

Shedding Light on Energy Star Markets

Evaluation Lessons from a Retail Lighting Market Transformation Program

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ABSTRACT

This paper addresses the evaluation analysis for one energy efficiency lighting program currently offered in the Pacific Northwest. The evaluation focuses on Phase II of the Energy Star Residential Lighting Program (Phase II) sponsored by the Northwest Energy Efficiency Alliance (the Alliance). This program offers support to retailers in a variety of forms to conduct sales of Energy Star-qualifying CFL bulbs and fixtures. The speed in which the CFL market is developing is evidenced by the dramatically changing scope of this evaluation over the life of this project.

The analysis relies on sales information collected from participating retailers and from the redemption of a very large CFL coupon program offered by the Bonneville Power Administration. This sales data is being combined with store-specific information from Dun and Bradstreet to develop an overall market assessment for CFLs within the Alliance territory. The sustainability of the market will be evaluated over time by tracking CFL sales and through several waves of lighting consumer surveys. Ultimately, the market assessment developed in this evaluation will help distinguish between CFL market saturation and sustainable market transformation.

Introduction

The market for lighting — both in terms of lighting demand and supply — is changing rapidly in the face of heightened concerns about the energy crisis. Nowhere is this more apparent than with compact fluorescent lights (CFL) in the Western states, particularly within the Pacific Northwest. This paper addresses the evaluation analysis for one energy efficiency lighting program currently offered in the Pacific Northwest. The speed in which the CFL market is developing is evidenced by the dramatically changing scope of the evaluation of this program.

The evaluation focuses on Phase II of the Energy Star Residential Lighting Program (Phase II) sponsored by the Northwest Energy Efficiency Alliance (the Alliance). This program offers support to retailers in a variety of forms to conduct sales of Energy Star-qualifying CFL bulbs and fixtures. The evaluation was originally intended to provide the traditional verification of program activities and provide some measurement of program effects. As discussed below, unprecedented increases in demand for CFLs due to a variety of factors has made this traditional evaluation approach almost meaningless in this application. As a consequence, the Alliance has shifted its evaluation focus to look at the entire CFL market within its territory in order to provide guidance for future programs. This paper addresses those analysis activities that are being conducted to develop a comprehensive CFL market characterization within the Alliance service territory as part of the Phase II program evaluation.

Background

In July 2000, the Alliance began Phase II of its Energy Star Residential Lighting Program. This program focuses on providing support for retailers within the Alliance territory for selling CFL bulbs and fixtures in the residential market. Included in the program are retailers throughout the Alliance service territory of Washington, Oregon, Idaho, and Montana. The program is scheduled to run for over 2 years, ending in December 2002. Major components of program implementation include the following:

- Regular visits to participating retailers from program field reps
- CFL Promotional materials (endcaps, tags, etc.)
- Training of retail sales staff on selling CFLs
- Cooperative marketing promotions
- Coordination with other agencies such as utilities, PUDs, BPA, and distributors
- Website for wholesale of CFLs not available through other channels

The Alliance has been an innovator in program evaluation by evaluating its programs while they are still being implemented. This allows important evaluation findings to be used to improve the current program rather than conducting the evaluation after the program has ended. In the fall of 2000, ECONorthwest began the evaluation process for the program and will be conducting the evaluation research until June 2003, 6 months after the program is scheduled to end. Continuing the evaluation after the program has ended will allow for measuring sustainability of the program actions and to gather additional information on consumer attitudes and product retention.

Scope

The scope of the evaluation for Phase II has changed dramatically with the advent of the current energy crisis afflicting the Pacific Northwest. One of the few beneficial results of the crisis is an enormous increase in awareness and interest in energy efficiency and energy saving technologies such as CFLs. As discussed below, the original sales goal for CFLs for the *entire program* was matched in one quarter of 2000. Given this unprecedented demand, it became apparent that the program evaluation should take a broader, market-wide scope, rather than the more traditional monitoring and verification of a single program.

The initial plan for the evaluation was to track very specific program actions and to develop a simple model relating program actions such as field rep visits, CFL promotions, and various types of promotional materials to CFL sales. Because of increased consumer awareness and an incredible increase in demand for CFLs, it has become readily apparent that a model focusing on the minutiae of program actions would not adequately address the other market forces that are the primary drivers of consumer demand. As a consequence, the evaluation scope was modified to address lighting market issues both in and outside the program.

The current plan for the program evaluation is to develop an overall CFL market assessment within the Alliance territory. This involves estimating total residential CFL sales and then determining

the share of CFLs flowing through program channels over time. There are three primary goals of the market assessment:

- Track Energy Star-qualifying CFL sales over time,
- Estimate the share of the CFL market that is flowing through program channels, and
- Estimate the sustainability of CFL sales.

