Final Truckload Events
Pilot Evaluation

October 2nd, 2017

Independent Electricity System Operator
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## Acronyms and Abbreviations

<table>
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<tr>
<th>Acronym or Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>IESO</td>
<td>Independent Electricity System Operator</td>
</tr>
<tr>
<td>LDC</td>
<td>local distribution company</td>
</tr>
<tr>
<td>NTG</td>
<td>net-to-gross</td>
</tr>
<tr>
<td>PY</td>
<td>program year</td>
</tr>
</tbody>
</table>
Executive Summary

As part of the program year 2016 (PY2016) consumer portfolio evaluation, the Cadmus team (Cadmus, Apex Analytics, Econoler and Nielson Opinion Quest) evaluated the Truckload Events Pilot, which was offered by several local distribution companies (LDCs): Enersource Hydro Mississauga Inc., Toronto Hydro-Electric System Limited, Hydro One Brampton Networks Inc. and Oakville Hydro.¹

With the evaluation, the Cadmus team sought to address these research objectives:

- Evaluate net energy savings (kWh) and demand reduction (kW)
- Assess effectiveness of delivery channel and marketing methods
- Gather feedback on participants’ and market actors’ experiences
- Document the pilot’s successes and challenges
- Assess the pilot’s scalability, including design and delivery modifications and target markets
- Identify what, if anything, can be done to improve evaluability

Pilot Description

The Truckload Events Pilot in partnership with four neighbouring LDCs. By partnering, the LDCs could take advantage of regional mass marketing opportunities and simplify logistics such as coordination with the retailer. The LDCs designed the pilot to accomplish the following:

- Increase awareness and early adoption of high-efficiency LED lighting
- Explore the effectiveness of a midstream model for encouraging the adoption of lighting
- Understand the opportunities for administrative cost reductions of using instant discounts rather than traditional coupons

The IESO targeted the pilot to residential customers who purchased general purpose and specialty LEDs at 22 stores of a single retailer on the weekends of September 17 and 18 and September 24 and 25, 2016. The retailer managed the store operations. The LDCs provided incentives, marketing materials and promotional staff. Marketing materials included newspaper ads, online leaderboards, a microsite (website created for the event), radio remote broadcasts and social media promotion by LDCs. During the events, in-store promotional staff remained in the lighting aisle to help customers select light bulbs and to provide information regarding LED technology. Through the pilot, the LDCs offered incentives for

¹ Enersource and Hydro One Brampton became part of Alectra Utilities in early 2017.
15 Phillips-brand LED products, including single packs of general purpose and flood LEDs and multipacks of three-candle LEDs.²

**Methodology**

To address the research objectives above, the Cadmus team conducted both impact and process evaluation tasks.

To produce verified gross energy savings and demand reduction, the team assessed the quantity of incented bulbs sold during the pilot and the per-unit savings, deriving gross savings from the quantity of bulbs multiplied by the per-unit savings.

To produce verified net energy savings and demand reduction, the team used historic sales from participating and comparison stores. First, we calculated pilot-induced sales as the difference between sales during the promotion and historic periods at pilot stores. Next, to account for general market trends, the team calculated the change in sales for a comparison group of nonparticipating stores during the same period (before and during intervention). The difference-in-differences between pilot and comparison store sales during the event and outside of the event period represents the program-based lift.

The Cadmus team gathered insights on the pilot design’s effectiveness and assessed the overall pilot operation and performance through a process evaluation, which included a comprehensive review of pilot documents, as well as phone interviews with staff from three sponsoring LDCs and one retailer. Additionally, the team reviewed the results of a participant survey administered by the LDCs to assess participant experience with the pilot.

**Key Findings and Conclusions**

As shown in Table 1, the Truckload Events Pilot achieved significantly more participation than planned and exceeded the projected kilowatt-hour and kilowatt savings goals. The team determined the pilot to have a net-to-gross (NTG) ratio of 97%.

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² Flood lamps are sometimes known as reflectors and include parabolic aluminized reflector, bulged reflector and multifaceted reflector bulbs.
Table 1. Truckload Events Pilot Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Units</th>
<th>Planned</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive Spending</td>
<td>$</td>
<td>$221,719</td>
<td>$969,131</td>
</tr>
<tr>
<td>Participation</td>
<td>Products</td>
<td>65,502</td>
<td>226,443</td>
</tr>
<tr>
<td>Gross Savings</td>
<td>kWh</td>
<td>5,392,205*</td>
<td>7,034,431</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>339*</td>
<td>442</td>
</tr>
<tr>
<td>Gross Realization Rate</td>
<td>% (kWh)</td>
<td>--</td>
<td>130%</td>
</tr>
<tr>
<td></td>
<td>% (kW)</td>
<td>--</td>
<td>130%</td>
</tr>
<tr>
<td>Net Annual Savings</td>
<td>kWh</td>
<td>--</td>
<td>6,807,732</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>--</td>
<td>428</td>
</tr>
<tr>
<td>Net-to-Gross Ratio</td>
<td>%</td>
<td>--</td>
<td>97%</td>
</tr>
</tbody>
</table>

* To determine the verified units, the team used sales data during the promotion to calculate planned gross savings. Therefore, the gross realization rate reflects differences in per-unit savings, but not variation in participation from planned levels.

The pilot design and delivery led to substantially greater participation and savings than planned. Interviewed respondents said the pilot was an effective partnership among the LDCs, the IESO and the retailer. The pilot met the objectives of testing the midstream delivery model, assessing the effectiveness of instant discounts and making a higher maximum number of products available for purchase.

Sales of LEDs during the promotion greatly exceeded expectations and the LDCs spent 437% of the planned incentive budget. The Cadmus team calculated a gross realization rate of 130% and verified savings of 7,034,431 kWh and 442 kW. The pilot resulted in net savings of 6,807,732 kWh and 428 kW, with NTG ratios by bulb type ranging from 94% to 98%.

The high sales volume of sales was in part because of large total discounts, effective marketing, customer interest and demand for LEDs, ease of use of the instant discounts and helpful in-store staff.

Extreme success caused difficulties. Despite analyzing historical sales and estimating likely pilot impacts based on Coupons promotions, the retailer’s forecast was very low. This unanticipated success caused logistical difficulties for the partnering LDCs and retailer. The retailer had difficulty maintaining sufficient stock of the incented products in the stores and was concerned about being paid. The LDCs were concerned about the large budget overage and how to secure appropriate funds.

Evaluation was limited by available data. Data were not sufficiently robust for reliable estimates of market lift or per-unit savings. For per-unit savings, the Cadmus team lacked information on pilot-specific baselines and in-service rates because participant surveys were not possible for this pilot. For the net savings analysis, we lacked full category data, complete historic sales and information on comparison store promotions, and therefore could not account for market shifts from non-qualifying to qualifying products. Additionally, although a goal of the pilot was to allow for higher maximum
purchases by customers, we were unable to verify this objective as we lacked sales data at the customer or transaction level.

**The pilot model was effective and could be scaled.** The LDC staff said the pilot was a good model for future programs, especially for products where the LDCs want to shift the market. Working with multiple retailers could help avoid inventory issues at a single retailer; however, multiple retailers would require careful planning and coordination, and each retailer would need data systems to manage the instant discounts.
1 Introduction

The Independent Electricity System Operator (IESO) contracted with the Cadmus team (Cadmus, Apex Analytics, Econoler and Nielsen Opinion Quest) to evaluate the pilots under the 2015–2020 Conservation First Framework (CFF). This document describes the evaluation objectives and approaches for the Enersource Truckload Events (Truckload) pilot that was offered in September 2016.

