Consumer Preferences for CFLs over Time: Where Are We Going?

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ABSTRACT

The Northwest Energy Efficiency Alliance's Residential Lighting Program promoting compact fluorescent lamps (CFLs) and fixtures finished its current implementation phase at the end of 2003. At that time, there were over 1,000 retailers actively involved in the program across Washington, Oregon, Idaho, and Montana. Program support includes cooperative advertising assistance and regular visits to retailers from program field reps to provide retailer training and promotional materials.

This paper focuses on the program evaluation and presents results from five consumer surveys conducted from 2001 to 2003 that tracked consumer awareness, purchase barriers, and satisfaction with CFLs. In two surveys, CFL purchasers were called back to determine satisfaction, retention, and the types of lamps purchased after the initial CFL purchase. Of primary interest is the sustainability of CFL sales, with over 10 million lamps sold in the program territory from 2001 to 2003. These surveys provide useful information on consumer responses to the program – particularly as it influences subsequent lighting purchases.

Consumers appear relatively satisfied with CFLs, with approximately 80 percent of CFL purchasers indicating that they were either "Satisfied" of "Very Satisfied" with the CFLs. Of those that were dissatisfied with CFLs and reverted back to incandescents, issues with high cost, not fitting fixtures, and poor light quality were among the reasons most often cited. Future program efforts should address these barriers by continuing to educate retailers and consumers on issues of lamp brightness and light color as well as understanding the long term benefits of CFLs.

Introduction

The Northwest Energy Efficiency Alliance's (the Alliance) Residential Lighting Program (Lighting Program) has promoted ENERGY STAR compact fluorescent lights (CFL) throughout the Alliance territory of Washington, Oregon, Idaho and Montana. Through the Lighting Program, the Alliance has provided assistance to retailers to sell ENERGY STAR CFL lamps and fixtures throughout a variety of channels. During the course of the program, the market for CFLs has changed dramatically. The energy crisis in 2001 led to an enormous increase in awareness of CFLs and other conservation measures. In addition, the Bonneville Power Administration (BPA) has sponsored a program that provided millions of residential customers with coupons for purchasing CFLs. As a consequence, both CFL awareness and sales increased dramatically as a result of both the Alliance and BPA programs.

This paper represents the latest in a series of papers and reports written about the Alliance's Residential Lighting Program evaluation and previous papers are included in the reference section of this report. Rather than repeat background program information in detail, the reader is referred to these other papers.

Program and CFL Market 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 lamps and fixtures in the residential market. The Lighting Program focuses its efforts on retailers in several different channels: "Do-It-Yourself" stores (e.g., Home Depot, Lowe's), Mass Merchandisers (e.g., Walmart, Costco), Hardware (small regional chains such as Thurman's and Penguin and independent stores such as Ace and True Value); and Lighting Specialty (e.g., World Lighting, Lamps Plus).

Major components of program implementation include the following:

- Regular visits to participating retailers from program field reps
- CFL Promotional materials (end caps, tags, etc.)
- Training of retail sales staff on selling CFLs
- Cooperative marketing promotions
- Coordination with other agencies such as utilities, PUD's, BPA, and distributors