As part of this process, an assessment of lighting retail outlets will be conducted, including retailers participating in the program as well as nonparticipating retailers.

Conservation programs and incentives offered by other organizations are anticipated to have a strong influence on demand for CFLs independent of program efforts. The funding for these programs is also expected to dwarf funding levels for Phase II. The Bonneville Power Administration's (BPA) CFL Coupon Program is currently issuing six-dollar coupons that are redeemable for CFLs and are being made available to all utility customers within the Alliance territory. At current prices, these coupons basically make the bulbs free to consumers. As of the end of May 2001, BPA had issued over six million of these coupons, which amounts to about one coupon for every two persons within the program territory.

In addition to coupons, BPA's Conservation and Renewable Discount Program is expected to inject tens of millions of dollars annually through area utilities to promote energy efficient measures in the Pacific Northwest. In addition to the BPA programs, the deregulation of Oregon's electricity market is scheduled for October 2001. Part of Oregon's deregulation plan is a public benefits charge on electricity sales in the state. Funds collected from this charge will be used to promote conservation and energy efficiency and funding is anticipated to be approximately \$35 million annually.

Given these large programs external to the Alliance combined with increased public awareness of CFLs, the challenge of the evaluation is to determine what issues should be addressed and how to measure the effect of a relatively small program in the middle of very strong market forces. As discussed below, the decision was made to focus on a broader market assessment to determine how the general market for CFLs has changed, both inside and outside the program. Once the overall picture of the market has been developed, the evaluation will focus on determining how much of the CFL market share flows through the various market channels, and how this program market share changes over time.

Methodology

The first step in this process utilizes CFL sales data collected from some of the participating retailers to develop a measure of total CFL sales within the Alliance service territory. Currently, field reps are collecting sales data at various intervals for some of the larger retailers participating in the program. In addition, data are collected for various cooperative marketing programs for the duration of the promotion. Table 1 shows the number of participating stores by type in the program as of May 2001. Note that the number of participants changes as more and more retailers become interested in selling CFLs.

Table 1: Program Participating Retailers

Market Channel	Sample Retailers	Number of participants
Do-it-yourself	Home Depot, Lowe s/Eagle Hardware, Home Base, Fred Meyer	169
Mass Merchandisers	Target, K-Mart, Wal-Mart, Costco	320
Lighting Specialty & Hardware	Lamps Plus, Globe Lighting, Seattle Lighting, Ace Hardware, True Value, Thurman Industries, Penguin, Bartells, Lumbermans	646

While field reps visit all of the participating stores, they are only able to collect detailed sales data from about 60 stores. This is due to the extremely proprietary nature of the sales data combined with difficulties of collecting sales data from many of the smaller stores that do not track sales by computer. Sales information has been obtained from some of the other retail outlets at the chain level in addition to the field rep data. This information was collected for several stores for the fourth quarter of 2000 and the first quarter of 2001, and it is anticipated that similar data will be collected quarterly for the duration of the program. The data collected from retailers at the chain level is aggregated across all stores and CFL bulb types. In contrast, the store-level data collected by the field reps shows sales by CFL product type for each individual store.

In addition to the proprietary nature of the sales data, one of the issues hampering data collection is that many of the smaller stores do not keep computerized records of sales and inventories. This makes collecting sales data from individual stores a very time consuming process. As a proxy for CFL sales at these stores, the evaluation will focus on shipment data from distributors that specialize in serving these smaller customers.

Using the available sales and shipment data, the next step is to weight this data to develop an estimate of total CFL sales in the market covered by the program. A couple of issues need to be addressed to accomplish this task. First, sales data collected by the field reps tends to be from the larger stores that are most active in promoting CFLs. Second, sales data for some stores are only collected during promotional periods. Using this information to extrapolate to all retail outlets will likely overstate CFL sales.

To help address these issues, the field reps have characterized most of the stores that they visit as either *active* or *passive* participants. Active participants are those retailers who are actively promoting CFLs and welcome program actions to assist this effort. Passive participants that are technically participating in the program and are being visited by field reps but that do not appear to do any more than the bare minimum to promote CFLs. Although this categorization is done subjectively based on the opinions of the field reps, this distinction will help in weighting sales data to the population. Stores that are not assigned a category by the field reps are assumed to be passive participants.