The Cadmus team conducted an impact and process evaluation to address several research objectives:

- Evaluate net energy savings (kWh) and demand reduction (kW)
- Assess effectiveness of delivery channel and marketing methods
- Gather feedback on participants’ and market actors’ experiences
- Document the pilot’s successes and challenges
- Assess the pilot’s scalability, including design and delivery modifications and target markets
- Identify what, if anything, can be done to improve evaluability

1.1 Pilot Description

The Truckload Events Pilot in partnership with four neighbouring LDCs: Enersource Hydro Mississauga Inc., Toronto Hydro-Electric System Limited, Hydro One Brampton Networks Inc. and Oakville Hydro. By partnering, the LDCs were able to take advantage of regional mass marketing opportunities and simplify logistics such as coordination with the retailer. The LDCs designed the pilot to accomplish the following:

- Increase awareness and early adoption of high-efficiency LED lighting
- Explore the effectiveness of a midstream model for encouraging the adoption of lighting
- Understand the opportunities for administrative cost reductions of using instant discounts rather than traditional coupons

The pilot was targeted to residential customers to encourage large-scale purchases of general purpose and specialty LEDs at 22 stores of a single retailer on the weekends of September 17 and 18 and September 24 and 25, 2016. The retailer managed the store operations. The LDCs provided incentives, marketing materials and promotional staff. Marketing materials included newspaper ads, online leaderboards, a microsite (website created for the event), radio remote broadcasts and social media promotion by LDCs. During the events, in-store promotional staff remained in the lighting aisle to help customers select light bulbs and to provide information regarding LED technology.

Enersource and Hydro One Brampton became part of Alectra Utilities in early 2017.
Through the pilot, the LDCs offered incentives for 15 Phillips-brand LED products, including single packs of general purpose and flood LEDs and multipacks of three-candle LEDs. Customers could purchase up to 25 of each package using an instant, point-of-sale discount. The LDCs offered an incentive of $3 for each standard LED bulb, $5 for flood lamps and $8 for candle packs. The retailer also offered a discount, on top of the program incentive, of $2 to $5 on most measures. This resulted in combined discounts of 75% for general purpose LEDs, 72% for flood LEDs and 62% for candle LEDs in pilot stores.

Figure 1 shows the average retail price, LDC incentive, retailer discount and final price by bulb type. For example, the regular retail price of the general purpose LED averaged $7.97. During the pilot, the final sale price for the same bulb was $1.97 after the partner LDCs provided a $3.00 incentive and the retailer provided an additional $3.00 discount.

![Figure 1. Average Prices and Discounts by Bulb Type](image)

Source: Pilot Measures and Sales Data

### 1.2 Pilot Participation Summary

The LDCs offered the Truckload Events Pilot during two weekends in September 2016 at 22 stores of a single retailer. The LDCs expected to provide incentives for 65,502 measures (comprised of 15 Phillips-

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4 Flood lamps are sometimes known as reflectors and include parabolic aluminized reflector, bulged reflector and multifaceted reflector bulbs.

5 The retailer also offered this discount at other (non-pilot) stores, in anticipation of the fall Coupons Program event, which started the following weekend.
brand LEDs), however, the actual sales greatly surpassed expectations, with 226,443 discounted measures sold (Table 2). The offered product combinations also differed from planned; the changes are described in Appendix A.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Planned Measures*</th>
<th>Verified Measures**</th>
<th>Ratio of Verified to Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose LED</td>
<td>53,767</td>
<td>107,516</td>
<td>200%</td>
</tr>
<tr>
<td>Flood LED</td>
<td>11,154</td>
<td>101,611</td>
<td>911%</td>
</tr>
<tr>
<td>Candle LED (multipack)</td>
<td>581</td>
<td>17,316</td>
<td>2,980%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>65,502</strong></td>
<td><strong>226,443</strong></td>
<td><strong>346%</strong></td>
</tr>
</tbody>
</table>

* Source: Pilot Business Case, Cost-effectiveness Planning Document
** Source: Pilot Measures and Sales Data.

As shown in Table 3, although the LDCs expected to spend $221,719 on the pilot, the final total was $969,131.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Planned Incentives*</th>
<th>Verified Incentives**</th>
<th>Ratio Verified to Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose LED</td>
<td>$161,301</td>
<td>$322,548</td>
<td>200%</td>
</tr>
<tr>
<td>Flood LED</td>
<td>$55,770</td>
<td>$508,055</td>
<td>911%</td>
</tr>
<tr>
<td>Candle LED (multipack)</td>
<td>$4,648</td>
<td>$138,528</td>
<td>2980%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$221,719</strong></td>
<td><strong>$969,131</strong></td>
<td><strong>437%</strong></td>
</tr>
</tbody>
</table>

* Source: Pilot Business Case, Cost-effectiveness Planning Document
** Source: Pilot Measures and Sales Data.

6 As shown in Appendix A, the Enersource Business Case for Truckload Events assumed five different bulb types would be offered, including globes, single packs of candles and multipacks of LEDs. Based on these bulb types, the Business Case estimated that 44,779 measures would receive discounts. To establish consistency with the design of the final Truckload Events Pilot, the Cadmus team adjusted bulb types to the measures offered in the pilot—that is, we adjusted LEDs in multipacks to single bulbs, combined single candles into three-packs and removed globes.

7 As shown in Appendix A, Enersource Business Case estimated $222,687 in incentive costs, based on five bulb types. To be consistent with the pilot design, the Cadmus team adjusted the bulb types with the final measures in the pilot and removed the globe assumptions, resulting in a reduction of $968.
2 Impact Evaluation

2.1 Methodology

The Cadmus team estimated the gross and net energy savings and demand reduction from the Truckload Events Pilot using the results of several activities:

- Review Truckload Events Pilot data records provided by the IESO (shown in Table 4)
- Conduct engineering analysis and update input assumptions for lighting per-unit savings based on the PY2016 Coupons Program participant survey
- Calculate gross verified energy savings and demand reduction
- Estimate NTG ratios using sales data from pilot and comparison stores
- Calculate net energy savings and demand reduction

Table 4. Impact Evaluation Sources

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Information and Document Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Measures and Sales Data</td>
<td>Independent Electricity System Operator. Excel files (dated March 2, 2017) containing:</td>
</tr>
<tr>
<td></td>
<td>• Model number of 15 qualifying measures</td>
</tr>
<tr>
<td></td>
<td>• Measure prices of qualifying products, including retail price, utility incentive level and retailer discount</td>
</tr>
<tr>
<td></td>
<td>• Weekly sales data, by store and model number for qualifying measures—for 50 weeks prior to the pilot, during the promotion period and 12 weeks after the promotion—for 22 pilot stores and 48 comparison stores</td>
</tr>
<tr>
<td>Coupons Programs Survey Data</td>
<td>PY2016 Coupons Program participant survey data</td>
</tr>
</tbody>
</table>

The following sections present the gross per-unit savings and net savings calculation methodologies.