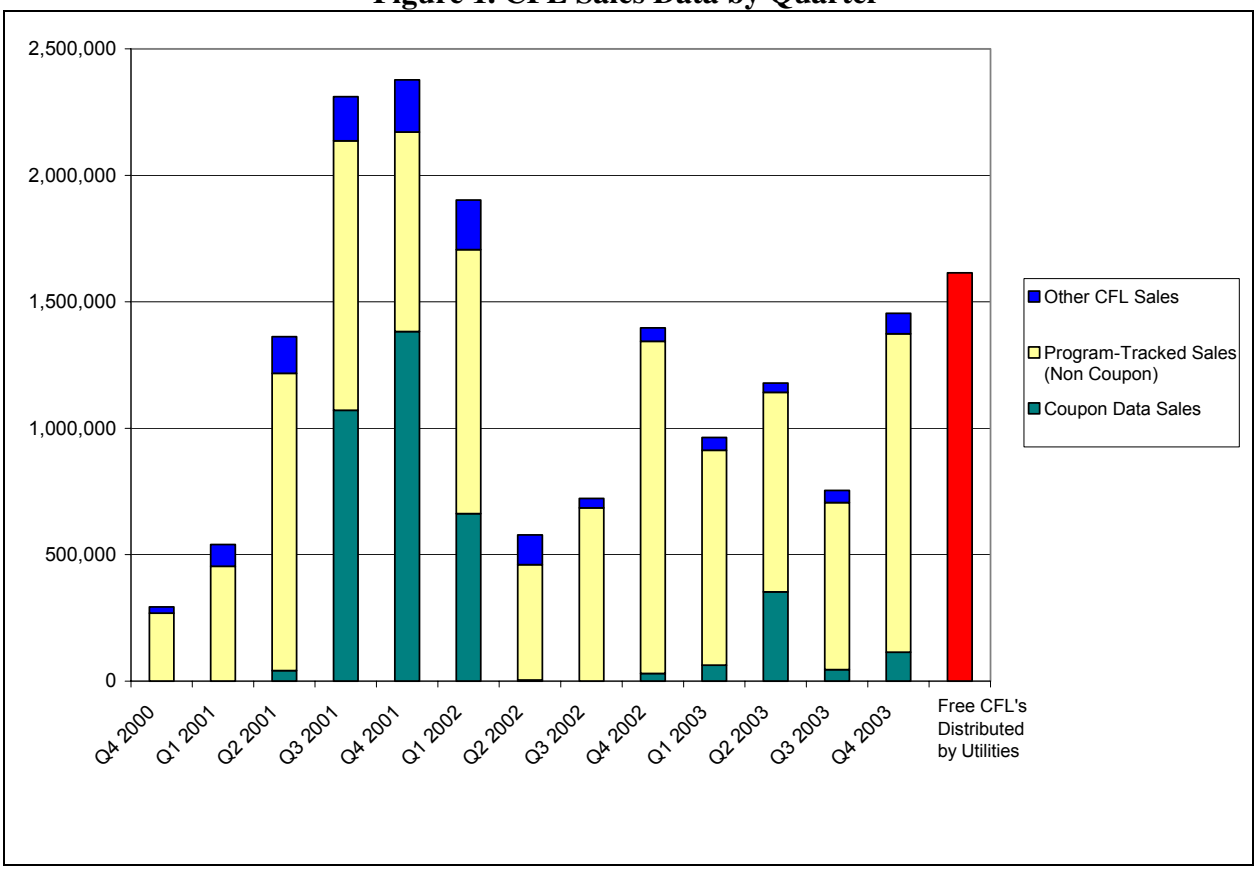
In addition to the Alliance program, BPA funded the Coupon Campaign during most of 2001 that provided residential electricity customers six-dollar coupons for the purchase of ENERGY STAR CFLs at participating stores throughout BPA's service territory. These coupons were distributed through local utilities that chose to participate in the program, and utility customers received the coupons with their monthly bills. In some cases, this involved multiple mailings of coupons over several months. At the end of the Coupon Campaign, over six million coupons had been distributed as part of this program. Coupon redemption data were tracked for individual stores participating in the Coupon Campaign, and this information was used for the lighting market characterization that was developed as part of the Lighting Program evaluation.

Figure 1 shows how CFL sales are distributed by quarter for Q4 2000 through Q4 2003. "Program-Tracked Sales" are CFL sales numbers that are reported directly to the Program by retailers that are active participating in the Program, either through a cooperative marketing agreement or regular interaction with Program field reps. "Coupon Data Sales" reflect sales resulting from coupon redemptions, and "Other CFL Sales" are CFL sales estimated by the evaluation for retailers that do not report sales to the Program and are not redeeming CFL coupons. For this latter group, CFL sales are estimated based on store type, size, and location.[1]

The first quarter of 2001 had about half a million CFL sales across the program territory. As concerns about the energy crisis grew, sales rose sharply throughout 2001 as California began experiencing rolling blackouts. Both the third and fourth quarter of 2001 saw CFL sales over 2 million. As shown by the lighter area in the chart, the sales due to the Coupon Campaign also occurred at this time, and coupon sales were generally less than half of all CFL sales for each quarter (with the exception of the fourth quarter of 2001). CFL sales have decreased since 2001 but have been trending upward over the latter half of 2002. Smaller versions of the original Coupon Campaign were implemented in 2003 and CFL sales and remained strong throughout 2003 even in absence of coupons or other direct incentives.

[1] The two evaluation reports listed in the References section describe in detail how the CFL sales estimation is done for these retailers.

Figure 1. CFL Sales Data by Quarter



As Figure 1 shows, there has been a tremendous increase in CFL sales within the Alliance territory and these CFL sales far exceeded what was initially anticipated for the Lighting Program. At the beginning of implementation, the Lighting Program had a goal of selling 455,000 CFL for all of 2001. In addition, baseline CFL sales were initially assumed to be 100,000 CFLs annually. From the program evaluation perspective, the primary question is to determine the degree to which increased CFL sales can be sustained and to determine the optimal role for the Lighting Program in influencing sales moving forward.

Consumer Surveys

To explore the issue of CFL sales sustainability (as well as other evaluation issues), a series of consumer surveys were fielded to collect data on consumer lighting purchases and preferences. Specific topic areas include consumer awareness of CFLs, market barriers, satisfaction with CFLs, future CFL purchase intentions, and lighting purchases made following a customer's experience with CFLs.

