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Nexus Market Research

Process and Impact Evaluation of the New Hampshire Residential Lighting Program

Submitted to:

**Public Service Company of New Hampshire
Unitil Energy Systems, Inc.
New Hampshire Electric Cooperative
Connecticut Valley Electric Company
Granite State Electric Company**

Submitted by:

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Appendices (Under Separate Cover)

A: Results of End-User Telephone Survey

B: Results of On-site Survey of Retailers

C: Results of End-User On-site Visits and Gross Savings Analysis

1. Executive Summary

This is a summary of a process and impact evaluation study of the New Hampshire Residential Lighting Program sponsored by Public Service Company of New Hampshire (PSNH), Unitil Energy Systems, Inc. (Unitil), New Hampshire Electric Cooperative (the Co-op), Connecticut Valley Electric Company (CVEC), and Granite State Electric Company (GSECo). More detailed findings appear in the subsequent chapters and the appendices (under separate cover).

1.1 Description of the Program and Evaluation Components

The New Hampshire Residential Lighting Program promotes the use of energy efficient lighting products across the state through a catalog, termed *nhsaves*, offering qualifying bulbs and fixtures at reduced prices, and through instant rebate coupons at participating retailers. The program began operation on June 1, 2002 and is scheduled to run through December 31, 2003.

The program provides instant retail rebates of \$3 for compact fluorescent light bulbs (CFLs), \$10 for exterior light fixtures, \$15 for interior light fixtures, and \$20 for torchieres. CFL rebates were originally set at \$5, but were lowered to \$3 in September 2002 to reflect the lower CFL prices available. To date, the bulk of sales have come through the retail rebates; the retail sector accounts for approximately 90% of the transactions processed and 80% of the units purchased.

The utilities have responsibility for overall program design and implementation, requiring them to come to a consensus on issues such as the design of the catalog, amount of the rebates, and selection of the contractors to assist in the program's implementation. The utilities hired contractors for catalog design and for website development, and also hired two primary contractors to deliver the program: Energy Federation, Inc. (EFI) and Applied Proactive Technologies (APT). EFI provides catalog and retail rebate fulfillment. For the catalog, EFI receives customer orders through the phone, mail, or web and ships the products from its inventory. EFI then invoices the appropriate utility for part of the cost of the rebated products ordered. EFI also processes the instant rebate coupons received from participating retailers. EFI pays the retailers and invoices the appropriate utility based on the customer's address.

APT's responsibilities consist of recruiting retailers to participate in the program, training the appropriate personnel, designing the point of purchase (POP) materials and newsprint ads, keeping the retailers supplied with coupons and other POP materials, and running a variety of promotions or special events. APT is also supposed to visit retailers periodically to ensure that displays are maintained and that lighting products receive prominent placement in the stores.

The current study, the Process and Impact Evaluation of the New Hampshire Residential Lighting Program, integrates data and findings from a variety of evaluation activities, including:

- ? Interviews with program staff members and implementation contractor staff members.
- ? Review of program data and materials.
- ? On-site survey of participating (37) and non-participating retailers (24)
- ? Telephone survey among participating (326) and non-participating (343) end-users
- ? On-site visits among participating end-users (72).

1.2 Process Evaluation Findings

Program Implementation

The description and analysis of the program implementation are based on interviews with the sponsoring utilities and two primary contractors as well as review of program data and materials.

Program Budget. The utilities budgeted approximately \$1.8 million for the program and had spent about \$1 million by June 30, 2003, providing rebates for approximately 80 thousand bulbs and 13 thousand fixtures. In contrast, the Massachusetts program had budgeted approximately \$5 million for 185 thousand bulbs and 118 thousand fixtures in 2001. According to the 2000 Census, Massachusetts has over 5 times as many households as New Hampshire—2.4 million compared to 470 thousand. Hence the program on a household-by-household basis is larger than that of Massachusetts, although the New Hampshire market is probably less saturated since most of the state did not have a retail lighting program before 2002. The cost per product delivered in New Hampshire is about \$10.75, compared to \$16.50 in Massachusetts, although there were 6.2 bulbs rebated for every fixture in New Hampshire compared to a ratio of 1.6 in Massachusetts—and fixtures are more costly and very likely more permanent. In any case, the New Hampshire program appears to be using available monies effectively to provide rebates for a relatively large number of products.

Retail Implementation. Applied Proactive Technologies (APT) implements the retail portion of the program (with the exception of rebate processing). APT significantly reduced its proposed budget for retail implementation before the start of the program; the original retail implementation budget developed by APT and other bidders would not have allowed the utilities to pay the rebates necessary to reach their goals. Moreover, APT recommended and received instructions from some utilities to “go slow” in recruiting retail stores and distributing rebate coupons in order to allow the utilities to maintain tight control over spending at the program’s outset. This meant that APT made heavy use of its contacts with chains that were already participating in the Massachusetts program in recruiting New Hampshire retailers. APT’s reduced budget also meant that it focused on recruiting chains rather than smaller, independent retailers, because the former would allow the more efficient use of available staff time.

EFI processes rebate coupons for the retail portion of the program. The average time for processing retail coupons is 60 days, with 90 days at the high end. Of this time, about 30 to 60 days is due to the lag in the retailer sending in coupons; EFI takes two to three weeks to process coupons once they are received. According to EFI, some retailers may send in coupons every few months.

Catalog Implementation. EFI implements the catalog portion of the program, and also processes rebate coupons for the retail portion of the program. EFI reports that most customers who use the catalog receive their orders in about two weeks. If a customer orders a product that is not readily available, they receive a postcard with several options (wait if the product is backordered; fill part of the order; accept a substitution such as a torchiere in a different color; cancel part or all of the order and receive a refund) and a toll-free number to call with a

preference. According to EFI, only a small portion of customers ordering from the catalog—about 2%—receive such a postcard.

Multipacks. The treatment of multipacks depends on the customer filling out the instant rebate coupon at the point of purchase (there are no multipacks in the catalog). If the customer correctly circles the number of bulbs in the package, the database will reflect the actual number of bulbs purchased; if the customer indicates the purchase of one bulb rather than one package, the database will undercount multipacks. The database shows that multipacks account for only about 5% of all retail bulb transactions. A total of 1,737, or 73%, of the transactions involving multipacks were correctly recorded in the database. Most of the incorrect entries consisted of multipacks recorded as one bulb. This resulted in undercounting by 1,023 bulbs. The database recorded 48,732 bulbs purchased by retail customers who supplied model numbers; adding the multipack bulbs not counted brings this to 49,755. Thus, we estimate that the database undercounts the retail bulbs sold by about 2% due to the multipack issue.

