October 13, 2015

REPORT #E15-322

Reduced Wattage Lamp Replacement Market Test Assessment Report

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This report presents results from the evaluation of the Reduced Wattage Lamp Replacement (RWLR) demonstration project, a market test of the Northwest Energy Efficiency Alliance's (NEEA) initiative to transform the general service fluorescent T8 market and make reduced wattage T8s the market standard in the lamp replacement market (referred throughout this report as the RWLR program).

1.1 PROJECT DESCRIPTION AND BACKGROUND

NEEA's overall objective is to shift the market for T8 linear fluorescent lamps toward reduced wattage T8s, so that they become a standard product choice in the T8 market. The RWLR program attempts to overcome supply-side and demand-side inertia and cost barriers standing in the way of increased adoption of reduced wattage T8s through targeting distributors and providing financial incentives, training, and marketing support. The demonstration project tested a market shift design in which T8 distributors received incentives for exceeding agreed-upon historical baseline sales of reduced wattage T8 lamps. The program specifically focuses on transforming the lighting **maintenance** market. (defined as lamp purchases due to routine maintenance procedures, namely, the replacement of failed lamps and ballasts, and includes both spot and group replacement scenarios).

NEEA launched the RWLR demonstration project in November 2013. As of February 2015, a total of 118 distributor locations from the first five participating distributors in the Northwest were enrolled in the program.

1.2 RESEARCH OBJECTIVES

NEEA retained Opinion Dynamics to conduct an evaluation of the RWLR demonstration project. The core goals of the evaluation were to determine the viability of the program design, assess program influence on distributor stocking and sales practices, and assess program ability to obtain sufficient sales data to provide a complete picture of the market for general service fluorescent lamps.

Additional research objectives include understanding the barriers and opportunities to wider adoption of reduced T8s, as well as understanding lighting trends.

1.3 RESEARCH ACTIVITIES

Opinion Dynamics conducted interviews with participating distributors, non-participating distributors, utility program managers, lighting maintenance contractors, property managers, and building operators. The evaluation team also conducted a distributor mystery shopper study, comparative state research, and sales data analysis.

1.4 CONCLUSIONS, KEY FINDINGS, AND RECOMMENDATIONS

Conclusions, summary of key findings supporting those conclusions, and associated recommendations are provided below.

Conclusion: The RWLR program is a viable and needed effort, given the remaining market potential and lack of competing interventions. The program's focus on the maintenance market is particularly relevant.

The evaluation results show that the T8 market is far from transformed. Reduced wattage T8s represent a fairly small percentage of sales, and even amid overall declining T8 sales, there is considerable potential remaining for reduced wattage T8s to capture market share. The interviewed distributors, contractors, property managers, and building operators generally favor the technology and consider it to be the best value on the market. LEDs are unlikely to gain significant market share for a while due to high prices and lack of experience with the technology. The maintenance market presents a particularly good niche for the RWLR program, as it is lagging behind the retrofit market in adoption of energy efficient lighting technologies and is generally underserved by the utility programs.

Recommendation: Evaluation results support NEEA's decision to expand the program. Opinion Dynamics does not have any additional recommendations related to this topic area.

Conclusion: The RWLR program's focus on distributors is a good strategy, although additional demand-side interventions would be beneficial in transforming the market.

Distributors represent the gateway to expanded sales of reduced wattage T8s in the commercial maintenance market and through their contact with customers have a considerable degree of influence on end-user and contractor purchasing decisions. Linear lighting purchases were sourced almost exclusively through distributors, and distributor recommendations were generally trusted and relied on. These findings validate NEEA's decision to focus the RWLR program on distributors. Property managers and building operators frequently make decisions about the types of lighting products to purchase and therefore also represent an important target for the program. Lighting contractors also exert some influence over customer decisions, although to a much lesser extent than distributors. Manufaturers are a source of information for some distributors, lighting contractors, property managers, and building operators. In addition to the supply chain actors, utilities present a valuable source of lighting information, especially for contractors.

Recommendation: Evaluation results support NEEA's decision to include manufacturer and demand-side interventions in the RWLR program. Opinion Dynamics recommends that NEEA considers such outreach mechanisms as trade shows, trade publications, and promotion through trade associations, as well as collaboration with utilities' energy efficiency programs. These sources were most frequently mentioned by property managers and building operators, as well as by contractors.

Conclusion: The market shift program design is <u>not</u> a viable program strategy.

Baseline approach is difficult to implement due to high variability in sales over time and declining overall T8 sales; the cumulative approach to goal achievement can be demoralizing for distributors; payment of incentives after goals were met also discouraged distributors from applying incentives toward lamp costs due to concern that they would not be reimbursed if they did not reach their goal. A viable alternative to this market shift design is paying incentives on a per-lamp basis regardless of the historical baseline. The use of this program design in

Massachusetts and Vermont resulted in the effective execution and rapid transformation of the T8 market.

Recommendation: Evaluation results support NEEA's decision to shift to the simple per-unit incentive program design. A decision to offer additional bonus payments for distributors that achieve their market share targets can provide an additional impetus to promote reduced wattage T8s. Opinion Dynamics recommends, however, that NEEA collects additional data, more specifically, details about end users who purchase discounted lamps, in cases where distributors pass incentives along to customers, to be able to assess program net impacts.

Conclusion: Program processes ran smoothly and resulted in high distributor satisfaction and praise for the program team. The program was also able to successfully set up and execute data collection and acquisition. Data processing systems, however, will greatly benefit from additional automation as the program expands.

The RWLR demonstration project achieved great success in developing and maintaining positive distributor relationships and high levels of distributor satisfaction. The program implementer was able to obtain and process the needed sales data and make data sharing processes easy for distributors. Data processes, however, used a fair amount of manual manipulations and Microsoft Excel-based formulas, which can potentially slow down the data cleaning and analysis process and result in increased error.

Recommendations: Opinion Dynamics recommends that NEEA further automates its data processing and quality assurance steps and considers a switch to a more rigorous database tool for data tracking than Excel. Should NEEA choose to continue using Excel, Opinion Dynamics recommends that NEEA employs new excel functionalities, such as pivot tables and custom macros. Additionally, in anticipation of an increase in sales data volume, the evaluation team also recommends standardizing data field naming conventions and content across distributors so that the data can be easily appended without generating additional data fields or modifying the existing ones. Finally, creating an index and a data dictionary will help ensure common understanding and transparency and eliminate any confusion or errors.

Conclusion: Sales of reduced wattage T8s relative to the negotiated baseline show limited success, likely due to variability in sales over time and the program design. Rising reduced wattage T8 sales and interest in the program are encouraging, but a range of barriers stands in the way of the program's success.

Distributor performance against the negotiated baselines was limited to a few high-performing months, which resulted in a positive overall shift of 5% from November 2013 to January 2015. Not all distributors achieved positive shifts in sales. A mystery shopper study revealed that, in general, distributor sales representatives did not attempt to upsell reduced wattage T8s and were filling orders as requested by customers. A range of barriers, including initial cost, supply-side and demand-side inertia, concerns with lamp performance, and lack of knowledge were the core barriers to the technology adoption. These barriers were consistent with those that NEEA identified and developed interventions around as part of the RWLR program.

Recommendation: While the per-unit incentive design will help address the initial cost barrier, NEEA should continue to seek opportunities to educate distributors, contractors, and end users

about reduced wattage T8s and their performance, thus dispelling any misconceptions and concerns with the technology and placing the product top-of-mind.

2. INTRODUCTION

This report presents results from the evaluation of the Reduced Wattage Lamp Replacement (RWLR) demonstration project, a market test of the Northwest Energy Efficiency Alliance's (NEEA) initiative to transform the general service fluorescent T8 market and make reduced wattage T8s the market standard in the lighting maintenance market. Evaluation activities included a comprehensive retrospective assessment of the program performance and a prospective viability assessment of additional and alternative program interventions.

2.1 PROJECT DESCRIPTION AND BACKGROUND

NEEA's overall objective is to shift the market for T8 linear fluorescent lamps toward reduced wattage T8s, so that they become a standard product choice in the T8 market. The RWLR demonstration project is a market test of a program that attempts to overcome supply-side and demand-side inertia and cost barriers standing in the way of increased adoption of reduced wattage T8s through targeting distributors and providing financial incentives, training, and marketing support. The demonstration project tested a market shift design in which participating T8 distributors received incentives for exceeding agreed-upon historical baseline sales of reduced wattage T8 lamps. As part of the RWLR demonstration project, NEEA provided incentives in the amount of $0.40 per each incremental lamp above baseline. In addition, a bonus incentive structure was in place through which NEEA provided an additional $0.10 per incremental lamp for sales above 20% of the baseline. Distributors had the latitude to choose what to do with NEEA's incentives, including incentivizing sales staff, investing in marketing, and/or passing incentives along to end users. As part of the program, NEEA also provided a few stipends for setting up sales data capture and transfer, marketing, and other expenses. Finally, NEEA developed a lighting calculator that distributors could use to make a financial case for reduced wattage T8s.

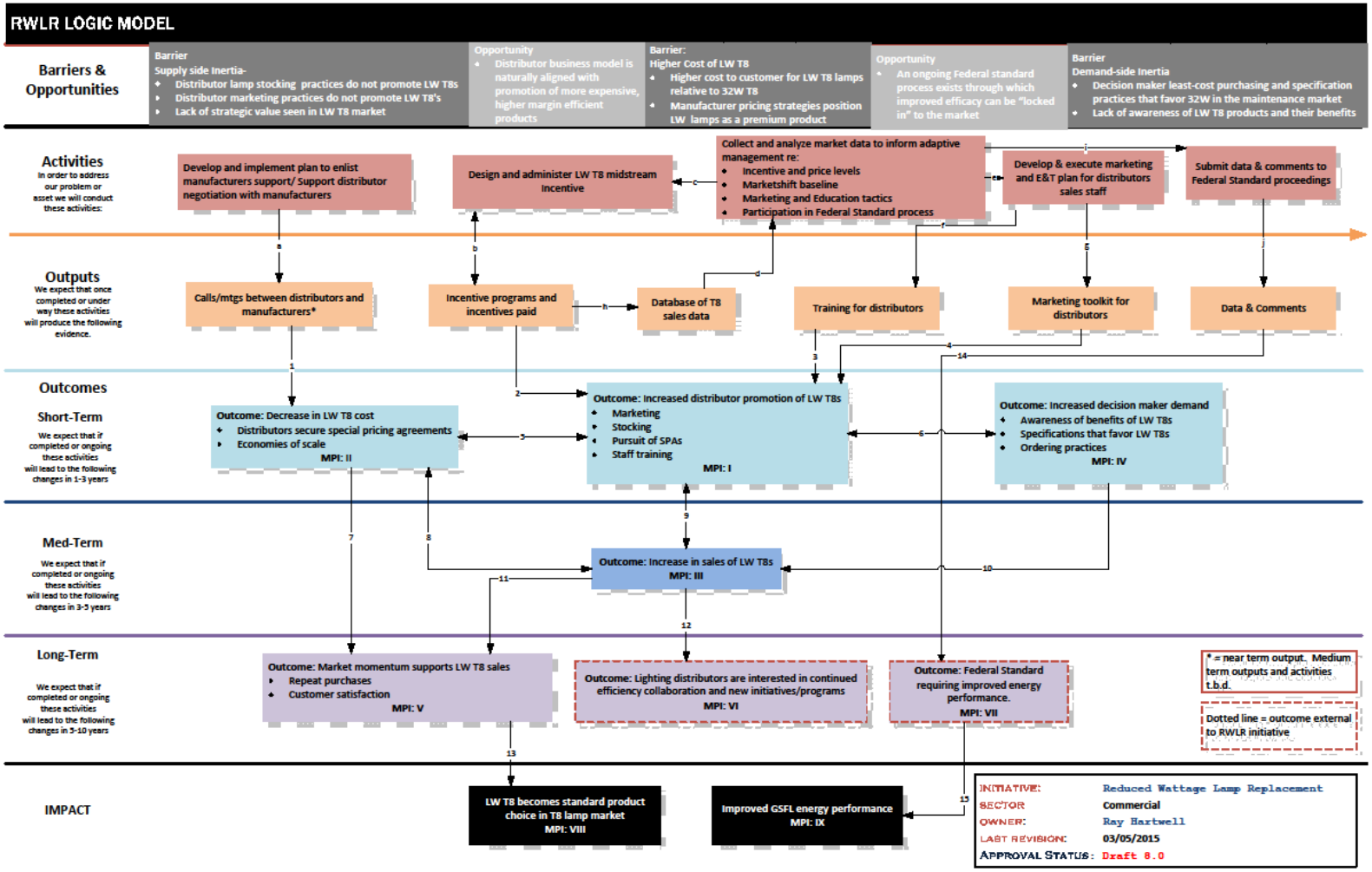
The program specifically focuses on transforming the lighting **maintenance** market. The lighting maintenance market is defined as lamp purchases due to routine maintenance procedures: namely, the replacement of failed lamps and ballasts, and includes both spot and group replacement scenarios. Through the RWLR demonstration project, NEEA attempted to accomplish the following core goals:

- To test the upstream market shift program design that focuses on increasing sales of reduced wattage T8 linear fluorescent lamps
- To influence the lighting maintenance market
- To test whether it is possible to obtain sales data that provides a complete picture of products flowing into the Northwest market for general service fluorescent lamps

As outlined in Figure 1, the RWLR is designed to overcome three main barriers: supply-side inertia, demand-side inertia, and cost. Changing federal standards and distributor business models naturally aligned with the promotion of the more-expensive and higher-margin efficient products were market opportunities that could aid program success. Figure 1 provides the program logic model. As can be seen in the model, the short-term intended outcomes include

decrease in costs, increased distributor promotion, and increased demand for reduced wattage T8s. These short-term outcomes are the focus of the evaluation. However, it is important to note that the expected time frame for the short-term outcomes is one to three years, and the RWLR demonstration project time frame may not be long enough to see all of those outcomes.

Figure 1. RWLR Program Logic Model

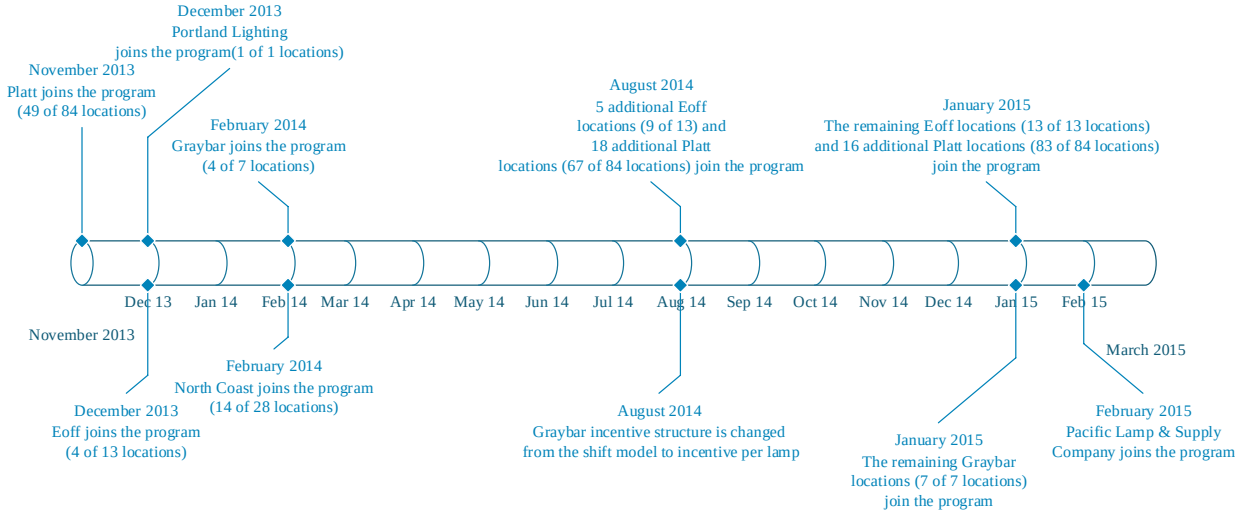


Notes: Program Logic Model Version 6 developed by NEEA.

The RWLR demonstration project launched in November 2013. At the start of the project, five distributors, both local and national, enrolled a total of 89 locations in the Northwest. Throughout 2014, additional locations from already participating distributors enrolled in the program. In Q1 2015, the program was scaled up for longer-term delivery. As of February 2015, a total of 118 distributor locations from the first five participating distributors in the Northwest were participating in the program. Additionally, a new distributor joined the program in early 2015, and negotiations are currently under way with five additional distributors.[1] The goal for the program in 2015 is to enroll a sufficient number of distributors to capture 40% of T8 sales in the Northwest by the end of 2015.

NEEA's main objective with this demonstration project was to test whether the market shift design was the right one to achieve its long-term objective of changing the T8 market. As the program implementation progressed and the market shift design proved to be a non-viable option for some distributors (reasons for non-viability of the design are described in great detail in Section 4.5 on page 30 of this report), NEEA changed the design to an upstream incentive model where distributors were compensated for each reduced wattage T8 sold regardless of the baseline. To further encourage sales of reduced wattage T8s, NEEA offered additional bonus payments for market share targets in addition to per-lamp incentives. NEEA also added a staff bonus with one of the distributors. Figure 2 provides a graphical overview of the program chronology.

Figure 2. RWLR Program Chronology



Notes: Opinion Dynamics analysis.

[1] Note that these newly enrolled distributors are not included in this evaluation.

2.2 RESEARCH OBJECTIVES

NEEA contracted with Opinion Dynamics to conduct an evaluation of the RWLR demonstration project. The evaluation had the following core research objectives:

1. Determine the viability of the incentive model in paying incentives directly to distributors on only the units sold/shipped above and beyond the historical sales baseline of reduced wattage T8s.

2. Assess program influence on distributor stocking and sales practices.

3. Gather distributor feedback on the program design, participation process, and data-sharing structures.

4. Assess whether the program introduced redundancies in the target market given other market interventions (for example, utility energy efficiency programs).