2.1.1 Gross Per-Unit Savings Methodology

The Cadmus team determined the gross energy savings and demand reduction associated with the Truckload Events Pilot by developing per-unit savings for each measure and applying those savings to the number of measures incented during the pilot. We determined measures’ gross per-unit savings using engineering analysis, with updated input parameters determined from pilot-specific measure characteristics and survey results from the PY2016 Coupons Program evaluation.
The Cadmus team calculated gross per-unit savings for pilot LEDs with the following algorithms:

**Equation 1. Gross kWh**

\[ \text{Savings}_{\text{Gross kWh}} = \left( \frac{\Delta \text{Watts}}{1,000} \right) \times \text{HOU} \times \text{ISR} \times \text{WHF} \]

**Equation 2. Gross kW**

\[ \text{Savings}_{\text{Gross kW}} = \text{Savings}_{\text{Gross kWh}} \times \text{kW factor} \]

Where:

- \( \Delta \text{Watts} \): Delta watts (baseline wattage minus efficient bulb wattage; the Cadmus team based efficient bulb wattages on the actual wattage of pilot measures, and based baseline wattage on survey-reported data from the PY2016 Coupons Program evaluation for applicable bulb types)
- \( \text{HOU} \): Annual hours of use by bulb type, based on the IESO Prescriptive Measure and Assumptions List.
- \( \text{ISR} \): In-service rate, which represents an estimate of the percentage of incentivized bulbs that participants will install (the team used survey-reported data from the PY2016 Coupons Program evaluation for bulb types, as pilot specific ISRs were not available due to the inability to contact participant surveys).
- \( \text{WHF} \): Waste heat factor, which is an adjustment to account for the effects on heating and cooling resulting from the decreased heat output of efficient bulbs (the team used the IESO Prescriptive Measure and Assumptions List)
- \( \text{kW factor} \): Summer peak conversion factor from kilowatt-hour to kilowatt (the team used the IESO Prescriptive Measure and Assumptions List)

Table 5 presents the verified input values and sources.

<table>
<thead>
<tr>
<th>Factor</th>
<th>General Purpose LEDs</th>
<th>Flood LEDs</th>
<th>Candle LEDs</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Bulb Watts</td>
<td>30</td>
<td>31</td>
<td>53</td>
<td>PY2016 Coupons Program evaluation participant survey results</td>
</tr>
<tr>
<td>Efficient Bulb Watts</td>
<td>9</td>
<td>6</td>
<td>14</td>
<td>Pilot data for each measure included: wattage characteristics for each bulb, weighted by final pilot sales</td>
</tr>
<tr>
<td>HOU</td>
<td>1,277</td>
<td>1,736</td>
<td>1,710</td>
<td>IESO Prescriptive Measures and Assumptions List (March 2017)</td>
</tr>
<tr>
<td>ISR</td>
<td>82%</td>
<td>84%</td>
<td>89%</td>
<td>PY2016 Coupons Program evaluation participant survey results</td>
</tr>
</tbody>
</table>
### Prescriptive Measures and Assumptions List

(March 2017)

<table>
<thead>
<tr>
<th>Factor</th>
<th>General Purpose LEDs</th>
<th>Flood LEDs</th>
<th>Candle LEDs</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHF</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>IESO Prescriptive Measures and Assumptions List</td>
</tr>
<tr>
<td>kWfactor</td>
<td>0.006%</td>
<td>0.006%</td>
<td>0.006%</td>
<td></td>
</tr>
</tbody>
</table>

### 2.1.2 Net Savings Methodology

To calculate net savings, the Cadmus team estimated a NTG factor from market data using weekly sales from pilot and comparison group stores. First, we estimated the difference between promotion-period sales and historic sales at the pilot stores. We then accounted for general market trends by calculating the change in sales for a group of comparison, or nonparticipating, stores during the same two periods. The difference-in-differences between pilot and comparison store sales represents the pilot-influenced lift, or the net savings attributable to the pilot.

We used the following equations to calculate separate NTG ratios for general purpose, flood and candle LEDs.

**Equation 3. Net-to-Gross Ratio**

\[
NTG \text{ Ratio} = \frac{Quantity_{net}}{Quantity_{Pilot\_prom}}
\]

**Equation 4. Net-to-Gross Calculations**

\[
Quantity_{net} = \%Net_{Energy\_Star} \times Quantity_{Pilot\_hist}
\]

Where:

- \( Quantity_{Pilot\_prom} \) = Pilot store average weekly sales\(^8\) during the promotion period
- \( \%Net_{Energy\_Star} \) = Market lift, in terms of percentage change in sales (see Equation 5)
- \( Quantity_{Pilot\_hist} \) = Pilot store average weekly sales during the historic period\(^9\)

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\(^8\) The team based this analysis on weekly sales data because no data were available to conduct an analysis for the specific promotion weekend days. The weekly sales totalled 229,633 bulbs, which is very close to the 226,443 bulbs sold during the two weekend events. Therefore, the weekly sales are sufficient for NTG analysis.

\(^9\) Although the pilot included data for 12 weeks following the promotion, the Cadmus team did not use these data in our evaluation because the fall Coupons Program event began the week after the pilot ended. Based on survey responses, we expected spillover from the pilot in the Coupons Program data. Specifically, one LDC survey indicated that, because some stores lacked sufficient inventory, in-store representatives told customers to delay their purchases until the Coupons Program event the following week.
Equation 5. Difference-in-Differences Method

\[ \%Net_{Energy\ Star} = (\%Chg\ ES\ Sales_{Pilot} - \%Chg\ ES\ Sales_{Comp}) \]

Where:

\[ \%Chg\ ES\ Sales_{Pilot} = \text{Percentage change in average ENERGY STAR weekly share of sales in pilot stores from historic to promotion period} \]

\[ \%Chg\ ES\ Sales_{Comp} = \text{Percentage change in average ENERGY STAR weekly share of sales in comparison stores from historic to promotion period} \]

The Cadmus team also tested but did not use a regression methodology because of a lack of historic sales trend and sufficient data, as described in section 2.3.

2.2 Findings

This section outlines the gross and net verified savings results, based on the methodology outlined in section 2.1.

2.2.1 Gross Verified Savings

The Truckload Events Pilot produced a total gross verified savings of 7,034,431 kWh and 442 kW, as shown in Table 6. This resulted in a gross realization rate of 130%.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Annual Gross Savings (kWh)</th>
<th>Annual Gross Savings (Coincident Peak kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reported*</td>
<td>Verified</td>
</tr>
<tr>
<td>General Purpose LED</td>
<td>2,196,767</td>
<td>2,313,183</td>
</tr>
<tr>
<td>Flood LED</td>
<td>2,822,347</td>
<td>3,688,866</td>
</tr>
<tr>
<td>Candle LED (multipack)</td>
<td>373,091</td>
<td>1,032,382</td>
</tr>
<tr>
<td>Total</td>
<td>5,392,205</td>
<td>7,034,431</td>
</tr>
</tbody>
</table>

* Verified units were used for calculating reported savings.

The high gross realization rate is attributable to increases in the per-unit savings from pilot-reported values (as shown in Table 7). The LDCs based the pilot savings estimates on the IESO Prescriptive Measures and Assumptions List. The verified results were higher for flood and candle LEDs because the baseline wattage was higher than the pilot-reported assumed values. Flood LEDs efficient verified wattage was lower than the reported assumed values.

10 For candle LEDs, the Cost-Effectiveness Planning Document assumed 7.2 kWh per candle, which the Cadmus team multiplied by three to match the offering of a three-candle multipack.
Table 7. PY2016 Unit Savings Review

<table>
<thead>
<tr>
<th>Measure</th>
<th>Planned</th>
<th>Verified</th>
<th>Percentage Change from Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose LED</td>
<td>20.4</td>
<td>21.5</td>
<td>105%</td>
</tr>
<tr>
<td>Flood LED</td>
<td>27.8</td>
<td>36.3</td>
<td>131%</td>
</tr>
<tr>
<td>Candle LED (multipack)</td>
<td>21.5</td>
<td>59.6</td>
<td>277%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23.8</strong></td>
<td><strong>31.1</strong></td>
<td><strong>130%</strong></td>
</tr>
</tbody>
</table>

2.2.2 Net Savings

The pilot resulted in 6,807,732 kWh and 428 kW of net savings (Table 8). The Cadmus team used the methodology described in section 0 to calculate bulb type NTG ratios that ranged from 94% to 98%.

