

A Market Transformed: But Will the Impacts Be Sustained?

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ABSTRACT

Over the last decade, the Northwest Energy Efficiency Alliance (NEEA) intervened in the lighting market to accelerate awareness and use of high-efficiency compact fluorescent lamps (CFLs) among Northwest residents. Over the course of a decade of market interventions, the Northwest experienced a dramatic increase in CFL sales, and market share grew from less than one percent to nearly 20 percent. NEEA met its project goals by the end of 2007 – with total regional sales of over 18 million CFLs – and concluded that additional market support was no longer necessary. As such, NEEA ceased its active market interventions at the end of 2007.

In 2008, NEEA sponsored a study to track and monitor several CFL market elements. The intent was to gauge changes that may have occurred since withdrawing their CFL incentives by comparing 2008 results on CFL sales, market share, affordability, availability, and diversity with those from prior studies. Study results show increased CFL sales and market share along with steady retail prices, dramatic increases in CFL availability (both for specialty and non-specialty lamps), and increased product diversity. These accomplishments were not achieved without support, however, as other energy-efficiency program sponsors in the Northwest continued to provide incentives (primarily for specialty CFLs) throughout 2008. These results suggest that a transition away from bare spiral CFL incentives toward specialty lamp incentives may prove to be an effective strategy to ensure continued CFL market progress for regions that have promoted large volumes of spiral CFLs for several years.

Introduction

This paper provides an overview of NEEA's residential lighting market interventions from 1997 through 2007. It describes ongoing efforts to track and monitor CFL market progress throughout the region, enabling NEEA to adaptively manage its lighting programs in response to market changes. The paper describes how NEEA concluded that its market interventions were no longer necessary at the end of 2007 and subsequently undertook follow-up research to gauge changes that may have occurred since its withdrawal of CFL incentives. After reviewing the study methods, the paper describes results pertaining to CFL sales, ENERGY STAR® CFL market share of total Northwest residential medium screw-base lamp sales, average CFL prices, availability of CFLs throughout the region, and the diversity of CFL models available for both bare spiral (non-specialty) and specialty CFLs. Based on these results, we provide a set of recommendations for program sponsors concerning energy-efficient lighting program strategy, planning, and tracking.

Project History

The Northwest Energy Efficiency Alliance (NEEA) is a regional non-profit organization that works within Idaho, Montana, Oregon, and Washington to encourage development and adoption of energy-efficient products and services. NEEA is funded by the region's electric utilities, public benefits administrators, state governments, public interest groups and other entities.

NEEA was actively involved in the Northwest CFL market for over a decade and launched its first consumer lighting market project in 1997. The project's purpose was to advance awareness and use of energy-efficient compact fluorescent lamps (CFLs) and fluorescent light fixtures among Northwest residential customers. The project was designed to address market barriers including high first cost; lack of product availability; lack of consumer awareness; incompatibility of CFLs with existing fixtures, dimmers, timers and photocells; performance problems; poor aesthetics of energy-efficient lighting products; and consumer dislike of fluorescent technologies. As such, NEEA established four key goals for the project (as shown in Table 1 below) and began sponsoring a series of Market Progress Evaluation Reports (MPERs) to gather data on indicators of market progress with regard to these goals (see, e.g., ECONorthwest 2004; KEMA, 2008).

During the late 1990s, the number of products that qualified for inclusion in NEEA's initiatives expanded. As a result, the project strategy evolved from targeting manufacturers to retailers in 2000. The project provided retailers with salesperson training as well as advertising and marketing support to encourage ENERGY STAR product promotion and marketplace acceptance. NEEA leveraged local utility activities and regional and national initiatives to encourage improvements in ENERGY STAR product quality.

In 2004, the project focused on improving the quality and consumer acceptance of CFLs in response to market data suggesting consumer issues with product performance. The project provided cooperative marketing opportunities and field services to retailers to promote ENERGY STAR products, and coordinated financial incentive offerings for qualifying products. The project also coordinated with national efforts such as ENERGY STAR's Change a Light, Change the World campaign and the lighting quality research conducted by the Program for Evaluation and Analysis of Residential Lighting (PEARL). Finally, the project supported advancement of new lighting technologies (e.g., dimmable, reflector CFLs) and supported efforts to encourage proper disposal of burned-out CFLs.

In 2005, the project coordinated a regional manufacturer buydown promotion to reduce the market price of CFLs in the region and establish promotional distribution channels to move high-quality, low-priced products into the market. The promotion provided broad geographic sales coverage (including rural markets) through distribution channels including grocery, drug, hardware, mass merchandise, do-it-yourself, and wholesale chains.