5. Determine if the program was able to gather sales data sufficient to provide a complete picture of the market for general service fluorescent lamps.

In addition, the evaluation team pursued the following research objectives to inform its understanding of market trends and to identify additional and alternative program interventions:

6. Explore the barriers to wider adoption of reduced wattage T8s.

7. Examine distributor business practices, including pricing, stocking, training, and sales practices, around lamp sales.

8. Describe how routine maintenance activities and decision-making processes are structured and assess the ease or difficulty of introducing new lighting technologies.

9. Assess driving factors behind the selection of lighting products.

10. Identify the sources of information that contractors and end users rely on in researching lighting products.

11. Explore future lighting trends.

12. Identify the most effective marketing and messaging strategies to advance the adoption of reduced wattage T8s.

13. Isolate alternative upstream program design approaches and describe their benefits and challenges.

3. METHODOLOGY

Opinion Dynamics conducted a variety of quantitative and qualitative research activities to answer the research questions. Table 1 lists each research activity and links it to a specific research question or questions from the previous section. Following the table is a detailed description of each evaluation activity and its scope.

Table 1. Overview of Research Activities

#	Research Activity	Activity Scope	Research Area Activity Supported
1	Participating Distributor Interviews	5 interviews	1,2,3,6,11
2	Non-Participating Distributor Interviews	6 interviews	6,11
3	Utility Program Manager Interviews	6 interviews	4
4	Distributor Mystery Shopper Study	12 distributors	7
5	Lighting Maintenance Contractor Interviews	10 interviews	6,8,9,10,11,12
6	Property Manager/Owner Interviews	8 interviews	6,8,9,10,11,12
7	Comparative State Research	3 interviews	13
8	Sales Data Analysis	Analysis of two-and-a-half years of sales data	1,2,5

3.1 PARTICIPATING DISTRIBUTOR INTERVIEWS

Opinion Dynamics conducted five interviews with participating distributors between July and September 2014. The interviews explored a range of topics, including the types of customers distributors serve, distributor interactions with the program, satisfaction with the various program components, distributor marketing and sales practices and changes to them due to the program, the current state of the lighting market, future market trends, perceived benefits of reduced wattage T8s, and barriers in the marketplace to their adoption.

Participating distributors served a wide array of customer types. Three out of five distributors worked mostly with contractors, while the remaining two serviced primarily property management companies. The extent to which each participating distributor serviced the maintenance market also varied. One distributor estimated that as little as 5% of its sales of fluorescent tubes were to the maintenance market, while another estimated that nearly 90% were maintenance sales. None of the distributors tracked sales in the maintenance market separately from sales in new construction or retrofit markets and therefore did not have a mechanism to accurately separate maintenance sales across those markets.

3.2 NON-PARTICIPATING DISTRIBUTOR INTERVIEWS

Opinion Dynamics completed six interviews with non-participating distributors between August and October 2014. The evaluation team received a list of distributors from NEEA and supplemented this list with an online Internet search. To ensure that we received feedback relevant for NEEA and reflective of the Northwest region market, the evaluation team interviewed distributors that had a considerable number of sales in the Northwest. Three of the six distributors had a national presence, while three were smaller, local distributors. Five of six distributor contacts worked at a single distribution center and could speak only to the trends at that center, while the other was a corporate representative from one of the national distributors.

Two of the five contacts working in a single distribution center either sold across the state or sold products across multiple states in the Northwest (Washington, Oregon, and Idaho). The remaining three contacts sold products in more concentrated geographies.

As part of the interviews, Opinion Dynamics explored the types of customers distributors serve, marketing and sales practices, awareness of the RWLR program, the current state of the lighting market, future market trends, and barriers to reduced wattage T8 adoption.

Like the participating distributors, the six non-participating distributors served a wide array of customers. One out of six sold almost exclusively to contractors, while the remaining five sold exclusively to end users across a variety of sectors, including office, municipal, industrial buildings, and new construction projects. The extent to which each non-participating distributor serviced the maintenance market varied. For example, one reported that the majority of its sales were to the maintenance market, while another noted that they very rarely sold bulbs to the maintenance market.

3.3 UTILITY PROGRAM MANAGER INTERVIEWS

Opinion Dynamics completed six interviews with utility energy efficiency program managers in August 2014. The interviews focused on the commercial lighting programs that utilities offered across the Northwest. Opinion Dynamics also explored program mangers' perceptions of barriers and motivators to reduced wattage T8 adoption.

3.4 DISTRIBUTOR MYSTERY SHOPPER STUDY

Opinion Dynamics completed a mystery shopper study with twelve participating and non-participating distributors in October 2015 (see Table 2). Opinion Dynamics called distributors posing as a property manager of a medium-sized office complex and asked for a quote for a lighting order of 400 4' linear T8s and 200 4' linear T12s. The goal of the study was to understand whether distributors promoted reduced wattage T8s and to gauge distributor knowledge of the technology and its benefits. Opinion Dynamics also asked about linear LEDs, as well as availability of the utility program incentives, to gauge distributors' knowledge of these topics.

Table 2. Mystery Shopper Distributors

Group	n
Participating Distributors – Participating Locations	5
Participating Distributors – Non-Participating Locations	2
Non-Participating Distributors	5
Total	**12**

3.5 LIGHTING MAINTENANCE CONTRACTOR INTERVIEWS

Opinion Dynamics completed ten interviews with lighting maintenance contractors in November 2014. The sample frame from which Opinion Dynamics drew the sample included contacts captured during the Puget Sound Lighting Maintenance Contractor Workshop and from a list of contractors that NEEA provided to Opinion Dynamics. As part of the sampling process, Opinion

Dynamics selected a range of contractors based on the type and location of the customers they serviced. Interviewers screened out contractors who did not perform lighting maintenance work. The maintenance contractors the evaluation team interviewed serviced a range of customers, including small property owners and large commercial property management companies, as well as a range of facility types, spanning retail, office, education, banking, and food service facilities, as seen in Table 2. The interviews explored the structure of the contractor's maintenance operation, customer base, maintenance contract structure, installation practices, and decision-making processes, among other topics.

Table 3. Types of Customers that Interviewed Lighting Maintenance Contractors Service

Contractor	Typical Customer Base in the Maintenance Market
1	Big box stores, hotels
2	Property management companies, banks, grocery stores
3	Manufacturing, banks, warehouses, service industry, hangars, schools, light posts, parking lot light posts, retail, car lots
4	Office buildings, health care providers, apartment buildings and townhomes, banks, women's shelter
5	Office buildings, warehouses, parking lots
6	Commercial buildings, offices, car dealerships, gas stations, office buildings, banks (mostly locally owned companies with multiple properties)
7	Shopping centers, UPS, strip malls, university
8	Banks, forest service (indoor spaces), industrial plants (with the exception of the forest service, most are small businesses)
9	Restaurants, big box stores
10	Did not disclose

3.6 PROPERTY MANAGER/BUILDING OPERATOR INTERVIEWS

The evaluation team completed eight interviews with property managers and building operators between November 2014 and February 2015. NEEA provided the initial list of contacts, which the evaluation team supplemented through an Internet search. To gain more contacts, the evaluation team asked property managers and building operators at the conclusion of the interview to identify other property managers and building operators. The property managers and building operators who were interviewed oversaw a range of commercial facility types, including office buildings and medical, government, educational, and retail facility types, as seen in Table 4. Property management companies included those that managed properties and those who also owned the properties they managed. The interviews explored lighting purchase decision-making processes, the structure of lighting maintenance contracts and activities, and awareness and use of T8 lighting technologies, among other topics.

Table 4. Types of Facilities that Interviewed Property Managers and Building Operators Own/Operate

Property Manager/ Building Operator	Own or Manage	Types of facilities
1	Manage only	Mixed use - mostly offices
2	Manage only	Mostly office and medical office spaces, some retail and industrial spaces
3	Own and manage	Mixed use facilities (medical, retail, small business, and commercial office space)
4	Own and manage	Mostly office space, some medical and government office facilities
5	Own and manage	Government office space
6	Owns and manage	Government office spaces
7	Own and manage	Infrastructure of department of transportation facilities (bus and train stations and terminals, service facilities)
8	Own and manage	Strip malls and shopping centers, neighborhood grocery stores

3.7 MASSACHUSETTS AND VERMONT COMPARATIVE STATE RESEARCH

Opinion Dynamics completed three interviews with program administrators and implementers of upstream commercial lighting programs in Massachusetts and Vermont in November 2014. The interviews explored program design and impact on the lighting market in those states, lighting maintenance market and program barriers, distributor enrollment in the program, and program data-tracking practices.

3.8 SALES DATA ANALYSIS

The evaluation team analyzed lighting sales data collected from participating distributors. The evaluation plan initially called for a sales shift analysis through statistical modeling that made use of the program's quasi-experimental design. The team identified insurmountable challenges to this analysis through a review of the data, information about program implementation, and overlap with utility-sponsored programs. Some of the challenges included:

1. Lack of comparable non-participating distributor locations with available monthly sales data
2. Presence of utility programs in parts of the Northwest with varying degree of activity in the market over time
3. Uneven and sporadic monthly sales data
4. Varying timelines for program ramp-up and resulting challenges in accurately defining the treatment period

In place of the sales shift analysis, the evaluation team analyzed the sales data cumulatively and for each distributor separately. As part of the analysis, the team looked at the overall sales trends over time, market share of reduced wattage T8s, and sales compared to the negotiated baseline. Paired with the analysis of the qualitative data, the evaluation team developed case studies for each distributor that provide context behind the sales trends and offer a qualitative assessment of the program's impact on each individual distributor.

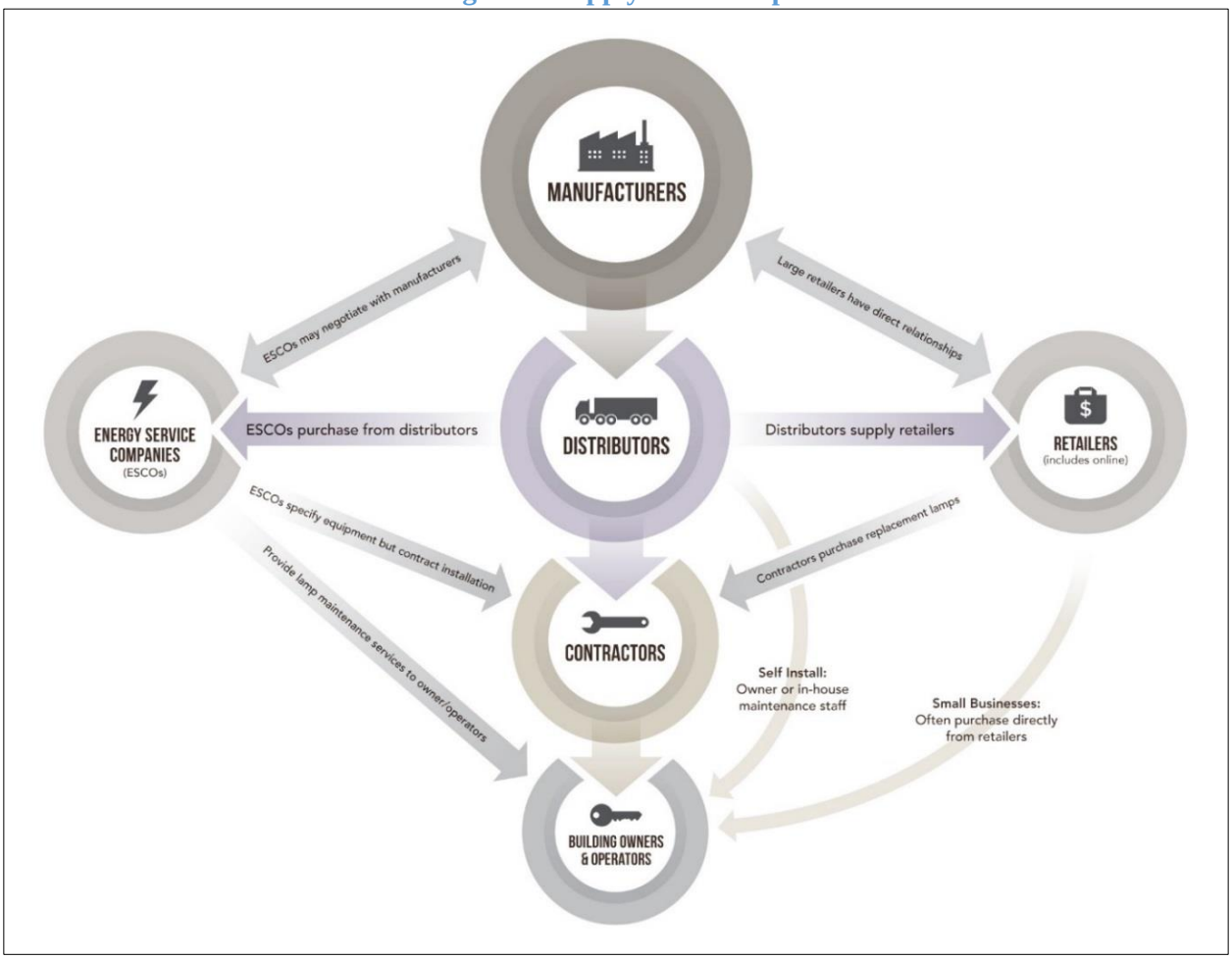
4. FINDINGS

This section presents detailed findings from the evaluation of the RWLR demonstration project.

4.1 MARKET ACTORS AND DECISION-MAKING PROCESSES

While the distribution chain for T8s is complex and includes a range of market actors, distributors represent the dominant sales channel for non-residential lighting products. Property managers and building operators we interviewed purchase lighting products primarily through distributors, although one out of eight mentioned procuring their lighting through contractors or purchase them at retail locations in addition to distributors. Lighting contractors reported purchasing T8s exclusively from distributors. This is consistent with the 2014 Non-Residential Lighting Market Characterization study conducted by Navigant Consulting that found that the majority of lamps flow from manufacturers to end users through distributors (see Figure 3).

Figure 3. Supply Chain Map



Source: Navigant Consulting 2014 Non-Residential Market Characterization Report.

Both participating and non-participating distributors interviewed as part of the evaluation reported having an ability to influence the lighting products that customers purchased. More specifically, four of the five non-participating distributors that answered this question indicated that they have significant influence in determining which bulbs their customers purchase. Of the three participating distributors who answered this question, all reported that they exerted considerable influence on their customers' lighting choices. Distributors with dedicated sales staff reported developing long-term relationships with customers, giving them the clout to persuade customers to switch to reduced wattage T8s.

> "…Oh tremendous amount of influence, lots of influence. We have a team. Well ok let me back up, we have outside sales people who have accounts, customer accounts. So they have a relationship with the customer and can influence the buying habits of that customer whether it's an end user or it's a contractor. We have specialists, at least one in each of our regions, lighting specialists who go out and educate and really for the success of this particular program a lot—most of it is driven by our specialists that are going into the branches, educating them on this program, educating the customer, going on sales calls, doing webinars. We have branch managers, we have sales managers. So all of those folks collectively have a lot of influence over our customer's buying habits."

Furthermore, aside from new construction and large property management firms, where lighting specifications are rigid and difficult to change, distributors reported that their customers generally had the latitude to make the decision to switch from regular to reduced wattage T8s, as long as it was within the allocated budget. More specifically, five non-participating distributors were asked this question, and all five indicated that customers generally have the ability to switch from 32W T8s to reduced wattage T8s. Of the three participating distributors who answered this question, two reported that the majority of customers have the ability to switch from 32W T8s to reduced wattage T8s, and one reported that some customers have the ability to switch to reduce wattage T8s. These findings indicate that distributors are frequently in direct contact with decision makers and offered an opportunity to promote reduced wattage T8s. Distributors, therefore, are best positioned to break the supply- and demand-side inertia and shift the market toward widespread adoption of reduced wattage T8s.

Moreover, interviews with property managers and building owners suggest that distributors were a credible source of lighting information and had influence on their decision-making processes. More specifically, three out of seven interviewed property managers and building operators (43%) and five out of ten lighting contractors (50%) explicitly mentioned distributors as a source of information on lighting and having influence on their lighting decision-making process.

These findings validate NEEA's decision to focus the program on distributors. However, while distributors play a dominant role in the market and through having interactions with a variety of market actors can influence their purchase decisions, the evaluation research revealed that property managers and building operators frequently make decisions about the types of lighting products to purchase and therefore also represent an important target for the program.

Property management companies dominate the commercial office space, but are also prominent in other commercial space types, including government, educational, and medical facilities. Lighting replacement practices varied and included both spot and group replacement. Property management companies generally performed lighting maintenance activities in-house. Generally,

chief engineers, maintenance technicians, commercial and leasing managers, and maintenance supervisors were assigned to a single or multiple facilities and chose which lighting products to install at their facilities. Two out of eight interviewed property managers and building operators cited relying on other property managers within their company's network as sources of lighting information. It is worth noting, however, that when making lighting purchase decisions, property managers can be constrained by corporate approval processes (such as approvals from the property asset managers) and preset maintenance budgets. Overall, property managers take the following key considerations into account when making lighting purchase decisions:

1. Financial considerations, such as upfront and cost to install, payback, and lifecycle cost analysis – five out of eight property managers and building operators cited upfront cost as the core factor in their purchase decision. One respondent mentioned payback period, and one mentioned lifecycle cost analysis. One respondent explicitly mentioned availability of utility programs and incentive as the driving factor behind lighting purchases.
2. Tenant preferences and tenant comfort – two out of eight property managers mentioned tenant preferences as a factor that influences their lighting purchase decisions. One property manager specifically mentioned disturbances to tenants as a factor.
3. Lighting consistency – two out of eight property managers reported that lighting consistency is important in their choice of lighting products.

