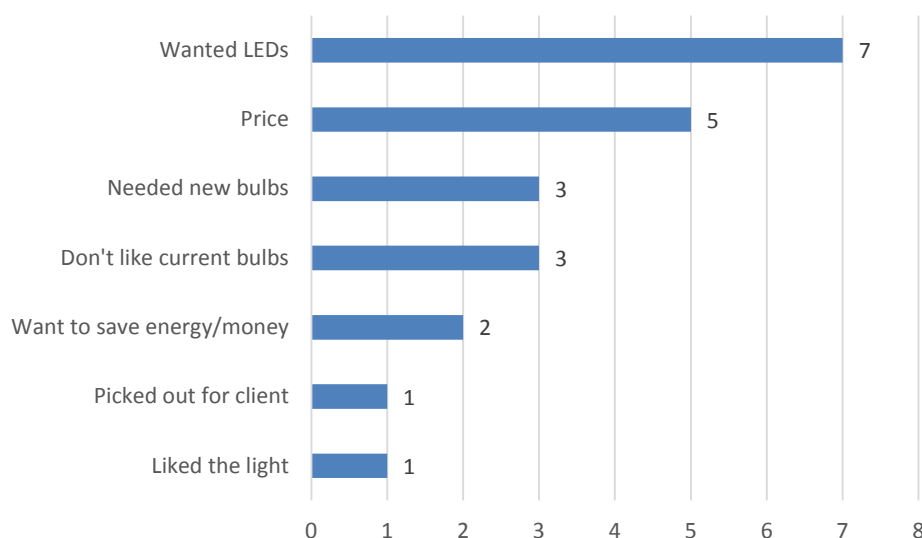
Store managers agree that the signage is important for promoting the program to customers. Several managers reported that changes to the type and quantity of signage could improve program awareness. Store managers say they would also like to see more program materials in the stores, such as pamphlets

and brochures, and more mass media so customers would know about the promotion before they come to the store.

Reasons for Purchasing Discounted LEDs

Customers said they purchased the Central Hudson discounted LEDs for a variety of reasons, with the largest numbers saying that they wanted to buy LED lamps and that they liked the price.

Figure 3-7 Reasons Customers Purchased Discounted LEDs



Customer Education

Central Hudson, ICF, the merchandising representative, and the store managers all showed interest in having more formal customer educational events. These might include having a manned display that showed the different lighting types, colors, and costs. At the time of the staff interviews, customer promotional events were in the planning stages.

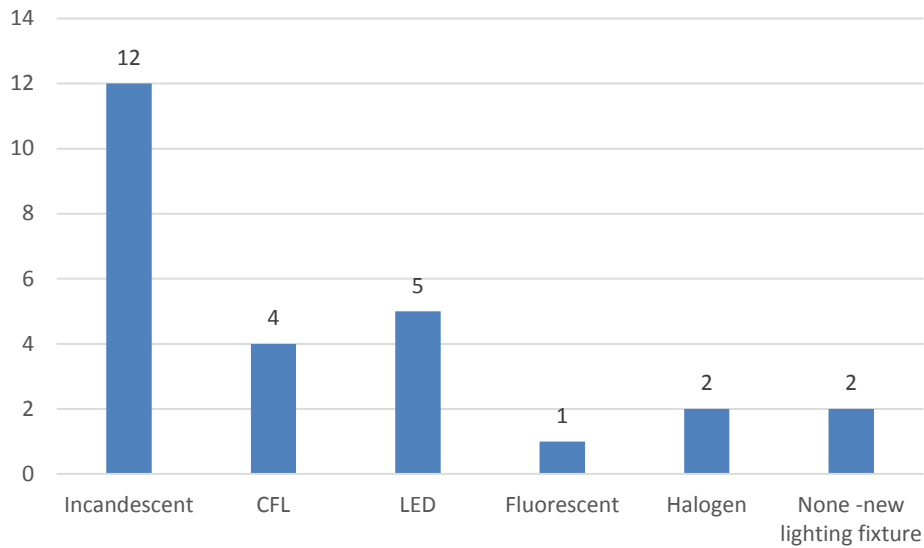
"Having the representative come in on the weekend for a few hours to explain the program and speak with customers would definitely be beneficial because that is when we are the busiest."—Store Manager

Program Effectiveness

Installation Rates

Most customers interviewed plan to install at least one of the LEDs purchased immediately. Only three of the 22 customers interviewed said they were not installing any of the LEDs purchased immediately, while seven said every LED purchased would be installed immediately. Twelve of the 22 customers said the LEDs would be replacing incandescent lamps; while four said they would be replacing CFLs, and five said they would replace LEDs.