NEEA expanded upon the success of the project in 2005 by coordinating similar promotions in 2006 and 2007 with a specific focus on consumers who had had limited access to high-quality, low-priced CFLs as well as those who had never purchased CFLs. The 2006 and 2007 promotions emphasized non-traditional CFL distribution channels (such as drug and grocery stores) and rural areas, and excluded large do-it-yourself chains and wholesale clubs from participating. In 2007 alone, participating retail chains sold approximately 1.8 million ENERGY STAR CFLs through NEEA's promotions and total regional sales of ENERGY STAR CFLs exceeded 18 million lamps.

As of 2007, data collected through NEEA's MPERs suggested that the project met its goals ahead of schedule (see Table 1). As such, NEEA concluded that additional support of the Northwest lighting market was longer necessary and ceased its active interventions in the market in early 2008.

Table 1. NEEA Lighting Project Goals and Market Progress Indicators

Goal	Market Progress Indicator(s)
Increase CFL sales in the Northwest from 750,000 to 1 million annually, reaching total sales of 10.8 million per year by 2009.	<ul style="list-style-type: none"> • The project reached its CFL sales goal in 2006.
Increase the rate at which consumers replace burned-out CFLs with new CFLs to 80 percent by 2010.	<ul style="list-style-type: none"> • As of 2006, 84 percent of CFL purchasers reporting that they are “likely” or “very likely” to replace a CFL with another CFL upon burnout.
Continue to increase CFL availability, diversity and affordability among lighting retailers, particularly in the smaller markets. Ensure that CFL availability, diversity and affordability are not major barriers to CFL purchases for consumers, particularly as the CFL purchaser base expands.	<ul style="list-style-type: none"> • Availability. CFL availability increased dramatically between 2006 and 2007, with a major expansion of the number and types of stores selling CFLs in the region. Availability does not seem to be a barrier to CFL purchase. • Diversity. Between 2006 and 2007, the proportion of stores that stocked CFLs increased for some styles and decreased for other styles. Although there is no clear pattern in these changes, lack of CFL diversity in retail stores does not appear to be a barrier to CFL purchase (see KEMA, 2008 for details). • Affordability. CFL prices did not change dramatically between 2006 and 2007. The average price across all CFL styles was approximately \$3.90 both in the fall of 2006. At this stage, phone survey results suggest that affordability is only a major barrier for non-purchasers.
Improve CFL product quality and consumer/retailer perceptions of product quality.	<ul style="list-style-type: none"> • Consumer satisfaction with CFLs has increased by a statistically significant margin between 2004 and 2006, with 85 percent of 2006 CFL purchasers reporting that they are satisfied with CFLs (ratings of 6 to 10 on a 10-point scale where 1 means “not at all satisfied” and 10 means “very satisfied”), compared with 77 percent in 2004 (KEMA, 2007).

Study Background and Overview of Methods¹

After withdrawing incentives from the Northwest CFL market at the end of 2007, NEEA sought to undertake another study to track and monitor several elements of the Northwest CFL market, including residential ENERGY STAR CFL sales and market share of total residential medium screw-base (MSB) lamp sales as well as CFL affordability, availability, and diversity (KEMA, 2009). To assess the market status after NEEA ceased its active intervention in the Northwest CFL market at the end of 2007, the study compares data on these attributes between the period before NEEA’s withdrawal and approximately year later (winter 2008).

To estimate total Northwest residential ENERGY STAR CFL sales, evaluators relied upon data gathered by NEEA’s current and prior program implementation contractors (Fluid Market Strategies, 2009; PECCI, 2006).² To estimate Northwest residential ENERGY STAR CFL market share of total residential MSB lamp sales, evaluators first calculated national CFL and non-compact-fluorescent MSB lamp sales per

¹ See KEMA, 2009 for a more detailed discussion of methods.

² Note that Fluid Market Strategies does not distinguish between bare spiral and specialty CFLs in its sales tracking efforts.

household over time and estimated a linear function based on the relationship between the two.³ We then applied this function to household-level estimates of Northwest ENERGY STAR CFL sales (based on Fluid Market Strategies, 2009 and United States Census, 2009) to estimate Northwest non-CFL sales per household. After extrapolating to the population level (again based on Census data), we then calculated Northwest CFL market share by dividing the total number of Northwest residential ENERGY STAR CFLs sold into total Northwest residential MSB lamp sales (the sum of Northwest CFL and non-CFL sales). U.S. estimates of CFL market share over time were based on a report from the ENERGY STAR program (U.S. DOE, 2009).

To gather data on CFL affordability, availability, and diversity, evaluators conducted lighting shelf surveys in late 2008 at 58 Northwest retail stores that sold lighting products. Field staff inventoried the CFLs found on the shelves at each store and also recorded shelf space measurements. We compared results from these shelf surveys with those conducted in support of MPER3 (KEMA, 2007) and stratified the sample by geography (metropolitan areas versus non-metropolitan areas); store type (big box versus non big box stores); and within store type, by store ownership type (national, regional or franchise chains versus independent stores).⁴ For the purposes of this study “big box” stores include large do-it-yourself chains, mass merchandise chains, and warehouse club stores, while non big box stores include drug, grocery, and small hardware chains.