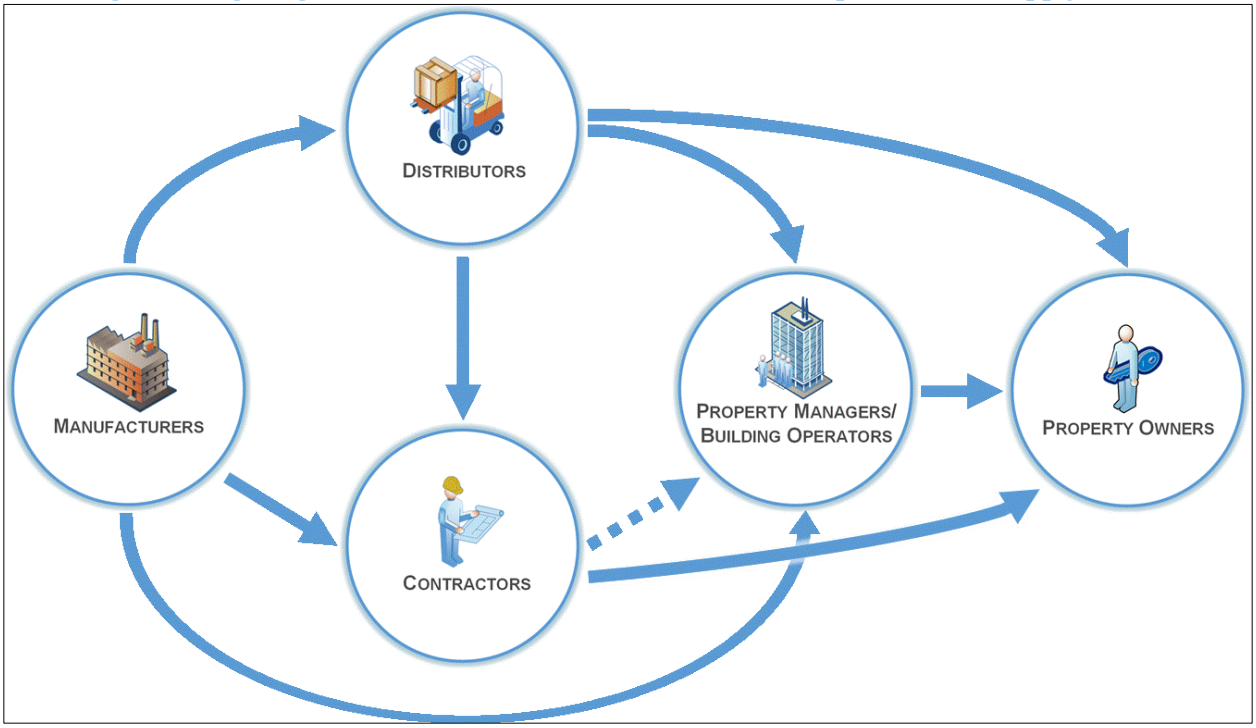
Lighting contractors also exerted some influence over customer decisions, although to a much lesser extent than distributors. The interviews with lighting contractors revealed that they generally followed property manager or owner guidance or installed less-costly options. Most commonly, contractors did not have routine maintenance contracts with their customers, but rather charged their customers on the time and material basis upon completion of the work. More specifically, only two out of ten contractors reported having maintenance contracts with just a few of their clients.

Finally, manufacturers were a source of information for some distributors, lighting contractors, property managers, and building operators. More specifically, two out of eight property managers and building operators and one out of ten lighting contractors explicitly mentioned manufacturers as a source of information. Furthermore, three out of five participating distributors and two out of five non-participating distributors[2] reported receiving and using manufacturer marketing materials or collaborating with manufacturers in some other form.

Figure 4 provides a graphical overview of the sources of information and influences on the most prominent supply chain actors. A dotted line between contractors and property management companies represents a limited flow of information and influence between the actors.

[2] One participating distributor was not asked the question.

Figure 4. Lighting Sources of Information and Influence Map within the Supply Chain



Notes: Opinion Dynamics analysis.

In addition to the supply chain actors, utilities present a valuable source of lighting information, especially for contractors. Three out of five contractors mentioned that they leveraged utility program information and training sessions to learn about lighting technologies.

These results suggest that targeting the demand side of the market, primarily property managers and building operators, and engaging manufacturers are viable strategies to increase the program impact and accelerate the adoption of reduced wattage T8s. It is worth noting that the RWLR program is in the process of implementing demand-side and manufacturer interventions.

To engage the demand side of the market, the program should consider having a presence at trade shows and in trade publications (such as *Electrical Construction and Maintenance Magazine*), as well as promotion through trade associations (such as the Building Owners and Managers Association). Both lighting contractors and property managers/building operators that Opinion Dynamics interviewed referenced the above-mentioned information sources. Collaboration with utilities may present a valuable outreach option for reaching lighting contractors.

4.2 MAINTENANCE MARKET FOCUS AND COMPETING OFFERINGS

The focus of the RWLR program is on the maintenance market. The maintenance market accounts for a majority of lamp sales (50%–60%) due to a fast lamp burnout rate (Navigant Consulting, Inc. 2014). Reduced wattage T8s represent a small share of the maintenance market (described in greater detail further in the report), thus leaving a lot of potential for program intervention.

Opinion Dynamics reviewed commercial energy efficiency program offerings from six utilities in the Northwest and Bonneville Power Administration (BPA) – all of them offered incentives for reduced wattage T8s. Therefore, there is a possibility that the RWLR program activity results in "double discounting" a portion of reduced wattage T8s. In fact, all participating distributors reported their sales of reduced wattage T8s being affected by utility programs and that there is a potential for double discounting lamps used for retrofit projects since NEEA does not restrict, nor is it feasible to restrict, incentives for sales to the maintenance market.

The overlap is hard to quantify because distributors have no way of tracking whether the lamps are installed in maintenance or retrofit scenarios. Similarly, utility programs generally do not track the installation scenario. The evaluation team relied on the estimates and anecdotal information from utility program managers and distributor interviews to explore the degree of overlap and presents those results below. The results point to a relatively small overlap, especially in the maintenance sector.

- **Utility programs discount only a portion of reduced wattage T8s sold.** Based on the 2015 Market Characterization and Baseline Report developed by Cadeo Group, an estimated 19% of all reduced wattage T8s sold were due to regional utility programs. This estimate is based on 2012 values and may have decreased in subsequent years due to the shifting focus of the utility programs to LEDs.

- **Reduced wattage T8s are not a priority measure in the utility programs.** While all six interviewed utility program managers reported incentivizing reduced wattage T8s, only one program manager of the six reported that reduced wattage T8s were a "significant" contributor to savings. Most of the program managers the team spoke with indicated that reduced wattage T8s were not a high priority measure for them.

- **Incentives for reduced wattage T8s in the utility programs are retrofit-geared.** Not all utility programs allow "lamp-only" replacement projects; often ballast replacement is also required to meet minimum energy savings and cost-effectiveness requirements. One program manager mentioned that they did offer lamp-only incentives, but indicated that they did not see much traction from that offering.

- **Upstream programs targeting distributors are limited to LED offerings.** Three out of six program managers that the evaluation team spoke with also work with distributors on upstream and midstream lighting programs. However, aside from the one program that was recently discontinued that incented reduced wattage T8s, these upstream or midstream programs are limited to LED products, specifically screw-based LED lamps.

One program manager reported having an upstream (buy down) program for LED lighting products that was a joint effort with local distributors. Another expected to launch a midstream LED program in September 2014, while another indicated that his utility was contemplating launching a similar program in 2015.

- **The maintenance market is not the focus of the utility programs.** All six program managers that the evaluation team spoke with indicated that they did not specifically target the maintenance market for T8s, and most felt that they were not influencing many maintenance sales. The vast majority of reduced wattage T8s incentivized through their programs are part of larger retrofit projects. As mentioned earlier, a number of programs do not allow for lamp-only replacements, meaning that very few 32W T8 lamps are replaced with 28W or 25W T8s in the absence of a ballast replacement as well. The majority of the program managers felt that replacing the existing stock of installed 32W lamps with reduced wattage lamps was a good niche for NEEA to occupy, as it is currently not a high priority for them.

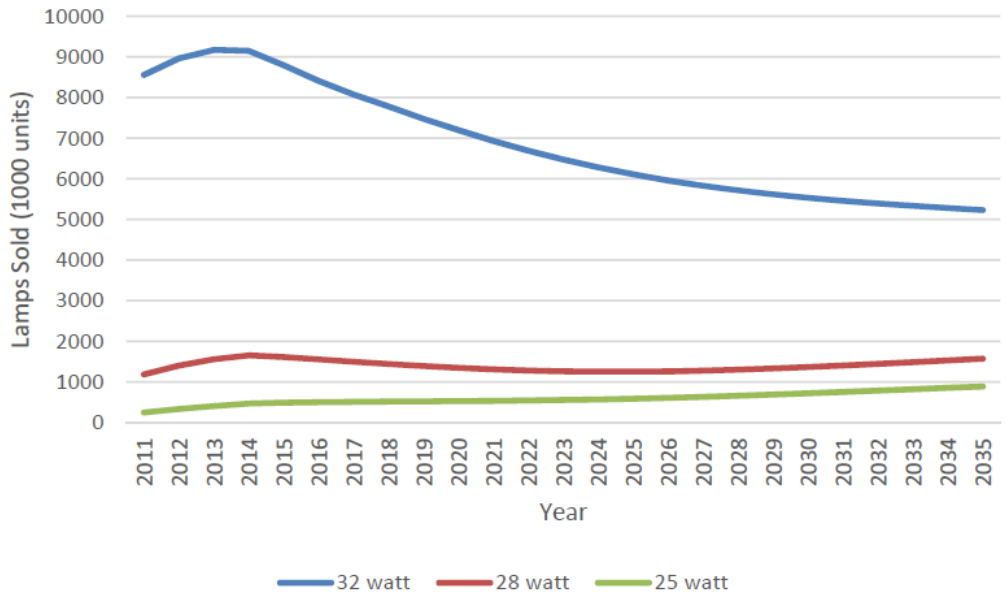
Based on these findings, the evaluation team concluded that the overlap between the RWLR program and utility programs is likely relatively small and that the focus on the maintenance market is in fact an appropriate niche for the RWLR program, given the state of the market and absence of other actors attempting to transform it.

4.3 LIGHTING MARKET TRENDS

Changing federal standards are shifting the commercial linear fluorescent lighting market (including the maintenance portion of the market) toward high efficiency. As of January 2012, the U.S. Department of Energy (DOE) began phasing out general service fluorescent T12 lamps. In January 2014, the regulation extended to general service fluorescent T8 700 series lamps. While there are loopholes that manufacturers can use to bypass the T12 phase-out, the share of T12s has been diminishing over time, likely in response to the legislation and increasing prominence of LEDs.

Based on the 2015 Cadeo Group's Study, overall T8 lamp sales are expected to decline over time. Amid this declining trend, projections show a slight increase in reduced wattage T8 sales. Despite the increase, reduced wattage T8s are projected to represent a small share of the overall T8 market well into the future. More specifically, reduced wattage T8s were projected to represent 14% of overall T8 lamp sales in 2011 and 20% in 2016.

Figure 5. T8 Lamp Sales Projections



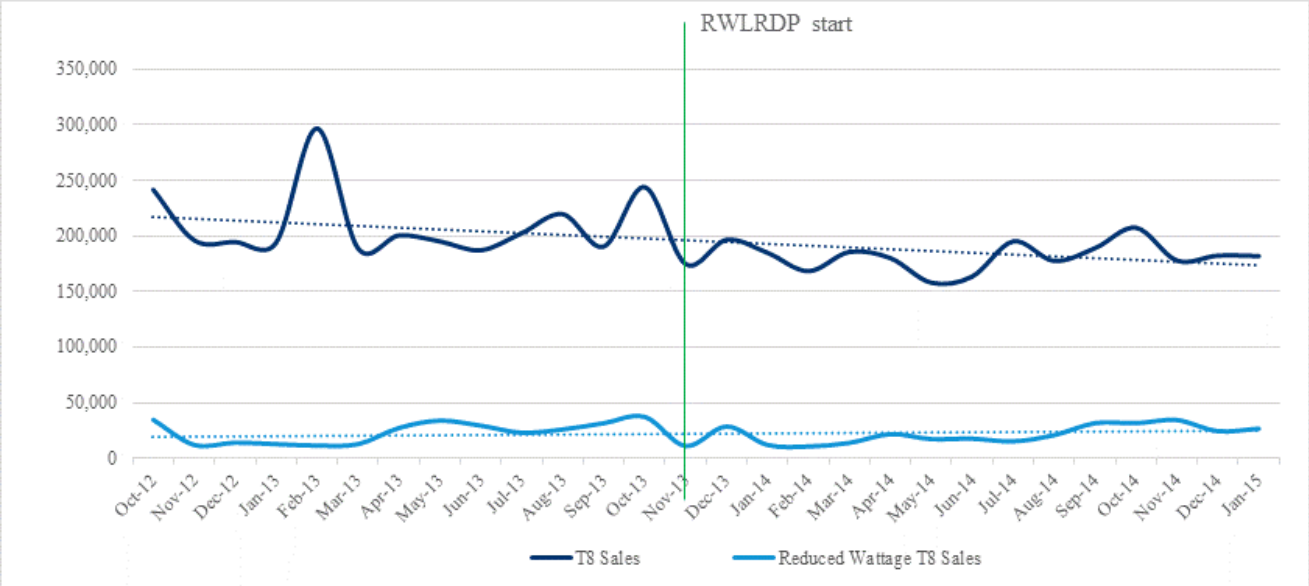
Source: Cadeo Group 2015 Reduced Watt Replacement Market Characterization and Baseline Study.

T8 sales trends among participating distributors (across both participating and non-participating locations) show a similar trend over time. T8 sales have been declining over time, while sales of reduced wattage T8s have been increasing slightly (see also Figure 7 below). Overall, given the Cadeo Group's projected 2014 sales, NEEA's RWLR demonstration project captured over 20% of T8 sales in the Northwest through enrolling the five participating distributors.

Between 2013 and 2014, T8 sales decreased by 13%. This shift could be due to T8s losing market share to emerging linear LEDs, as well as to the longer life of incumbent technologies. LEDs overall (not just linear) represent the fastest-growing technology in the Northwest, having grown thirteen-fold from 2010 to 2012 to capture an estimated 4% of lamp sales in the Northwest in 2012 and were projected to increase to 21 times the 2010 levels in 2013 (Navigant Consulting, Inc. 2014). While widespread adoption of LEDs seems inevitable, current high upfront costs and uncertainty around LED performance in commercial applications will likely delay the process.

The share of reduced wattage 4' T8s remains low. Between October 2012 and January 2015, 11% of participating distributors' T8 sales were reduced wattage T8s. Of those, 82% were 28W reduced wattage T8s. Even amid declining T8 sales, there is considerable potential remaining for reduced wattage T8s. These reduced wattage T8 sales are not specific to the maintenance market. According to the distributor interviews, they sell more reduced wattage T8s for retrofit projects than maintenance scenarios, making the uncaptured potential even greater.

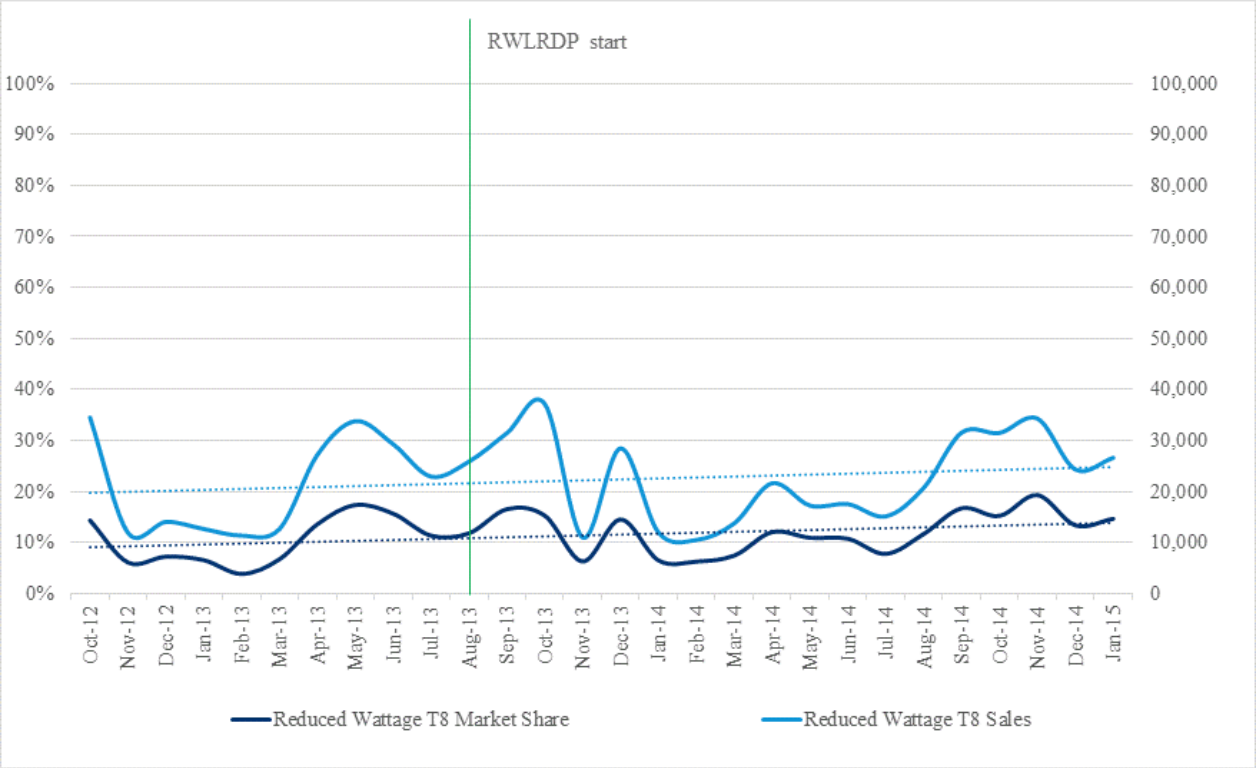
Figure 6. T8 Sales Over Time



Notes: Opinion Dynamics sales data analysis for 5 participating distributors (includes sales data from 118 participating locations and 15 non-participating locations).