The mechanism that links sales data from participating stores to the retail population are the store-level descriptive data obtained through Dun and Bradstreet (D&B). Data collected from field reps are currently being compared with D&B store-level data to determine if there is a systematic way to extrapolate CFL sales consistently across store, whether based on store size, store type, total sales, and/or geographic location. The analysis steps combining the field rep data and D&B information are shown in Figure 1. This process also utilizes coupon redemption data from BPA's Coupon Program, which is discussed below. Through a combination of retailer information from D&B and sales data from the program field reps and the BPA Coupon Program, CFL market share information will be estimated and tracked over the life of the program.

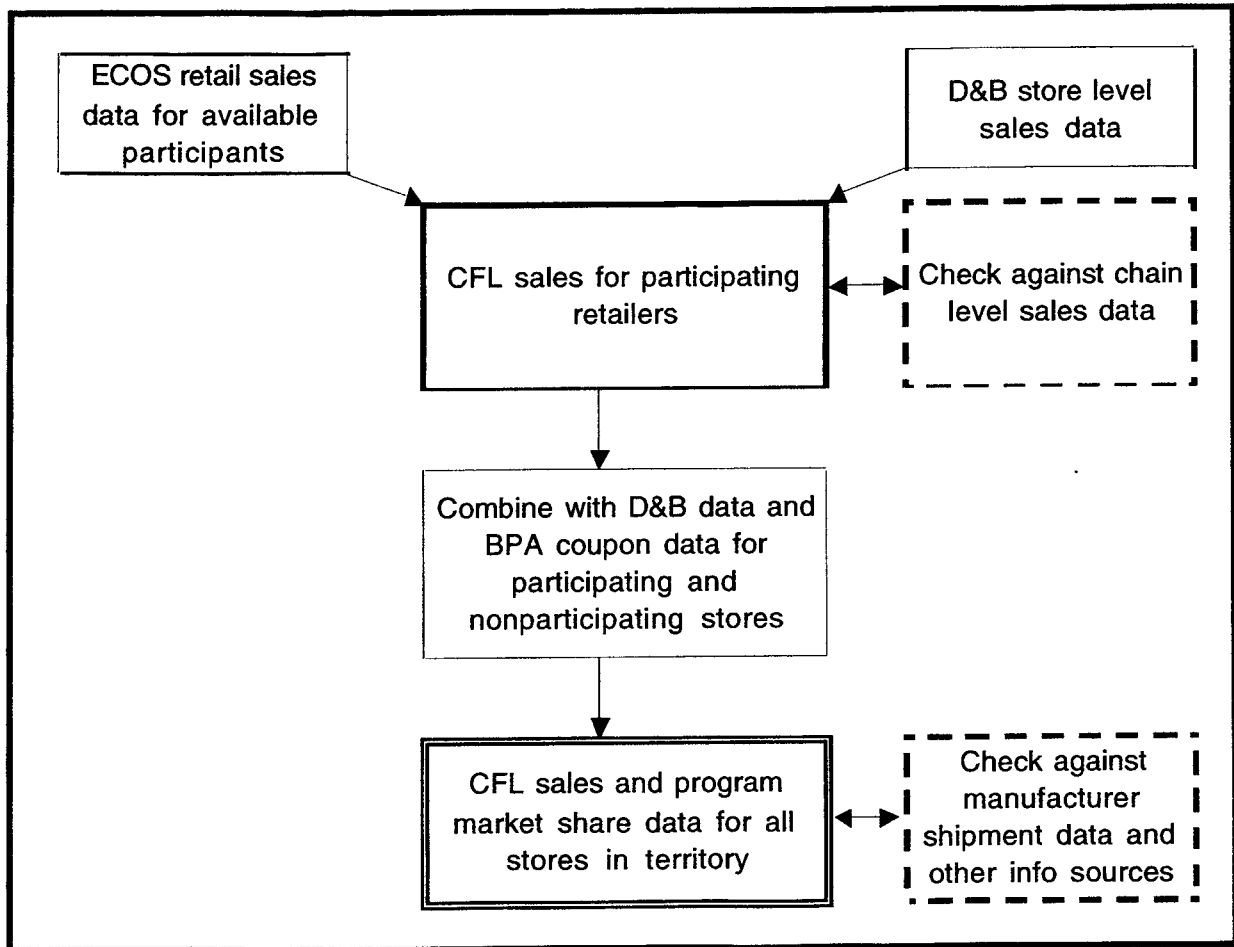


Figure 1: Data Sources and Analysis Path

Since the data being collected by the field reps and provided by distributors and retailers will be provided at regular intervals (quarterly), a timeline will be developed to show how sales are changing over the life of the program. This timeline will track CFL sales against market events such as

- Oregon electricity market deregulation

- Spending of Oregon's Public Benefits funds
- BPA C&R Discount program
- Drought conditions affecting hydroelectric power generation
- Energy prices
- Other major news announcements/events (CA crisis, blackouts, governor announcements)

The purpose of this timeline is to show a chronological tracking of major market events and CFL sales. While the timing of events does not necessarily mean events are correlated, a simple mapping these events over time will be informative. Statistical correlations between specific market events and CFL sales will be estimated as the situation warrants.

