

Function of the ENERGY STAR® Label in Market Transformation Programs

*Thomas Mauldin, XENERGY
Mitchell Rosenberg, XENERGY*

ABSTRACT

Many utilities and efficiency organizations across the United States have adopted the ENERGY STAR® label to identify qualifying products for their market transformation programs. Given the substantial investment made by these organizations in adopting the ENERGY STAR® label, the effectiveness of the label is a key factor impacting the success of these market transformation programs. With evidence gathered from several research studies, this paper analyzes the effectiveness of the ENERGY STAR® label in the context of associated programs. These studies include lighting and appliance research conducted in Long Island and California as well as a national study regarding the ENERGY STAR® label. A variety of factors influence the role of the ENERGY STAR® label. These include: customer recognition and understanding of the label; customer perceptions of energy efficiency and other product features; and the condition of the retail environment. These factors operate differently for different products and segments of the market. The findings from these studies may have implications for the design and operation of market transformation programs across the United States that incorporate the ENERGY STAR® label.

Introduction

Over the past several years, the ENERGY STAR® label, sponsored jointly by the Department of Energy (DOE) and Environmental Protection Agency (EPA), has become the accepted means of identifying energy-efficient products for customers in the United States. This label applies to a variety of products, ranging from lighting and appliances to HVAC systems and new homes. In addition to promotion by DOE and EPA, many utilities and efficiency organizations across the United States have adopted the ENERGY STAR® label to identify qualifying products for their regional market transformation programs. Given the substantial investment made by these organizations in adopting the ENERGY STAR® label, the effectiveness of the label is a key factor impacting the success of many market transformation programs. This paper draws key findings from several recent studies on the ENERGY STAR® label and the associated residential market transformation programs. These include: lighting research conducted in Long Island and California; appliance research conducted in Long Island and California; and a national study of the ENERGY STAR® label. In light of the findings from these studies, we then draw conclusions that may have implications for other residential market transformation programs that incorporate the ENERGY STAR® label.

Background

This paper draws key findings from several recent studies on the ENERGY STAR[®] label and associated outreach efforts. Table 1 lists the relevant research tasks of these studies. In 2000, a study of CFL lighting products was conducted in Long Island; this research included a telephone survey with a random selection of customers. A study of the Long Island appliance market was performed in 2001; this research included surveys with customers who recently purchased an appliance. The phone survey was followed up with a mail survey to determine the appliance model number. This information was then used to validate the ENERGY STAR[®] status of the appliance and thus segment the telephone survey results by ‘ENERGY STAR[®] purchasers’ and ‘Standard appliance purchasers’. In addition, mystery shopper surveys were conducted in retail stores in order to gauge the effectiveness of point-of-purchase (POP) displays and the promotional efforts of sales staff.

Both of the Long Island research studies were conducted in support of residential market transformation programs operated by the Long Island Power Authority. These programs include rebates for ENERGY STAR[®] qualifying CFL bulbs, CFL fixtures, and clothes washers as well as support for retail stores who participate in the program. This support includes provision of ENERGY STAR[®] Point-of-Purchase materials (POP), sales staff training, and coordination of promotional events. This retail support is available for ENERGY STAR[®] qualifying CFL bulbs and fixtures as well as ENERGY STAR[®] qualifying clothes washers, refrigerators, dishwashers, and room air conditioners. The Long Island programs also promote ENERGY STAR[®] products through radio, television, and newspaper advertising and offer customers a mail order catalog for efficient products.

Table 1. Relevant Tasks of Research Studies

Client: Market	Survey Type	Number of Surveys	Year
LIPA: Long Island Lighting	Customer telephone	352	2000
LIPA: Long Island Appliance	Customer telephone Mail verification Mystery shopper	406 220 10	2001
SDG&E: California Lighting & Appliance	Customer telephone Mystery shopper	1,353 184	1999
EPA: National Awareness	Customer mail	3,496	2000

The results of the Long Island studies are supplemented by findings from the 1999 baseline study of the California lighting and appliance market. This research included telephone interviews with customers as well as mystery shopper surveys (Table 1). The state-wide California programs consisted of manufacturer buy-down incentives for ENERGY STAR[®] screw-in CFL bulbs, hardwired fixtures, and torchieres as well as salesperson incentives for ENERGY STAR[®] clothes washers, refrigerators, dishwashers, and room air conditioners. However, no customer rebates were provided. The program also provided training for sales staff.

The final study from which we draw findings is a national study on the awareness and understanding of the ENERGY STAR® label conducted for the EPA.

Effectiveness Criteria

In order to evaluate the effectiveness of the ENERGY STAR® label and the associated residential market transformation programs we first must identify some relevant criteria to measure performance. Before customers can proactively search out and purchase an energy-efficient product, they first must be able to identify these products. Therefore awareness of the ENERGY STAR® label is the critical first step. A related indicator is accurate identification of the ENERGY STAR® label on the actual product itself. Another important measurement is customer understanding of the ENERGY STAR® label: whether customers understand the energy efficiency message and realize that the label identifies energy efficient products. Customer perception of product features, particularly the value placed on energy efficiency versus other product attributes, also provides valuable insight. The final criteria we use is the condition of the retail environment; essentially the extent to which Point-of-Purchase materials and sales staff are effective in promoting energy efficient appliances.