Figure 7 provides a graphical depiction of reduced wattage T8 sales and market share trends. The fluctuations in both the sales and the market share of reduced wattage T8s over time are quite consistent. This suggests that what is driving the fluctuations in sales of reduced wattage T8s is different from what is driving the fluctuations in sales of standard wattage T8s. If sales of both types of T8s were rising and falling at the same time, the market share of reduced wattage T8s would not change.

Figure 7. Sales and Market Share of Reduced Wattage T8s Over Time



Notes: Opinion Dynamics sales data analysis for 5 participating distributors (includes sales data from 118 participating locations and 15 non-participating locations).

In the absence of the sales data for non-participating distributors, the evaluation team explored the percentage of reduced wattage T8 sales as part of the interviews. All non-participating distributors were able to provide the percent of T8 sales that were reduced wattage. The numbers were relatively low as the majority of non-participating distributors did not specifically promote reduced wattage T8s. Five out of six non-participating distributors reported that between 1% and 35% of their T8 sales in the Northwest were reduced wattage. One distributor stated that majority of its T8 sales (80%) were reduced wattage. The average market share of reduced wattage T8s across the interviewed non-participating distributors was 26%. However, this percentage is likely an overestimate because each distributor was weighted equally and the large distributors had lower market shares of reduced wattage T8 sales. Similar to participating distributors, non-participating distributors also reported that reduced wattage T8s were used more for retrofits and new construction than for the maintenance market.

As previously mentioned, LEDs, both fixtures and LED tube lamps (or T-LEDs), are becoming a more prominent product. All of the distributors that the evaluation team interviewed (both participating and non-participating) reported that the linear lighting market is shifting toward LEDs, that there is excitement and a healthy interest in this technology, and that their marketing is geared toward promoting those products. Two participating distributors specifically mentioned T-LEDs increasing in popularity.

"Well pedal to the metal in the last three months. The contractors have become very aggressive now with [LED] T8's. I mean there are LED T8's that are being marketed out there, take out a T8, a 32 T8 and pop

> this in, don't change out the bowels, just put in an LED you're done. Now here's the caveat, most utilities don't pay on that yet. But [when] they do, game over in my opinion. The light levels are the same, if not better. The color rending is better than a T8 and its 50,000 hours. You know I mean that's very appealing for end users that don't have to continue to change out lamps."

Distributors disagree, however, on how quickly LEDs will become the industry standard for T8s, with projections ranging anywhere from five to ten years. Of the five interviewed participating distributors, two thought that LEDs were only a few years away from supplanting reduced wattage T8s as the natural replacement product. They cited increasing lifespan, continued reductions in initial cost, better CRI and color temperature options, and technological novelty as reasons why customers may be more drawn to LEDs. However, two other distributors were more skeptical that LEDs will take the place of reduced wattage T8s any time soon. They felt that the price difference was still far too great and that there were only marginal energy savings compared to reduced wattage fluorescents. Non-participating distributors shared similar thoughts. Some thought that the price points on LEDs were prohibitive and did not see prices dropping much further. Others thought that LEDs were rapidly encroaching on the fluorescent T8 market, and it is only a matter of time until they become widely available and affordable, thus rendering reduced wattage T8s obsolete.

It is important to note that LED dominance, as explained by distributors, was driven mostly by the installation of new fixtures, rather than the maintenance market, and therefore it is reasonable that the maintenance market would lag behind other markets in the adoption of LEDs. One distributor specifically mentioned that in case with LEDs, they would complete a lighting retrofit.

> "No, we're more – if wanted to go LED, we're going to go change the entire depth of the fixture and get an LED retrofit."

All of the utility program managers that the evaluation team spoke with indicated that LEDs (screw-based, LED fixtures, and T-LEDs) were beginning to play a significant role in their programs. One program manager reported that LEDs accounted for 89% of his small commercial program and that hardwired LED fixtures accounted for 47% of the savings that come from lighting. All but one program managers reported that LED pricing was becoming more competitive and that the quality has improved to a point where LEDs can be used in many general illumination settings. Many of the current LED installations consist of screw-based CFL or incandescent lamp replacements, although a number of the program managers specifically mentioned the Phillips InstantFit lamp, a new T-LED product on the market that can fit directly into existing sockets without rewiring or changing of drivers. The program managers reported that they expected the other major manufacturers to market similar products in the near term. All but one program manager appeared to embrace this technology. One manager reported taking a more conservative approach to incentivizing any T-LED products.

When Opinion Dynamics specifically asked program managers if they expected similar T-LED products to make inroads into the maintenance market and replace existing 32W T8s, they were split. Two out of six believed that the product cost was still too high compared to a standard lamp replacement for it to be cost-effective for customers to leap frog from 32W T8s to T-LEDs. Another two felt that the public's general awareness and interest in LEDs could be enough alone

to overshadow reduced wattage T8s, and the remaining two felt that the products might not be competitive now but that they would be very soon.

The analysis of the participating distributor sales data shows the presence of T-LED sales as early as 2012. The sales volumes have been very low based on the data provided to us. It is unclear, however, how consistently distributors reported T-LED savings to the program.

With these findings in mind, the evaluation team advises NEEA to closely monitor the rapidly changing lighting market to ensure the future viability of the program amid growing interest in and use of LEDs.

4.4 PROGRAM IMPACT ON REDUCED WATTAGE T8 SALES

The RWLR demonstration project was designed as a market shift program, where distributors receive incentives for sales of reduced wattage T8s above and beyond an agreed-upon historical baseline. Incentives were provided in the amount of $0.40 per incremental lamp. A bonus incentive structure provided an additional $0.10 per incremental lamp sold above 20% of the baseline. Distributors had the freedom to choose how they would use the incentives. They could pass them along to customers, incentivize sales staff, or simply add them to their bottom line.

The program provided additional stipends to assist with the costs of setting up sales data capture and transfer, marketing, and other expenses. Program staff also developed a lighting calculator that distributors could use when selling to customers to make a financial case for reduced wattage T8s.

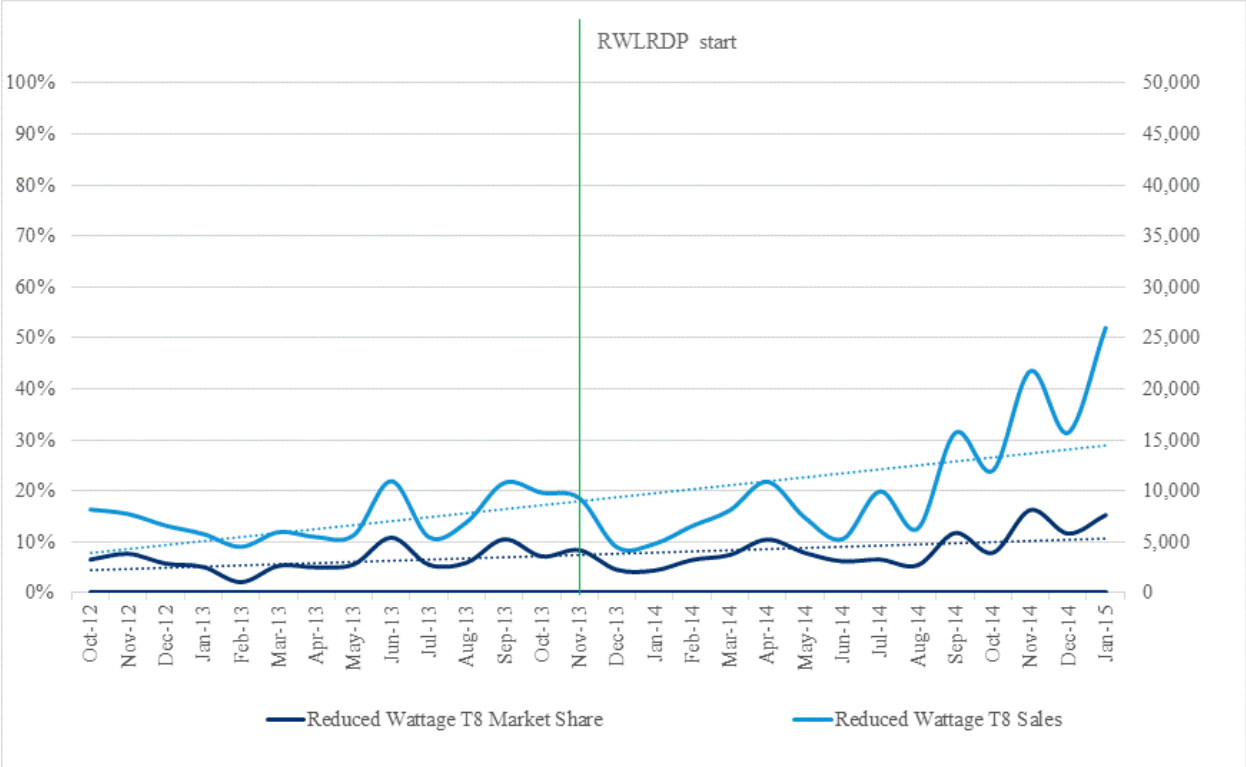
True program impacts on sales are best assessed through a sales shift modeling analysis that employs a comparison group. Unfortunately, the evaluation team could not identify and use such a group to evaluate the RWLR demonstration project. Opinion Dynamics explored the possibility of using non-participating locations of participating distributors as a comparison group. However, the analysis of the non-participating locations of participating distributor, sales volume, and sales trends over time revealed considerable differences from the participating locations. Furthermore, as the program progressed, most of the non-participating locations of participating distributors became participating locations, making the modeling analysis impossible.

Instead, to assess program performance and isolate impacts, the evaluation team explored historical sales trends, compared them to the agreed-upon baselines, and explored the program's impact on sales and stocking practices of participating distributors. The team developed case studies for each participating distributor that provide empirical evidence of the program influence, or lack thereof, on sales trends of reduced wattage T8s. A summary of the results is provided below.

An analysis of the participating locations of participating distributors reveals that sales and market share of reduced wattage T8s increased over time, especially in the last few months (see Figure 8). While the increase in sales of reduced wattage T8s can be explained by a range of factors, it is feasible that the shift was partially due to program activity.

Average market share of reduced wattage T8s was 6% during the year prior to the program but increased to9% during the program period. While this growth is seemingly small, the shift represents a 56% increase.[3] Overall sales data vary widely over time, making pattern identification and comparison difficult when looking at monthly sales.

Figure 8. Monthly Sales and Market Share of Reduced Wattage T8s Over Time – Participating Locations

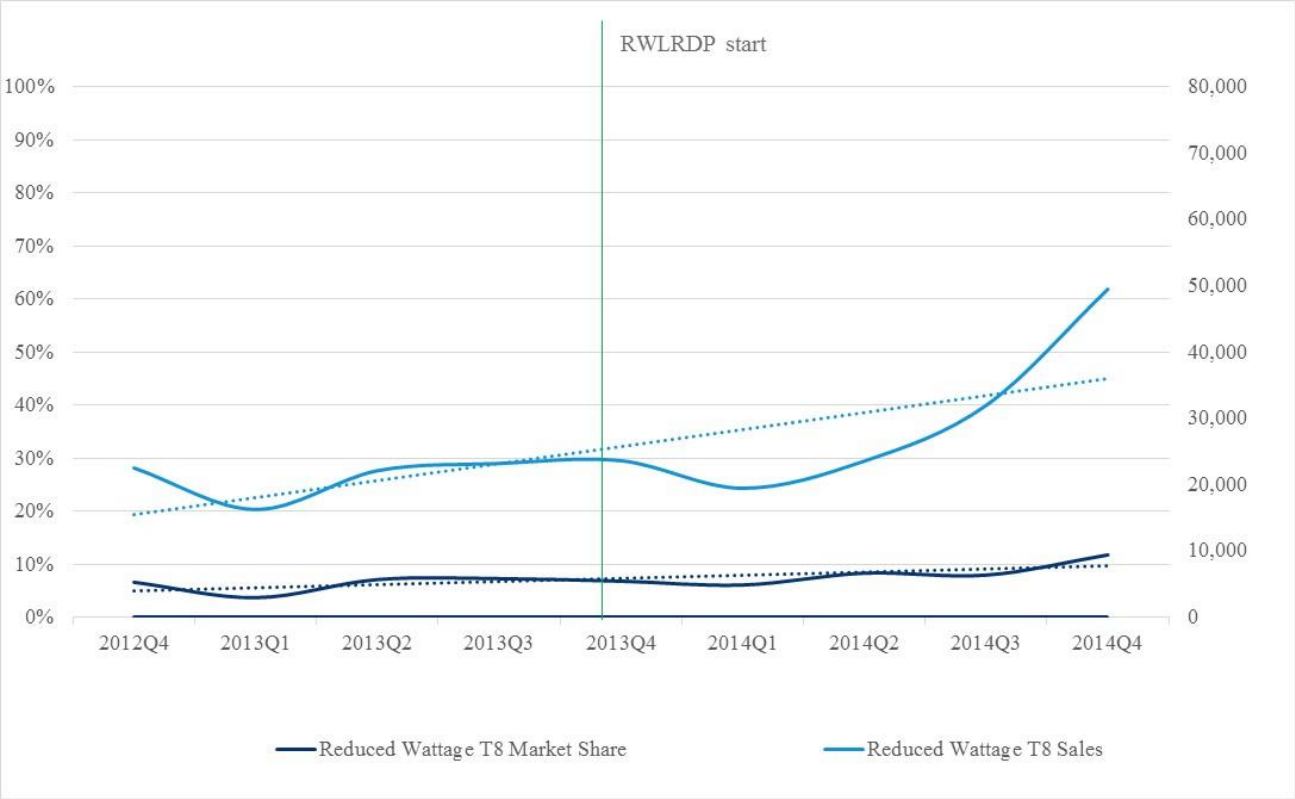


Notes: Opinion Dynamics sales data analysis for 5 participating distributors (118 participating locations).

Looking at the reduced wattage T8 sales at an aggregate (quarterly) level provides a more clear picture of sales trends, and more specifically, an increase over time in sales volume and a slight increase in the market share.

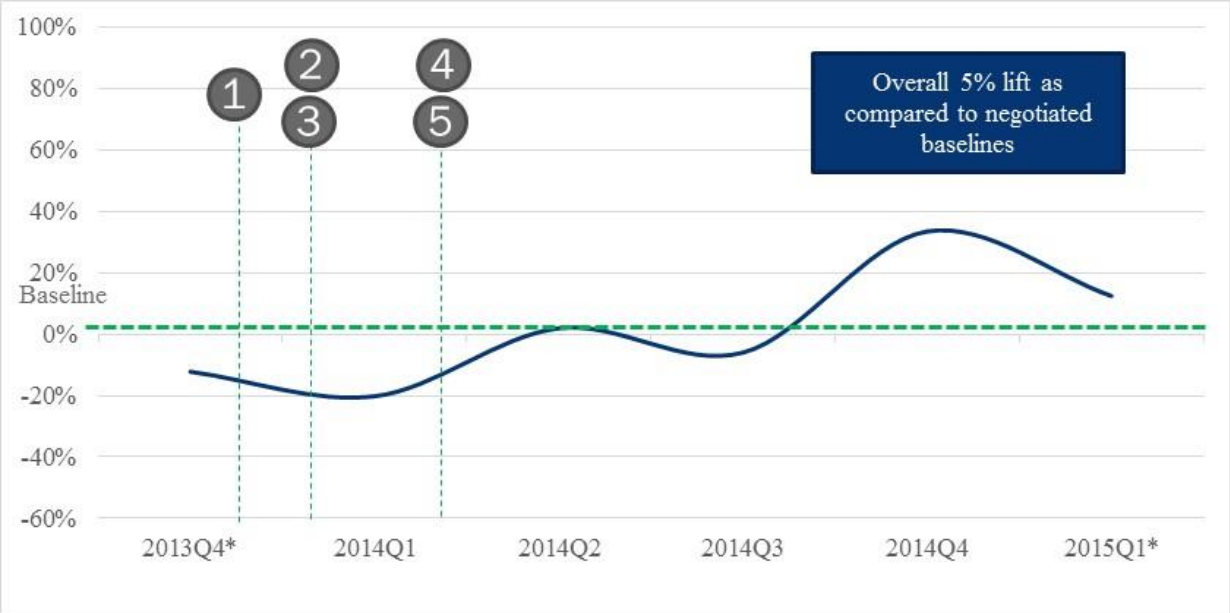
[3] The historical period was uniquely defined for each distributor, because of the different timeline for participation in the program. The percent change in reduced wattage T8s was calculated for each participating distributor individually. To arrive at the overall percent shift in reduced wattage T8s, we weighted each individual distributor's results by the percent contribution of that distributor to the overall reduced wattage T8 sales.

Figure 9. Quarterly Sales and Market Share of Reduced Wattage T8s Over Time – Participating Locations



Comparison of reduced wattage T8 sales relative to the negotiated baseline produced similar results, indicating that the negotiated baselines are quite similar to the historical baseline. During the program implementation period, participating distributors achieved a 5% overall shift in reduced wattage T8 sales as compared to the negotiated baseline (see Figure **10**) at participating locations. Much of the shift was achieved in the last four months after the program ramped up its activity. However, even then, performance was uneven month-to-month.