Table 1 shows the samples used in each of the consumer surveys. In each survey, we collected responses from households that had recently purchased CFLs or incandescent light lamps. The first customer survey (Wave I) was fielded in May and June of 2001, at the height of the energy crisis and an enormous media campaign promoting conservation measures. The second survey (Wave II) was fielded in April 2002 after the energy crisis abated. An additional survey (Call Back) was fielded in April 2002 and involved calling back both CFL and

incandescent purchasers from Wave I to determine retention rates, satisfaction levels, and follow through on stated intentions to purchase CFLs in the upcoming year. Survey results for a range of issues relating to the sustainability of the CFL market are provided in the tables below. A third set of surveys (Wave III) was done in April and May of 2003 and involved fielding the same general consumer survey and the Call Back survey from Wave II.

The sample for each of the general consumer surveys was designed to be proportional to the Northwest population. To ensure balanced demographic representation, the random sample was stratified by state and residence in urban, intermediate, and rural areas based on population density within the county. Further, respondents were asked screening questions that divided them among three categories: CFL purchasers, incandescent purchasers, and free CFL recipients. These sub-groups ensured an equal range of experiences within the sample strata and allowed for detailed analysis of survey results. Survey responses are then weighted by portion of the population that is aware of CFLs within each geographic sector.

Table 1. Survey Sample Design

	Surveys and Sample Sizes				
				Callback	Callback
Respondent Group	**Wave I**	**Wave II**	**Wave III**	**Wave I**	**Wave II**
CFL Purchasers	246	202	156		
Incandescent Purchasers	316	166	176	180	75
Free CFL Recipients	38	32	21		
CFL Purchasers + Free CFL Recipients				163	125
Total Sample	600	400	353	343	200

Given that the 2001 survey was conducted following California's struggle with energy shortages and rolling blackouts, consumers' perceptions of the regional energy outlook significantly influenced CFL sales in neighboring northwest states. In the months and years that followed, however, the sense of urgency that had seemed to drive consumer behavior has lessened, and subsequent surveys revealed measurable changes in consumer preferences. While its unique circumstances make 2001 an imperfect benchmark, survey results from that year relative to those that follow give nonetheless telling indications of consumer behavior, purchase drivers, and sustainability of CFL market trends.

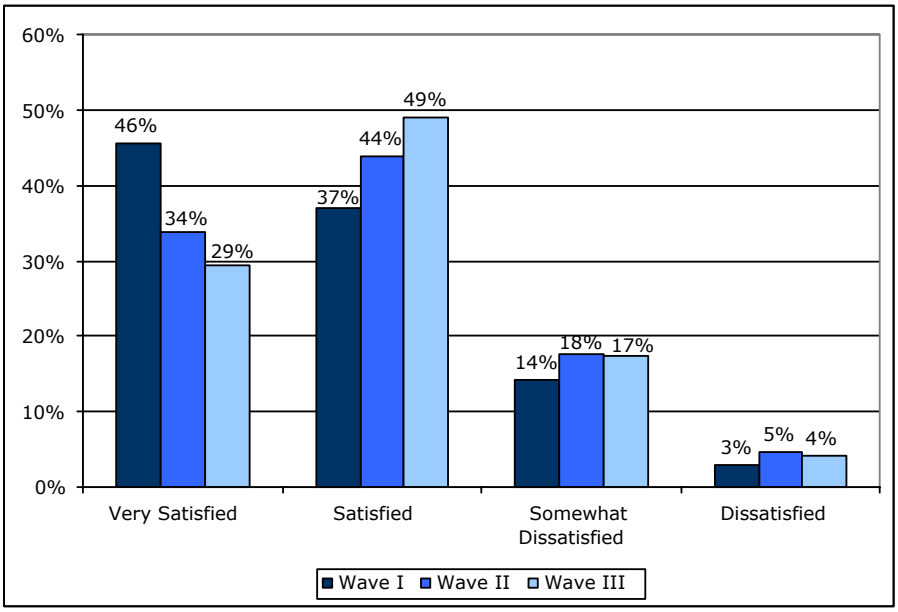
The survey results reported here focus on consumer satisfaction with CFLs. In particular, we examine how dissatisfaction with CFLs has affected subsequent lighting purchases. By identifying the source of dissatisfaction – particularly in those instances where consumers return to incandescents – we are able to help inform the Lighting Program of actions that may help reduce or eliminate important market barriers.

General Lighting Consumer Survey Results

Figure 2 reveals satisfaction levels among those who had recently purchased CFLs within the previous 3 months. Respondents were asked to rate their satisfaction with CFLs on a 1 to 10 scale. Ratings of 9-10 were coded as "Very Satisfied", 6-8 coded as "Satisfied", 3-5 as "Somewhat Dissatisfied" and 1-2 as "Dissatisfied".

As shown by these categorical responses, satisfaction with CFLs is relatively high in each survey period: in Wave I, more than 45 percent were "Very Satisfied" with CFLs, and approximately 35 percent were "Satisfied". The number of those "Very Satisfied" decreased in Wave II and Wave III, but these consumers appear to have shifted towards the "Satisfied" category as the frequency of this response increased in both surveys. Generally, total ratings of "Satisfied" and "Very Satisfied" combined accounted for roughly 80 percent of responses. In contrast, the number that was "Somewhat Dissatisfied" and "Dissatisfied" remained essentially constant across surveys.