Large Orders. The program limits the number of CFLs that may be purchased to six per year per residential account. Figure 1-1 shows that a fair portion of transactions exceed this maximum accounting for a significant percentage of all CFLs sold. In this figure, retail transactions involving more than six CFLs represent transactions involving the same customer buying more than six CFLs on a single date. Catalog transactions involving more than six CFLs represent the same customer buying more than six CFLs over a 12-month period (October 2002 to October 2003). The utilities often approve large orders if the bulbs and fixtures are intended for separate housing units, so this may not be a problem. Large orders may increase energy savings by maximizing the number of bulbs installed, but if they are not spread out among multiple housing units may reduce market transformation effects by concentrating incentives among fewer customers and hence preventing broader experience with efficient lighting. Customers putting in large orders could also be more likely to leave bulbs and fixtures uninstalled, and thus contribute to the relatively low in-service rate.

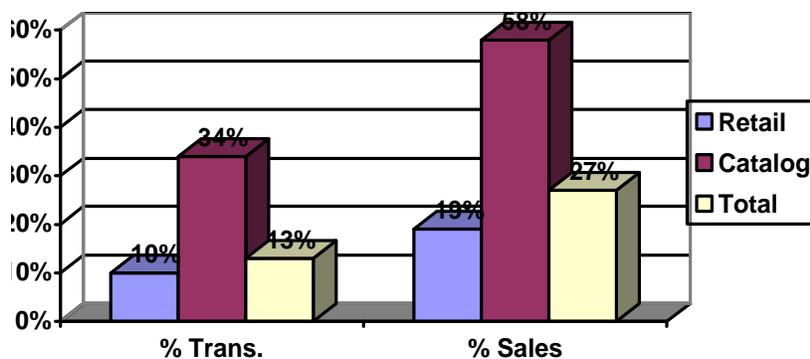


Figure 1-1: Transactions Involving More Than Six CFLs

Program Marketing and Promotion

The description and analysis of program marketing and promotion are based on interviews with the sponsoring utilities and two primary contractors, review of program materials, and interviews with retailers.

Promotional events for the program include ongoing torchiere turn-ins, newspaper articles, home shows, and sidewalk sales. Sales appear to have increased after these events, and also after the release of the catalog in September of 2002 and March of 2003. Among the participating retailers interviewed, forty-three percent reported participation in special promotional events, all of them saying the events increased traffic in their stores. The most frequently mentioned special events included torchiere turn-in events and special CFL bulb pricing events. In response to lighting promotions, 46% of participating retailers say sales of portable CFL fixtures increased, 54% say so about exterior fixtures, 60% about interior fixtures, and 78% about CFLs.

While only 13 of the 37 stores in the participating retailer sample reported using program advertising to increase sales, program materials were frequently observed during the on-site visits. Figure 1-2 below shows the types of ENERGY STAR promotional displays that were found in participating stores. Most stores (70.3%) had *nhsaves* and/or National Program signs present, while banners and brochures were found in fewer than one out of five stores. Other less frequently found items included magnets and calculation tools.

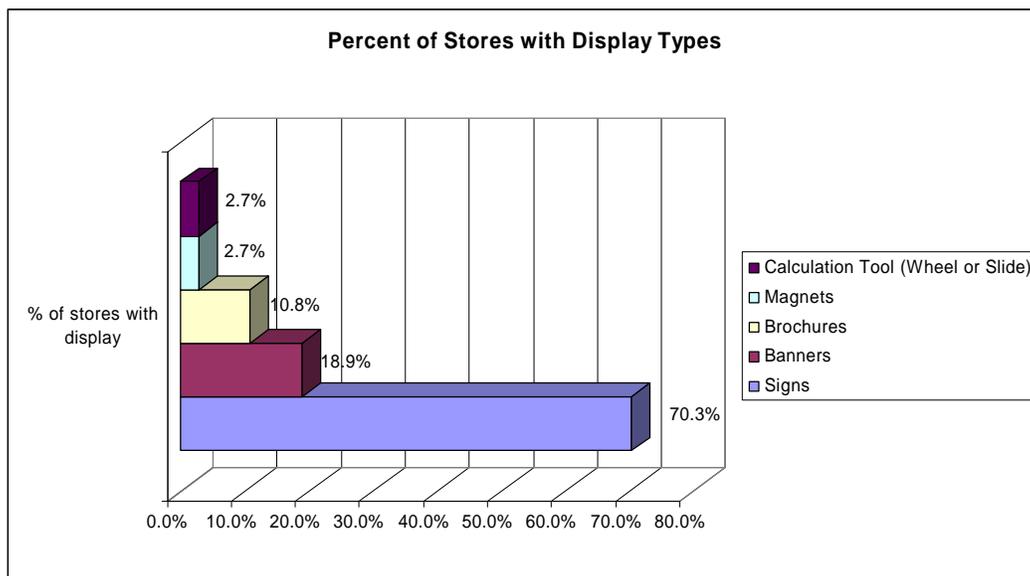


Figure 1-2: Display Types Observed at Participating Stores

About two-thirds of participating stores say they train their employees on the benefits of ENERGY STAR lighting—most often relying on the APT representative.

Retailer Awareness, Perceptions, and Attitudes

Participating retailers (90%) are much more likely than non-participating retailers (42%) to be familiar with ENERGY STAR lighting products.

Four of the 24 non-participating retailers are interested in participation, and another five would consider participation given more information about the program. The most common reason for declining participation was a lack of authority. These retailers reported that their corporate office would need to make such a decision.

Retailer Satisfaction

Figure 1-3 shows retailers’ ratings of satisfaction with the program and assessments of program responsiveness to the lighting market. Overall, participating retailers are satisfied with the Residential Lighting Program, rating it an average of 7.5 on a scale of 1 (not at all satisfied) to 10 (extremely satisfied). All of the retailers in the sample also feel that the New Hampshire initiative is at least as good as the National initiative, with five reporting that it is better. Participating retailers feel that the program is responsive to changes in the lighting market, giving it an average rating of 7.3 on a scale of 1 (not responsive) to 10 (extremely responsive). Only two respondents out of 37 gave ratings below five, saying that the program “doesn’t seem to get out to distributors” and is “unaware of any new products.”