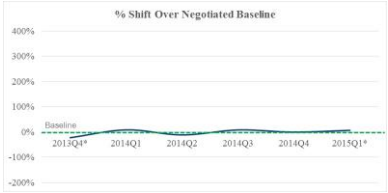
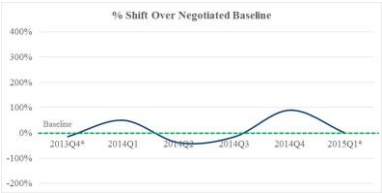
Figure 10. Percent of Reduced Wattage T8 Sales as Compared to the Negotiated Baseline



Notes: Opinion Dynamics sales data analysis for 5 participating distributors (118 participating locations). Grey circles indicate when different distributors enrolled in the program.
*Indicates partial quarter (less than three months)

Table 5 shows that each distributor's performance against its negotiated baseline was inconsistent and varied over time. Three out of five participating distributors achieved positive shift ranging from 5% to 27%. One distributor did not achieve any shift (0%), and one had a negative shift (-6%).

Table 5. Sales Shift Trends by Distributor

Distributor	Sales Shift Trend (As Compared to the Negotiated Baselines)	% Sales Shift from Negotiated Baseline
1		<1%
2		27%
3		16%
4		5%
5		-6%

*Indicates partial quarter (less than three months)

Despite the somewhat erratic performance of the program, participating distributors acknowledged the value of the program in driving the sales of reduced wattage T8s during the interviews with them. One distributor specifically mentioned that, prior to the program, sales staff were not mentioning reduced wattage T8s to customers. Since the program start, there was a concerted effort to make 28W T8s the new standard within the sales group. Another distributor mentioned making changes to the ordering system to include automatic prompts to sales staff to mention reduced wattage T8s.

The mystery shopper telephone survey results suggest a different level of effort on behalf of distributors in selling reduced wattage T8s. The survey revealed that, in general, distributor sales representatives did not attempt to upsell reduced wattage T8s and were providing quotes and filling order as requested by customers, which is consistent with the existence of supply-side inertia. More detailed mystery shopper survey results are provided in Section 4.7 of this report.

4.5 MARKET SHIFT PROGRAM DESIGN AND ALTERNATIVE PROGRAM MODELS

Based on the sales data analysis and interviews with participating distributors, Opinion Dynamics determined that the market shift program design initially deployed by the RWLR demonstration project is not a viable program design option for several core reasons.

- **Variability in sales.** Historical baselines were set based on lamp sales during a representative period in the past. However, the evaluation team's review of the sales data identified a high degree of variability in sales over time, which made setting an accurate baseline challenging. Distributors attributed sales spikes to a variety of factors, the most common being large retrofit projects, utility program cycle end, and customer budget surpluses at the end of a fiscal year. In fact, during the program implementation period, baseline sales for one of the participating distributors were inflated due to a large order and had to be accounted for. While in some cases large orders like that are obvious, there may be cases where variability in sales may not be quite as prominent, making accurate adjustments challenging. The use of non-participating locations to set baselines is also not a viable option as those locations also experienced a high degree of variability in sales volumes.

- **Baselines set in absolute terms.** Historical baselines were set in terms of absolute sales, and incentives were provided on a per-lamp basis above the baseline. This approach is problematic given the eroding sales of T8s over time. A market penetration approach based on an individual distributor's overall sales of T8's might be more appropriate because it effectively controls for the downward trend of standard T8 sales. This market share approach to setting program goals may also help partially mitigate heavily fluctuating lamp sales over time.

- **Cumulative approach to goal achievement.** As part of the program requirements, if a distributor underperforms in a given month and sells less than the baseline, the balance gets rolled over to the next month, increasing the goal that the distributor has to meet to receive incentives that month. This approach puts distributors in "debt" with regard to the baseline, making it harder to "repay" it and receive incentives.

- **Payment of incentives after goals are met.** While distributors have the freedom to use the incentives as they choose, given that NEEA program incentives are only issued when distributors achieve a positive shift in sales compared to the baseline, distributors must invest their own money upfront to promote the sales of reduced wattage T8s. Distributors were hesitant to do this in case they did not meet their goal, which would mean that they did not receive the later payment to cover these costs. None of the participating distributors used the incentives to either pass it along to the customers or incentivize sales staff. One distributor specifically mentioned that not having a committed incentive that could be applied toward lamp cost was the primary reason for lack of performance within the program.

An alternative to the RWLR demonstration project's "market shift" design is to provide incentives on a per-lamp basis regardless of the historical baseline. This alternative design is used in Massachusetts and Vermont, the two states with a considerable track record running a similar type of program. Based on the interviews with program administrators and implementer staff from these two states, Opinion Dynamics learned that paying incentives on a per-lamp basis resulted in effective execution and rapid transformation of the T8 market. Deploying this "simple incentive" design would give distributors more flexibility in terms of incentive use. Table 6 provides a comparative overview of the Massachusetts and Vermont programs. As can be seen from the table, both programs engaged all distributors in the state and have been overperforming against the set goals.

It is important to note that the total cost of implementing a "simple incentive" design can be considerably higher than that of the "market shift" design due to the need to incentivize all lamp sales and not just those above the baseline, as well as due to the need to track additional data. Reduced wattage T8 incentive levels have been set at $2 per-lamp in both Massachusetts and Vermont, which is much higher than RWLR demonstration project's $0.40 per-lamp **above the baseline** incentive.

Table 6. Massachusetts and Vermont Upstream Commercial Lighting Program Comparative Overview

Program name	Bright Opportunities Program	SmartLight Program
State	Massachusetts	Vermont
Implementation contractor	Ecova	Efficiency Vermont
Program start year	2011	2008
Product offerings	28W and 25W T8 lamps, T5HO lamps, 28W and 25W U-bend lamps, LED lamps (PAR, A-line, MR16, and decorative lamps) and fixtures	28W T8 lamps, 26W T5 lamps, T5HO lamps, reduced wattage CFL lamps, metal halide lamps, LED lamps (PAR, globe, A-lamps, MR16, candle, decorative)
Requirements for participating distributors	Must be a distributor operating in Massachusetts Must agree to the lighting sales data reporting requirements	Must be a distributor with a location in Vermont Must agree to the lighting sales data reporting requirements
Total number of participating distributors	110	33
Percent of distributors in state participating	100% Distributors joined the program to stay competitive	100% Distributors joined the program to stay competitive

Program name	Bright Opportunities Program	SmartLight Program
Program incentive structure	Incentives can only be offered to non-residential customer with electric service in Massachusetts Fixed lamp/equipment specific incentive ($2 for linear fluorescent lamps, $10–$30 for LED lamps, $25–$50 for LED retrofit kits, $150 for LED stairwell kit with sensor) Minimum customer contribution required at point of sale to prevent stockpiling ($1 for linear lighting, $5 for LED lamps and retrofit kits, and $25 for LED stairwell kits with sensor) Distributors have the freedom to use incentives as they see fit, however most pass them along to customers to stay competitive	Incentives can only be offered for sales to Vermont-based customers (both commercial and residential customers) Fixed lamp/equipment specific incentives ($2 for 28W T8s, 26W T5s, reduced wattage CFL, and 50–1W T5HO, $3 for < 50W T5HO, $10–$20 for metal halide lamps, $4–$35 for LED products) Minimum customer contribution of $4.99 for LED products; no minimum customer contribution for the other products Residential sales are limited to 12 products per transaction; commercial sales are limited to 250 products per project Distributors have the freedom to use incentives as they see fit, however most pass them along to customers to stay competitive The program provides a small administrative incentive to distributors for processing and submitting sales data Two promotional efforts (very successful) where distributors received additional incentives for increasing energy efficient product sales over the historic baseline
Tracking data requirements	Sales data of program-incented equipment should be submitted monthly	Sales data of program-incented equipment provided monthly, with some flexibility based on sales volume and distributor needs
Marketing and outreach tactics	Targeted marketing offered through Mass Save and approved by the Massachusetts Program Administrators Co-branded marketing	Cooperative advertising program (program covers half the cost of ads)
Distributor training	Limited to training on sales data structure and sharing	
Program barriers/challenges	Distributor delays with providing sales data in a timely manner Lengthy incentive processing timelines (~60–70 days after making lighting sales) Inability for distributors to offer more customized marketing Incentives	Aside from distributor difficulty providing sales data, reported program challenges have been minimal
QA/QC	Select site visits	Select site visits

Program name	Bright Opportunities Program	SmartLight Program
Overlap with other commercial lighting programs in the state	None with the prescriptive lighting program, measure offerings are unique to the upstream program Possible overlap with the custom lighting program, but the program has processes in place to not double count the savings	None with the prescriptive lighting program, measure offerings are unique to the upstream program Possible overlap with the custom lighting program, but the program has processes in place to not double count the savings
Interviewee-reported program impact	The program has been overperforming against the set goals The program has been successful in transforming the T8 market to reduced-wattage T8s in Massachusetts; the program plan on dropping reduced wattage T8s in the coming year	The program has been overperforming against the set goals The program has been successful in transforming the T8 market to reduced-wattage T8s in Vermont; the program plan on dropping reduced wattage T8s in the coming year

The RWLR demonstration project began using the simple per-lamp incentive design in the summer of 2014 for one distributor. Program staff are in the process of shifting to this design for the remaining distributors. NEEA is also offering additional bonus payments for market share targets in addition to per-lamp incentives. Given the empirical evidence, Opinion Dynamics agrees that this change in program design was warranted. One challenge of this design is that, without a baseline, it is harder to attribute sales of reduced wattage T8s to the program. Massachusetts and Vermont programs, and a similar program in Illinois, require distributors to collect and provide the program with contact information for all customers that purchased discounted T8s through the program so that evaluators can conduct traditional self-report and net-to-gross surveys to assess program influence on those purchases. This report includes recommendations for the type of program-tracking data that NEEA should collect with this new program design in a later section.

4.6 PROGRAM PARTICIPATION PROCESS

All five distributors were satisfied with the upstream design of the program. One of the participating distributors said that by directly incenting distributors instead of manufacturers or end users, the program reduced the time and effort, and effective participation costs, of participating in the program, since they did not have to fill out multiple forms for clients to receive incentives. However, the change in incentive structure may necessitate additional data-tracking requirements.

All five distributors also consistently expressed high levels of satisfaction with their interactions with program staff. They found the program staff to be very accessible and helpful in answering questions, providing marketing and training support, and being open to proposed changes to the program design.

Satisfaction with incentive levels is high across the board, despite the fact that not all distributors were able to achieve a positive shift in sales as compared to their baselines.

All distributors also reported high levels of satisfaction with sales data reporting and transfer, and found the process to be smooth and easy.

Most (three of five) distributors reported using NEEA's tools (lighting investment calculators and marketing templates) and being satisfied with them. Two participating distributors reported using NEEA's marketing templates to create internal as well as external marketing materials. One distributor used NEEA templates for customer communications. One distributor specifically highlighted the value of the program staff efforts with marketing. The reported effectiveness of those tools on increased sales of reduced wattage T8s was mixed.

"And I personally and I think I speak for [distributor name redacted], we really like this kind of a program because it eliminates a lot of the paperwork and time if we're being allowed to sell the product because we're really good at it. So I think the communication we've had with NEEA, with Andre, with Elaine, with that team they've helped us with marketing. They've helped us with ideas for fliers. They've gone into our branches and talked to the branches independently about our involvement in the program and why it's important. And that lends way to what we talk about to our customer."

"We had a good working relationship and still do. We did receive some materials from them. We printed a brochure and sent it out to every one of our customers. I had personal input to it, thought it was really good looking and one of our best flyers that we've ever sent out and we got one response, one. So no matter how much price of ownership I could possibly put into this, it had pretty dismal results."

4.7 BARRIERS AND MOTIVATORS TO PROGRAM PARTICIPATION

Opinion Dynamics identified a range of barriers to increased adoption of reduced wattage T8s, as well as distinct motivators to program participation. Findings presented in this section include feedback from a range of interviewed stakeholders, namely participating and non-participating distributors, lighting maintenance contractors, and property managers and building operators.

Barriers

Initial cost. Initial cost was considered to be the largest barrier to increased reduced wattage T8 sales across all market actors interviewed as part of the evaluation. Four out of eight property managers and six out of ten lighting maintenance contractors explicitly cited cost as the driving factor in their (or their clients') selection of lighting products. While prices for reduced wattage T8s are not substantially higher when compared to standard 32W T8s, large orders are routinely specified as part of fixed budgets, so selling a higher-cost product becomes a significant challenge. This is exacerbated if the purchaser does not control the amount of money that can be spent on lighting.

Performance of reduced wattage T8s. A number of market actors voiced concerns with the performance of reduced wattage T8s, such as performance in cold weather; dimming applications; and areas with a lot of air movement, such as near fans. One of eight property managers/building operators noted the slow start up of reduced wattage T8s and issues with discoloration of the bulb. One of four non-participating distributors that commented on barriers to greater reduced wattage T8 adoption noted that reduced wattage T8s do not perform well in the cold, one mentioned reduced light output of reduced wattage T8s, one mentioned issues with bulb discoloration, and one mentioned differences in color rendering. One out of ten lighting contractors we spoke with noted trouble with reduced wattage T8s not working with existing ballasts, two mentioned that reduced wattage T8s produce less light, one mentioned that reduced

wattage T8s do not work well in warm areas, and one mentioned that reduced wattage T8s do not work well in low temperatures. Distributors, reported that 32W T8s are preferable in applications that need a lot of light, such as industrial applications.

Lack of awareness and familiarity with technology and demand-side inertia. Distributors and maintenance contractors reported that end-use customers rarely understood reduced wattage technology, let alone actively seek it. Two out of six non-participating distributors and one out of five participating distributors mentioned the need for customer education. Furthermore, two participating distributors noted that few customers knew enough or actively sought reduced wattage T8s. Two out of ten maintenance contractors specifically mentioned that most of their customers oftentimes do not have sufficient knowledge of reduced wattage T8s to research or request it. Contractors themselves were not always sufficiently familiar with the technology and its benefits. Overall, six out of ten contractors were either only somewhat knowledgeable or not very knowledgeable about reduced wattage T8s. Two out of ten contractors explicitly admitted to not having a sufficient level of knowledge about reduced wattage T8s.

Not all interviewed property managers and building operators were familiar with reduced wattage T8s either. One out of eight property managers and building operators was unaware of reduced wattage T8s. Those who knew were not very knowledgeable about the technology.

One participating distributor mentioned end user reluctance to break the set purchasing habit and switch to more energy efficient technologies.

> "What we found is that the challenge has been in getting that message out to our customers and our associates. In spite of the marketing and the direct mailing and the emailing broadcasts that we've done, a lot of people are just creatures of habit. If they purchased three cases of 32-watt T8 lamps the last time they placed an order, they're inclined to make it easy and not take the extra step to explore what options might be available."

One contractor provided similar feedback about their sales and stocking practices.

> "You get into the habit of using certain lamps and you know we've kind of dialed in all of our customers pretty much we use the – we are down to about three to four different T8 light bulbs such as our go to."

Existing misconceptions about reduced light output. Lack of awareness and knowledge leads to misconceptions about the lighting output of reduced wattage T8s. Two out of ten contractors, and one of six non-participating distributors thought that replacing standard wattage T8s with reduced wattage T8s would reduce the light output. One of the contractors said the following:

> "The only time I use low wattage products is when someone wants less light, and that is not very often."

Low per-bulb savings. Contractors reported that energy savings resulting from reduced wattage T8s were not appealing enough to convince end users to pay more. More specifically, three out of ten contractors voiced this sentiment. One contractor specifically mentioned that higher upfront costs make the payback period not worth the investment.

Supply-side inertia and lack of knowledge. Supply-side inertia is visible and, paired with the lack of knowledge among distributors about reduced wattage T8s, presents a major barrier to program success. Non-participating distributors who sell directly to end users (three out of four) reported that they had a lot of sway in the type of bulb the customer chooses, yet they also reported that they did not push reduced wattage T8s. Reasons include focus on LEDs and the need to sell through the existing inventory of T12 and 700 series T8s.

As part of the mystery shopper research, participating distributors did not attempt to upsell reduced wattage T8 products. More specifically, none of the twelve distributors that were called mentioned reduced wattage T8s as an alternative to the T12s and T8s in the quote request. Upon probing, three of the five contacts at participating distributor locations were able to provide information on reduced wattage T8s, including a price quote. One of the five recommended LED tube lighting as an alternative, and one reported not stocking reduced wattage T8s and did not provide any additional information. One participating distributor location did not stock reduced wattage T8s. However, the nature of the inquiry did not allow the evaluation team to probe further. Of the two contacts that the evaluation team spoke with at non-participating branches of participating distributors, one reported not stocking reduced wattage T8s, while the other had little knowledge of the technology.

The evaluation team also included non-participating distributors in the study. Four of out five did not mention reduced wattage T8s, of whom two were able to discuss reduced wattage T8s, and two had little knowledge of the technology and could not discuss it. One out of five distributors specifically recommended standard wattage T8s.

In response to a request for a quote on T12 lamps that were being phased out because of federal regulations, four of the twelve distributors suggested retrofitting those lamps with something else (one participating location of a participating distributor and three non-participating distributors). However, none of the four refused to sell Opinion Dynamics these lamps, although some mentioned that they might be hard to find or that they might not have the stock to fulfill the order.

Competing Priorities. Distributors had higher priorities than selling reduced wattage T8s. More specifically, distributors reported the need to sell through the phased-out inventory of T12s and 700 series T8s. One noted that generous utility incentives for LEDs took their focus away from reduced wattage T8s, and another noted that T8s make up a very small percentage of their overall inventory, and it is therefore not a focus.

> "The push for the LED lighting that's going to be the number one [challenge to selling reduced wattage T8s] because there's so much more marketing materials, there's more incentives from the manufacturer you know lighting manufacturers or fixtures manufacturers, LED—you know that's pretty much where the buzz in the industry is right now is the LED."

Need for uniform lamps and consistent light output. The evaluation team found there to be general unease among some market actors about trying a new product and reluctance to mix lighting products or stock multiple lamp types. Three non-participating distributors reported that they did not recommend mixing reduced wattage T8s and 32W T8s, because replacing standard

T8s with low-wattage T8s in a spot replacement scenario can create issues with luminosity and light color, as well as reduced life of the bulb due to older ballasts.