Figure 3-8 Type of Lamps LEDs Will Be Replacing



Most customers said they would store the LEDs not immediately installed for later use, although one customer did say that he wanted to try one of the LEDs to see if he liked it, before installing the other LED lamps he purchased.

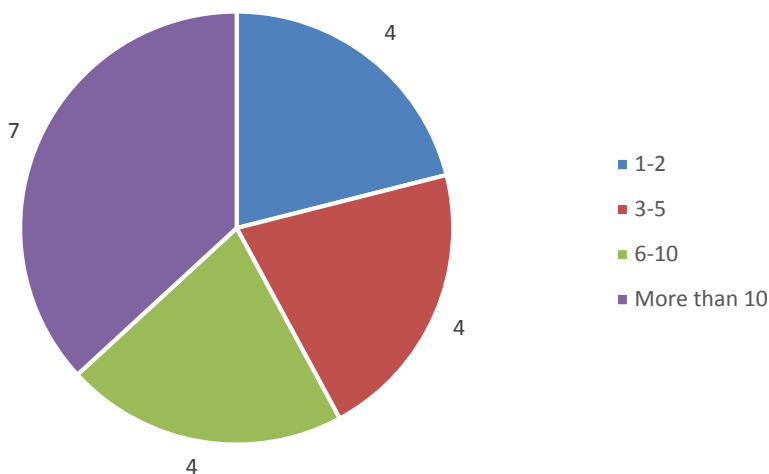
Leakage

Nineteen of the 22 customers interviewed in-store said their electric utility was Central Hudson. The other three customers named Orange and Rockland, Westchester or Solar City as their electric utility. All of the customers planned to install the LEDs in a residential home, although two customers were contractors purchasing the lamps for newly constructed homes.

Prior Experience with LEDs

Nineteen of the 22 customers had prior experience with LEDs, with most having six or more LEDs currently installed in their homes.

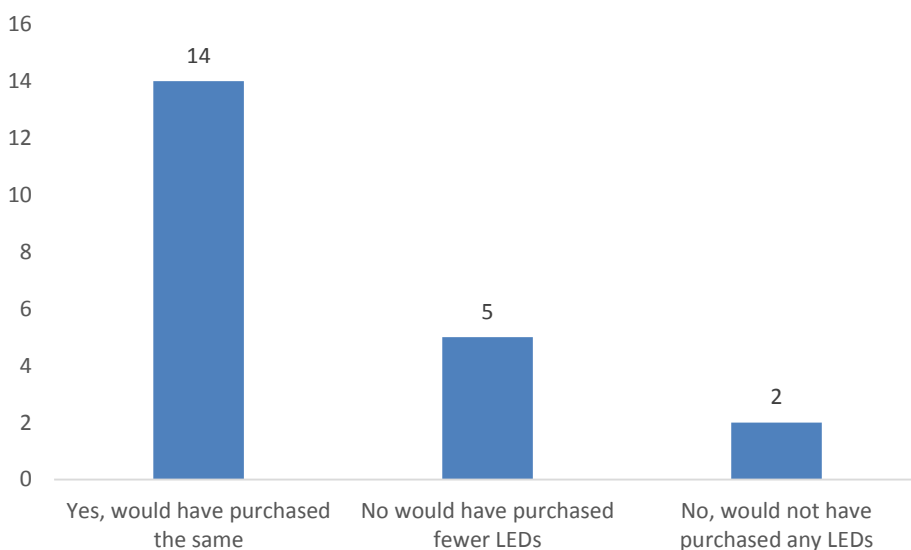
Figure 3-9 Number of LEDs Currently Installed in Home



Free Ridership and Spillover

Fourteen of the 22 customers said they would have purchased the same number of LEDs if the Central Hudson discount had not been offered. Five said they would have purchased fewer LEDs and two customers said they would not have purchased any LEDs.

Figure 3-10 Purchases if Central Hudson Discount Had Not Been Offered



Eighteen of the customers interviewed in-store said they plan to purchase LEDs again in the future, while others were not sure if they would purchase LEDs again. Sixteen said they would purchase LEDs again even if the discount was not offered, while one said they would be too expensive and two customers did not know if they would purchase LEDs in the future without the discount.