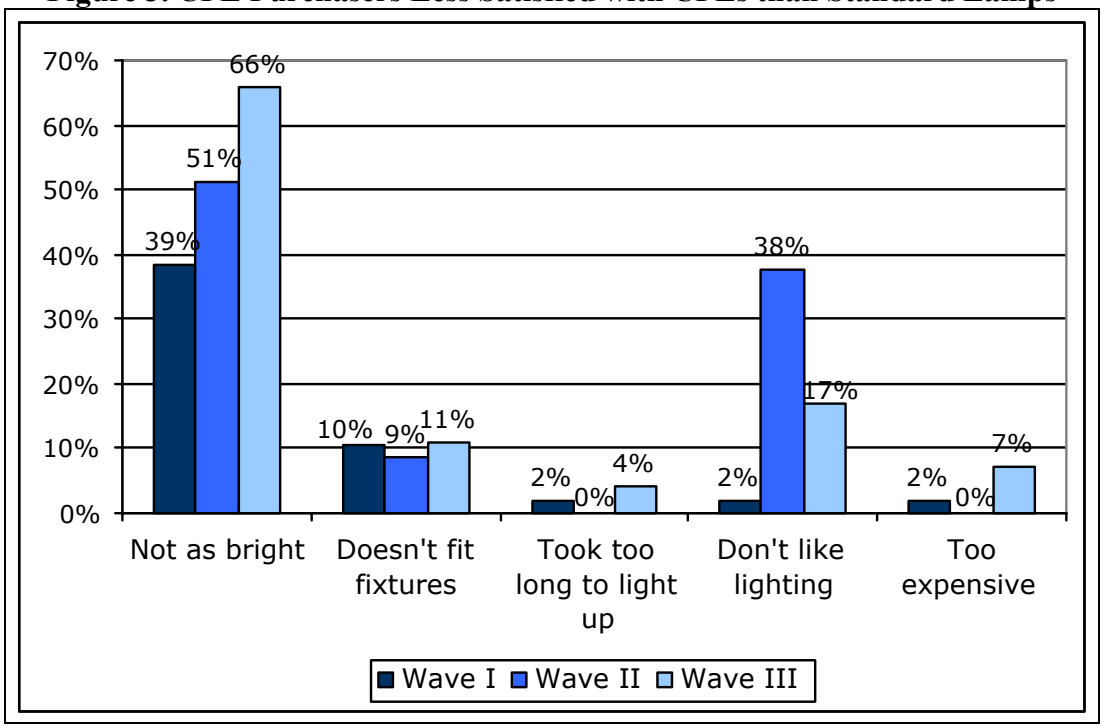
Figure 2. CFL Satisfaction



Sample Size: Wave I = 167, Wave II = 192, Wave III = 155

Figure 3 reports reasons why those less satisfied with CFLs than with incandescents did not prefer CFLs. Across all three survey years, large numbers of "less satisfied" respondents claimed the CFLs relative dimness made them less desirable. This dissatisfaction with CFL light quality increased noticeably over time, perhaps reflecting a return to former preferences for brighter, less efficient lamps as energy concerns appeared less pressing. While fewer consumers claimed CFLs were incompatible with fixtures, this concern was nonetheless consistently mentioned.

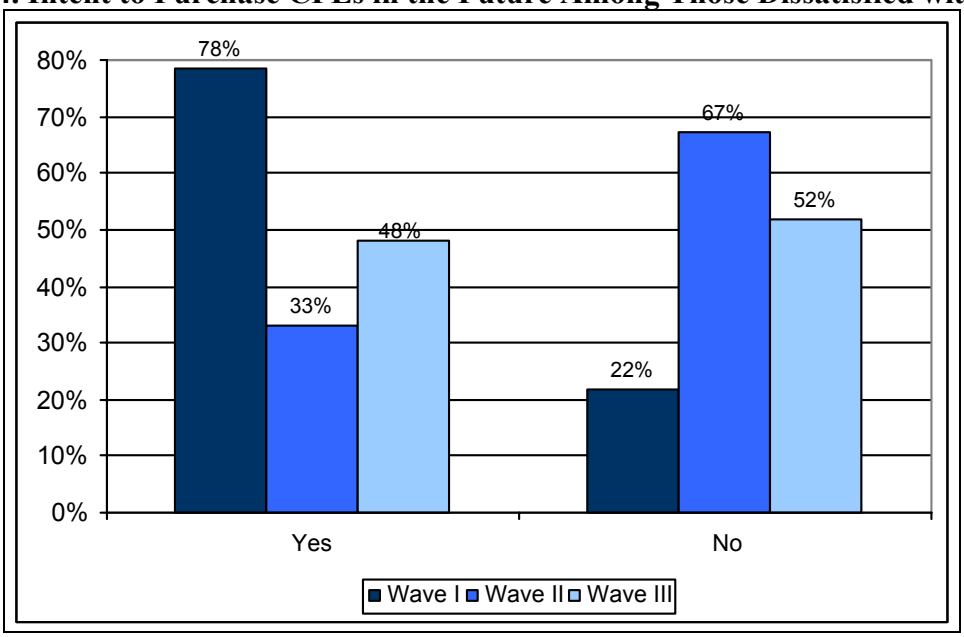
Figure 3. CFL Purchasers Less Satisfied with CFLs than Standard Lamps