> "Low wattage T8 do not make sense in a spot replacement situation because the other lamps typically are standard wattage, and you can see a difference in the light between low wattage and standard wattage T8s.You wouldn't want to mix them."

Several (three out of eight) interviewed property managers and building operators reported being hesitant to stock different types of lamps, preferring instead a uniform lamp type to be installed across all fixtures in a facility.

Motivators

Distributors had several methods that they used to promote reduced wattage T8 bulbs. They focused primarily on the reduced cost of operation due to both energy savings and reduced replacement costs. Other benefits of reduced wattage T8s that some distributors highlighted included higher color resolution index values and lower initial costs when compared to LEDs.

Non-participating distributors expressed interest in finding out more about NEEA's RWLR program and saw it as an opportunity for their company. In addition, of six non-participating distributors who declined the interview, two nevertheless indicated interest in the program.

Several distributors provided suggestions about the type of support that NEEA could provide to encourage the sale of reduced wattage bulbs. One suggested that a rebate of $1 per lamp would increase sales of reduced-wattage T8s. Another noted that a dedicated individual that the distributors work with who could answer any questions and help guide them through the program would be helpful. A third distributor, a corporate contact, said that simplifying the legal contract would make it easier on her team. She also mentioned that allowing a sufficient amount of time between announcing a new program and launching it would allow for better planning and execution of the program. She expressed concerns about extremely large discounts that can encourage very low bulb prices and customers reselling bulbs and suggested that the program should solicit pricing information from distributors to ensure that customers pay at least half the value of the bulb so that they, as she put it, "have some skin in the game."

4.8 PROGRAM-TRACKING DATA CONSIDERATIONS

As part of the RWLR demonstration project, D&R, the program implementer, collected distributor sales data in the form of invoices and aggregated the data into a single Excel-based data source. D&R obtained and processed distributor sales data on a monthly basis. Data fields included:

- Distributor location

- Sold-to location (defined by zip code)[4]
- Item model number
- Shipment date (month and year)
- Quantity sold (bulbs/lamps)
- Price (acquired for only one distributor)

All distributors provided comprehensive data on the sales of 4' T8s, broken down by wattage. Some distributors also provided data on T5s, T12s, 8' T8s, U-Bend, LEDs, and other lamp sales. Distributors reported that, after an initial effort to set up the tracking templates and data-extraction mechanisms, data-tracking and -sharing practices were efficient and easy.

The data fields collected from distributors were sufficient to evaluate the market shift program design. However, as the program shifts to the alternative per-unit incentive design, the implementer will need to collect additional data to estimate program impacts, such as additional details on end users who purchased discounted reduced wattage T8s. As proven through the implementation of similar program designs in Massachusetts and Vermont, distributors are highly likely to pass at least a part of the incentive along to end users. In these cases, collecting customer information will support the evaluation of program net impacts. This type of data has been successfully tracked in similar programs in Massachusetts and Vermont.

As part of the data review process, Opinion Dynamics also assessed data accuracy and quality and worked with NEEA and the implementer to identify and correct any data gaps, omissions, or errors. The review and analysis of the most recent sales data extract identified very few inconsistencies.

Processing the sales data is a time-intensive task that requires a considerable number of manual manipulations. The implementer relies on Excel spreadsheets to store and process the data. Data field naming conventions and content within those spreadsheets vary from one distributor to another. The implementer uses a range of lookup tables to assign distributor locations and lighting products as program qualifying and non-qualifying. D&R manually revises those lookup tables as products change. Lamp classification and location classification, as well as other analyses are based on an Excel formula that the distributor needs to drag down to apply to the newly added data. Quality assurance and quality control procedures have also mostly manual.

As the program expands and the number of participating distributors grows, NEEA and the program implementer should consider automating sales data processing to avoid any potential errors, as well as to increase process efficiency. NEEA and the implementer should also consider embedding additional quality assurance processes to ensure that the data are accurate and error

[4]The sold-to location is tracked only after 2015. Zip code is the zip code of shipment address, not the installation address.

free. While these data tracking enhancements will be more costly, they may ultimately save staff time spent on manual data processing and quality control.

With the growth in the volume of data and the need for computational power to process it, Excel may not be the optimal tool given the amount of time it takes to process formula-based commands on large data sets. If NEEA were to choose to continue using Excel, Opinion Dynamics recommends that it is outfitted with new pivot table functionality and custom macros at the very minimum to ensure consistency in data processing and to identify and flag any issues with the data.

Opinion Dynamics also recommends that the implementer standardizes data field naming conventions and content across distributors so that the data can be easily appended without generating additional data fields or modifying the existing ones. As more distributors enroll in the program and as distributor locations move from non-participating to participating over time, it would be helpful to track these changes in a separate data field to avoid any confusion. Finally, creating an index and a data dictionary with definitions of the core data fields and values, as well as rules for assigning data values, will help ensure common understanding and transparency and eliminate any confusion and errors.

5. CONCLUSIONS AND RECOMMENDATIONS

This section presents the key conclusions and recommendations.

Conclusion: The RWLR program is a viable and needed effort given the remaining market potential and lack of competing interventions. The program's focus on the maintenance market is particularly relevant.

The evaluation results show that the T8 market is far from transformed. Based on the T8 sales projected as part of Cadeo Group's 2015 Reduced Watt Replacement Market Characterization and Baseline report, reduced wattage T8s represent a small percentage of overall T8 sales. More specifically, in 2011 reduced wattage T8s were projected to represent 14% of overall T8 lamp sales, and in 2016 they were projected to reach 20%. While the overall T8 sales are projected to decline over time, there is still considerable potential to capture market share. Overall declining T8 sales trends and slightly increasing reduced wattage T8 sales among participating distributors are consistent with the Cadeo Group's study. Overall, reduced wattage T8s represent 11% of participating distributor T8 sales. The interviewed distributors, contractors, property managers, and building operators generally favor the technology and consider it to be the best value on the market. And, while there is interest in LEDs as an alternative product, LEDs unlikely to gain significant market share for a while due to high prices and lack of experience with the technology.

The maintenance market is lagging behind the retrofit market, is generally underserved by the utility programs, and presents a particularly good niche for the RWLR program.

Recommendation: Evaluation results support NEEA's decision to expand the program. Opinion Dynamics does not have any additional recommendations related to this topic area.

Conclusion: The RWLR program's focus on distributors is a good strategy, although additional demand-side interventions would be beneficial in transforming the market.

Distributors represent the gateway to expanded use of reduced wattage T8s in the commercial maintenance market. Contractors purchase lighting products exclusively through distributors. Property managers and building operators we interviewed also purchase lighting products primarily through distributors, although some procure their lighting through contractors in addition to distributors. Through their contact with customers, distributors have a considerable degree of influence on end-user and contractor purchasing decisions. These findings validate NEEA's decision to focus the RWLR program on distributors as the core market actor segment. However, while distributors play a dominant role in the market, the evaluation research revealed that property managers and building operators frequently make decisions about the types of lighting products to purchase and therefore also represent an important target for the program. Lighting contractors also exerted some influence over customer decisions, although to a much lesser extent than distributors. Manufacturers were a source of information for some distributors, lighting contractors, property managers, and building operators. In addition to the supply chain actors, utilities presented a valuable source of lighting information, especially for contractors.

Recommendation: Evaluation results support NEEA's decision to include manufacturer and demand-side interventions in the RWLR program. Opinion Dynamics recommends that NEEA considers such outreach mechanisms as trade shows, trade publications, and promotion through trade associations, as well as collaboration with utilities' energy efficiency programs. These sources were most frequently mentioned by property managers and building operators, as well as by contractors.

Conclusion: The market shift program design is <u>not</u> a viable program strategy.

Variability in sales over time and declining overall T8 sales made the baseline approach difficult to implement. In addition, the cumulative approach to goal achievement, where unachieved baseline sales were carried over to the next month, can be demoralizing. Payment of incentives after goals were met also discouraged distributors from applying incentives toward lamp costs due to concern that they would not be reimbursed if they did not reach their goal. A viable alternative to this market shift design is paying incentives on a per-lamp basis regardless of the historical baseline. Such a design guarantees that distributors receive incentives and allows them to pass the incentives along to custmers to offset higher costs of reduced wattage T8s without the fear of not being reimbursed for them. The use of this program design in Massachusetts and Vermont resulted in the effective execution and rapid transformation of the T8 market.

It is important to note that the total cost of implementing a "simple incentive" design can be considerably higher than that of the "market shift" design due to the need to incentivize all lamp sales and not just those above the baseline, as well as due to the need to track additional data. Reduced wattage T8 incentive levels have been set at $2 per-lamp in both Massachusetts and Vermont, which is much higher than RWLR demonstration project's $0.40 per-lamp **above the baseline** incentive.

Recommendation: Evaluation results support NEEA's decision to shift to the simple per-unit incentive program design in the near future. A decision to offer additional bonus payments for distributors that achieve their market share targets can provide an additional impetus to promote reduced wattage T8s. Opinion Dynamics recommends, however, that NEEA collects additional data, more specifically, details about end users who purchase discounted lamps, in cases where distributors pass incentives along to customers, to be able to assess program net impacts.

Conclusion: Program processes ran smoothly and resulted in high distributor satisfaction and praise for the program team. The program was also able to successfully set up and execute data collection and acquisition. Data processing systems, however, will greatly benefit from additional automation as the program expands.

The RWLR demonstration project achieved great success in developing and maintaining positive distributor relationships. Participating distributors were highly satisfied with the program design, incentive levels, data requirements, and program support, and with their relationship with program staff.

The program implementer was able to obtain and process the needed sales data. Participating distributors said that after an initial effort to set up the tracking templates and data extraction mechanisms, data-tracking and -sharing practices were efficient and easy. Data processes, however, used a fair amount of manual manipulations and Microsoft Excel-based formulas. Quality control and assurance procedures were also manual. As the program expands, however, it will become more and more time-consuming to process the sales data, and limitations with Excel may slow down the process. The potential for error associated with manual data processing practices will also increase with the increase in data volume.

Recommendations:
The following are the recommendations for improving data tracking and processing. These recommendations are based on our review of the data tracking system at a single point in time. According to the program staff, these recommendations have been adopted.

1. *Automate data processing steps and quality assurance processes.*

2. *Switch to a more rigorous database tool for data tracking. If NEEA chooses to continue using Excel, Opinion Dynamics recommends that NEEA employs new pivot table functionality and custom macros at the very minimum to ensure consistency in data processing and to identify and flag any issues with the data.*

3. *Standardize data field naming conventions and content across distributors so that the data can be easily appended without generating additional data fields or modifying the existing ones. As more distributors enroll in the program and as distributor locations move from non-participating to participating over time, it would be helpful to keep track of these changes in a separate data field to avoid any confusion.*

4. *Create an index and a data dictionary with definitions of the core data fields and values, as well as rules for assigning data values to ensure common understanding and transparency and to eliminate any confusion and errors.*

Conclusion: Sales of reduced wattage T8s relative to the negotiated baseline show limited success, likely due to variability in sales over time and the program design. Rising reduced wattage T8 sales and market share and interest in the program are encouraging, but a range of barriers stands in the way of the program's success.

Distributor performance against the negotiated baselines was limited to a few high-performing months, which resulted in an overall shift of 5% from November 2013 to January 2015. An overall increase in shift occurred later in the program implementation, and this later increase is primarily due to a single distributor. Overall, compared to the negotiated baseline, three of the five participating distributors achieved a positive shift ranging from 5% to 27%. One distributor did not achieve a market shift (<1%), and one had a negative shift (−6%). Month-to-month sales performance was erratic due to highly fluctuating sales. While some distributors reported that the program influenced how they promoted reduced wattage T8s, a mystery shopper study revealed that, in general, distributor sales representatives did not attempt to upsell reduced wattage T8s and were filling orders as requested by customers. It is likely that the limited performance was

caused by the market shift program design, as increasing sales and market share of reduced wattage T8s offered reassurance of the program's future performance. Non-participating distributors also showed interest in the program.

A range of barriers, including initial cost, supply-side and demand-side inertia, concerns with lamp performance, and lack of knowledge were the core barriers to the technology adoption. These barriers were consistent with those that NEEA identified and developed interventions around as part of the RWLR demonstration project.

Recommendation: While the per-unit incentive design will help address the initial cost barrier, NEEA should continue to seek opportunities to educate distributors, contractors, and end users about reduced wattage T8s and their performance, thus dispelling any misconceptions and concerns with the technology and placing the product top-of-mind.

REFERENCES

Navigant Consulting, Inc. 2014. *Non-Residential Lighting Market Characterization.* Boulder, CO.

Cadeo Group. 2015. *Reduced Watt Lamp Replacement Market Characterization and Baseline*. Washington, DC.

A. APPENDIX: DISCUSSION GUIDES

PARTICIPATING DISTRIBUTOR GUIDE

[Note to Reviewer] The Interview Guide is a tool to guide process evaluation interviews with participating commercial and industrial lighting distributor locations in NEEA's RWLR-Demonstration Project. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual plays in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped.

Introduction

Hi, may I please speak with [NAME]? My name is ___ and I'm calling from Opinion Dynamics. We are part of the team hired to conduct the evaluation of NEEA's energy efficiency programs and we're currently in the process of conducting interviews with commercial and industrial lighting distributors. The questions will take about 20 to 30 minutes. May I speak with the person at your firm who is most familiar with your stores participation in the Northwest Energy Efficiency Alliance (NEEA) Reduced Wattage Lamp Replacement Demonstration Project? [IF NOT, SCHEDULE A CALL BACK.]

Thank you. May we record this conversation? While we may use selected quotes in our final reports, your responses will be kept strictly anonymous.

Participation and Overview

1. Can you briefly describe how your branch became involved in the RWLR pilot program?
2. What did you see as the primary benefits for participating in the program?

Incentive

3. Was the incentive of $.40/lamp enough to move the market? If not, what do you think the incentive should be?
4. NEEA gave participating distributors some latitude in how they could use the incentive dollars earned through the program. How did you use the funds at your location?
5. The incentive structure also required that each distributor location establish a "baseline" that distributors needed to hit before the incentive could be applied. Did you find any challenges with this approach? How could those challenges be overcome?
6. Did you experience any challenges in providing the data needed to establish the baseline and calculate the incentive?

Marketing

7. NEEA also provided a marketing stipend to each of the participating distributors. How did your company use the marketing stipend? Was the stipend adequate? If not, how could it be improved? How effective do you think your marketing approach(es) has been in increasing the sales of low wattage T8s?
8. NEEA also provided some marketing support in terms of templates and calculators. Did you use any materials or support offered by NEEA if so, how? Do you have any suggestions for how the marketing materials could be improved?
9. Aside from the energy saved by converting to RWT8s, what attributes of the T8s do you use as selling points, if any?
10. Do you receive any marketing support from the manufacturers you work with? What types of support do they provide? Do you think the support you receive from manufacturers is adequate? What could be improved?
11. Are there any other types of marketing materials that you use to sell fluorescent lighting generally? Do you have any special materials for RWT8s? Would it be possible for us to get copies of that marketing material?

Training

12. NEEA required that participating distributors provide training on the product and program requirements. Can you explain your approach for training staff? How many trainings did you host? How many staff were trained?
13. Were there any challenges in to providing the required training?
14. Do you have any suggestions for how NEEA could help improve the training?
15. Do you think your staff are knowledgeable enough to educate their customers about RWT8 products?

Sales

16. Based on the program data we see that RWT8s generally account for [RWT8AMNT] percent of the market share for T8 lamps? Is this correct?
17. What percentage of your sales are spot replacement versus full re-lamping projects? What are the challenges to selling RWT8 products in a spot replacement scenario vs. a full re-lamping situation? Also, what percentage are inside vs. outside sales? What are the challenges to selling RWT8 products in inside sales vs. outside sales situations?
18. Do you have any customers that could be described as “third party” lighting maintenance companies, which might purchase bulbs from you to install in their client’s locations?
19. In what market segments are your biggest clients? [EXAMPLES: schools and local government, office park, retail, restaurants, small industrial, large industrial, hospitals, etc.]

Benefits and Barriers

20. What are the major obstacles to selling more low wattage T8 bulbs?
21. Is there anything about these bulbs specifically do customers not like?

22. Do you think the emergence of LED products will impact your sales of T8 fluorescent generally and RWT8's specifically?
23. Thinking specifically about the lighting maintenance market (not new construction or major renovations), how long do you think fluorescent will be the dominant technology? When do you expect LED's to begin making headway into the maintenance market?
24. What, in your opinion, would be the best way for NEEA to help you increase sales of low wattage T8 bulbs in the maintenance market?

Satisfaction

25. How satisfied were you with the following components of the NEEA RWLR Project? For each characteristic I mention, please tell me if you were very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied.
    a. The incentive level provided by the project
    b. The trainings offered by the project
    c. Recommendations from the project to increase low wattage T8 sales
    d. Your interaction with the project team
    e. The project overall
26. Is there anything that you would like to see changed about the project?
27. Is there anything about the project that you think is working particularly well?

Corporate Structure

28. How is your corporation structured? Is it a hub and branch system, where the main office oversees satellite locations, or is each location more autonomous?
29. How free are staff at different locations to offer different prices, marketing materials, and sales techniques?

Firmographics

30. How many employees do you have at your location?
31. How long has your location been in business, in years? [Your best guess is fine]
32. Would you consider your location to be part of a national firm, a regional firm, a local firm, or something else?
33. In which utility territory(s) does this location usually sell bulbs?

Those are all the questions I had for you at this time! Thank you very much for speaking with me; your responses will be very helpful. Have a good day!

NON-PARTICIPATING DISTRIBUTOR GUIDE

[Note to Reviewer] The Interview Guide is a tool to guide process evaluation interviews with non-participating commercial and industrial lighting distributor locations in NEEA's RWLR-Demonstration Project. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual plays in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped.