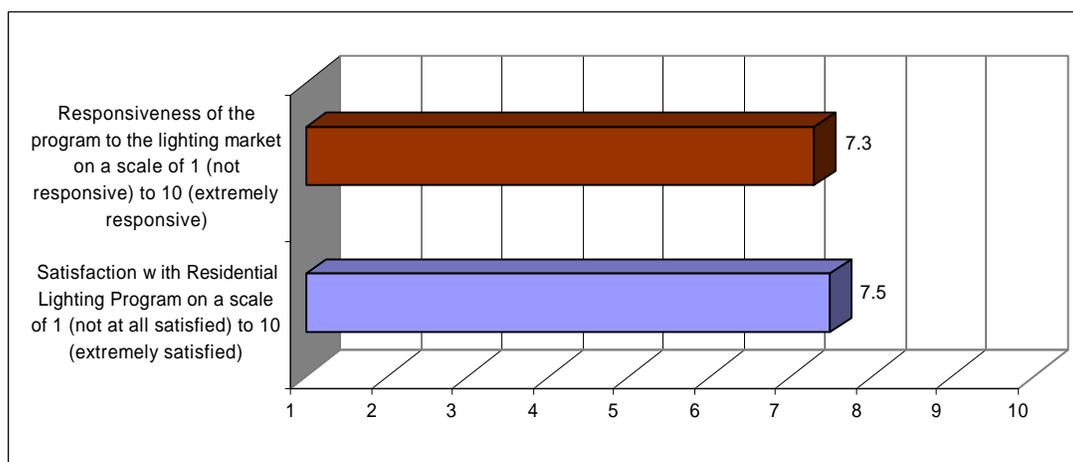


Figure 1-3: Retailer Rating of Satisfaction and Program Responsiveness

All but two retailers said they would be at least “somewhat likely” to participate if the rebates were cut in half. One of the two exceptions said they would be “somewhat unlikely” and the other did not know. If the rebates were discontinued, however, most (65%) of the participating retailers reported that their participation in the program would be “very unlikely.”

End-User Participation Levels

The goal for the program is to serve 36,148 customers; as of mid-October, the number of customers served was 30,752—85% of the goal. The proportion of all residential customers served is 5.6%. The program will continue through the end of December, so the goal appears to be within reach.

As shown in Figure 1-4, people buying efficient lighting products through the program were more likely than non-participants to live in single-family homes, to own rather than rent, to be over the age of 55, and to have upper middle rather than high or low incomes.¹ It may be that many lower-income earners feel they cannot afford to invest in efficient lighting, and many

¹ All of these differences are significant at the 90% confidence level, except for the \$100,000 or more income difference, which is significant at the 80% confidence level.

higher-income earners are not motivated by the savings on electric bills, while middle income earners feel they can make the investment and then benefit from the savings.

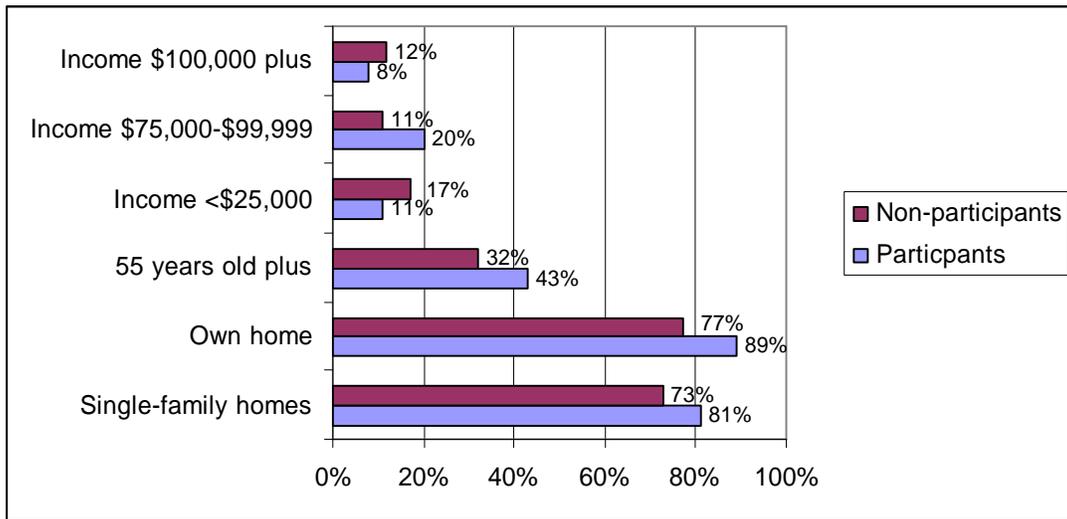
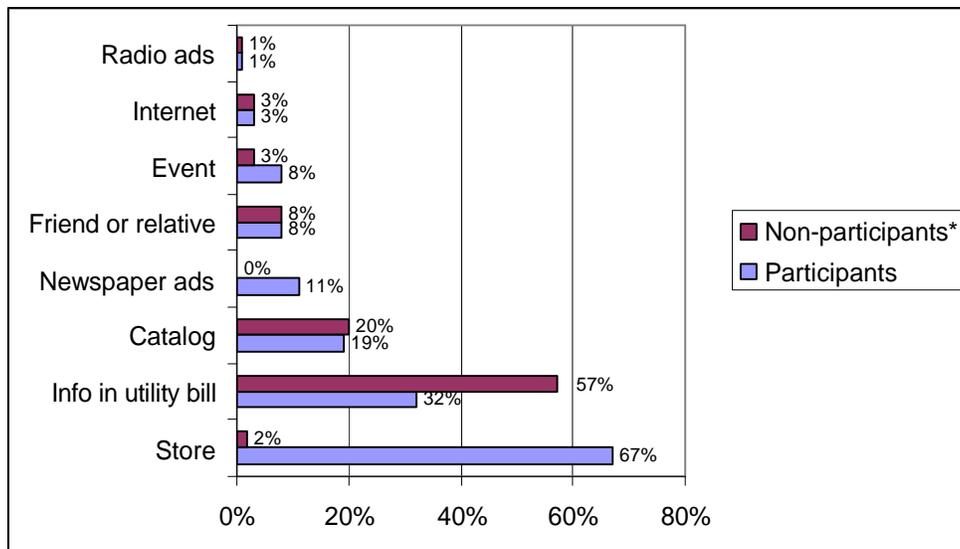


Figure 1-4: Demographics of Participants and Non-participants

End-User Awareness

Statewide, 40% of non-participating customers are aware of the lighting program. As shown in Figure 1-5, most non-participants who are aware found out through information in their utility bill, while most participants found out through in-store displays. This appears to show that point-of-purchase displays are extremely effective: if consumers notice them, they are very likely to buy efficient lighting products. Nearly equal portions of participants and non-participants found out about the program through the catalog.