These factors operate differently for different products (lighting vs. appliances) as well as for different segments of the market, especially for adopters vs. non-adopters.

Methodological Issues

Both the Long Island and California market transformation programs promote ENERGY STAR® labeled appliances and lighting products to residential customers. Because most of the research we draw upon was conducted in support of these programs, the findings are influenced by the programs as well as the ENERGY STAR® label itself. However, the studies were conducted soon after the programs began operation, thus the results should be relatively representative of pre-program market conditions. In addition, we have also attempted to select elements of the research findings that we believe are most relevant to the ENERGY STAR® label. It is not always possible to disentangle the results though; some of our criteria, such as customer awareness of the label or sales staff promotion of ENERGY STAR® products, may be influenced by program efforts and thus may change over time. Lastly, the results of these studies reflect the conditions of the Long Island and California markets at the time of the study; these conditions may have changed since that time, especially with the influence of ongoing programs.

However, we do feel that the findings from our research provide insight into the effectiveness of the ENERGY STAR® label in the context of these associated programs. Therefore we believe these findings may have implications for other market transformation programs that incorporate the ENERGY STAR® label.

Findings

This section discusses the key findings on the ENERGY STAR® label from the national EPA study. Following that is an analysis of findings from the Long Island and California studies on energy efficient appliances and lighting products. These results focus on customer recognition and understanding of the ENERGY STAR® label, perception of energy efficiency

and other product attributes, purchasing behavior, and market segmentation. In order to provide additional market insight, key findings on the retail environment are also discussed.

National Findings on the ENERGY STAR® Label

The national mail survey found that 41% of respondents were aware of the ENERGY STAR® label (Cadmus Group & XENERGY 2001). Not surprisingly, awareness is higher in regions that have local MT programs (high publicity regions) than those regions without local MT programs (low publicity regions): 52% vs. 37% (Table 2).

Based on a content analysis of unstructured survey responses, 37% of respondents were determined to have a ‘high’ understanding of the labels meaning while 42% had no understanding; relatively few respondents fell between these two extremes. In addition, understanding was directly related to prior awareness: nearly two-thirds of respondents who were previously aware of the ENERGY STAR® label had ‘high’ understanding compared to only 19% of those previously unaware. Income appears to be strongly associated with understanding too: 51% of respondents earning more than \$75,000 per year had ‘high’ understanding compared to only 25% of those earning less than \$25,000 (Cadmus Group & XENERGY 2001).

Table 2. National Findings on the ENERGY STAR® Label

Characteristic	Category	Percent
Awareness	Overall awareness	41%
	% of those aware from High Publicity, Low Publicity regions	52%, 37%
Understanding	Overall % with ‘high’ understanding	37%
	Overall % with ‘no’ understanding	42%
	% of those previously aware, unaware with high understanding	64%, 19%
	% of those with annual income >\$75k, <\$25k with high understanding	51%, 25%
Places heard about ENERGY STAR®	In-store displays	58%
	Direct mail	40%
Products where label seen	Computers/Monitors	52%
	Refrigerators	43%
	Dishwasher	25%
	Clothes washer	25%
	Room air conditioner	22%
	CFL	13%

Most respondents learned about the ENERGY STAR® label from in-store displays (58%) or direct mail (40%) (Cadmus Group & XENERGY 2001). The study also found that respondents reported seeing the ENERGY STAR® label primarily on computers/monitors (52%) and refrigerators (43%). In addition, about one-quarter mentioned dishwashers, clothes washers, and room air conditioners while 13% mentioned CFLs (Table 2). Products that tend to be supported by local MT programs, such as clothes washers, dishwashers, and refrigerators, were cited more often in high publicity regions than low publicity regions; for other products the figures were more similar.

Seventy-four percent of respondents reported seeing the ENERGY STAR® label on a product they recently purchased. One-half of these respondents said they were influenced by

the label: 58% in high publicity regions versus 35% in low publicity regions (Cadmus Group & XENERGY 2001).

Appliances

In this section, we discuss key findings from Long Island and California on ENERGY STAR® appliances. These findings focus on customer knowledge and market segmentation as well as the condition of the retail environment.

Customer knowledge. Both the Long Island and California studies found that appliance purchasers are unable to identify energy-efficient appliances. About 90% of Long Island respondents thought they bought an energy efficient appliance regardless of whether or not they actually purchased an ENERGY STAR® appliance (XENERGY 2002b). Similar results were found in California where 7%-9% of customers were determined to have purchased an ENERGY STAR® appliance regardless of whether or not they reported buying an energy efficient appliance (XENERGY 1999). Consumers are also confused about the attributes of ENERGY STAR® appliances: they tend to slightly overestimate the incremental cost of efficient refrigerators, dishwashers, and air conditioners but substantially underestimate the incremental cost of efficient clothes washers. In addition, customers tend to overestimate energy cost savings for all appliances by a factor of two or more.