Introduction

Hi, may I please speak with [NAME]? My name is ___ and I'm calling from Opinion Dynamics. We are part of the team hired to conduct the evaluation of NEEA's energy efficiency programs and we're currently in the process of conducting interviews with commercial and industrial lighting distributors. The questions will take about 15 minutes. May I speak with the person at your firm who is most familiar with the sales and marketing process at your location? [IF NOT, SCHEDULE A CALL BACK.]

Thank you. May we record this conversation? While we may use quotes in our final reports, your responses will be kept strictly anonymous.

Awareness

1. Before today's call, had you heard of Northwest Energy Efficiency Alliance (NEEA) Reduced Wattage Lamp Replacement Demonstration Project?
   [IF AWARE]
   a. Why did your firm decide not participate in the project?

Customer Relationship

2. Approximately, what percentage of your sales of T8 products involves sales directly to customers? In what market segments are you most likely to be working directly with the customer as opposed to sales through contractors or installers? [EXAMPLES: schools and local government, office park, retail, restaurants, small industrial, large industrial, hospitals, etc.]
3. Approximately, what percentage of your sales involve "third parties" such as contractors, installers, lighting maintenance contractors, which might purchase bulbs from you to install in their client's locations or resell? In your experience, what role do these third parties play for customers? [PROBE here for if they sign fixed-term contracts for lighting maintenance or if they actually make decisions about what is ordered]
4. To what extent do the customers you interact with have the ability to make the decision to switch from a standard 32W T8 to a reduced wattage T8?
   a. (IF LIMITED EXTENT) What challenges does this present for the push to sell reduced wattage T8s? How do you overcome these challenges?

Marketing

5. How do you typically promote linear florescent lights
6. How do you promote the reduced wattage T8 bulbs?
7. Do you receive any marketing support from the manufacturers you work with? What types of support do they provide? Do you think the support you receive from manufacturers is adequate? What could be improved?
8. Are there any other types of marketing materials that you use to sell fluorescent lighting generally? Do you have any special materials for reduced wattage T8s? Would it be possible for us to get copies of that marketing material?

Sales

9. What percentage of your T8 sales are reduced wattage bulbs? Has that percentage increased, decreased, or stayed the same over the past few years? Has it changed recently?
   a. [IF CHANGED] What factors do you believe contributed to the change?
10. What percentage of your reduced wattage T8 sales are spot replacement versus full re-lamping projects? What are the challenges to selling reduced wattage T8 products in a spot replacement scenario vs. a full re-lamping situation?
11. What percentage of your reduced wattage T8 sales are inside vs. outside sales? What are the challenges to selling reduced wattage T8 products in inside sales vs. outside sales situations?
12. What are the major obstacles to selling more reduced wattage T8 bulbs? Are there things about these bulbs that customers do not like?
13. Do you think the emergence of LED products will impact your sales of T8 fluorescent generally and reduced wattage T8's specifically? Why or why not?
14. Thinking specifically about the lighting maintenance market (not new construction or major renovations), how long do you think fluorescent will be the dominant technology? When do you expect LED's to begin making headway into the maintenance market?
15. My company has been hired by an organization that is interested in increasing the sales reduced wattage T8s sold in the maintenance market. As they continue to design their program, what kind of support could they provide that would help your store be able to sell more reduced wattage T8 bulbs?

Firmographics

16. How many employees do you have at your location?
17. How long has your location been in business, in years? [Your best guess is fine]
18. For each of the following types of customer, please tell me if you regularly sell them any type of fluorescent tube lighting, including but not limited to reduced wattage T8s? [by regularly, I mean sell at least one bulb per calendar month, on average]
    a. Large Industrial
    b. Small Industrial
    c. Commercial Office Space
    d. Commercial Retail
    e. Restaurants

f. Schools/Universities
g. Hospitals
h. Local Governments
i. 3rd Party Lighting Contractors/Installers

19. Would you consider your location to be part of a national firm, a regional firm, a local firm, or something else?
20. In which utility territory(s) does this location usually sell bulbs?

Those are all the questions I had for you at this time! Thank you very much for speaking with me; your responses will be very helpful. Have a good day!

UTILITY PROGRAM MANAGER DISCUSSION GUIDE

[Note to Reviewer] The Interview Guide is a tool to guide evaluation interviews with utility program managers in the Pacific Northwest about what programs currently incent or increase the use of Low Wattage T8 Lamps in their territories. This is in support of NEEA's RWLR Program and will be used to determine what niche role the NEEA program is filling.

Introduction

Hi, may I please speak with [NAME]? My name is ___ and I'm calling from Opinion Dynamics. We have been retained by NEEA to conduct the evaluation of their reduced wattage T8 lamp replacement program and we're currently in the process of conducting interviews with utilities to get a sense of if and how they incent low wattage T8 products. The questions will take about 10 to 15 minutes.
Would you be the best person at [UTILITY] to speak with about incentives for efficient lighting? [IF NOT, SCHEDULE A CALL BACK.]

Thank you. May we record this conversation? While we may use selected quotes in our final reports, your responses will be kept strictly anonymous.

Introduction

1. Can you briefly describe your role at [UTILITY]?

Programs

2. Has your company ever offered standard or prescriptive incentives for the purchase or installation of reduced wattage T8 lamps?
   a. If so, when did your company offer low watt T8s as a standard or prescriptive measure? Do you still offer them now?
   b. If so, has the incentive remained the same or changed in the past 2 years?
   c. If not, when did you discontinue them?
   d. [If 2=yes] Approximately how many low watt T8 lamps have you incentivized through your prescriptive or standard program annually? [prompt that guess is fine]
3. Has your company every offered upstream or midstream incentives for low watt T8 lamps?
   a. If so, when did your company offer upstream or midstream incentives for low watt T8s?
   b. Do you still offer them now?
   c. If so, has the incentive remained the same or changed in the past 2 years?
   d. If not, when did you discontinue them?
4. [If 2=yes] Approximately how many low watt T8 lamps have you incentivized through your upstream or midstream program annually? [prompt that guess is fine]
5. Does your company currently have any incentives or programs that may indirectly incent the installation of reduced wattage T8s, through retrofit or new construction/or design-based programs? [SKIP TO 8 if NO to both 3 and 4]
6. Do you have a sense of how many reduced wattage T8's would, in total, be incented by your programs? Your best guess is fine.

7. Are there any other ways that a low watt T8 could potentially be incentivized through your programs?

Benefits and Barriers

8. What are the major obstacles to selling more reduced wattage T8 bulbs?
9. Is there anything about these bulbs specifically that customers do not like?
10. Do you think the emergence of LED products will impact the maintenance (replacement) market for T8 fluorescents generally and reduced wattage T8's specifically?
11. Do you currently incent any linear LED products for non-residential customers?
    a. If so, can you describe your LED product incentives?
    b. If not, do you have any plans to do so in the future?

Those are all the questions I had for you at this time! Thank you very much for speaking with me; your responses will be very helpful. Have a good day!

LIGHTING CONTRACTOR DISCUSSION GUIDE

[Note to Reviewer] The Interview Guide is a tool to guide in-depth interviews with Lighting Maintenance Contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The interviews will be audio taped and transcribed.

Introduction

Hi, may I please speak with [NAME]? My name is ___ and I'm calling from Opinion Dynamics. We are part of the team hired to conduct research for the Northwest Energy Efficiency Alliance (or NEEA). NEEA would like to understand lighting trends and dynamics in the lighting maintenance market to refine and improve its energy efficiency offerings and feedback from you will be extremely valuable. This discussion will not take more than 15 minutes of your time. Your responses will be kept confidential and will be reported in aggregate (they will not be linked to your company). Do you have the time to talk now? [IF NOT, SCHEDULE A CALL BACK.]

Thank you. May we record this conversation? As I mentioned, your responses will be kept strictly anonymous and will not be attached to your company.

Screener

1. Is your company involved in performing interior lighting replacement in the commercial sector? [IF NO, TERMINATE]
2. Do you work in Washington, Montana, Oregon, or Idaho? [PROBE FOR SPECIFIC AREAS WITHIN WASHINGTON, MONTANA, OREGON, AND IDAHO] [TERMINATE IF DOES NOT OPERATE IN THESE STATES OR ASK TO BE TRANSFERRED TO SOMEONE ELSE IF RESPONDENT IS UNABLE TO SPEAK ABOUT THOSE STATES.]

Company Overview

For the rest of our interview, I would like for you to focus on the **lighting services** that you provide in commercial facilities in the **Northwest**, which we define as Oregon, Washington, Idaho and Montana market(s).[IF NEEDED: COMMERCIAL FACILITIES ARE NON-RESIDENTIAL AND NON-MULTI-FAMILY FACILITIES]

3. Does your company <u>only</u> provide maintenance, repair, and operations services or does your company also provide other lighting services, such as renovations, remodels, new construction, energy efficient upgrades, retrofits? [PROBE FOR THE FULL SPECTRUM OF SERVICES THAT THE COMPANY PROVIDES]
4. [IF COMPANY PROVIDES NON-MAINTENANCE SERVICES] If you were to provide a breakdown of your lighting sales across the various lighting service areas, what percent of sales are in lighting maintenance vs. other lighting work? [PROBE FOR BEST ESTIMATE]
5. Do you also provide services related to lighting control systems?

6. [IF COMPANY PROVIDES NON-MAINTENANCE SERVICES] I'm interested in your company's structure. Do you have a division that works just on maintenance (maintenance, repair and operations) and nothing else, or do employees work across a variety of service areas such as maintenance, retrofits, remodels, etc.?
7. Does your company have designated sales people?
8. [IF NO] Who is in charge of generating new sales leads and maintaining existing clients?
9. What types of certifications does your crew have? [E.G. CLASS II, JOURNEYMEN, APPRENTICE]

Customer Base

10. What types of commercial customers/facilities does your company typically service? [PROBE FOR BUSINESS SECTORS, TYPE (LOCAL VS. NATIONAL), FACILITY SIZES, AND FACILITY TYPES, FACILITY OWNERSHIP – LEASE VS. OWN]
11. [IF COMPANY PROVIDES NON-MAINTENANCE SERVICES] Thinking about the lighting maintenance market specifically, are the customers that you service different from your other customers? If so, how are they different?
12. When providing services to your commercial customers, do you primarily work with the building owners/operator, property management companies, or other contacts? [PROBE FOR A % BREAKDOWN IN TERMS OF TITLES AND PROBE FOR WHAT THE "OTHERS" ARE]
13. [IF COMPANY PROVIDES NON-MAINTENANCE SERVICES] Is this different in the lighting maintenance market specifically? If so, how is it different?

Maintenance Contract, Installation Practices, and Decision Making Processes

14. For lamp replacements, <u>who</u> ultimately decides what lamp to purchase? Describe the process of how this decision typically gets made.
15. How are your routine maintenance contracts with customers structured?
16. Are they fixed price contracts, cost reimbursement, or other types of contracts?
17. What is the typical contract time period? Is it different by customer type? If so, how?
18. Is replacement equipment type (e.g., standard wattage T8s vs. reduced wattage T8s) generally specified in contracts or is there flexibility with equipment choices? Is it different by customer type? If so, how?
19. Do contracts that include maintenance of lighting controls differ from those that do not? If so, how do they differ?
    a. [IF NO FLEXIBILITY] How would you go about making changes to the types of lamps you install? Who makes those decisions?
20. When a contract is renewed, do you revisit the type of equipment installed? How often do you suggest changes? Who must approve those changes?
21. Do you typically purchase the products for the customers or do they purchase them directly for you to install? [PROBE FOR VARIATION BY BUSINESS TYPE AND FACILITY TYPE]

    [IF CONTRACTOR PURCHASES LIGHTING EQUIPMENT]

    a. How do you typically order lighting equipment? Do you work with a distributor, or salesperson, or do you purchase equipment through retail channels (online or at the store)?

    [IF CONTRACTOR WORKS WITH A DISTRIBUTOR]

   b. Do you work with one or multiple distributors? Why do you work with more than one distributor?
22. Do your customers place maintenance orders with your company in-person, or is the process automated (e.g., online)? [PROBE FOR VARIATION BY FACILITY TYPE AND BUSINESS TYPE]
23. What sources of information do you use to learn about and stay up-to-date on the lighting products?
24. How are maintenance activities structured? What percentage of your customers replace lamps on burn out and what percentage replace lamps as group replacements? Is it different by facility type? What about business type? If so, how?
25. Do you have standing orders with the distributors/manufacturers for specific lighting technologies? If so, what influences the changes in the orders? [PROBE FOR CHANGES IN MAINTENANCE SPECIFICATIONS]

Sales of Linear Lamps

I would like to shift gears and talk about the types of lighting products that your company installs as part of its maintenance work. Unless I say otherwise, for the rest of the questions, please focus just on your maintenance contracts.

26. What percent of your lighting maintenance work involves linear fluorescent fixtures versus other types of fixtures?
27. What percent of the linear fluorescent fixtures are T8s?
28. What percentage of your T8 replacements sales are reduced wattage, 28 or 25 watt, T8s? [PROBE FOR BREAKDOWN BETWEEN 28W AND 25W T8S]
    a. [IF SOME INSTALL REGULAR WATTAGE T8s] Why do you not always install low wattage T8s? What would motivate you to move to using more low wattage T8s?
29. What percentage of your customers are now purchasing T-LEDs? What kinds of customers are most interested in T-LEDs? [PROBE FOR FACILITY TYPES AND BUSINESS TYPES]
30. Does your company encourage customers to install reduced wattage T8s as an alternative to standard wattage T8s?
    a. [IF YES, PROMOTE] When encouraging your customers to install reduced wattage T8s, how do you explain the benefits of the lamps over standard wattage T8s?
    b. [IF YES, PROMOTE] Please rank the benefits of reduced wattage T8s as you promote them to customers. [IF NEEDED, PROBE FOR ENERGY SAVINGS, LONGER LIFE SPAN, LUMEN OUTPUT, ETC.]
    c. [IF YES, PROMOTE] Do your customers ever go against your recommendation and stick with regular wattage T8s? If so, why? What are the barriers to the installation of reduced wattage T8s? [PROBE FOR COSTS OF LAMPS, CUSTOMER PERCEPTION THAT REDUCED WATTAGE MEANS REDUCED LIGHT OUTPUT, DIFFICULT TO CHANGE STANDING ORDERS WITH CUSTOMERS]
    d. [IF YES, PROMOTE] Are there some customer types who are less likely to follow your recommendation and install reduced wattage T8s? If yes, why do you think that is?

   e. [IF NO DO NOT PROMOTE] Why don't you encourage your customers to install reduced wattage T8s?
   f. [IF NO DO NOT PROMOTE] What would motivate you to encourage your customers to install reduced wattage T8s?
   g. [IF NO DO NOT PROMOTE] Are there other products that you encourage your customers to install as an alternative to standard wattage T8s?

31. What percentage of your maintenance customers still have T12s in use?
   a. [IF > 0% ASK] When servicing those fixtures, do you typically recommend replacement of T12 ballasts with an energy efficient ballast?
   b. [IF YES] What ballast do you install or recommend?
32. When replacing a T12 ballast with a T8 ballast, how often do you install reduced wattage T8 lamps versus standard wattage lamps?
   a. [IF > 0% ASK] What influences the recommendation of a standard wattage T8s, reduced wattage T8s, or other alternative, such as LEDs?
33. How knowledgeable would you say you/your staff/sales force is about reduced wattage T8s and their benefits?
   a. [IF COMPANY PROVIDES NON-MAINTENANCE SERVICES] Do you promote reduced wattage T8s to the same degree in the maintenance and the non-maintenance market or is your approach different based on the market? If different, why? What factors drive the differences? [PROBE FOR CUSTOMER PREFERENCES, CORPORATE DECISION MAKING STRUCTURE, CONTRACTUAL ISSUES, UTILITY PROGRAMS, CURRENT LIGHTING INVENTORY, ETC.]
34. What changes do you see happening to the linear fluorescent market in the future? Why? [PROBE FOR EMERGENCE OF LEDS. PROBE FOR DIFFERENCES BETWEEN NEW CONSTRUCTION AND MAINTENANCE] How quickly do you expect the market to start changing?
35. Do you think that reduced wattage T8s will remain a viable energy efficient alternative to standard T8s moving forward? Why do you say that?

Lighting Controls

[ASK IF CONTRACTOR PROVIDES LIGHTING CONTROL MAINTENANCE SERVICES]

I have just a few questions about lighting controls and then we will be done.

36. What percentage of your lighting maintenance work involves lighting control systems, such as occupancy sensors, timers or daylight sensing and dimming?
37. What percentage of your lighting maintenance customers have some type of automated lighting controls?
38. What types of maintenance are most common for lighting control systems?
39. When installing or maintaining controls systems, what are the key factors that affect how easy or difficult it is to install/maintain the system?
40. If you could change just one or two things about controls systems to make them easier to install, operate and maintain, what would you change?
41. How often do you encounter part replacement issues, such as mismatched parts, when performing lighting control system installations or maintenance?

42. How do you stay up-to-date on lighting controls, so that you can service them properly?
43. What changes do you see happening to the lighting controls market in the future? Why?
44. Have you heard of controls that are installed on a per-fixture basis rather than on a per-room or per zone basis? Do you have any experience with these types of controls?

Program Awareness

45. Are you aware of any energy efficiency programs that provide incentives for reduced wattage T8s either to contractors or end users? What about energy efficiency programs that provide incentives for reduced wattage T8s in the maintenance market?
    [IF YES]
    a. What are the programs? [PROBE FOR LOCATION AND PROGRAM DESIGN]
46. Are you signed up as a trade ally for any of these programs? If so, which programs?
47. Do you promote these programs among your customers? Why or why not?
48. How do you find out about these programs?

Firmographics

I would also like to learn a bit more about your company and then we will be done.