Table 8. Net Savings

<table>
<thead>
<tr>
<th>Measure</th>
<th>Net-to-Gross Ratio</th>
<th>Annual Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kWh</td>
</tr>
<tr>
<td>General Purpose LED</td>
<td>98%</td>
<td>2,259,556</td>
</tr>
<tr>
<td>Flood LED</td>
<td>97%</td>
<td>3,576,477</td>
</tr>
<tr>
<td>Candle LED (multipack)</td>
<td>94%</td>
<td>971,698</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97%</strong></td>
<td><strong>6,807,732</strong></td>
</tr>
</tbody>
</table>

To understand the NTG ratios in more detail, the following figures and tables present the analysis by bulb type. Figure 2 shows average weekly sales for general purpose LEDs for the 50 weeks prior to the promotion and the two weeks during the promotion at both pilot and comparison stores. The final two data points show the sharp increase in sales in Truckload Events Pilot stores during the September 2016 promotion, relative to comparison store sales.
Table 9 presents the difference-in-differences analysis for general purpose LEDs. The first two rows show the historic and promotion-period average weekly sales for event and comparison stores. The third row shows that pilot stores showed a 6,606% increase in sales, while the comparison stores showed a 55% increase.\textsuperscript{11} To account for the market change in comparison stores, the percentage change attributed to the pilot is 6,550% (the difference of comparison and pilot store results), resulting in the estimate of 53,029 more measures being sold because of the pilot. The ratio of this value and promotion weekly sales (54,228) results in a 98% NTG ratio.

\textsuperscript{11} The reason for the increase in comparison store sales is unknown, but could be due to the price discounts provided by the retailer on the affected bulbs in anticipation of the fall Coupons Program event. It may also be due to some spillover from the pilot marketing.
Table 9. General Purpose LED Net-to-Gross Analysis

<table>
<thead>
<tr>
<th>Weekly Average</th>
<th>Pilot Stores</th>
<th>Comparison Stores</th>
<th>Pilot Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Weekly Sales (50 weeks pre-pilot)</td>
<td>810</td>
<td>1,328</td>
<td>--</td>
</tr>
<tr>
<td>Promotion Weekly Sales</td>
<td>54,288</td>
<td>2,064</td>
<td>--</td>
</tr>
<tr>
<td>% Increase: Historic to Promotion Sales (%Chg_ES_Sales)</td>
<td>6,606%</td>
<td>55%</td>
<td>--</td>
</tr>
<tr>
<td>Pilot minus Comparison Stores % Increase (%NetEnergyStar)</td>
<td>--</td>
<td>--</td>
<td>6,550%</td>
</tr>
<tr>
<td>Net Sales due to Pilot (Quantity_net)</td>
<td>--</td>
<td>--</td>
<td>53,029</td>
</tr>
<tr>
<td>Ratio of Increased Sales to Pilot Sales (Net-to-Gross)</td>
<td>--</td>
<td>--</td>
<td>98%</td>
</tr>
</tbody>
</table>

Figure 3 shows the average weekly sales for flood LEDs for the 50 weeks prior to and the two weeks during the Truckload Events Pilot promotion, for both pilot and comparison stores. Similar to general purpose LEDs, there is a large increase in flood LEDs sales in pilot stores during the promotion.

Table 10 shows the NTG analysis for flood LEDs. The pilot stores showed a 2,631% increase in sales, while the comparison stores showed a decline of 17%. To account for this market change in comparison stores, the percentage change attributed to the pilot is 2,648%, resulting in the estimate of 50,040 more measures being sold because of the pilot. The ratio of this value and promotion weekly sales (51,613) results in a 97% NTG ratio.
Table 10: Flood LED Net-to-Gross Analysis

<table>
<thead>
<tr>
<th>Weekly Average</th>
<th>Pilot Stores</th>
<th>Comparison Stores</th>
<th>Pilot Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Weekly Sales (50 weeks pre-pilot)</td>
<td>1,890</td>
<td>2,934</td>
<td></td>
</tr>
<tr>
<td>Promotion Weekly Sales</td>
<td>51,613</td>
<td>2,442</td>
<td></td>
</tr>
<tr>
<td>% Increase: Historic to Promotion Sales (%Chg_ES_Sales)</td>
<td>2,631%</td>
<td>-17%</td>
<td></td>
</tr>
<tr>
<td>Pilot minus Comparison Stores % Increase (%Net_EnergyStar)</td>
<td>--</td>
<td>--</td>
<td>2,648%</td>
</tr>
<tr>
<td>Net Sales due to Pilot (Quantity_net)</td>
<td>--</td>
<td>--</td>
<td>50,040</td>
</tr>
<tr>
<td>Ratio of Increased Sales to Pilot Sales (Net-to-Gross)</td>
<td>--</td>
<td>--</td>
<td>97%</td>
</tr>
</tbody>
</table>

Figure 4 shows the average weekly sales for candle LEDs for only seven weeks prior to the promotion; until this point, sales for this multipack were zero for both pilot and comparison stores.

![Figure 4. Candle LED Weekly Sales](image)

Table 11 lists the results of the NTG analysis for candle LEDs. The pilot stores showed a 2,879% increase in sales, while the comparison stores showed an increase of 75%. To account for this market change in comparison stores, we attributed a percentage change of 2,804% to the pilot, resulting in the estimate of 8,392 measures because of the pilot. The ratio of this value and promotion weekly sales (8,917) during the pilot results in a 94% NTG ratio.
### Table 11. Candle LED Net-to-Gross Analysis

<table>
<thead>
<tr>
<th></th>
<th>Pilot Stores</th>
<th>Comparison Stores</th>
<th>Pilot Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Weekly Sales (7 weeks pre-pilot)</td>
<td>299</td>
<td>409</td>
<td>--</td>
</tr>
<tr>
<td>Promotion Weekly Sales</td>
<td>8,917</td>
<td>717</td>
<td>--</td>
</tr>
<tr>
<td>% Increase: Historic to Promotion Sales (%Chg_ES_Sales)</td>
<td>2,879%</td>
<td>75%</td>
<td>--</td>
</tr>
<tr>
<td>Pilot minus Comparison Stores % Increase (%NetEnergyStar)</td>
<td>--</td>
<td>--</td>
<td>2,804%</td>
</tr>
<tr>
<td>Net Sales due to Pilot (Quantity_net)</td>
<td>--</td>
<td>--</td>
<td>8,392</td>
</tr>
<tr>
<td>Ratio of Increased Sales to pilot Sales (Net-to-Gross)</td>
<td>--</td>
<td>--</td>
<td>94%</td>
</tr>
</tbody>
</table>

### 2.3 Threats to Validity

The Cadmus team’s gross and net analysis of the Truckload Events Pilot was limited due to insufficient participant and sales data.

#### 2.3.1 Gross Analysis: Participant Data

Due to the pilot design, there was no way for the team to identify participant contact information to conduct a participant survey. For consistency with the Coupons Program, for the Truckload Events Pilot gross analysis, the Cadmus team used baseline wattages and in-service rates from the PY2016 Coupons Program evaluation survey results (even though these wattages and rates may be different for the Truckload Events Pilot due to the delivery method and customer characteristics).

The Coupons Program had a limit of five measures that could be purchased and required customers to redeem a physical coupon. In contrast, the Truckload Events Pilot had a limit of 25 bulbs and awarded an instant, point-of-sale discount. The pilot design may have motivated participants to purchase more measures than they intended to immediately install (planning to put some bulbs in storage for later use or to give bulbs to friends or family), which would have resulted in a lower initial in-service rate for the pilot than for the Coupons Program. As described in sections 3.1.4 and 3.3.1, the LDCs surveyed 1,082 participants to understand awareness, purchase intentions and experience with the pilot. This survey revealed that 54% of respondents purchased more LEDs than “required to convert (their) home,” which means they probably stored at least some of the LEDs purchased during the pilot.