* Those who are aware of the program—40%

Figure 1-5: Sources of Awareness of the Program

End-User Motivations for Participation and Nonparticipation

Participants in the program were motivated primarily by a desire to save money on their electric bills (52%); many also responded to good prices on the products (22%).

In addition to lack of awareness, the primary reason why non-participants did not make any lighting purchases through the program is the lack of need (29% of those aware of the catalog, and 48% of those aware of retail coupons).

End-User Satisfaction

Overall satisfaction with the quality of the purchasing process through the *nhsaves* catalog and the rebate coupons at participating retailers runs quite high. On a scale of 0 to 10, with 0 being the lowest rating and 10 being the highest rating, mean ratings are 8.2 for both catalog and retail participants.

When asked the reasons underlying their ratings through an open-ended question, catalog participants who give high ratings focus on the good variety of products, informative explanations of products, good catalog design, the quality of the products, and service. Criticism is minimal and the reasons vary widely. Retail participants attribute their high ratings of the purchasing process in part to its ease of use and the quality of the products. Criticism of the retail program process was focused on the amount of paperwork required, disappointment with the technology (not bright enough/short life/quality of light), and a combination of elements of the retail experience (lack of coupons at stores, employees not being able to answer questions, and confusion over rebate amounts at the check-out).

1.3 Impact Evaluation Findings

Gross Savings

We estimate the gross savings and the realization rate as shown in Table 1-1 below. The primary reason that the realization rates aren't higher is that in-service rates are lower than originally assumed; secondarily, the wattages displaced are lower than had been assumed.

Table 1-1: Gross Energy Savings (kWh) and Realization Rate by Product Type

Product Type	Gross Energy Savings (kWh)			Realization Rate		
	Retail Participants	Catalog Participants	Total Participants	Retail Participants	Catalog Participants	Total Participants
CFLs			3,350,465			70.1%
Permanent fixtures			458,360			76.2%
Portable fixtures			923,303			48.9%
Total	4,023,111	779,444	4,732,128	71.4%	47.6%	65.1%

Table 1-2 shows the gross energy savings and the realization rate adjusted for end-user telephone survey respondents who have not installed their lighting products yet, but plan to do so.

Table 1-2: Maximum Potential Gross Energy Savings (kWh) and Realization Rate

Product Type	Gross Energy Savings (kWh)			Realization Rate		
	Retail Participants	Catalog Participants	Total Participants	Retail Participants	Catalog Participants	Total Participants
CFLs			3,953,549			82.7%
Permanent fixtures			656,372			109.1%
Portable fixtures			978,701			51.8%
Total	4,707,798	880,823	5,588,621	83.55%	53.8%	76.9%

Net Savings

We estimate the net adjustments to gross energy savings as shown in Table 1-3 below. After taking into account these net adjustments, we estimate net savings and the net realization rate as shown in Table 1-4.

Table 1-3: Net Adjustments to Gross Energy Savings

	CFLs	Perm. Indoor Fixtures	Portable Fixtures	Exterior Fixtures
Free Ridership	17.4%	17.1%	3.2%	27.6%
Spillover	4.4%	8.3%	15.7%	8.6%
Snapback	2.6%	4.2%	3.4%	0.0%
Snapforward	0.1%	0.0%	0.0%	0.0%

Table 1-4: Savings (kWh) and Realization Rates after Net Adjustments

Category	Based on Gross Savings (kWh) Estimate from On-sites			Realization Rate	Based on Maximum Achievable Gross Savings (kWh)			Realization Rate
	Retail	Catalog	Total		Retail	Catalog	Total	
CFLs			2,826,892	52.0%			3,335,733	61.3%
Permanent Fixtures			398,806	44.4%			571,090	63.6%
Portable Fixtures			1,006,836	107.7%			1,067,246	114.2%
Total	3,544,251	688,283	4,232,534	58.2%	4,165,200	808,869	4,974,069	68.4%
Realization Rate	62.9%	42.0%	58.2%	58.2%	73.9%	49.4%	68.40%	68.4%

The above estimates are for annual savings only. We strongly encourage the New Hampshire utilities to include lifetime savings in any cost-effectiveness analysis, because the costs incurred are for one year only, while the kWh savings will continue as long as the lighting products are installed and operating. Table 1-5 shows estimated lifetime savings. This analysis included calculating lifetimes based on the actual operating hours of the lighting from the on-site activities

and the rated lifetime hours. We have assumed that the rated lifetime hours are 8,000 for bulbs, 15,000 for portables, and 20,000 for fixtures—all of which are conservative estimates. Calculating the annual gross savings times the expected measure lifetimes provides an estimate of nearly 32,000 MWh of net energy savings—over 400% more than the annual tracking savings. Since this estimate is based on products already installed, the figures could be even higher once additional products are installed (based on maximum potential gross energy savings).

Table 1-5: Estimated Lifetime Savings

Technology Segments	Hours per year	Lifetime (yrs)	Gross Annual Savings (kWh)	Estimated Lifetime Gross Savings (kWh)	Estimated Lifetime Net Savings (kWh)
CFLs	1,705	4.69	3,350,465	15,713,681	13,458,768
Indoor & Outdoor Fixtures	1,153	13.01	458,360	5,963,264	5,188,636
Portables/Mult. Technologies	1,351	14.80	923,303	13,664,884	14,948,017
Total			4,732,128	35,341,829	31,610,618

1.4 Market-Related Findings

The gross and net impact figures above are metrics for the resource acquisition aspect of the program. In addition, the program has a market transformation aspect, in that it aims to help make the market for efficient lighting self-sustaining over time. Increasing free ridership and spillover are signs of such market transformation (see previous section). Other such indicators are declining prices over time, a greater proportion of shelf space devoted to the energy-efficient models displayed, increasing market penetration, and increasing saturation.