To gain supplier perspectives on CFL market developments between 2007 and 2008, evaluators conducted eleven interviews with representatives of the CFL manufacturers and retail chains that participated in NEEA’s 2007 CFL promotions. Interviews included representatives of five of the seven CFL manufacturers and six of the sixteen retail chains that participated.

Findings

Northwest Residential ENERGY STAR CFL Sales

Total Northwest residential ENERGY STAR CFL sales for 2008 reached approximately 24.7 million, representing a 36 percent increase over total sales for 2007 (Figure 1). Although incentive CFL sales as a proportion of total CFL sales declined from 32 percent in 2007 to 27 percent in 2008, the overall number of CFLs for which energy-efficiency program sponsors provided incentives (“incentive CFLs”) in 2008 increased by 11 percent over the prior year (from 5.9 million CFLs in 2007 to 6.6 million 2008; Fluid Market Strategies, 2009). The Bonneville Power Administration (BPA) and other entities sponsored the largest regional CFL promotion in the Northwest in 2008. Their Change a Light, Change the World program provided incentives for nearly 3.9 million CFLs with a focus on incentives for non-twister (specialty) lamps such as, reflectors, globes, decorative lamps, and other styles (BPA, 2007; Fluid Market Strategies, 2009). These findings suggest that other Northwest energy-efficiency program sponsors continued to support the CFL market after NEEA’s withdrawal.

³ The evaluation relied upon two separate estimates of total U.S. residential MSB lamp sales and residential ENERGY STAR CFL sales to generate a range of estimates of Northwest residential ENERGY STAR CFL market share (Itron, 2006 and U.S. DOE, 2009); see KEMA, 2009 for further detail.

⁴ See KEMA, 2007 for additional information on sample design, weighting, and other details.

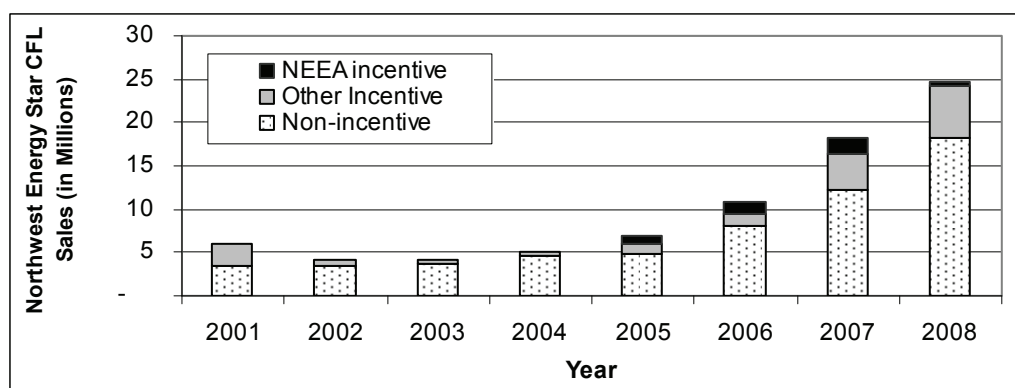


Figure 1. Estimated Northwest Residential ENERGY STAR CFL Sales, 2001-2008^{5, 6}

Of the CFL manufacturer and retailer representatives interviewed in support of the study, approximately half reported that NEEA’s withdrawal from the incentive market resulted in no changes in their 2008 CFL sales, while the other half reported decreased overall CFL sales of varying degrees. Nearly all of the representatives in the latter group reported that their losses were minimized or entirely supplanted by revenue from specialty lamp and non-rebated lamp sales. So while their total sales (in terms of number of CFLs) may have decreased somewhat, they sold more (higher-priced) specialty lamps and thus their revenues were not dramatically impacted.

Northwest Incentive CFL Sales

Table 2 below shows total Northwest residential ENERGY STAR CFL sales as well as the proportion of these sales for which NEEA’s promotions were responsible over time. As shown, NEEA began providing incentives for CFLs in 2005. During 2005 and 2006, CFLs discounted through NEEA’s incentive program accounted for 13 percent of total CFL sales in the Northwest. This proportion declined to 10 percent in 2007 and 2 percent in 2008 (when NEEA’s 2007 promotional CFL sales continued into the first quarter of 2008).