Preliminary Results

The results presented in this paper are very preliminary. The estimates discussed here were completed at the very beginning of a three-year evaluation processes. In addition, market conditions are constantly changing and new retailers are being added to the list of program participants on a monthly basis. These factors should be considered when reviewing the results presented here. As discussed below, many of major analysis tasks are taking place during the summer of 2001, and the most current analysis results from these efforts will be presented at the IEPE conference.

Sales information from currently available sources is shown in Table 2 for the last quarter of 2000. This information was compiled from sales reps visits to stores, where they had access to CFL sales data, and from data that was supplied by some retailers at the chain level. While every effort has been made to collect data for the Alliance territory only, some retailers provided aggregated data which may include some stores outside the program territory. More consistent data collection is expected as the program continues.

As shown in Table 2, almost 300,000 CFL bulbs were sold at the end of 2000. Much of this was due to a particularly large promotional effort at one large chain. Nevertheless, the amount of CFL sales during this period is extraordinary —the goal for the entire year was 200,000 bulbs and this was met in only one quarter. These figures for the fourth quarter of 2000 are prior to most of the energy crisis emphasis in the Pacific Northwest and before the extent of the current drought conditions became widely apparent.

Table 2: Program Sales Data by Market Channel

Product	Period	4Q 2000 Sales	1Q 2001 Sales	Percent increase
CFL Bulbs	Mass Merchandisers & Do-It-Yourselfers	277,196	448,457	62 %
	Hardware & Specialty	17,018	68,258	401 %
Total CFL Sales		294,214	516,715	76 %
CFL Fixtures	Mass Merchandisers & Do-It-Yourselfers	13,224	18,909	43 %
	Hardware & Specialty	440	838	90 %
Total CFL Fixture Sales		13,664	19,747	45 %

As shown in the far right column of Table 2, sales of both CFL bulbs and fixtures increased dramatically in the first quarter of 2001 over the prior quarter. During the first quarter of 2001, the program area received an enormous amount of information concerning the ongoing energy crisis in California the potential for blackouts in the Pacific Northwest due to ongoing drought conditions. Independent of the Phase II Program efforts, area utilities as well as the governors of both Washington and Oregon called on citizens to conserve electricity, with CFLs as one of the most often mentioned conservation measures. Due to these external market events combined with the retail infrastructure developed in part from Phase II program efforts, CFL sales increased dramatically. CFL bulb sales increase by 76 percent over the prior quarter, while CFL fixture sales increased 45 percent.

Table 2 shows the number of sales within the program for those stores for which we have sales data. The next step is to use this information to estimate total participant sales. Table 3 shows the average sales per employee for both active and passive participants. Again, this is a subjective categorization that has been made by the field reps for the stores that they visit. As shown in Table 3, the sales per employee for active stores are higher than for the passive stores, as expected.

Table 3: Average CFL Sales per Employee by Participation Category for Retailer Sample

Participation Category	Average Monthly CFL Bulb Sales per Employee	Average Number of Employees per Store	Percent of Retail Sample	Percent of all Participants	Percent of all CFL Sales at Participating Retailers
Active	3.80	108	97 %	31 %	85 %
Passive	2.52	9	3 %	69 %	15 %

A couple of points stand out from the information presented in Table 3. First, the field reps have categorized the vast majority of the stores they visit as active participants. This is not surprising, since those stores that are most receptive to the circuit riders are likely to be active promoters of CFLs and welcome the promotional materials provided the field reps provide. In addition, all of the big box retailers such as Home Depot have been categorized as active participants even if the field reps do not visit all the Home Depot stores, as it is known from other sources that they are actively promoting CFLs. The remaining stores have been categorized as passive participants, which is a conservative estimate since at least some of these stores are likely promoting CFLs, given the current market. The result of the categorization for the entire sample is that only 31 percent of all participants are considered active while 69 percent are passive. Most of the passive participants are the smaller, independently owned hardware and supply stores, as evidenced by the difference in average number of employees per store across active and passive participants.

The last column of Table 3 shows the percent of CFL sales through program channels from both active and passive participant retailers. While active participants comprise a smaller percent of the participant total in terms of number of stores, this group does account for the majority of CFL sales. Using the sales data for the first quarter of 2001 (the most recent data), active participants are responsible for 85 percent of the CFL sales flowing through program channels. This result is not particularly surprising, as the active participants contain the largest retailers with more employees. From an evaluation standpoint, however, it does indicate that program resources (in the form of field rep visits and other promotional assistance) are being directed to the stores that have the greatest potential for selling large amounts of CFLs.