Pricing of Efficient Lighting

Among retail stores in New Hampshire, the average price for a CFL is \$6.41, compared to \$1.67 for a non-CFL bulb. While the average price for a non-CFL bulb appears high, the 90% confidence interval around this estimate is fairly high at +/- \$0.07. Prices are similar among participating and non-participating retailers.

Shelf Space and Model Counts

Figure 1-6 presents the weighted proportion of shelf space (and floor space) dedicated to energy efficient lighting products. The results are presented by lighting technology. As expected, participating stores consistently dedicate more space to energy efficient lighting products than their non-participating counterparts. Overall, participants dedicate approximately 11% of their lighting shelf and floor space to energy efficient lighting, while non-participants only dedicate less than one-half of one percent, which amounts to about 2% overall. These results suggest that recruiting new retailers is likely to result in an increase in availability of efficient lighting products available for consumers.

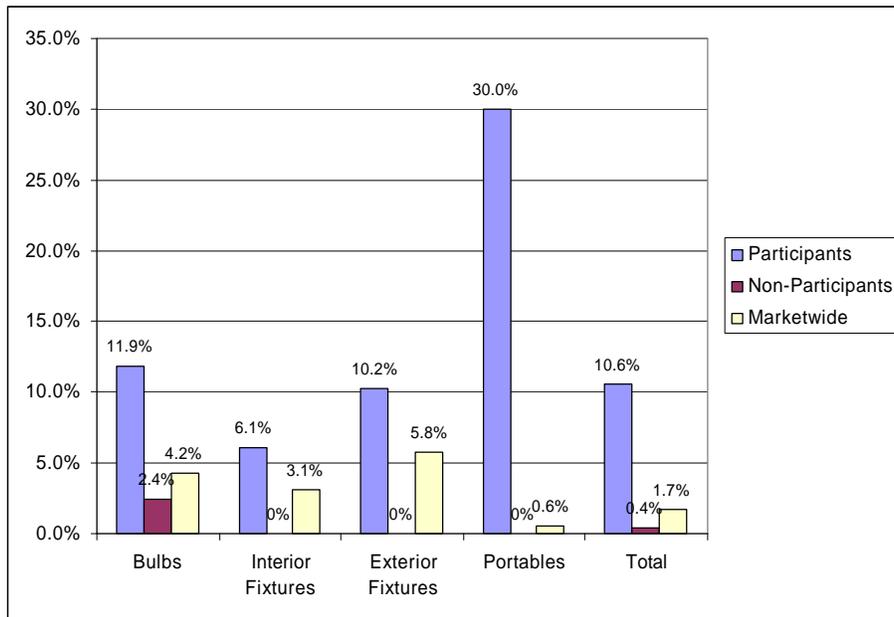


Figure 1-6: Proportion of Shelf Space with Energy Efficient Lighting

Market Penetration of Efficient Lighting

Figure 1-7 below shows estimated market penetration of CFLs in New Hampshire in 2003 compared with California, Wisconsin, and the nation as a whole in 2000, 2001 and 2002.² Of permanent interior fixtures sold in New Hampshire, 2.0% of are CFL fixtures; the figure is 1.1% for exterior fixtures, and 0.7% for portable CFL fixtures. National fixture penetration estimates are not available for other states.

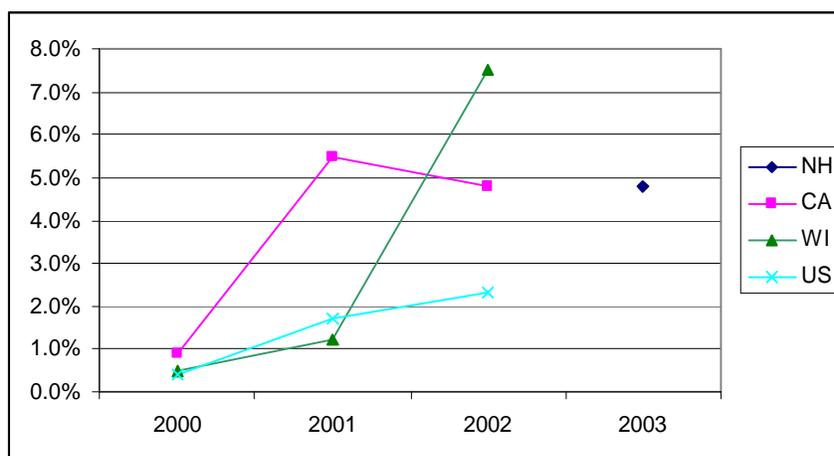


Figure 1-7 Penetration of CFLs (out of all screw-in bulbs sold)

Saturation of Efficient Lighting

Among participants only, 7.7% of household sockets have pin-based CFLs installed, 15.8% have screw-in CFLs, and 2.9% have plug-in fluorescent tubes. We should point out, however, that this is not market saturation, which would include non-participants.

End-User Experiences with Efficient Lighting

Nearly nine out of ten participants (88%) say they had at least a little knowledge of CFLs before the program, while fewer than three-quarters of non-participants (73%) had been familiar with CFLs. Still, a majority of both customer groups say they were familiar with CFLs before the program. A large majority of non-participants (72%) were not familiar with CFL fixtures, compared to only 49% of participants.

Thirty-six percent of non-participants claim to have CFLs currently installed, and another 7% have used CFLs in the past, bringing the total of non-participants who have had personal experience using CFLs to 43%. Prior to the program, 49% of participants had used CFLs.

² Alan Fields et al, "CFL Market Penetration Using Point-of-Sale Data: Regional Perspectives," presented at the 2003 Energy Program Evaluation Conference, Seattle. Note that the national, California, and Wisconsin figures are based on point-of-sale data, and are likely to be more accurate than the estimates provided by retailers for New Hampshire.