To understand the sensitivity of this analysis to the in-service rate assumptions (Table 5), the Cadmus team calculated gross savings, gross realization rates and net savings under various scenarios. For example, if the pilot-specific ISR were 70%, the resulting gross savings would have been 5,843,148, with a realization rate of 108%, as shown in as shown in Table 13.

#### Table 12. In-service Rate Scenarios

<table>
<thead>
<tr>
<th>If the In-Service Rate was...</th>
<th>Gross Savings (kWh) would be...</th>
<th>Realization Rate would be...</th>
<th>Net Savings (kWh) would be...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current: 84%*</td>
<td>7,034,431</td>
<td>130%</td>
<td>6,807,732</td>
</tr>
<tr>
<td>80%</td>
<td>6,677,883</td>
<td>124%</td>
<td>6,464,468</td>
</tr>
</tbody>
</table>
If the In-Service Rate was... | Gross Savings (kWh) would be... | Realization Rate would be... | Net Savings (kWh) would be...
---|---|---|---
70% | 5,843,148 | 108% | 5,656,410
60% | 5,008,412 | 93% | 4,848,351
50% | 4,173,677 | 77% | 4,040,293
40% | 3,338,942 | 62% | 3,232,234

* Represents weighted average of in-service rates from Table 5.

Additionally, the pilot may have motivated different types of customers to buy LEDs, such as small business owners purchasing for non-residential applications, which would affect gross savings inputs such as baseline and hours of use. However, we did not explore this possibility because participant surveys were not possible for this pilot.

### 2.3.2 Net Analysis: Sales Data

The Cadmus team’s net analysis of the Truckload Events Pilot was limited due to insufficient data—we had no data for non-discounted lighting sales (for both non-qualifying LEDs and less efficient bulbs, also known as full category data) and had no historic data for the same weekends as the pilot, but in previous years.

Although sales for LEDs have been increasing as prices decrease and customers become more accepting, historic sales data for the types of LEDs discounted by the pilot (Phillips-brand general purpose, flood and three-pack of candles) show a flat trend, as discussed previously and illustrated in Figure 2, Figure 3 and Figure 4. Therefore, the biggest threat to the validity of this analysis is that the Cadmus team was unable to account for the possibility that customers would have purchased other LED products, such as non-ENERGY STAR or non-Phillips brands, in the absence of the pilot. For those measures where customers substituted non-qualifying LEDs for qualifying LEDs, the savings per measure through the pilot would be zero. Therefore, the net savings results likely represent the upper bound. In the future, it is important to collect historic and promotion period data on qualifying and non-qualifying measures (i.e., full category data) for pilots such as this to ensure a reliable net savings estimate.

To understand the sensitivity of this analysis to customers substituting non-qualifying LEDs with pilot-incented measures, the Cadmus team calculated NTG ratios under various scenarios. For example, if the historic nonqualifying LED sales were twice the sales of qualifying measures, and if those sales were converted to incented measures during the pilot, the average NTG would have been 92% and the net

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12 The Cadmus team used regression analyses to test the historic trends for pilot and comparison stores. In both analyses, we found no positive, statistically significant trend, which indicates that there was not an increasing trend in qualified products. Therefore, we used the basic average of sales (i.e., a zero trend) to estimate the net sales.
savings would have been 6,471,677 kWh. If the non-qualifying sales were twenty times the pilot sales, the NTG would have been 49% and net savings of 3,446,871 kWh, as shown in Table 13. This scenario analysis shows that the NTG ratio is sensitive to sales of non-qualifying LEDs, and therefore it is important to collect these data in the future.

Table 13. Net-to-Gross Scenario Analysis

<table>
<thead>
<tr>
<th>If non-qualifying LED measure sales were...</th>
<th>The NTG ratio would be:</th>
<th>Net Savings (kWh) would be:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown (i.e., assumes zero substitution)</td>
<td>97% (i.e., result in Table 8)</td>
<td>6,807,732</td>
</tr>
<tr>
<td>2x the market sales of qualifying LEDs</td>
<td>92%</td>
<td>6,471,677</td>
</tr>
<tr>
<td>5x the market sales of qualifying LEDs</td>
<td>85%</td>
<td>5,979,267</td>
</tr>
<tr>
<td>10x the market sales of qualifying LEDs</td>
<td>73%</td>
<td>5,135,135</td>
</tr>
<tr>
<td>20x the market sales of qualifying LEDs</td>
<td>49%</td>
<td>3,446,871</td>
</tr>
</tbody>
</table>

* This result is based on all non-qualifying bulbs being converted to qualifying bulbs during the promotion.

For this analysis, the Cadmus team used units of measures sold. However, the more reliable approach is to use the percentage of market sales to estimate lift, then apply the estimate to total market sales. Full category data would support this more robust methodology, which also normalizes sales to market shares and accounts for seasonal impacts.

Finally, the pilot dataset provided to the team lacked data from the same weeks for the previous year. It is important that historic datasets include the promotion period of the previous year to ensure those particular weeks do not already have a significant change in sales relative to other weeks.
3 Process Evaluation

3.1 Methodology
The Cadmus team reviewed pilot documentation and conducted phone interviews with six staff members from the three sponsoring LDCs and one retailer staff to learn more about stakeholder and market actor experiences, motivations and overall satisfaction. For additional insight into the customer experience, we also reviewed a participant survey conducted by the LDCs during the pilot events.

See 4Appendix B for the stakeholder interview guide.

3.1.1 Document Review
Table 14 shows the documents the team reviewed to inform our development of the data collection instruments. The IESO provided these documents on behalf of behalf of the LDCs.

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Document Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-Effectiveness Planning</td>
<td>Independent Electricity System Operator. CDM EE Cost Effectiveness</td>
</tr>
<tr>
<td>Marketing Materials</td>
<td>LED Super Sale Truckload Creative, 2016</td>
</tr>
</tbody>
</table>

3.1.2 Stakeholder In-Depth Interviews
The Cadmus team conducted telephone interviews with six key staff from three of the sponsoring LDCs.\(^{13}\) During these interviews, we gathered information on the pilot design, delivery, successes and challenges, as well as the future program plans of administrative and implementation staff.

3.1.3 Market Actor In-Depth Interviews
The Cadmus team also conducted one telephone interview with a staff member from the participating retailer. During the interview, we asked about pilot delivery, recruiting, training, marketing methods, data collection, satisfaction, scalability and areas of success, challenges and lessons learned.

3.1.4 Participant Surveys
The Cadmus team did not conduct surveys with participating customers. Instead, we reviewed the results of 1,082 completed surveys fielded on electronic devices by LDC in-store promotional staff during

13 One LDC interview was with three staff members, another was with two staff members.
the pilot event. During the survey, the LDCs asked customers about their awareness of the pilot, purchase intentions, experience with in-store lighting experts and previous participation in the Coupons Program.

3.2 Findings
This section discusses the pilot design, pilot experiences, successes, challenges and lessons learned from the perspective of LDC staff, the retailer and, where relevant, participants.

3.2.1 Pilot Design and Delivery
As described in the Pilot Business Case, the partnering LDCs designed the Truckload Events Pilot to increase the early adoption of LED lighting by reducing two participation barriers identified in the Coupons Program: (1) the inability of some customers to access online or print coupons and (2) a purchase limit of five units per measure. Therefore, the LDCs designed the pilot with these objectives:

- Determine the number of units purchased per transaction when quantities are allowed up to 25
- Evaluate the effectiveness of a midstream approach through monitoring:
  - Retailer interest
  - Customer experience
  - Budget management
- Evaluate the use of a midstream approach to test and promote new energy-efficient products

To reduce the barriers, the staff designed the pilot to allow participants to purchase up to a maximum of 25 bulbs per measure, and made an instant discount available at the point-of-sale, rather than a coupon to redeem later. Staff designed the pilot incentives to be the same level as those in the Coupons Program. The retailer reported offering additional discounts, as described earlier and shown in Figure 1 above.