Once participant CFL sales have been determined, the next step is to estimate the share of the total market that these sales represent. This step will rely on participating retailer sales data, D&B store data, and BPA Coupon Program sales data when they become available. To expand the sample of participating stores to the population, the participating stores first need to be categorized by SIC code so that they can be matched with the D&B data. The distribution of participating stores within SIC codes is shown in Table 4.

Table 4: Program Sales Data by Market Channel

SIC Code	SIC Code Description	Number of Participating Stores	Participant Share of Retailers
5063	Electrical Apparatus	43	4
5199	Nondurable Goods, Misc.	13	1
5211	Lumber and Other Building Materials	387	34
5251	Hardware Stores	181	16
5311	Department Stores	59	5
5331	Variety Stores	29	3
5399	Misc. General Merchandise	98	9
5411	Grocery Stores	67	6
5719	Misc. Home Furnishings	7	1
5912	Drug Stores	113	10
5999	Misc. Retail	138	12
Total		1,135	100 %

The participating stores represent less than 5 percent of the retail population within these SIC codes. However, the SIC code definitions are very broad even at the four-digit level and contain retailers that are not part of the CFL market. Many of these stores do not sell any light bulbs, for example, and are unlikely to do so in the future. We are in the process of working through the D&B data to remove these stores to determine the potential retailer population that can be reasonably expected to carry Energy Star-qualifying CFLs. This information, combined with sales data from field reps and the BPA coupon program, will provide the needed information to determine the amount of CFL sales that are being captured through program channels, and how CFL sales fluctuate over time.

Much more detailed sales data for both participant and nonparticipant retailers will become available in the next few months as the CFL coupons issued by BPA are redeemed. As of May 2001, over six million coupons have been printed and distributed as part of this program. As these coupons are redeemed, we will know how many are redeemed at each store, regardless if they are participating in the program. These coupons will make up the vast majority of CFL sales and will provide more accurate information on program penetration rates. Preliminary estimates based on coupon data are expected for the presentation of this paper in August at the IEPE Conference.

Next Steps

This paper is being written at the very beginning of the market assessment analysis. Consequently, two key components in the market assessment have yet to be fully developed. Additional information will be available in time for the conference, however, and the addition of these components will allow for a more detailed picture of the CFL market to be presented. The role of these components is described briefly below.

BPA Coupon Program Data

As discussed, much more detailed sales data for both participant and nonparticipant retailers will become available in the next few months as the BPA CFL coupons are being redeemed. As of May 2001, over six million coupons have been printed and distributed as part of this program. As these coupons are redeemed, we will know how many are redeemed at each individual store, regardless of if they are participating in the program.

These coupons will make up the vast majority of CFL sales with the program area and will provide valuable detailed information on program penetration rates. For these reasons, the coupon data will be the primary information source used to estimate total CFL sales within the program area. This information will be combined with the D&B store-level data and participant sales data to create a more detailed picture of the CFL market both in and outside the program. Preliminary estimates based on coupon data are expected for the presentation of this paper in August at the IEPE Conference.

Lighting Consumer Survey

Part of the Phase II evaluation consists of a lighting consumer survey. The survey will cover both customers that purchased CFLs as well as recent lighting purchasers that opted for incandescent bulbs. Information that is being gathered in this survey includes:

- Attitudes, perceptions, and awareness of CFL bulbs
- Motivations for purchasing CFLs
- Barriers to purchasing CFLs
- Perceptions of the current energy crisis
- Intentions for future CFL purchases
- Comparison of current CFL purchases with CFL purchases in prior years

The first survey wave is being fielded in June 2001 and the results from this survey wave will be presented with this paper at the IEPE conference. The second survey wave is scheduled for late fall 2001 and the third survey wave will be completed in the late spring of 2002. In addition, those respondents that purchased CFLs will be called back later in the evaluation to determine if the CFLs are still being used. This will provide information on product life and retention over the life of the program.

The consumer survey and coupon redemption information will allow for the development of a much more comprehensive picture of the CFL market. In addition, the completed evaluation will involve data collection from sales and consumer surveys over a three-year period. The analysis of market trends over this period combined with multiple waves of consumer surveys will allow conclusions to be drawn as to the long-term effects of the program efforts and the degree to which these effects are sustainable. In particular, the analysis is being structured so that, in the long run, the evaluation results will help distinguish between CFL market saturation and sustainable market transformation.