Table 2. Northwest Incentive CFL Sales and NEEA Incentive CFL Sales as a Percentage of Total Northwest Residential ENERGY STAR CFL Sales, 2001-2008 (Fluid Market Strategies, 2009)

Year	Total Northwest Residential ENERGY STAR CFL Sales	Northwest CFL Incentive Sales as % of Total CFL Sales	NEEA Incentive CFL Sales as % of Total CFL Sales	NEEA Incentive CFL Sales as % of Incentive CFL Sales
2001	5,979,890	72%	0%	0%
2002	4,195,880	20%	0%	0%
2003	4,171,552	15%	0%	0%
2004	5,097,690	10%	0%	0%
2005	6,832,478	42%	13%	44%
2006	10,751,906	32%	13%	52%
2007	18,157,300	48%	10%	30%
2008	24,710,098	36%	2%	7%

⁵ Fluid Market Strategies, 2009; PECI, 2006. See Table 2 for total CFL sales.

⁶ Note that while NEEA ceased to provide CFL incentives at the end of 2007, five retail chains did not sell through their allocations during 2007; thus, incentive sales continued into 2008 and 2008 and totaled 452,253 CFLs in the first quarter.

Energy-efficiency program sponsors in the Northwest provided incentives for approximately 6.6 million CFLs in 2008, an 11 percent increase over 2007. Although incentive sales were higher overall, incentive sales declined by approximately 15 percent as a proportion of total 2008 CFL sales as compared to 2007 sales (27% and 32%, respectively). There was also a shift in the proportion of overall incentive CFL sales tracked by channel in terms of the mix of stores through which the incentives were provided. As shown in Figure 2, the proportion of total tracked promotional sales through big box stores increased by approximately one-third (from 67% to 88%), while the proportion of tracked promotional sales through non big box (drug, grocery, and small hardware) stores dropped by nearly two-thirds (from 33% of the regional total in 2007 to 12% in 2008). Despite this shift, however, Figure 3 demonstrates that there was no concurrent shift in the proportion of overall Northwest CFL sales between the two store types from 2007 to 2008.

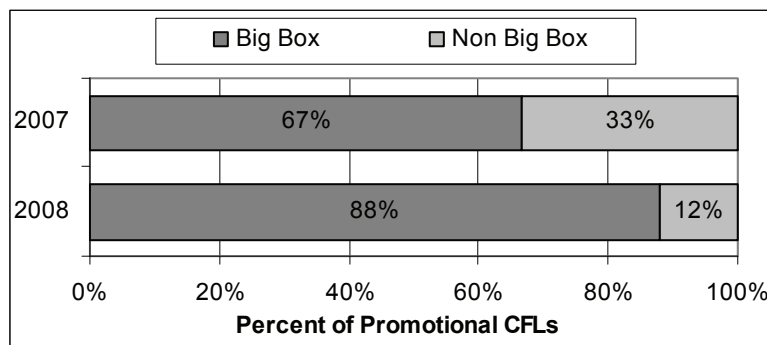


Figure 2. Percentage of Northwest Promotional CFLs by Store Type, 2007 and 2008 (Fluid Market Strategies, 2009)⁷

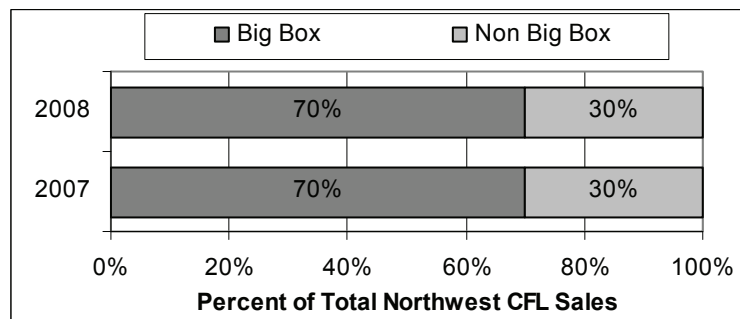


Figure 3. Percentage of Total Northwest CFL Sales by Store Type, 2007 and 2008 (Fluid Market Strategies, 2009)⁸

Northwest ENERGY STAR CFL Market Share

Evaluators estimated Northwest residential ENERGY STAR CFL market share of total residential medium screw-base lamp sales for 2008 at between 35 and 48 percent, compared with only 20 percent nationally (Figure 4). These findings not only demonstrate that current Northwest residential ENERGY

⁷ 2007 n=4,868,350; 2008 n=5,829,203. Note that some promotional CFL sales were not tracked by retail channel. Seventeen and 11 percent of total promotional CFLs were not tracked by channel and in 2007 and 2008, respectively. All of the 2008 promotional CFLs that were not tracked by channel (n = 721,403) were sold through the Snohomish County Public Utility District's CFL coupon promotion.

⁸ 2007 n = 18,157,300; 2008 n = 24,710,098.

STAR CFL market share of total residential MSBL sales is considerably higher than in the United States as a whole, but also that Northwest CFL market share continued to increase between 2007 and 2008 while U.S. market share declined.