Customer Satisfaction

Since none of the customers surveyed were aware they were purchasing lamps discounted by Central Hudson, program satisfaction could not be addressed. ICF, the merchandising rep, and store managers, said they have not received any complaints from customers about the program, lamps or discounts. They identified the main barriers to LED purchases as cost, lack of familiarity with LEDs and concern about specific aspects of LEDs such as the color and shape. Customers are reported to be skeptical of the longevity associated with LEDs, finding it hard to believe the lamps will last 20 years.

4

CONCLUSIONS AND RECOMMENDATIONS

Main Findings

Central Hudson's Residential Lighting Program achieved 86% of its energy savings goals for 2016, with a calculated net savings of 5,860 MWh, while spending only 46% of the program budget.

Table 4-1 2016 Program Performance versus Goal

Metric	Target	2016 Actual	% Achieved
Net MWh Savings	6,800	5,860	86%
Program Expenditures	\$1,318,339	\$606,524	46%

The process evaluation revealed the following program strengths and challenges:

Program Strengths

- Sales for the program are strong. In 2016, the program sold 165,574 LED lamps.
- Program processes appear to be running smoothly:
 - The relationship between Central Hudson and ICF is very good; Central Hudson has found ICF to be very responsive and supportive of the program.
 - Twenty-one stores across five different retailers are involved in the program.
 - No problems were identified with program data or invoicing.
 - Effective QA/QC procedures are in place at multiple points in program processes.
- There appears to be relatively little program leakage.

Program Challenges

- While corporate commitment to the program is strong, interviews suggest that individual stores are not always highly invested in the program because the decision to participate is often made at the corporate level.
- The program appears to be primarily attracting customers who purchased LED lamps in the past, and those who say they would have purchased the same lamps without the discount.
- Forty-five percent of customers who purchased LEDs say they will be using the discounted lamps to replace high efficiency lamps (e.g., LEDs and CFLs) that are already in place.
- Customers purchasing the discounted lamps do not appear to be aware of the program, or of Central Hudson's affiliation with the discounts, even though Central Hudson's sponsorship is communicated with in-store signage.

Recommendations

The evaluation team recommends the following actions to improve the program:

Recommendation 1: Obtain stronger local store commitment by conducting annual or bi-annual training events with local store personnel to discuss the program and educate sales associates about LED lamps. Sales staff that are invested in the program are likely to influence more customers to buy LEDs, especially

those customers who might not normally do so. Additionally, more invested sales staff could be more articulate and helpful in emphasizing Central Hudson's role in the program.

- Decisions to participate in the program are often made at the corporate level and local personnel are less invested in the program.
- Few customers buying LEDs are aware of the program or that Central Hudson is providing discount.
- Most customers buying the discounted lamps have prior experience with LEDs.

Rationale: In-person meetings will increase local sales staff buy-in to the program, improve attribution for the Central Hudson program, and increase sales among customers less familiar with LEDs.

Recommendation 2: Improve point of sale (POS) displays. Since Central Hudson's sponsorship is going largely unnoticed, we recommend the following: make the Central Hudson logo larger, add brochures and pamphlets, and separate the discounted lamps from other LEDs when possible. More effective in-store sales materials will likely lead more customers without prior experience with LED lamps to purchase the discounted lamps.

- Few customers buying LEDs are aware of the program or that Central Hudson is providing a discount.
- Most customers buying the discounted lamps have prior experience with LEDs.

Rationale: Improved signage will increase attribution for the Central Hudson program, and increase sales among customers less familiar with LEDs.

Recommendation 3: Hold customer education events at stores. Program staff identified an interest in, and need for, more customer education and promotional events. Such events will increase the awareness of LEDs among those with no prior experience with LEDs, and should reinforce the Central Hudson brand. It will be important for ICF to work with the retailer to hold these events on known high-volume days, such as spring home makeover sales.

- Few customers buying LEDs are aware of the program or that Central Hudson is providing a discount.
- Most customers buying the discounted lamps have prior experience with LEDs.

Rationale: Customer education will increase attribution for the Central Hudson program, and should increase sales among customers less familiar with LEDs.

Recommendation 4: Hold turn-in events, in which customers receive an additional discount for turning in incandescent lamps.

- Forty-five percent of customers who purchased the discounted lamps said they would be replacing high efficiency lamps (e.g., LEDs and CFLs) that were already in-place.
- Most customers buying the discounted lamps have prior experience with LEDs.