Sample Size: Wave I = 51, Wave II = 48, Wave III = 28

Despite the levels of dissatisfaction among some consumers, their stated intentions of future CFL purchases are surprisingly high. Figure 4 shows the future purchase intentions for those respondents that were dissatisfied with their previous CFL purchase. Among these dissatisfied respondents, intent to continue purchasing CFLs decreased dramatically from the first to the second survey wave, which is likely due to a decreasing interest in conservation once the energy crisis faded. While even dissatisfied consumers may have been willing to substitute CFLs for other lamps in the short term, fading energy concerns most likely decreased their inclination to purchase additional CFLs. Nonetheless, numbers of those who intended to re-purchase CFLs despite their dissatisfaction were surprisingly high across all three survey waves. This result should be considered with caution, however, as repeated unsatisfactory experiences with CFLs will undoubtedly decrease CFL purchases in the long run.

Figure 4. Intent to Purchase CFLs in the Future Among Those Dissatisfied with CFLs

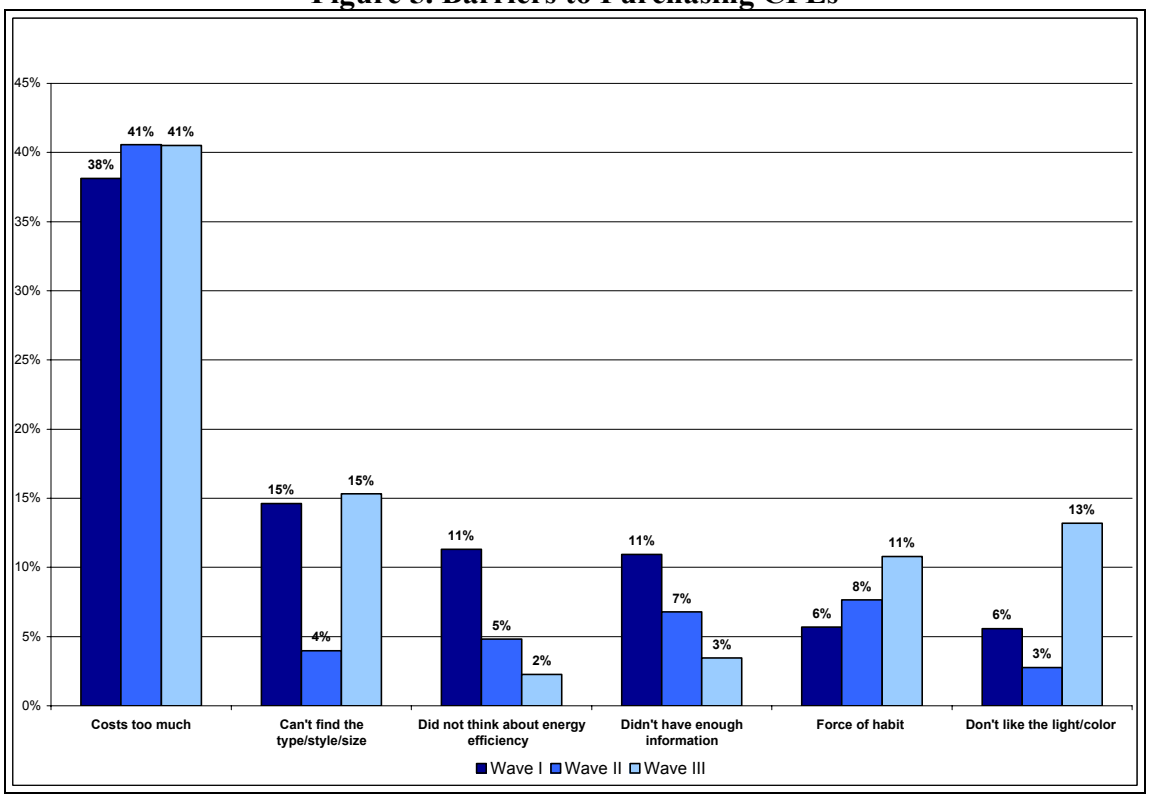


Sample Size: Wave I = 259, Wave II = 206, Wave III = 127

Figure 5 shows some of the barriers to purchasing CFLs mentioned in all of the survey waves. Throughout the evaluation, first cost has remained the most common barrier and is mentioned consistently by about 40 percent of the sample in each survey wave. Not being able to find the correct lamp size or type was also a commonly cited reason for purchasing incandescents rather than CFLs.

Two factors where considerable Lighting Program resources have been directed have shown decreases in responses over time. Across the three surveys, fewer respondents reported that they did not have enough information or that they did not think about energy efficiency when making their lighting purchase. As shown in the far right of Figure 5, force of habit and not liking the light color or brightness were mentioned increasingly across the surveys and these represent areas that the Lighting Program should continue to address.