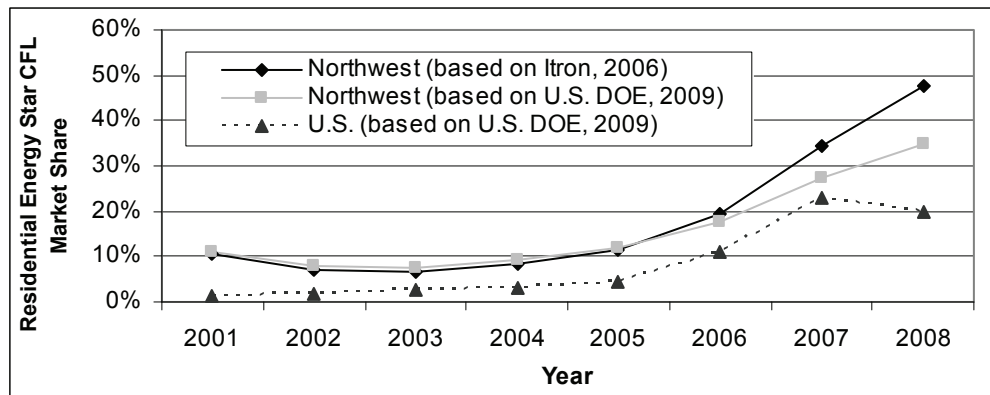


Figure 4. Estimated ENERGY STAR CFL Market Share of Total Residential Medium Screw-Base Lamp Sales for the Northwest and U.S., 2001-2008

CFL Affordability

Based on shelf survey data, there was no significant change in the average retail CFL price across all store types and regions between 2006 and 2008 (Figure 5). Average retail prices may have increased slightly in non big box stores in general, and particularly among metro-area non big box stores. CFL supplier comments regarding average CFL prices aligned well with those from the lighting retailer shelf survey.

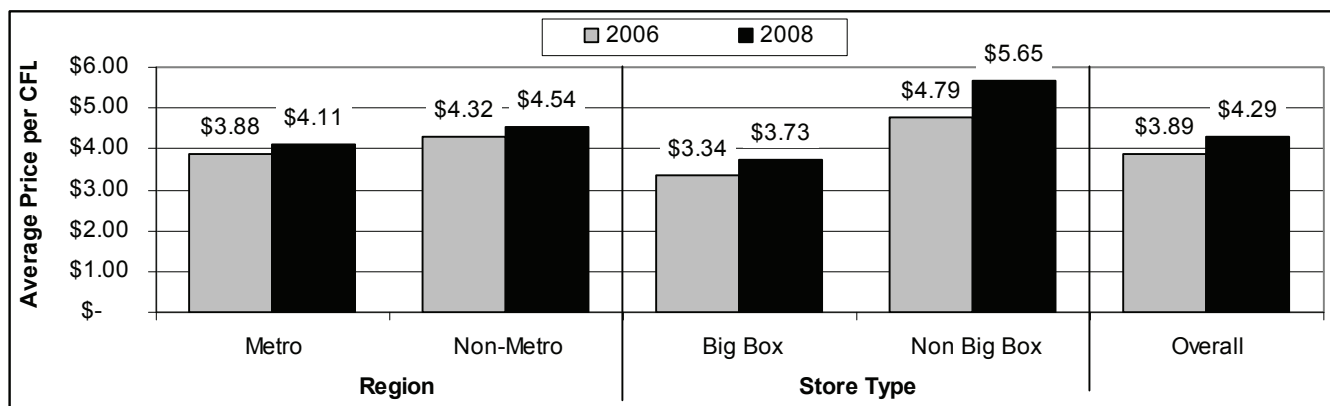


Figure 5. Average Northwest Price per CFL by Region and Store Type, 2006 and 2008⁹

CFL Availability

CFL suppliers reported little or no difficulty in supplying the Northwest CFL market in 2008. Shelf survey findings suggest that the proportion of Northwest lighting retailers that carried both spiral and specialty (specialty¹⁰) CFLs increased overall between 2006 and 2008 (Figures 6 and 7). The percentage of

⁹ Number of stores is as follows -- Metro: 2006 n=52, 2008 n=36; Non-Metro: 2006 n=26, 2008 n=22; Big box: 2006 n=36, 2008 n=24; Non big box: 2006 n=36, 2008 n=34. Overall number of stores: 2006 n=88; 2008 n=58. The number of stores is the same for Figures 5, 6, 7, and 8.