In addition, according to one LDC interview, the pilot was offered only during two weekend events to add an element of urgency.

The pilot involved one retailer and all 22 of the retailer’s stores within the partnering LDC territories. One LDC said the retailer was recruited because of its positive working relationships with LDCs, its ability to manage the instant discount and its willingness to share data.

14 The Cadmus team was not able to verify the statistical representation of the survey method, including recruiting approach, timing and store locations.

15 Pilot Business Case.
The retailer reported that its interest in participating in the pilot was to support its LDC partners and test the innovative pilot approach. During the pilot design, the retailer forecasted the expected bulb sales based on historic sales and experience with Coupons Program promotions. As shown in Table 2 above, this forecast was significantly below actual pilot performance. The retailer said forecasting demand for the new pilot was difficult, especially when the level or quality of the marketing effort was unknown. The retailer managed pilot operations, including informing store associates in advance of the pilot and stocking inventory.

The partnering LDC staff supplied incentives, produced marketing materials and assigned in-store lighting experts to encourage LED adoption. One LDC said its marketing team developed the pilot’s new, integrated marketing campaign, which included newspaper ads, online leaderboards, a microsite (website created for the event), radio remote broadcasts and social media promotion by LDCs. Two LDCs reported that the marketing campaign was effective for the contiguous service territories of the LDC partners because they could take advantage of mass marketing opportunities in a single area.

The LDCs and Phillips, the bulb manufacturer, trained the in-store lighting experts, or “brand ambassadors,” to help customers learn more about LED lighting and how to incorporate it into their homes. One LDC said it used its own staff, and other LDCs reported hiring third-party promotional staff to support the event.

### 3.3 Participant, LDC and Market Actor Experience

This section discusses participant, LDC and market actor pilot experiences.

#### 3.3.1 Participant Experience

The LDCs and retailer staff reported positive feedback from customers on the pilot offering and rules. One LDC staff member who attended the event described it as a “feeding frenzy,” with people “filling shopping carts” with bulbs.

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16 *Pilot Business Case*. Information was corroborated by all LDCs and the retailer during interviews.

17 Marketing materials. Information was corroborated by two LDCs during interviews.

18 *Pilot Business Case*. Information was corroborated by all LDCs and the retailer during interviews.
The LDCs conducted an in-store survey of 1,082 participants to gain insights into the participant experience. As shown in Figure 5, more than half the respondents said they found out about the event while in the store, either through in-store signage (33%) or from an in-store lighting expert (21%). Nearly one-third (29%) of the respondents said they learned about the pilot through mass marketing, including print ads (17%), online ads (10%) and radio remote broadcasts (2%). Additionally, 6% of respondents reported learning about the pilot through their utility’s marketing campaign (i.e., newsletter, website, Facebook and Twitter).

Figure 5. Customer Awareness of Pilot

"We had a lot of positive feedback from the customers as well as the in-store staff that the rules were much easier to explain to customers than coupon redemption.”

– LDC interview

The participant surveys also provided insight into the customers’ pilot experience, as shown in Figure 6. Most respondents (84%) reported receiving help from the in-store lighting staff. Although nearly all respondents (97%) indicated that their bulb purchases were for personal use, more than half (54%) said they purchased more bulbs than were required to convert their home to LED lighting.

19 Customers who communicated with in-store sales representatives were probably more likely to complete the survey. One LDC staff member indicated that survey results should be viewed with caution, as most customers were in a hurry to make their purchases.
3.3.2 LDC Experience
Respondents from all three LDCs reported being satisfied with the pilot, citing effective partnerships, an engaged retailer, smooth delivery and very high uptake by customers. However, they also reported that success brought difficulties. For example, two LDCs pointed out that the high level of pilot participation was not expected, so the initial LDC budget was depleted in the first weekend. Despite these budget constraints, the LDCs said they chose to honor their commitments to the retailer and their customers by offering the pilot during the second weekend. All three LDCs reported working together to try to reduce participation in the second weekend by removing online marketing and cancelling radio efforts.

As noted in Table 3 above, the final incentive cost was 437% of planned levels, which one LDC staff member reported was “stressful in the midst of it” and another said led to “strained relationships” among the stakeholders. Nevertheless, respondents from all three LDCs applauded the collaborative efforts among the IESO and LDCs and indicated that overspending the budget was handled fairly.

3.3.3 Market Actor Experiences
The retailer was satisfied with the success of the pilot (i.e., strong sales of promoted measures), but reported being surprised at its high uptake. The retailer said they had some initial concerns about the LDCs having sufficient budget to pay incentives for all the measures, but said the budget situation was resolved to their satisfaction.

“From a budget perspective, it was a little tricky, but it [the pilot] showed a lot of customer interest and a lot of positive feedback for the methodology of the midstream model.”

– LDC interview
The retailer said the pilot’s success also caused inventory issues at the stores. During the first weekend, the retailer said some products sold out, and replacements had to be brought in from other stores in the region for the second weekend. However, this meant pulling products that would have been available for the Coupons Program, which ran the next weekend. The retailer said that improved forecasting would mitigate this inventory issue, but that it would need to plan several months ahead of the event to ensure sufficient inventory.

### 3.4 Success, Challenges and Future Planning

This section outlines areas of pilot success (such as high participation) challenges (such as accurate sales forecasting) and future planning considerations, based on the process evaluation activities.

#### 3.4.1 Success

By all accounts, the pilot was extremely successful at increasing sales of LED measures during the two weekends, as shown earlier in Figure 2, Figure 3 and Figure 4, and it greatly exceeded expectations, with a ratio of actual to planned measures of 346% (as shown in Table 2). The three LDC respondents and the retailer were surprised at the level of customer interest, calling it “a runaway success” and a “tidal wave.” When asked the source of the success, they said a combination of factors, with one describing it as “a perfect storm.” Key factors reported by respondents included these:

- Large combined discounts (LDC plus retailer)
- Effective marketing
- Customer interest and demand for LEDs
- Ease of use of instant discounts
- Helpful in-store staff

In addition, one LDC respondent said the pilot’s success showed the “pent up demand” and price sensitivity of customers toward LEDs. However, the retailer and another LDC respondent said the total discount may have been larger than needed to encourage the adoption of LED lighting.

#### 3.4.2 Challenge

The primary challenge of the Truckload Events Pilot was that the forecast was substantially below actual participation, which led to financial concerns for all LDCs and the retailer. In addition, the retailer experienced issues maintaining sufficient inventory, which may have affected the following Coupons Program offering. In one LDC staff’s opinion, the unique nature of lighting—such as many sockets per home and relative similarity in products—makes it less likely for other consumer products to have such “runaway success.”

Another challenge was evaluating the pilot objective of determining the number of units purchased per transaction with increased maximums. Because we lacked data on individual purchase quantities, we were unable to discern the effect of the higher per-customer maximum purchase limits during the two weekend events.
3.4.3 Future Planning

The successes and challenges outlined above led to many lessons learned from the pilot:

- **Need for improved forecasting.** The retailer and the three LDC respondents said the pilot needed more accurate market intelligence and forecasting of expected achievements to plan for the financial and inventory implications.

- **Need for contract risk mitigation.** The three LDC respondents indicated the need to build risk mitigation into the contracts with retailers. Two suggested adding a budget cap in the contract, and two suggested establishing contractual stages where the pilot could be stopped or changed to mitigate risk while still being viable for retailers.\(^{20}\)

- **Discounts could be smaller.** Because LED prices have dropped, one LDC respondent and the retailer said that the pilot’s total discount could be reduced and still achieve results.