Figure 5. Barriers to Purchasing CFLs



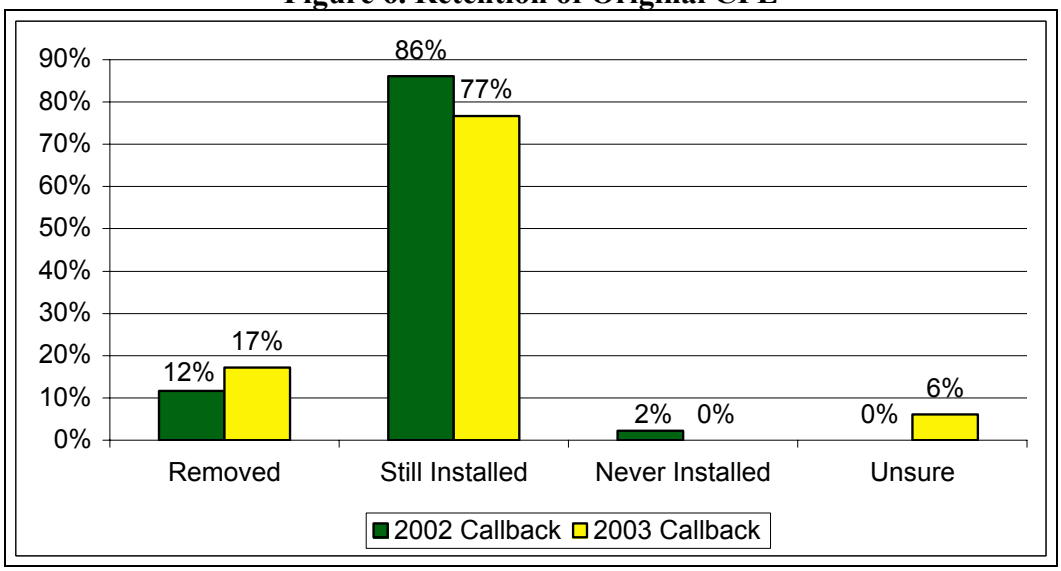
Sample Size: Wave I = 316, Wave II = 166, Wave III = 168

In addition to the general lighting survey, we also fielded two Call Back surveys to re-interview respondents from previous surveys. Administered in April 2002, the first call back survey targeted CFL and incandescent lamp purchasers from Wave I of the general consumer survey. The second instrument was fielded in April-May 2003 and interviewed CFL and incandescent purchasers from the Wave II general consumer survey. The Call Back survey results were particularly useful as we sought to determine how a CFL purchase influences the subsequent purchase of other lighting products. As shown in some of the following charts, however, some questions had relatively small sample sizes and consequently some caution should be used when interpreting these results.

Figure 6 shows CFL retention rates within one year following the original survey.[2] Generally, most CFLs remain installed after their original purchase: In the 2002 Call Back survey (targeting purchasers from Wave I), 86 percent of the lamps purchased were still installed after one year. Similarly, the 2003 Call Back survey (targeting purchasers from Wave II) had 77 percent of the original CFLs still installed after one year.

[2] Given that the original CFL surveys asked about lighting purchases in the prior year, the Call Back surveys are asking about lighting purchases that occurred one to two years ago.