End-User Perceptions of Changes in the Market

In general, majorities of respondents previously aware of CFLs and fixtures—if they have an opinion—believe that CFLs and fixtures are currently available in more stores, and that more models are available, than at the time they first became aware of energy-efficient lighting. (Figures 1-8 and 1-9)

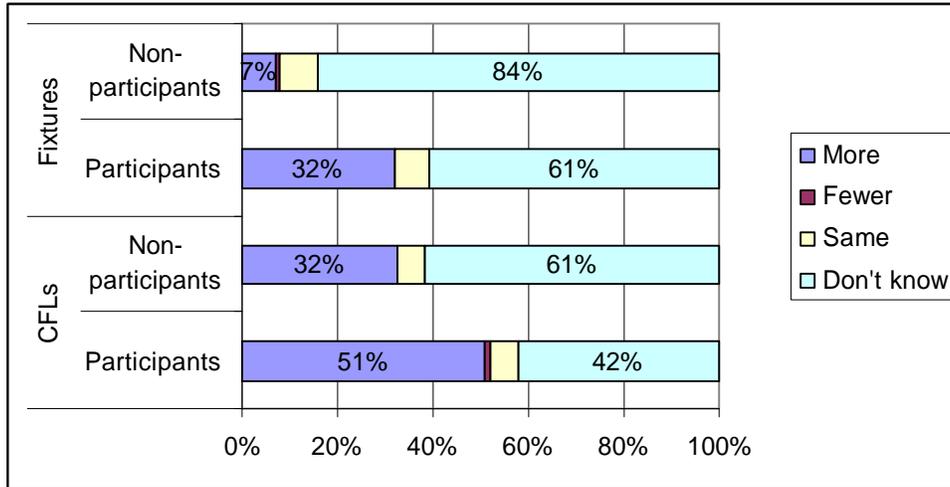


Figure 1-8: Perceptions of Availability in Stores Compared to When First Became Aware

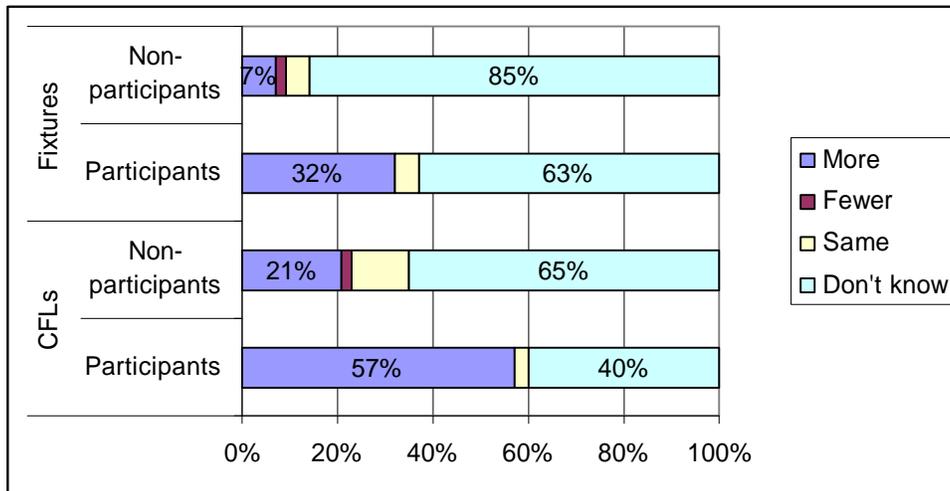


Figure 1-9: Perceptions of Models Available Compared to When First Became Aware

Most participants who had been aware of CFLs—if they have an opinion—think the quality of CFLs and fixtures has improved, but perceptions among non-participants are more evenly divided. (Figure 1-10)

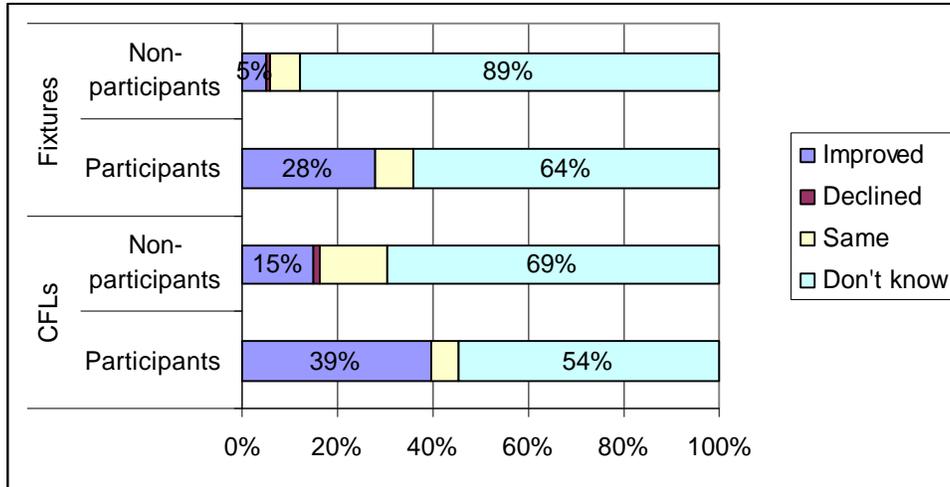


Figure 1-10: Perceptions of Quality Compared to When First Became Aware

Most participants previously aware of CFLs and fixtures—if they have an opinion—think prices have gone down. Non-participants generally perceive prices of CFLs and CFL fixtures to have stayed about the same, if they have an opinion.