- **Need to allow for sufficient design time.** One LDC said future design timelines should include the long process for coordination among the LDCs, the retailer and the manufacturer. For example, marketing materials need to be approved by all parties, and it could require long lead times to print items such as flyers.

- **Need to consider the timing of other events.** The retailer said the timing of this event, directly preceding the Coupons Program event, was not ideal for customers or for inventory, and recommended keeping the promotions more separated in time, to allow retailers to restock.

Two LDC respondents said that many of the pilot lessons learned have already been integrated into the Coupons Program. These changes include adding risk mitigation strategies in the retailer contracts, using an instant discount, allowing higher maximum caps on items and creating a sense of urgency by having an instant discount only twice per year.

Two LDCs said the Truckload Events Pilot was an effective model that could be used in the future for the right product, such as an innovative product. One LDC said that expanding the pilot to include multiple retailers could avoid inventory issues at a single retailer. However, two LDCs said managing multiple retailers would be more difficult, requiring enhanced planning and coordination as well as maintaining data systems to manage the instant discounts.

\(^{20}\) One LDC suggested both these options.
4 Conclusions and Recommendations

The pilot design and delivery led to substantially greater participation and savings than planned. Interviewed respondents said the pilot was an effective partnership among the LDCs, the IESO and the retailer. The pilot met the objectives of testing the midstream delivery model, the effectiveness of instant discounts and a higher maximum number of products available for purchase.

Sales of LEDs during the promotion greatly exceeded expectations and the pilot spent 437% of its planned incentive budget. The Cadmus team calculated a gross realization rate of 130% and verified savings of 7,034,431 kWh and 442 kW. The pilot resulted in net savings of 6,807,732 kWh and 428 kW, with NTG ratios by bulb type ranging from 94% to 98%.

The volume of sales was in part because of large total discounts, effective marketing, customer interest and demand for LEDs, ease of use of instant discounts and helpful in-store staff.

Extreme success caused difficulties. Despite analyzing historical sales and estimating likely pilot impacts based on Coupons promotions, the retailer’s forecast was very low. This unanticipated success caused logistical difficulties for the partnering LDCs and retailer. The retailer had difficulty maintaining sufficient stock of the incented products and was concerned about being paid. The LDCs were concerned about the large budget overage and how to secure appropriate funds.

- Recommendation: Examine ways to improve forecasting, including conducting scenario analyses for various levels of achievement. Establish risk mitigation strategies to control future participation such as contract caps or stage-gates (points at which the contract can be amended or stopped).

The evaluation was limited by available data. Data were not sufficiently robust for reliable estimates of market lift or per-unit savings. For per-unit savings, the Cadmus team lacked information on pilot-specific specific baselines and in-service rates because participant surveys were not possible for this pilot. For the net savings analysis, we lacked full category data, complete historic sales and information on comparison store promotions, and therefore could not account for market shifts from non-qualifying to qualifying products. Additionally, although a goal of the pilot was to allow for higher maximum purchases by customers, we were unable to verify this objective as we lacked sales data at the customer or transaction level.

- Recommendation: In future program planning estimates and evaluation results, account for non-qualifying measures when estimating savings and NTG ratios. To ensure reliable per-unit savings, assess pilot or program-specific in-service rates and baselines wherever possible.

- Recommendation: For future midstream programs, collect full category product sales (i.e., qualifying and non-qualifying measures) for at least one year prior to the promotion and at pilot and comparison stores, ideally with pricing data. Collect information, including similar promotions, at comparison stores.
The pilot model was effective and could be scaled. The LDC staff said the pilot was a good model for future programs, especially for products where the LDCs want to shift the market. Working with multiple retailers could help avoid inventory issues at a single retailer; however, multiple retailers would require careful planning and coordination, as well as data systems to manage the instant discounts.

- **Recommendation**: Consider a similar delivery model for future promotion of innovative products to encourage market transformation.

- **Recommendation**: Consider incorporating integrated marketing techniques, instant discounts and helpful in-store staff into other programs that are seeking an increase in participation.
Appendix A. **Comparison of Business Case and Planned Incentives**

Table 15. Business Case and Adjusted Planned Quantities and Incentives

<table>
<thead>
<tr>
<th>Measures</th>
<th>Quantity</th>
<th>Per-Unit Incentives</th>
<th>Total Incentives</th>
<th>Measures</th>
<th>Quantity</th>
<th>Per-Unit Incentives</th>
<th>Total Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose LEDs</td>
<td>18,325</td>
<td>$3.00</td>
<td>$54,975</td>
<td>General Purpose LED</td>
<td>53,767</td>
<td>$3.00</td>
<td>$161,301</td>
</tr>
<tr>
<td>Specialty LEDs (Flood/Reflector)</td>
<td>11,154</td>
<td>$5.00</td>
<td>$55,770</td>
<td>Flood LED</td>
<td>11,154</td>
<td>$5.00</td>
<td>$55,770</td>
</tr>
<tr>
<td>Specialty LEDs (Globe)</td>
<td>1,743</td>
<td>$5.00</td>
<td>$8,715</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Specialty LEDs (Candle)</td>
<td>1,743</td>
<td>$5.00</td>
<td>$8,715</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>General Purpose LEDs - Multipacks of 3</td>
<td>11,814</td>
<td>$8.00</td>
<td>$94,512</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Candle LED (multipack)</td>
<td>581</td>
<td>$8.00</td>
<td>$4,648</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44,779</strong></td>
<td><strong>$222,687</strong></td>
<td></td>
<td><strong>65,502</strong></td>
<td><strong>$221,719</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B. Enersource Truckload Events Pilot Staff Interview Guide

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify roles and responsibilities</td>
<td>A1, C1</td>
</tr>
<tr>
<td>Document design process, including goal setting and purpose</td>
<td>B1-B4</td>
</tr>
<tr>
<td>Assess delivery and marketing methods</td>
<td>C1-C5</td>
</tr>
<tr>
<td>Assess participant and market actor experience, including satisfaction and effectiveness of incentive levels</td>
<td>D1-D2, E3</td>
</tr>
<tr>
<td>Document areas of success, challenges and lessons learned</td>
<td>B4, C4-C7, F1-F1</td>
</tr>
<tr>
<td>Assess scalability, including design and delivery modifications and target markets</td>
<td>F3-F4, G5</td>
</tr>
<tr>
<td>Identify key evaluation topics</td>
<td>G5</td>
</tr>
</tbody>
</table>

**Audience:** Local Distribution Companies (LDCs) and Independent Electric System Operator (IESO) staff responsible for the pilot programs.

**Purpose:** Identify key roles and responsibilities; document pilot design process and delivery; assess participant and market actor satisfaction; determine what works well and where challenges exist; assess scalability of pilot and ways to improve evaluability.

The Cadmus team scheduled and conducted these interviews, which took between 45 and 60 minutes. The interviews will be used to inform the evaluation plans.

**Target Audience:** The team will conduct one interview per LDC (listed in table below) and one with the IESO staff for a total of nine interviews.