Rationale: Turn-in events may be particularly useful because they are novel and might generate additional publicity for the program. A turn-in event could increase the number of incandescent lamps replaced by discounted LEDs, thereby reducing the total number of incandescent lamps in the service territory. Additionally, these types of events may provide additional encouragement to try LEDs for those people who have not installed any LEDs so far.

A

INTERVIEW GUIDES

Program Manager/Implementation Contractor Interview Guide

Background

1. Please provide a brief description of the Residential Lighting program.
2. Please describe your job responsibilities related to the program.
3. On average, what percent of your time is spent on the Residential Lighting program?
4. What other Central Hudson staff work on the program? What is their role regarding the program? Who, if anyone, provides you with support? What support do they provide?

Program Goals

5. What metrics are used to track the success of the program? (Probe for electric savings, participation rates, number of units, etc.)?
6. How are goals for this program established?
7. Is the program on track to meet its goals for 2016? (Probe for YTD numbers on specific metrics such as participation, savings, etc.)

Program Marketing

8. What is the target market for the program?
9. How does the program engage retailers? What do retailers have to do to participate in the program? Do they need to meet specific requirements to be a participating retailer? How many retailers are currently participating in the program?
10. Do you offer any information or training events to retailers?
11. Is the program marketed to customers mainly through Point of Sale materials? If yes, what else has been done to market the program? Does the marketing include any education on the benefits of LEDs?
12. Have you tried different types of POS materials or marketing strategies? Are some marketing strategies or messages more beneficial than others? How is success of the marketing strategies or messages measured?
13. What are the main barriers to participation? How does the program address these barriers?

Program Operations

14. What are the participation steps from the customers' perspective?
15. Are there any specific aspects of the program that are working very well? Any not working well? (*Probe for details*) What could be done to improve the program?
16. Is any follow up done with participating customers to verify that the lighting has been installed in Central Hudson's service territory? Do you plan to follow up with participants in the future to determine persistence of energy savings (e.g., find out if any bulbs have been removed and why)?

17. What quality control/quality assurance procedures are in place? Are these documented?
18. Do the incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?
19. Have there been any modifications made to the original program design?
20. Are customers satisfied with the program overall? With the lighting? Are they satisfied with the incentive amount? With the savings achieved? How is satisfaction with the program measured? (i.e., is this based on survey information or is it anecdotal?)
21. What is your opinion of free ridership for this program? Do you think customers would pay for the lighting on their own, outside of the program, without the incentive? Why do you say that?
22. Do you think the program is changing customers' energy efficiency attitudes and actions? (*Probe for specifics*)

Program Data and Documentation

23. Does the tracking database collect all the information you need? Is there information/data that you wish were available but are not? Is there information in the database that you don't use?
24. What type of documentation is required to support the purchase and installation of the lighting?

Program Impacts

25. How do you estimate savings for the program? Do you have deemed savings for each type of light bulb? How were the deemed savings determined?
26. What type of information or data is collected to determine the savings for each participant?

Evaluation

27. What do you hope to learn from this evaluation? Are there specific issues you would like the evaluation to address?
28. Is there anything else we should have discussed on program operations or opportunities that we missed?

Store Manager Interview Guide

1. How did your store become involved in the Central Hudson program? What role, if any, did you have?
2. Do you feel like your staff is sufficiently knowledgeable about the program and the discounted light bulbs?
3. Did you or your staff receive any training from ICF or Central Hudson?
 - a. If yes, what type of training did you receive? Was it helpful? How could it be improved?
 - b. If no, do you think training would be beneficial? What type of information would you like to see included in the training?
4. Does the merchandising representative (Latoya) visit the store on a regular basis?
 - a. If yes, how often does she visit? Is she helpful?
 - b. Do you think it would be beneficial for her to visit more often?
5. Do you set up the signage for the discounted bulbs, or is that handled by ICF/the rep? Do you think the signage is adequate? What could be improved? Are you responsible for maintaining the signage? If not, who is?
6. Are there any specific challenges with the program? Anything that is working really well or could be improved?
7. Is there additional lighting you would like to see discounted as part of the program?
8. Has the program increased the amount of LEDs that you sell? Do you think more customers come to your store because of the discounts provided by Central Hudson?
9. Would you have stocked the same amount of LEDs without the Central Hudson discount? Has the discount provided by Central Hudson influenced what you will stock in the future?
10. Do you think customers would pay full price for the lightbulbs if the Central Hudson discounts were not available? Why do you say that?
11. Do you think once they try the LEDs customers will be more likely to purchase them in the future?
12. Do you think purchasing LEDs leads to increased customer interest in other energy savings products?
13. Are you responsible for providing any data to ICF or Central Hudson? What type of data do you provide? Are there any challenges to providing the data?
14. Is there anything else we should have discussed on program operations or opportunities that we missed?