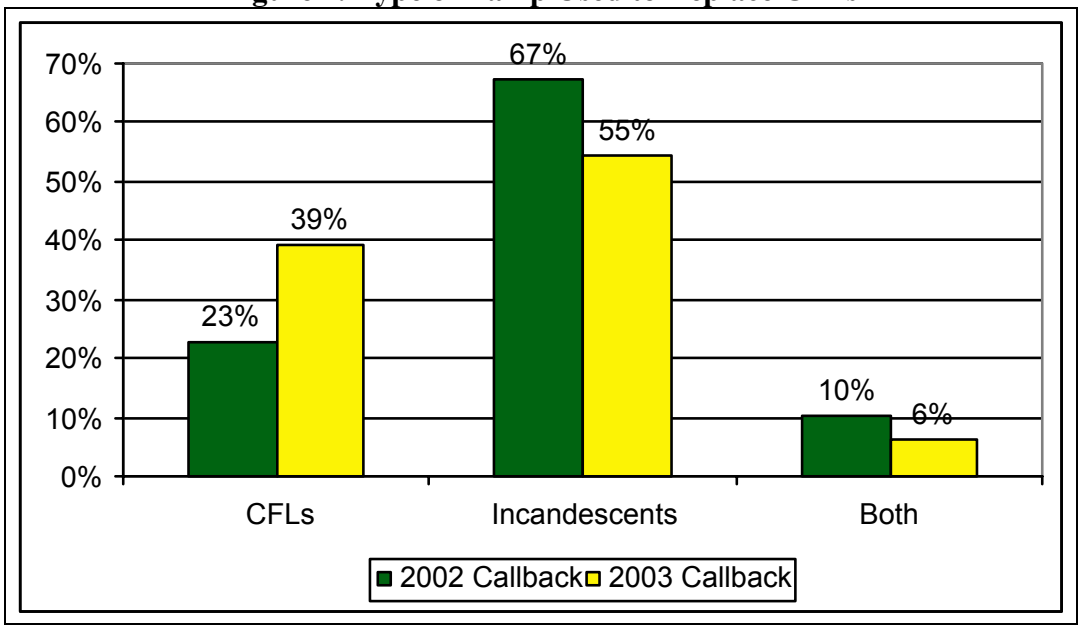
Figure 6. Retention of Original CFL



Sample Size: 2002 Callback = 492 (lamps) 2003 Callback = 751 (lamps)

Figure 7 shows the types of lamps that most commonly replaced CFLs. A consistent majority of CFLs were replaced with incandescent lamps, but survey responses also indicated that consumers were increasingly willing to replace CFLs with other CFLs – an increase from 23 percent to 39 percent across the two surveys. Given that a significant portion of consumers are nonetheless reverting to incandescents, an understanding of the reasons for the trend will help inform the Lighting Program and provide guidance as to where program resources should be allocated.

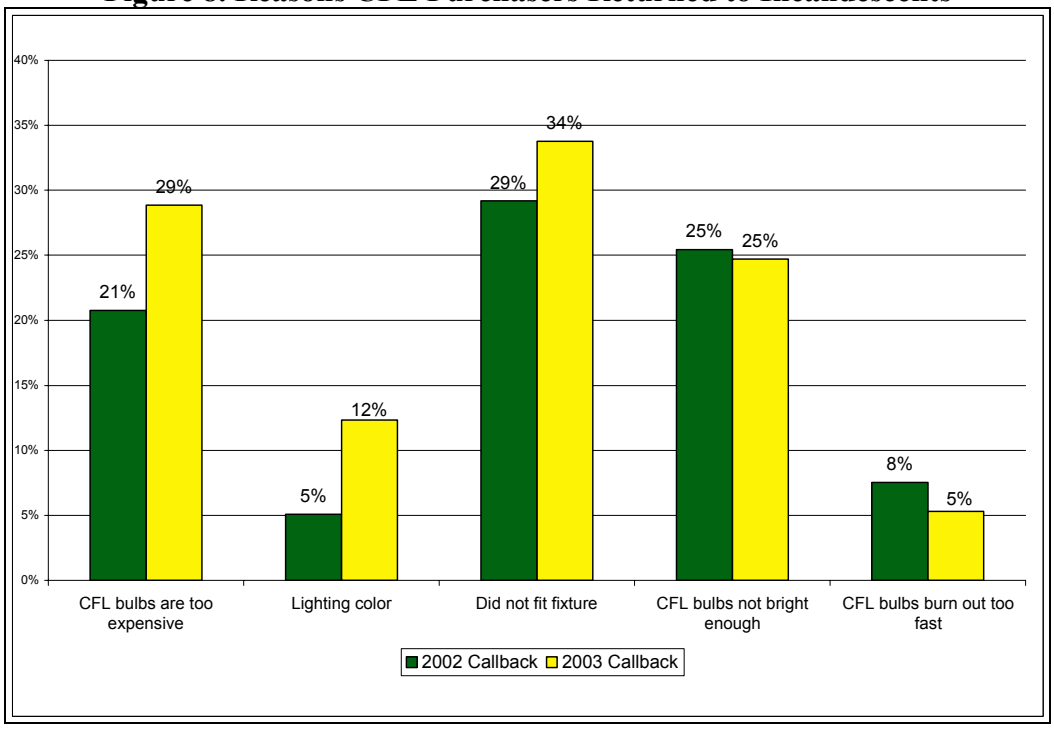
Figure 7. Type of Lamp Used to Replace CFLs



Sample Size: 2002 Callback = 32. 2003 Callback = 43

Figure 8 shows reasons why former CFL consumers purchased incandescents in subsequent lighting purchase opportunities and generally confirms the trend shown in the previous exhibit. For these customers, a CFLs cost, fixture compatibility, and light quality are among the most common reasons for purchasing an incandescent lamp instead. Frequency of these complaints either remained constant or increased over time, suggesting a limited consumer tolerance for products perceived to be too expensive or providing dim or off-color lighting.