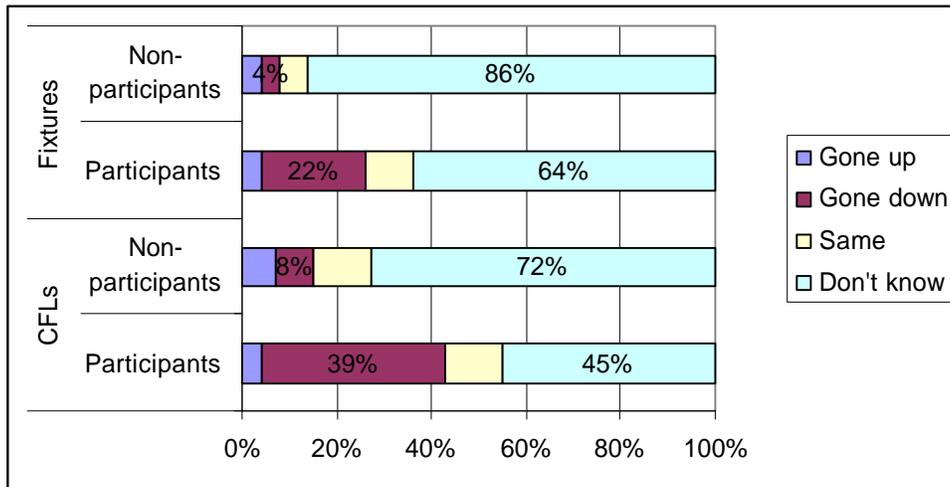


Figure 1-11: Perceptions of Prices Compared to When First Became Aware

End-User Behavior and Attitudes

When buying bulbs, participants (55%) and non-participants (62%) typically stock up on them, while 37% of both participants and non-participants buy them on an as-needed basis as bulbs burn out. For those who stock up, the cost of CFLs is a potential barrier, given the need to make a substantial up-front investment. For those who buy bulbs as they burn out, the availability of CFLs is a potential barrier.

The end-user surveys asked customers who had purchased CFLs prior to the program why they had done so. As shown in Figure 1-8, the highest proportions mention low operating costs compared to incandescents, followed among non-participants by the related reason of saving electricity. Other important benefits are not having to change the bulb as often, being good for the environment, and rebates.

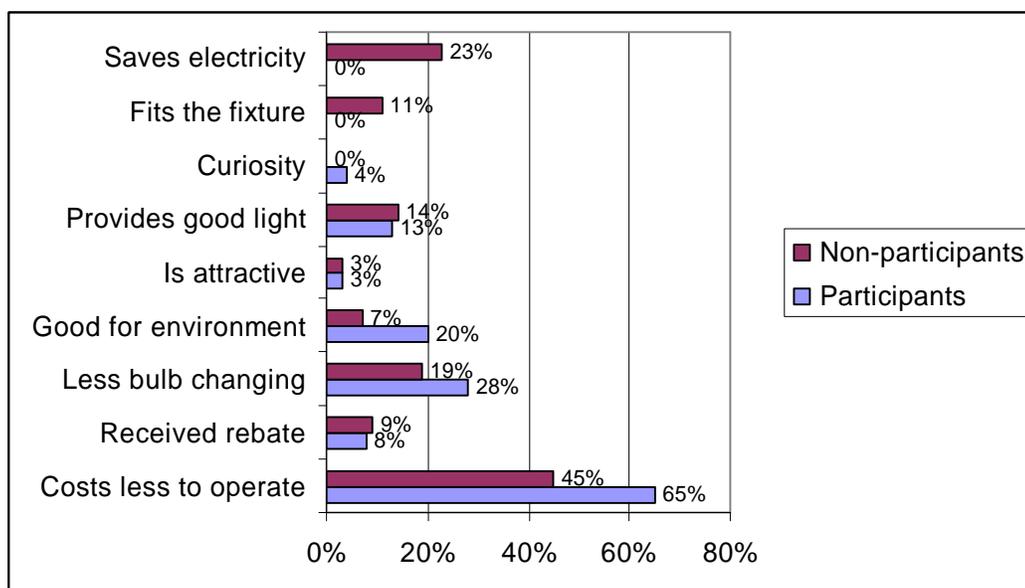


Figure 1-12: Reasons for Previous Purchases of CFLs

The major reasons why many non-participants stopped using CFLs is because the bulbs were not bright enough (34%), because of the expense (32%), because they had moved (27%), and because they had burned out (15%).

Among non-participants who are aware of CFLs but never used them, high cost is the main barrier for many (26%). Consumer motivation, or lack thereof, is another major barrier to their use—many non-participants say they have never thought about using CFLs (13%) or admit they do not know much about them (21%). Perceived limitations of the technology, such as poor fit in fixtures (8%) and aesthetic preferences (like another type of bulb—12%, don't like the way CFLs look—5%) also are cited as reasons for not using them.

Figure 1-9 shows the proportion of non-participants who would be willing to pay \$3, \$5, \$10, or \$15 per CFL, including proportions adjusted for awareness of CFLs and the program. While stated willingness to pay typically overstates how consumers would actually behave, it is worth

noting that the difference in the size of the group of all non-participants willing to pay \$15 and those willing to pay only \$3 is 26%, whereas the size of the difference between the group of all non-participants willing to pay \$15 and the same group adjusted for both kinds of awareness is 44%; hence awareness may be a bigger barrier than cost.

As expected, non-participants who are willing to pay \$15 per CFL have higher incomes than those who are not willing to pay that much. At \$10 apiece, customers in lower-income categories are still slightly less likely to purchase, but the relationship is much weaker; at \$3 apiece, there is no significant relationship between willingness to purchase and income.

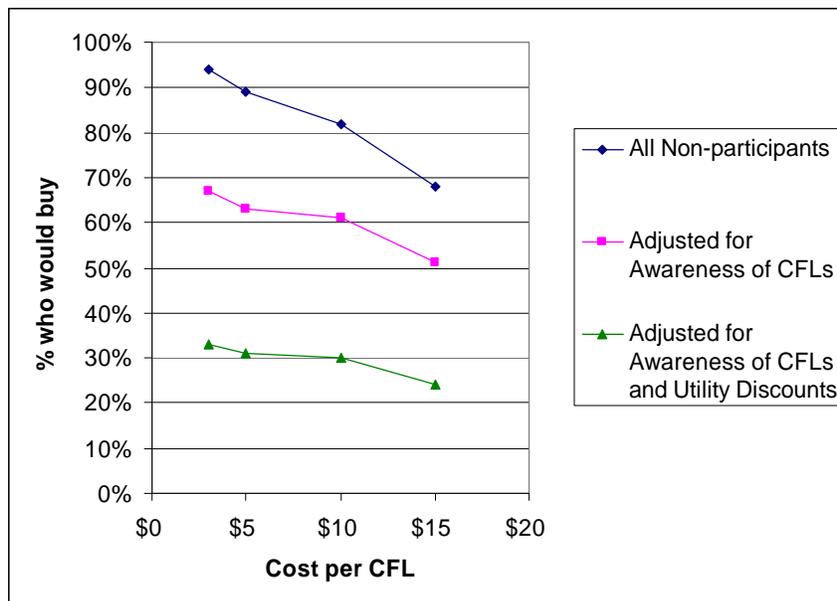


Figure 1-13: Non-participant Willingness to Pay for CFLs

1.5 Recommendations

On the basis of this evaluation we make the following recommendations. See Chapter 6 for a fuller discussion.