B

IN-STORE INTERCEPT SURVEY

Central Hudson Residential Lighting POS Store Intercept Survey

Interviewer to Record

[Store Name]

[Store Location]

[Date & Time Slot]

Introduction

Hello, I noticed you purchased light bulbs today. I am working with Central Hudson to help them improve their energy-efficiency programs and I'd like to take a few minutes of your time to ask you some questions about your purchases. It should take less than 10 minutes.

For our records, may I please have your electric utility and your zip code?

[Record Electric Utility & Zip code]

Lighting Purchases

1. May I please take a look at the light bulbs that you purchased? (RECORD NUMBER AND TYPE OF BULBS PURCHASED)
 - Non EE (RECORD NUMBER)
 - Discounted LEDs (RECORD NUMBER)
 - LEDs or other EE bulbs not discounted by Central Hudson (RECORD NUMBER)
2. Are you aware that you received a discount from Central Hudson on the LEDs that you purchased?
 - Yes
 - No (SKIP TO QUESTION 6)
3. Before entering the store were you aware Central Hudson was offering a discount on LED bulbs?
 - Yes
 - No (SKIP TO QUESTION 6)
4. Did you come into the store today specifically to buy LEDs discounted by Central Hudson?
 - Yes (SKIP TO QUESTION 7)
 - No
5. What prompted you to purchase the discounted LEDs today?
 - Discount provided by Central Hudson
 - Price
 - Store marketing materials
 - Had bulbs burn out
 - Wanted to try LEDs
 - Other

Plans to Install LEDs

[IF CUSTOMER BOUGHT BULBS OTHER THAN DISCOUNTED LEDs] For the remaining questions let's focus on the LEDs you purchased that were discounted by Central Hudson.

6. Do you plan on installing the discounted LEDs that you purchased today in your home, a business or some combination?

Plan to install in home (SKIP TO QUESTION 10)

Plan to install in business

Plan to install in both home and business

7. Who is the electric utility for your business?

[RECORD UTILITY]

8. What is the zip code for your business?

[RECORD ZIP]

9. How many of the LEDs do you plan to install immediately, in the next few days?

[RECORD NUMBER]

Don't know (SKIP TO Q13)

10. [IF Q10 > 0] Do you plan to install the LEDs in the interior or exterior of your home?

Inside

Outside

11. [IF Q10 > 0] What type of bulbs will the LEDs be replacing? (CHECK ALL THAT APPLY)

Traditional Incandescent

CFL

LED

Other (specify)

None – new lighting fixture

Don't know

12. [IF Q10 NE Q2 DISCOUNTED LEDs] What do you plan to do with the LEDs that you don't install immediately? (CHECK ALL THAT APPLY)

Put in storage for later use

Give to someone else

Other (specify)

Don't know (exclusive)

Experience with LEDs

13. Before today, have you ever used an LED bulb in your home?

Yes

No (SKIP TO Q16)

Don't know (SKIP TO Q16)

14. How many LEDs do you currently have installed in your home?

- 0
- 1-2
- 3-5
- 6-10
- More than 10

15. If the Central Hudson discount had not been offered would you have purchased the same number of LED bulbs today?

- Yes, would have purchased the same
- No would have purchased fewer LEDs
- No, would not have purchased any LEDs

16. Do you plan to purchase additional LEDs in the future?

- Yes
- No --- Why not? [RECORD ANSWER] (SKIP TO Q19)

17. Will you purchase additional LEDs if the Central Hudson discount is no longer offered?

- Yes
- No – Why not? [RECORD ANSWER]

Demographics

Finally, I'd like to ask you just a few questions about your household.

18. Which of the following best describes your home . . . ?

- Single family detached
- Single family attached
- Condo or townhouse
- Mobile or manufactured home
- Apartment
- Other (specify)

19. What type of primary heating system do you currently have in your home?

- Natural gas furnace
- Electric furnace
- Electric baseboard
- Heat pump
- Other (specify)

20. Does your home have central air conditioning?

- Yes
- No

21. [RECORD GENDER]

- Female
- Male

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