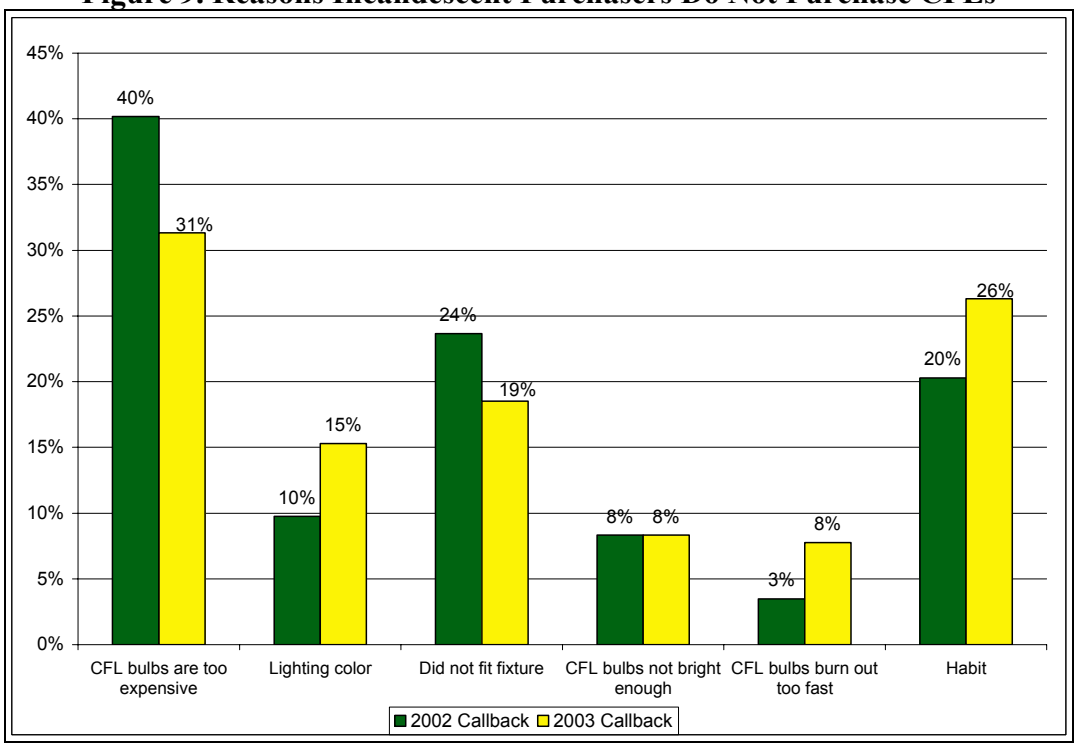
Figure 8. Reasons CFL Purchasers Returned to Incandescents



Sample Size: 2002 Callback = 61, 2003 Callback = 64

Figure 9 reports reasons why routine incandescent purchasers choose not to purchase CFLs. As in the other reported trends, a CFL's cost, color, and fixture incompatibility remain the most commonly recognized purchase barriers. In addition, routine incandescent purchasers appear considerably motivated by force of habit. Other recognized barriers remained relatively stable over time.

Figure 9. Reasons Incandescent Purchasers Do Not Purchase CFLs



Sample Size: 2002 Callback = 102, 2003 Callback = 46

Conclusions

Based on sales trends over the last three years, CFL sales have increased dramatically within the Alliance territory and far exceeded the original expectations for the program. While sales have fallen off from their highs in 2001 at the height of the energy crisis, CFL sales remain significant and have not returned to their pre-program levels. Surveys of residential lighting customers indicate high levels of awareness of CFLs and almost half of all households have purchased or received a CFL in the last three years.

While these results are encouraging, some market barriers remain that should be addressed in future incarnations of the Alliance's Lighting Program if these numbers are to be sustained at any level. Where possible, the Lighting Program should work to expand CFL channels and increase product variety so that CFLs can be used in more applications. In the long term, larger potential markets and more product variety will increase sales and should decrease prices. In the short term, the Lighting Program should consider the follow recommendations to help sustain CFL sales within the program territory:

- *Increase program efforts to educate consumers on CFL color and brightness issues.* This appears to be a key area where dissatisfaction with CFLs can have a long-term detrimental effect. This was listed as a primary reason for switching back to incandescents among lighting customers that have installed CFLs. Program efforts should address these problems by increasing the use among retailers of working lighting displays, accurate wattage conversion charts, and lighting color guides.
- *Continue efforts to track and mitigate early CFL burnouts.* The evaluation surveys indicate that consumers are somewhat tolerant of CFL lamps that burn out early (relative

to dissatisfaction with lamp brightness and/or lighting quality) and are tending to stay with CFLs. There is no reason to believe that this trend will continue, however, and repeated experiences with burnouts will eventually cause consumers to switch back to incandescents – particularly since longer lamp life is often cited as a benefit to CFLs. The Lighting Program has been collecting information on CFL early burnouts and this effort should continue along with efforts to increase retailer response rates to the lamp burnout surveys.

- *Expand CFL promotional efforts to more convenient retail channels.* The consumer survey shows that one of the reasons why incandescents are purchased instead of CFLs is out of habit, which was cited by 26 percent of the respondents in the latest Call Back survey as to why they returned to purchasing incandescents after buying a CFL. The Wave I consumer survey also shows that 35 percent of respondents tend to purchase light bulbs at grocery stores, which are frequented far more often than the types of stores currently targeted by the program. Encouraging more grocery stores (and other highly frequented retail channels) to carry ENERGY STAR CFLs will help reach these consumers.

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