¹⁰ For the purposes of this paper, “specialty” lamps include any non- bare spiral CFLs as well as bare spiral CFLs with

non-metropolitan stores carrying spiral CFLs increased by a statistically-significant margin between 2006 and 2008, as did the percentage of big box stores carrying both spiral and specialty CFLs.¹¹

In the midst of these changes, the average share of lighting product shelf space per store devoted to CFLs in the Northwest did not change by region or store type. These results suggest that the stores that are new to the CFL market are displaying CFLs in a fashion similar to the longer-term market participants since the averages did not change.

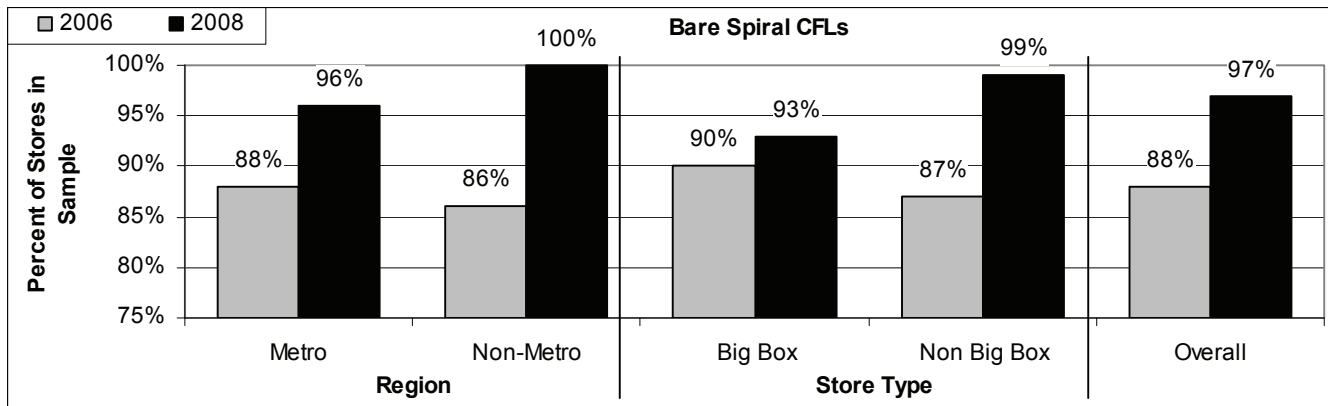


Figure 6. Percent of Stores in Sample Carrying Spiral CFLs by Region and Store Type, 2006 and 2008

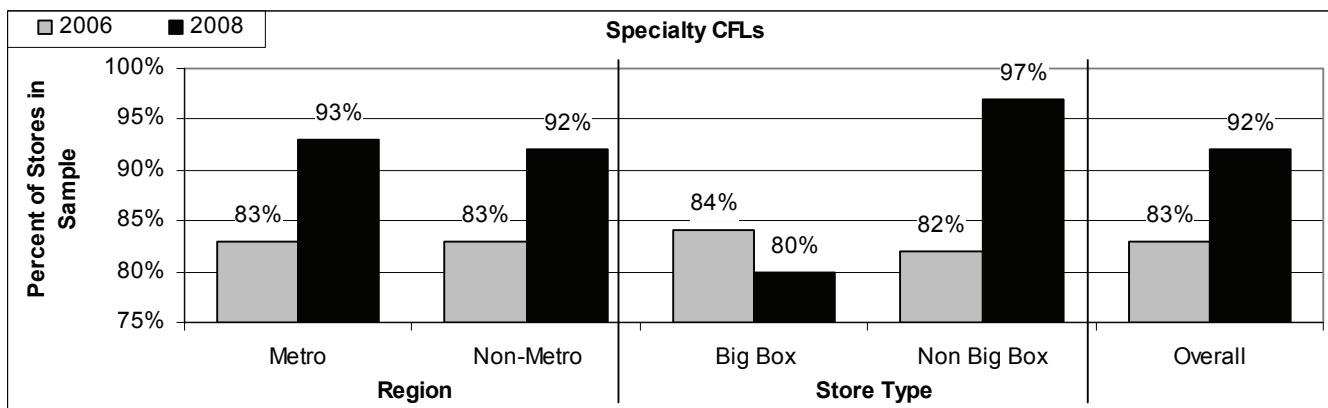


Figure 7. Percent of Stores in Sample Carrying Specialty CFLs by Region and Store Type, 2006 and 2008

CFL Diversity

Researchers gathered shelf survey data on the number of CFL models per store by style (spiral versus specialty) as an indicator of diversity. Overall, the average number of spiral models per store increased dramatically between 2006 and 2008, while the average number of specialty models held constant (despite the increase in overall proportion of stores carrying CFLs of both styles in the survey sample; see Figures 5 and 6 above). The most dramatic increases in product diversity were apparent in non big box stores and stores in non-metropolitan areas (Figures 8 and 9). Disparities in product offerings between stores in metropolitan areas (which typically offered a larger number of CFL models) and non-metropolitan areas also lessened.

specialty features (such as dimmable and 3-way lamps).