49. How many employees does your company have? And how many employees support your company's operations in the Oregon/Washington/Idaho/Montana market(s) specifically?

Those are all the questions I have. Thank you very much for your time!

PROPERTY MANAGER AND BUILDING OPERATOR DISCUSSION GUIDE

[Note to Reviewer] The Interview Guide is a tool to guide in-depth interviews with Property Owners and Managers. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The interviews will be audio taped.

Introduction

[IF NAME IS AVAILABLE] Hi, may I please speak with [NAME]?

[IF NAME IS NOT AVAILABLE] May I please speak with the person who is in charge of making decisions regarding the types of lighting technologies that are installed at your facility/facilities that you oversee? [IF NEEDED ASK FOR FACILITIES MANAGER, PROCUREMENT DIRECTOR, OR SOMEONE IN A SIMILAR POSITION]

My name is ___ and I'm calling from Opinion Dynamics. We are part of the team hired to conduct research for the Northwest Energy Efficiency Alliance (or NEEA). NEEA would like to understand lighting trends and dynamics in the commercial buildings to refine and improve its energy efficiency offerings, and feedback from you will be extremely valuable. This discussion will not take more than 15 minutes of your time. Your responses will be kept confidential and will be reported in aggregate (they will not be linked to your company). Do you have the time to talk now? [IF NOT, SCHEDULE A CALL BACK.]

Thank you. May we record this conversation? As I mentioned, your responses will be kept strictly anonymous and will not be attached to your company.

Company Overview

1. Does your company own or operate commercial buildings in Washington, Montana, Oregon, or Idaho? [PROBE FOR WHICH STATES] [PROBE FOR SPECIFIC AREAS WITHIN WASHINGTON, MONTANA, OREGON, AND IDAHO] [TERMINATE IF DOES NOT OPERATE IN THESE STATES OR ASK TO BE TRANSFERRED TO SOMEONE ELSE IF RESPONDENT IS UNABLE TO SPEAK ABOUT THOSE STATES]
2. For the remainder of the interview I would like to focus on commercial properties that your company owns and/or manages in the northwest region (Oregon, Washington, Montana, and Idaho).
3. Could you briefly describe your company and your role and responsibilities?
4. What facility types does your company own and/or manage? [PROBE FOR SECTOR AND SIZE]
5. [ASK ONLY OF PROPERTY MANAGEMENT COMPANY RESPONDENTS] Does your company own any of the facilities that it manages? If so, what percent of the facilities that your company manages does your company also own? Approximately, what percent of the total square footage does that represent?

Decision Making Processes

6. Who makes decisions about the types of lighting products that are used across the facilities that your company owns and/or manages?

   a. Are those decision making processes different by facility type or region? If so, how?
   b. Are those decision making processes different by type of lighting project? [TENANT IMPROVEMENTS AND MAJOR REMODEL, LIGHTING RETROFIT PROJECT, OR SIMPLE LAMP MAINTENANCE]
   c. Are those decision making processes different for projects that include lighting controls such as occupancy sensors or daylight sensors?
7. Do you have a system or procedure for planning lighting replacements or upgrades? Do those replacements and upgrades happen on an ad hoc basis or is it something that is generally scheduled to occur at certain intervals? What is the frequency? What factors drive it?
   a. Is this process the same or different for lighting controls?
8. What are the driving factors behind the selection of lighting products at your company's facilities?
   [IF NOT MENTIONED, PROBE FOR THE FOLLOWING]
   a. Do tenant preferences play any role? If so, what role?
   b. What about energy efficiency/green corporate policies?
   c. What about lighting product costs?
   d. What about availability of energy efficient technologies?
   e. What about federal standards and regulations?
   f. Is this process the same or different for lighting controls specifically? If different, how so? [RE-PROMPT ON TENANT ROLE, EFFICIENCY, COST, AVAILABILITY, CODES/REGULATION.]
9. What parties influence you and your organization on the decision on what lighting products to purchase and install?
   [IF NOT MENTIONED, PROBE FOR THE FOLLOWING]
   a. [PROBE ONLY IF THE RESPONDENT IS PROPERTY OWNER] Property management firms
   b. Electrical contractors
   c. Electrical distributors
   d. Lighting manufacturer representatives
   e. Lighting designers
10. Are these influencers the same or different for lighting controls? If different, how so? [RE-PROMPT ON PROPERTY MANAGEMENT FIRMS, ELECTRICAL CONTRACTORS AND DISTRIBUTORS, MANUFACTURER REPS, LIGHTING DESIGNERS.]
11. How easy or difficult is it to introduce new lighting technologies in the facilities that your company owns and/or manages? How does your company generally go about trying out new lighting technologies?
12. Where do you find information about lighting and lighting control products? [IF NEEDED, MENTION SPECIFIC TRADE PUBLICATIONS, NEWSLETTERS, WEBSITES, ORGANIZATIONS, VENDORS, ETC.]

Maintenance Contracts and Activities

13. Do you work with lighting maintenance contractors to facilitate lighting maintenance at any of the facilities that your company owns and/or manages, or is all lighting maintenance work performed by internal staff?

14. [ASK IF USE CONTRACTORS] Do the contractors that you work with make lighting purchases, or does your company purchase lighting products?
15. [ASK IF USE CONTRACTORS] How are your routine maintenance contracts with contractors structured?
    a. Are they fixed price contracts, cost reimbursement, or other types of contracts?
    b. What is the typical contract time period? Is it different by facility or contractor? If so, how?
    c. [PROBE IF CONTRACTORS ORDER LIGHTING] Is replacement equipment type (e.g., standard wattage T8s vs. reduced wattage T8s) generally specified in contracts or is there flexibility with equipment choices? Is it different by contractor or facility? If so, how?
        i. What role does owner maintenance product specification play in this transaction?
    d. Does this differ for lighting controls? If different, how so?
16. How are maintenance activities structured? In what percent of the facilities that your company owns/manages do you perform group replacement vs. on-demand replacement? Is it different by facility? If so, how?
17. [ASK IF PERFORM MAINTENANCE WORK INTERNALLY OR IF CONTRACTOR DOES NOT PURCHASE LIGHTING EQUIPMENT] For the lighting maintenance work that your company performs internally/for the lighting products that you purchase to maintain your current lighting, where do you obtain lighting products? Do you work with distributors, manufacturers, retailers, someone else or a mix of actors? Online suppliers?
    a. How is your ordering process structured – do you have standing orders or do you place lighting orders on "as needed" basis?
    b. Do you physically go to the store to make the purchase? Purchase by phone? Online?
    c. Is there a certain person at the purchasing location that you consult with (i.e., a sales or account representative)?
    d. Does this differ for lighting controls? If different, how so?

Awareness and Use of T8 Technologies

I would like to shift gears a bit and talk about the types of lighting products that your company uses across its facilities.

18. Thinking about all of the facilities in the northwest region that your company owns and/or manages, approximately what percent of your lights are linear fluorescent lighting fixtures?
    a. How, if at all, is this percentage different by state or facility type?
    b. What other fixtures are common across the facilities that your company owns/manages?
19. And approximately what percent of the linear fluorescent light fixtures are T8s?
20. Are you familiar with reduced wattage T8s? If so, what do you think about them? [PROBE FOR LAMP DURABILITY, ENERGY SAVINGS, LIGHT QUALITY, COMPATIBILITY WITH T8 BALLASTS]
21. [IF FAMILIAR WITH REDUCED WATTAGE T8s] Do you use reduced wattage T8s in any of the facilities that your company owns and/or manages?

a. [IF NO] Why not? What could motivate your company to try reduced wattage T8s?
b. [IF YES] What percent of T8s across your company's facilities are reduced wattage T8s?
c. [IF YES] What do you view as the core benefits of reduced wattage T8s? What about challenges associated with reduced wattage T8s?

22. [ASK IF ORDER LIGHTING PRODUCTS THROUGH DISTRIBUTORS] When placing orders for T8 through distributors, have distributors filled your order or have you heard them mention reduced wattage T8s as an alternative for standard wattage T8s? If, so what exactly have distributors told you? How, if at all, has it influenced your purchasing decision?

Future Trends

23. What changes, if any, do you see happening to the linear fluorescent lighting at your facilities in the future? Why? [PROBE FOR EMERGENCE OF LEDS. DIFFERENTIATE BETWEEN T-LED LAMPS (THAT GO IN THE CURRENT FIXTURES) AND NEW LED FIXTURES] How quickly do you expect to start trying out new lighting technologies?
    a. What factors do T-LEDs need to overcome before you see these lamps replacing fluorescent lamps for lamp replacement?
24. What changes, if any, do you anticipate (or hope for) in lighting control technologies?

Program Awareness

25. Are you aware of any energy efficiency programs that provide incentives for reduced wattage T8s? What about energy efficiency programs that provide incentives for reduced wattage T8s in the maintenance market?
    [IF YES]
    a. What are the programs? [PROBE FOR LOCATION AND PROGRAM DESIGN]
    b. Have any of your facilities participated in any of those programs? If so, which programs? If no, why not?

Awareness and Use of Lighting Control Technologies

I would like to switch gears a bit and ask you a few questions about lighting controls.

26. What are the typical benefits of lighting controls? What are the typical issues of lighting controls?
27. What are the most compelling reasons to invest in lighting controls? What are the barriers to adding lighting controls to your company's facilities?
28. If you could change just one or two things about lighting controls systems to make them more appealing to include in your building(s), what would you change?
29. Do you have internal resources to handle the maintenance of lighting control systems, or do you need to rely on maintenance contractors?
    a. [IF NEED TO RELY ON MAINTENANCE CONTRACTORS] Have you had any difficulty finding and retaining trained maintenance contractors to assist with the maintenance of lighting control systems?
30. In your experience, do you find that spaces with lighting controls have higher or lower occupant satisfaction? How so?

31. Have you heard of controls that are installed on a per-fixture basis rather than on a per-room or per-zone basis? Have you had any experience with such controls?

Those are all the questions I have. Thank you very much for your time!

MYSTERY SHOPPER DISTRIBUTOR SURVEY

[Note to Reviewer] The Interview Guide is a tool to guide mystery shopper interviews with lighting distributors. This guide provides information on the business the mystery shopper is representing, the type of order they will place, and places to probe for information on how lighting distributors may attempt to sell higher efficiency lighting options.

Business Description

The interviewer will represent as a property manager for a medium-sized office complex (roughly 20,000 square feet over 3 office spaces) performing a group relamping of their facility's primary overhead lighting, a mix of 4' linear T8s and T12s. Before each interview, the interviewer will research the distributor's likely territory and select a location to represent the office being in if asked.

Order Description

The interviewer will look for a quote on a one-time order of linear fluorescent lamps as part of a group relamping cycle. The interviewer will be looking to purchase:

- 600 linear fluorescent lamps
  - 400 4' linear T8s (32W) (electronically ballasted, although interviewer does not need to mention this unless asked)
  - 200 4' linear T12s (40W) (magnetically ballasted, although interviewer does not need to mention this unless asked)

Questions and Script

1. Hi, I need to order [READ ORDER]. Could you give me a quote? (IF NEEDED: for a relamping cycle I am doing in my facility). [INTERVIEWER SPECIFIES ORDER CHARACTERISTICS AND PROVIDES ANY FACILITY CHARACTERISTICS]
2. [IF DISTRIBUTOR SUGGESTS REPLACING T12S WITH T8S] What will be needed to make the change? Do I need new fixtures? Do I need new ballasts?
3. [PROBE IF DISTRIBUTOR DOES NOT SUGGEST REDUCED WATTAGE T8S] I heard about "reduced wattage" T8s. Do you stock them? If so, can you tell me about them? [REFER TO REDUCED WATTAGE T8 FOLLOW UP QUESTIONS SECTION]
4. [PROBE IF DISTRIBUTOR DOES NOT MENTION LINEAR LEDS] What about LEDs? Are there any LED products that I can use instead of fluorescent T8s? Do you stock them? If so, can you tell me about them? [REFER TO LINEAR LEDS FOLLOW UP QUESTIONS SECTION]

Reduced Wattage T8 Follow-Up Questions

[PROBE AS PART OF THE REDUCED WATTAGE T8 DISCUSSION]

5. What wattages do reduced wattage T8s come in? Is one better than the other?
6. What about the lamp performance? Do low wattage T8s last as long as regular T8s? Is there a difference by wattage (28W vs. 25W)?

7. What about quality of light? Because these lamps are lower wattage, will they be dimmer? Will I need more lamps to meet the lighting requirements of my space?
8. Are reduced wattage T8 lamps compatible with my existing ballasts or do I need to replace ballasts to install reduced wattage T8?
9. What about cost? How much more expensive are reduced wattage T8s than regular T8s?
10. Would I get any rebates (from local utilities) if I purchase reduced wattage T8s?

Linear LED Follow-Up Questions

[PROBE AS PART OF THE LINEAR LED DISCUSSION]

11. Are linear LEDs compatible with my existing ballasts or do I need to replace ballasts in order to install linear LEDs?
12. What about lamp performance? How reliable is the technology? What is the expected life of an LED lamp?
13. What about quality of light? Is it compatible with the T8 lighting output? If different, how is it different?
14. What about cost? How much more expensive are linear LEDs as compared to regular T8s?
15. Would I get any rebates from (local utilities) if I purchase linear LEDs?

Thank you very much for the information. I will get back to you if I decide to place the order with you.

MASSACHUSETTS AND VERMONT PROGRAM STAFF INTERVIEW GUIDE

Opinion Dynamics will conduct interviews with the program managers and key implementation staff in Massachusetts and Vermont actively working on the day-to-day implementation of the Bright Opportunities Program (Massachusetts) and the SMARTLIGHT Program (Vermont) in order to understand the program theory, as well as successes and challenges associated with the program design and implementation.

Reviewer Note: The following instrument is meant to serve as a guide to the interviewer and may not necessarily be read verbatim to the interviewee.

Introduction

1. How long have you been involved in running the <Bright Opportunities/SMARTLIGHT> program?
2. Can you briefly describe your role and you responsibilities within the program?

Program Design and Performance

3. What are the objectives of the program? How does the program measure whether it has met its goals? [PROBE FOR ENERGY SAVINGS, UNIT SALES, MARKET SHARE] Does the program have a single goal across all product types or separate goals by product?
4. How has the program been performing historically against its goals? What are the reasons for such performance?
5. How, if at all, does it vary by product type? [PROBE FOR LEDS VS. T8S SPECIFICALLY]
6. What were the reasons you chose an upstream program design for this program instead of a more traditional downstream design?
7. What requirements do the distributors need to meet to participate in the program?
    a. Are there requirements for how distributors can use program rebates? If so, what are they? [PROBE IF DISTRIBUTORS ARE REQUIRED TO REDUCE THE PER UNIT PRICE OF INCENTED EQUIPMENT THEY CHARGE THEIR CUSTOMERS]
    b. Does the program require that distributors train their staff? If so, what training does the program require?
8. How did the program determine the incentive levels? Do you think that the incentives are set at the right level? What are distributor reactions to the incentive levels? [PROBE FOR REDUCED WATTAGE T8S SPECIFICALLY]
9. How have distributors been using the incentives? Have they been passing them along to customers, applying toward their bottom line, using them to stimulate the sales staff, or using them in any other ways, or in more than one way?
10. What percent of program incented lamps are reduced wattage T8s (28 and 25 watt lamps)? What percent of program energy savings do reduced wattage lamps account for?
11. What do you see as the future contribution of reduced wattage T8s to the program? Why do you say that?
12. Does the program provide any types of marketing assistance to participating distributors? If so, what type of marketing assistance does the program provide?

   a. What feedback have you gotten from distributors on how program assistance with marketing is used and what tactics have been more successful than others
13. Have distributors reported any barriers to participating in the program? [PROBE FOR DIFFICULTY MEETING PROGRAM SALES TRACKING REQUIREMENTS, LENGTH OF THE INCENTIVE PROCESSING PERIOD, BURDENSOME PAPERWORK ASSOCIATED WITH THE PROGRAM, ETC.]

Maintenance Market and Program Barriers

14. Do you have a sense of the percent of program rebated lamps that are installed as part of routine maintenance as opposed to new construction and major retrofit?
    a. How does it vary by product type? What about reduced wattage T8s specifically?
15. What are the barriers to greater adoption of energy efficient lamps in the maintenance market specifically?
    a. Do you think the maintenance market is flexible when it comes to lamp specification? Who makes those decisions? Does it vary by facility type or business type? How?
    b. Do distributors have contact with the decision-makers and are able to change the maintenance market dynamics? Why do you say that?
16. It is our understanding that the program rebates high efficiency lamps without requiring a ballast change-out. How concerned are you with the ballast lamp compatibility and subsequent performance of the rebated lamps? Why do you say that?
17. Aside from the <Bright Opportunities/SMARTLIGHT> program are there any other incentives for commercial lighting products? If so, what are they?
    a. How do you ensure that there is no "double-dipping"?
18. What are the barriers to greater adoption of energy efficient lighting in the state?

Program Distributor Coverage

19. How many distributors are currently participating in the program?
20. What percent of the commercial lighting sales in the state do participating distributors account for?
21. How are distributors selected for program participation? Are any distributors refused program participation? If so, why?
22. What are the challenges, if any, with getting the distributors into the program? Why do some distributors choose not to participate?

Program Data Tracking

23. What specific data do you require distributors to provide as part of program participation?
24. How easy or difficult has it been to set up the data tracking processes for the program? What challenges have you experienced? How were those challenges overcome? What additional improvements can be made?
25. To your knowledge, do the distributors submit their sales data in a timely manner? Is the sales data complete? Do you have any concerns with the completeness of accuracy of the tracking data?
26. What are distributor reactions to the data tracking requirements? Do they find it easy or difficult? What challenges have they experienced, if any?

Conclusion

27. Are there any key program process-related areas that we have not discussed that would like to mention?

Thank you very much for taking the time to talk with us today and assist in this evaluation. Your contribution is a very important part of the process.