- ? **Work with the PUC to assure program continuity.** Uncertainty over the program's existence beyond 2003 has contributed to difficulties in retailer recruitment; not surprisingly, retailers want some assurance that the rebates will continue to be offered before investing heavily in energy efficient lighting inventories. It is also unfortunate that, after the utilities put a great deal of effort into the Fall 2003 catalog, which has generally received high marks from everyone interviewed, it will only be available for a short time. The utilities need to be able to react to changes in the market by redesigning the program to address evolving needs. A long-term program has some flexibility, but it is hard to make changes when the program may only have a few months of operation left.
- ? **Reporting.** EFI and APT have generally provided program managers with enough information to effectively monitor the program. We recommend that APT provide

information on special promotions to all the utilities on a regular basis. (Even if the promotion did not take place in a given utility's territory, this information is useful in assessing the effectiveness of different tactics.) We recommend the torchiere category be expanded to include all portables. We also recommend that EFI report catalog sales in the same terms as retail sales (CFLs, interior fixtures, exterior fixtures, and the suggested new portable category) with a category of "other" added, if necessary.

- ? ***Multipacks.*** Multipacks account for a relatively small share of CFLs sold; however, it does appear that the program database misses approximately 2% of all retail CFLs sold due to inaccurate recording of multipacks. The utilities should explore having EFI check model numbers against a current list of multipacks to make sure the correct number of CFLs is recorded.
- ? ***More control over the number of products purchased.*** The database analysis shows customers purchasing more than six CFLs account for a sizable portion of the products purchased. While many of these are legitimate purchases—e.g., a landlord installing CFLs in separately metered apartments—large volume purchases ultimately limit the number of customers that may participate (and likely has a negative impact on the in-service rates of purchased lighting). In the interest of equity, the utilities should consider setting a lower trigger for investigating large orders. Also, greater enforcement of the CFL limit could spread the incentive dollars among more customers and thus help facilitate market transformation.
- ? ***Include in-service rates in savings estimates and the realization rate.*** If available in-service rates had been used in the initial estimates of savings, the realization rate would have been much closer to the estimates derived through this study.
- ? ***Revise the displaced wattage in the common assumptions.*** Some of these wattages appear to be too high based on the on-sites.
- ? ***Consider using lifetime savings for benefit-cost analysis.*** CFLs and CFL fixtures are likely to be used beyond one year, so energy savings should also extend beyond one year. Following this recommendation would also necessitate following another recommendation: assessing persistence of measures (see below).

The remaining recommendations assume the program will continue operation beyond 2003.

- ? ***Consider developing a standard package for retailer co-operative advertising.*** This will reduce the amount of work necessary to run these ads and allow the implementation contractor to take advantage of more opportunities to promote the program. Cost-sharing could encourage more retailers to advertise and help get the word out.
- ? ***Consider more attractive pricing and better promotion for the catalog.*** (Note that this recommendation has already been implemented.) As already noted, catalog sales have accounted for a small portion of the total, probably because of the catalog's relatively high prices and low promotion. The utilities have kept catalog prices high to avoid undercutting

the retailers and generating bad will. However, many catalog items are not available through the retailers, particularly high-end fixtures. Lowering their prices would make them more attractive to consumers without hurting the retailers. Items may also be dropped from the catalog as they become available in stores. Customers cannot buy from the catalog if they do not know of its existence. The utilities should consider printing enough catalogs for all their residential customers during a one-year period, especially since they have invested in developing an improved version.

- ? ***Consider developing a buy-down program.*** The program administrators involved in running the Massachusetts program endorse the buy down concept for New Hampshire. Manufacturers and retailers would be invited to participate and receive payments that enable them to sell energy-efficient lights for lower prices. A key advantage of a buy-down program is its simplicity: the retailers do not have to handle any coupons, which some find burdensome. Retailers do have to document that they have ordered and received a certain number of energy-efficient lighting products; manufacturers, similarly, have to document shipments. Additional smaller, independent retailers may participate in a program that does not involve coupons. However, there are some negative aspects to buy-down programs: the utilities would not know who is buying the products and how many they are buying; this would also make participant surveys impossible.
- ? ***Make effective use of limited resources in retail implementation.*** While one circuit rider cannot visit all participating retailers frequently, it is important to keep in touch by phone to ensure that everyone has enough coupons and POP materials; these materials could then be sent through the mail. APT may also explore building relationships with lighting manufacturers' representatives or distributors who can help maintain some of the displays, or could hire temp workers.
- ? ***Consider targeting smaller retailers.*** The program may achieve a set amount of kWh savings with its focus on chains, but some people do not buy their lights at these stores. Interviews with the sponsors and APT suggest that smaller, independent retailers have not participated in the program as much as they could have with better targeting. Market transformation entails reaching a larger, more diverse group of customers by going after the smaller retailers who serve them.

The last four recommendations address program evaluation issues.

- ? ***Allow more time for the next evaluation.*** This study was conducted in a very short time, necessitating some compromises. For example, the timing required us to conduct the end-user telephone surveys and the end-user on-site visits at the same time, rather than conducting the telephone survey first and recruiting respondents for the on-site visits—which would have allowed verification of survey responses.
- ? ***Include a full saturation component.*** The on-site visits conducted for this study were among participants only. Including non-participants would have permitted estimation of the saturation of CFL lighting—a key indicator for market transformation.

- ? ***Estimate penetration through point-of-sale data.*** California, Wisconsin, and (soon) Massachusetts track sales of CFLs in this manner, and have national numbers for comparison. A similar approach in New Hampshire would allow analysis of sales attributable to the program and the effects of different rebate levels.

- ? ***Assess persistence of measures.*** Because current savings estimates are for one year only, while most lighting products promoted by the program will likely remain in place for several years, the savings attributed to the program may be dramatically underestimated.