¹¹ Statistical significance was tested at the 90 percent level of confidence.

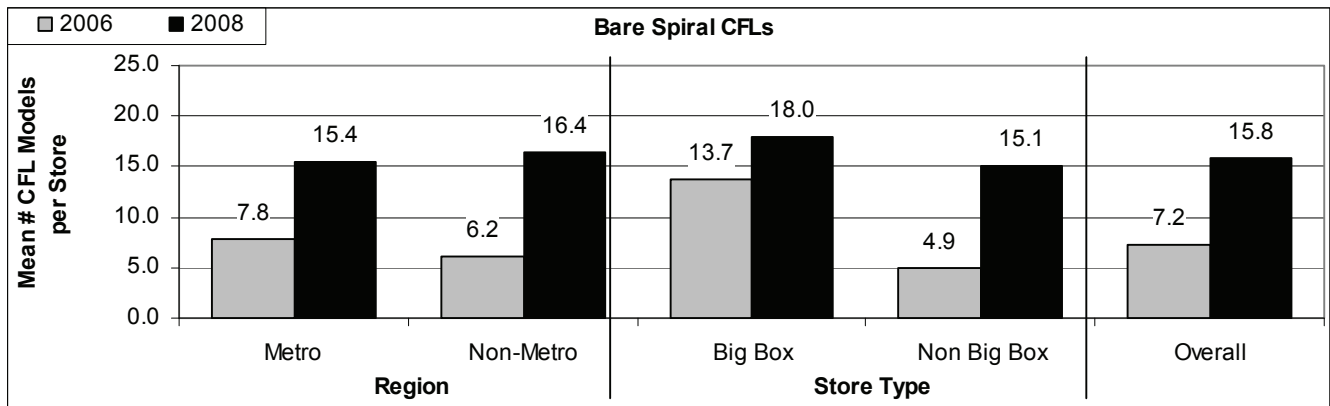


Figure 8. Mean Number of Bare Spiral CFL Models per Store by Region and Store Type, 2006 and 2008

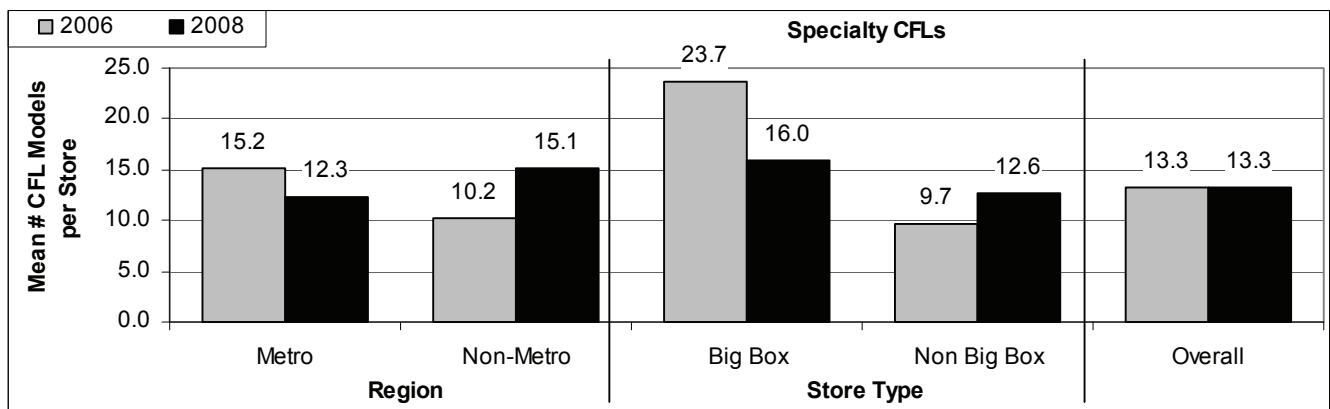


Figure 9. Mean Number of Specialty CFL Models per Store by Region and Store Type (Across All Stores), 2006 and 2008

Conclusions

The Northwest market for ENERGY STAR CFLs continued to make progress in 2008 despite the absence of NEEA’s active promotional efforts. While the average retail CFL price remained about the same between 2006 and 2008, there were dramatic increases in CFL availability – particularly among non-metro and non big box stores, both of which were a focus of NEEA’s CFL promotions for several years. CFL availability also increased throughout the region for specialty CFLs, with considerable growth in the number of non big box stores carrying these product types. There were also noteworthy changes in CFL diversity, with substantial increases in the mean number of specialty CFL models carried across all Northwest regions and store types and smaller (yet noteworthy) increases in the number of specialty models carried in non-metro and non big box stores.