<table>
<thead>
<tr>
<th>Pilot</th>
<th>LDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truckload Event</td>
<td>Enersource</td>
</tr>
<tr>
<td>Home Appliance Market Lift</td>
<td>IESO</td>
</tr>
<tr>
<td>Residential Direct Mail</td>
<td>Canadian Niagara Power, Eastern Ontario Power and Algoma Power</td>
</tr>
<tr>
<td>Residential Direct Install</td>
<td>Westario</td>
</tr>
<tr>
<td>Electronics Take Back</td>
<td>Toronto Hydro*</td>
</tr>
<tr>
<td>Solar Powered Ventilation Fans</td>
<td>Hydro One Brampton</td>
</tr>
<tr>
<td>Heat Pump Advantage</td>
<td>Hydro One Networks Inc.</td>
</tr>
<tr>
<td>Heat Pump Water Heater Advantage</td>
<td>Hydro One Networks Inc.</td>
</tr>
<tr>
<td>Residential Air Source Ductless Heat Pump</td>
<td>EnWin</td>
</tr>
</tbody>
</table>

* In partnership with Green Living Enterprises and Samsung Electronics.

**General Instructions**

- Interview guide will **not** be read verbatim, but will be used to guide the conservation.
- Interviewer instructions are in green [LIKE THIS].
- Skip pattern instructions are in red [LIKE THIS].
Email Invitation

To: [EMAIL]  
From: [YOUR EMAIL]  
Subject: Evaluation Interview about the Enersource Truckload Event Pilot

Hello [XXX],

As part of the 2016 consumer evaluation, which includes certain pilot programs, the Cadmus team (Cadmus, Apex and Econoler) is conducting in-depth interviews with key local distribution companies (LDCs) and Independent Electric System Operator (IESO) staff. As such, I would like to set up a time to speak with you regarding the Enersource Truckload Event Pilot.

With the interviews, we seek to ensure we have a thorough understanding of the pilot design and delivery and to inform development of the evaluation plan. We’ll also seek your perspective on things that work well or any challenging areas.

Please let me know if you are available during any of the following times [LIST OPTIONS]. I expect this interview will take about 45 to 60 minutes, but we can always schedule a follow-up if we need more time. If these times and dates do not work well, let me know what availability you have next week, and I’ll schedule a time for us to speak then.

I appreciate your time and help with this. I look forward to speaking with you.

Calendar Invite

To: [EMAIL]  
From: [YOUR EMAIL]  
Subject: Interview about the Enersource Truckload Event Pilot

Hello [XXX],

Thank you for agreeing to speak with me about the Enersource Truckload Event Pilot. Our call is scheduled for [INSERT TIME AND DATE OF CALL] and will take about 45 to 60 minutes.

Thank you. I look forward to speaking with you.
A. Introduction

Thank you for making the time to speak with me. As part of the IESO pilot evaluation and to inform development of the Enersource Truckload Event Pilot evaluation plan, the Cadmus team is conducting in-depth interviews with key LDCs and IESO staff.

With these interviews, we seek to ensure we have a thorough understanding of the pilot, data sources and things you look forward to learning through the evaluation. We’ll also seek your perspective on things that work well or any challenging areas. We will use the information you provide to inform our understanding of the pilot, so we can provide well-rounded and balanced observations and recommendations.

A1. To start, please tell me about your role and main responsibilities working on the Enersource Truckload Event Pilot.

B. Pilot Design

Now, I’d like to talk about how the pilot was initially designed.

B1. Thinking about the design and intent of the pilot, what would you say was the pilot’s primary purpose?

B2. What was the process that you and your team went through to design this pilot? How did you...
   B2a. Decide on LEDs as your target technology?
   B2b. Set the incentive levels?
   B2c. Decide on the delivery approach?
   B2d. Set goals (participation and savings per table below)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Quantity</th>
<th>MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose LEDs</td>
<td>18,325</td>
<td>438</td>
</tr>
<tr>
<td>Specialty LEDs (Flood/Reflector)</td>
<td>11,154</td>
<td>347</td>
</tr>
<tr>
<td>Specialty LEDs (Globe)</td>
<td>1,743</td>
<td>32</td>
</tr>
<tr>
<td>Specialty LEDs (Candle)</td>
<td>1,743</td>
<td>14</td>
</tr>
<tr>
<td>General Purpose (Multipacks of 3+)</td>
<td>11,814</td>
<td>847</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44,779</strong></td>
<td><strong>1,678</strong></td>
</tr>
</tbody>
</table>

B3. Did the pilot reach the planned goals? [PROBE: BARRIERS TO PARTICIPATION]
   B3e. [IF NOT ON TRACK] Why do you think that is?

B4. [SKIP IF B2 AND B3 ARE ON TRACK] What, if anything, would you change about the pilot to help reach the [PARTICIPATION/SAVINGS] goals?
C. Pilot Delivery

Now, I’d like to talk with you about the pilot delivery.

C1. Please describe how the pilot was administered and delivered, beginning with how customers first learn about the pilot and the role of retailers, through the purchase of LED bulbs.
   C1f. How, if at all, did the pilot interact with the Coupons Program?

C2. [SKIP IF DISCUSSED IN C1] How effective was marketing through the retailer weekly flyer?
   C2g. What makes you say that?

C3. Did the pilot cross-promote any providence-wide energy savings opportunities (related to Coupons and Heating and Cooling programs)?

C4. How did your team monitor and report on the pilot progress? (For example, through mid-year and final reports.) Would you mind sharing these with the IESO, so we can view them?

C5. It’s our understanding that one of the pilot objectives was to assess how the quantity of bulbs purchased per transaction may have changed after the previous limit of five bulbs per purchase was removed (with coupons). How did you assess this metric?
   C5h. [IF ASSESSED] What was the result?

C6. What challenges did you encounter with delivery of the pilot?
   C6i. How where these challenges addressed?

C7. Did you make any changes to pilot from the initial design?
   C7j. [IF YES] Please describe the changes.
   C7k. [IF YES] Why did you make these changes?

D. Customer Experience

Now, I’d like to talk about customer experience.

D1. How effective do you think offering discounted LED bulbs without needing to show coupons was in encouraging customers to participate in the pilot?
   D1l. What makes you say that?

D2. How satisfied do you think participating customers were with their pilot experience?
   D2m. What makes you say that?

D3. What, if any, customer data did you collect during the pilot? For example, customer, retailer and staff surveys (noted in the pilot evaluation plan).
   D3n. [IF APPROPRIATE] Would you mind sharing these with the IESO, so we can view them?
E. Market Actor Experience

The next few questions are about the supporting [CONTRACTORS, RETAILERS, MANUFACTURERS].

E1. What do you think were the main challenges for the supporting retailer?

E2. [SKIP IF NO CHALLENGES ARE IDENTIFIED IN E1] How would you change the pilot to address these challenges?

E3. How satisfied do you think supporting retailers were with their pilot experience, both at the store and corporate levels?
   E3o. Why do you say that?

F. Successes, Challenges and Future Planning

Please think about the pilot overall for the next set of questions.

F1. What would you say is working particularly well?

F2. What were the key lessons learned?

F3. Is the pilot being converted or has it already been converted into a local program?
   F3p. If yes, how was this decided?

F4. If the Truckload Event Pilot expanded, what changes do you think should be made? What markets would be most appropriate? [PROBE: DESIGN AND DELIVERY MODIFICATIONS AND TARGET MARKET]
   F4q. Why is that?

G. Closing

We are almost finished.

G1. We hope you can provide a few data points that will help us evaluate the Truckload Event Pilot. Do you have…
   G1r. The retail price of participant products sold through the control stores during the event period?
   G1s. Contact information for the person you worked with at the retailer in implementing this pilot?
   G1t. Store-level contact information (phone and email) for persons most familiar with the program at the 22 event store locations?

G2. [Request data to be provided to the IESO if in existence]
G3. In our document review, we found product sales data were provided from participating retailers; did you also collect contact information from end users?
   G3u. [IF APPROPRIATE] Would you mind sharing these with the IESO, so we can view them?

G4. Is there anything else you would like to cover that we did not discuss?

G5. Now thinking about the evaluation, what are you interested in learning from this evaluation?

   Thank you for your input. We appreciate your time. Have a nice day.