A 2008 evaluation of NEEA’s Consumer Lighting Project reports that “there could be some backsliding in market progress if grocery, drug, and discount stores do not offer attractive prices and aggressively promote CFLs in the absence of CFL promotions” (KEMA, 2008). This statement was supported by suggestions from representatives of CFL manufacturing firms, retail stores, and Northwest utilities that CFLs would disappear from many of these channels – or that these channels would stock only one or two CFL models at prohibitively high prices – if CFL promotions did not continue. The Northwest

CFL market has not yet reached the point at which this hypothesis can be tested because of the continuously high (even increased) level of CFL promotion in the region between 2007 and 2008.

Because NEEA's later CFL promotions focused on providing incentives through non big box stores, one effect of their withdrawal may be the moderate shift in total incentive CFL sales away from non big box stores and toward big box stores. However, this effect was minimal given that there was no concurrent shift in overall CFL sales between the two store types. And despite the shift in CFL incentives between store types, energy-efficiency program sponsors continued to support the non big box channel by providing incentives for more than three-quarters of a million CFLs to these stores, and many of these incentive CFLs were specialty products. The incentive programs continued to support CFL market progress in the region in absence of NEEA's CFL promotions.

The Northwest market for medium screw-base bare spiral (non-specialty) CFLs seems to be transformed, at least in regions that have had significant prior program support (Rasmussen, Teja and Canseco, 2008). It is noteworthy, however, that the increase in Northwest ENERGY STAR CFL sales between 2007 and 2008 did not occur in the absence of energy-efficiency program incentives for CFLs. The data suggest that the approach taken in the Northwest – a gradual shift away from incentives for bare spiral CFLs and toward incentives for other lamp styles – may support continued CFL sales growth at moderate CFL prices (roughly \$4.00 per lamp, on average, across all lamp types). Given these circumstances, results from the Northwest may not be directly transferable to regions in which CFL incentive sales account for a far larger proportion of total CFL sales than in the Northwest and/or regions in which consumers have become accustomed to paying lower average prices for CFLs than in the Northwest market.

Recommendations

The findings from this research have implications for not only the Northwest but also for other regional CFL markets. Based on the above conclusions, we recommend the following:

1. **Energy-efficiency program sponsors should establish CFL market transformation goals and metrics – as well as processes for measuring progress toward those metrics – at the earliest possible stage of market intervention.**

Goals and metrics should ideally be developed prior to program implementation to establish baseline levels, but a “better late than never” attitude should be taken toward commencing market measurement after a program's inception. Without these goals and metrics, the concept of “a transformed market” becomes all the more difficult to define.

2. **To support measuring progress toward market transformation goals, program sponsors should undertake rigorous market tracking efforts.**

Program sponsors should track CFL sales, consumer adoption rates, and (where possible) household-level CFL saturation rates throughout the course of their incentive programs.

- Sponsors should track sales data at the **highest resolution available** – such as by store type, geographic area, lamp style (spiral versus specialty), and lamp price – to foster deeper understanding of the market. These data can be used to enhance or alter program offerings to ensure that all market dimensions are addressed.

- Sponsors should also consider **tracking non-CFL sales** to aid calculation of accurate estimates of CFL market share of total residential MSB lamp sales. Many markets currently lack such estimates.

Although this recommendation may seem obvious, tracking efforts in states such as California have proven that “the devil is in the details.” Many retail chains have been reluctant to provide CFL sales data, thus estimating CFL sales and market share in California has proven to be challenging (Itron, 2006 and 2008). Program sponsors should strongly consider **establishing sales data requirements** (ideally for CFLs and non-CFLs) for manufacturers and/or retailers to whom they provide program incentives and writing such requirements into supplier agreements.

3. Market tracking efforts should continue after CFL incentives are substantially altered, scaled back, or eliminated.

This strategy enables early detection of any geographic areas, sales channels, or lamp styles that are lagging behind the rest of the region and may require additional market support. Program sponsors can then consider developing targeted programs to address the laggards.

4. Program sponsors that have offered financial incentives for bare spiral CFLs for many years should consider a gradual shift away from market support for bare spirals and toward specialty CFLs.

Recent events in the Northwest CFL market suggest that a transition away from bare spiral CFL incentives toward specialty lamp incentives may prove to be an effective strategy to ensure continued market progress. Inherent in this recommendation are the assumptions that market data for the region shows that market progress is approaching the program’s goals, and that sufficient checks are performed to ensure quality and performance of the specialty products. Regions in which programs have offered substantial CFL price subsidies – such as California, where the average 2007 price was estimated at \$2.50 for a 15-Watt bare spiral CFL (Itron, 2008)¹² – may require longer transition periods to gradually increase prices for bare spiral CFLs.

¹² Note that this average price estimate excludes data from a large mass merchandise chain store and home improvement stores (which traditionally have lower than average CFL prices) and may thus represent a high-end estimate.

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