The Long Island study also found that customers confuse the intention of the Energy Guide and ENERGY STAR® labels: on an unaided basis, 13% of customers cited the Energy Guide label as the reason why they thought their appliance was energy-efficient; in comparison, less than 8% mentioned the ENERGY STAR® label. In addition, when directly probed, over 80% of customers reported seeing the EnergyGuide label on their appliance; of these customers, nearly one-quarter thought the mere presence of the label indicated energy efficiency (XENERGY 2002b). In California, on an unaided basis, 19% of purchasers said they relied on the ENERGY STAR® label and 8% relied on the EnergyGuide label to identify their energy efficient appliance (XENERGY 1999).

Customer segmentation. About one-half of both ENERGY STAR® purchasers and Standard purchasers on Long Island were aware of the ENERGY STAR® label (Table 3). A similar proportion, about one-third, could provide an accurate description of the label; however, more ENERGY STAR® purchasers understood the labels' meaning than did Standard purchasers. In addition, roughly one-half of respondents rated the ENERGY STAR® label as 'influential' in their decision, regardless of whether they bought an ENERGY STAR® appliance or not. Lastly, only 26% of ENERGY STAR® purchasers and 32% of Standard purchasers cited energy efficiency as their most important decision factor. All these findings suggest that neither the ENERGY STAR® label nor energy efficiency strongly influenced customers' purchase of ENERGY STAR® appliances (XENERGY 2002b).

Manufacturers have begun marketing high-end appliances as more than just "commodities" and now offer more style, design, and performance options (Four Winds Alliance & D&R International 2000). Customers appear to recognize this bundling of premium features with energy efficiency. Over one-third of Long Island respondents associate better features and appearance with an energy-efficient appliance and another 12% associate higher performance (Table 3). ENERGY STAR® purchasers also associate efficient

models with higher quality: 26% of ENERGY STAR® purchasers associated quality/reliability compared to only 8% of Standard purchasers (XENERGY 2002b).

Table 3. Findings on Appliance Purchaser Segmentation in Long Island, Part I

Characteristic	ENERGY STAR® Appliance Purchaser	Standard Appliance Purchaser
% aware of ENERGY STAR® label	55%	48%
% providing accurate description of ENERGY STAR® label	35%	34%
% understanding meaning of ENERGY STAR® label	55%	39%
# Observations	38	174
% rating ENERGY STAR® label as ‘influential’	55%	50%
# Observations	22	83
Most Important Decision Factor		
% citing energy efficiency	26%	32%
# Observations	28	155
Qualities associated with an energy efficient appliance		
Better features/appearance	37%	36%
Higher performance	11%	13%
Quality/reliability	26%	8%
# Observations	38	181

ENERGY STAR® purchasers in Long Island also appear to be more capable of paying the higher price for a high-end efficient model: 61% of ENERGY STAR® purchasers earn \$75,000 per year versus only 42% of Standard purchasers (Table 4). In addition, only 13% of ENERGY STAR® purchasers cited cost as their primary decision factor compared to 30% of Standard purchasers. ENERGY STAR® purchasers appear to instead be driven by the better features/appearance of the model: 53% mentioned these as the most important decision factor compared to 38% for Standard purchasers. Lastly, ENERGY STAR® purchasers more often buy their new appliance due to remodeling (18% vs. 7%), where the appliance cost is only a portion of the overall project expense. While it is possible that our research did not capture the effect of the ENERGY STAR® label or energy efficiency on the appliance purchase, these findings do suggest that past purchases of ENERGY STAR® appliances on Long Island may have been motivated more by the desire of wealthier consumers for better styled, higher quality appliances (XENERGY 2002b).

Retail environment. Most all customers speak to sales staff about their appliance purchase: nearly 90% of appliance purchasers on Long Island reported doing so; in California this figure was 72% (XENERGY 2002b; XENERGY 1999). However, the California research found that only 12% of sales staff were ‘very knowledgeable’ regarding the ENERGY STAR® label and that just 13% mentioned energy efficiency ‘a great deal’ in their sales pitch. Both studies found that about 15% of appliances initially shown were ENERGY STAR® qualified models. After the shopper prompted the staff regarding energy efficiency, more ENERGY STAR® models were then shown. Due to the emphasis of MT programs on efficient clothes washers, sales staff appear to be much more knowledgeable about energy efficiency and the ENERGY STAR® label regarding clothes washers than other appliances. However, when asked about the meaning of the ENERGY STAR® label and EnergyGuide labels, about 80% of

the salespersons on Long Island correctly expressed the intentions of the two labels. These findings indicate that sales staff tend not to discuss energy efficiency or ENERGY STAR[®] unless prompted by the customer.

Table 4. Findings on Appliance Purchaser Segmentation in Long Island, Part II

Characteristic	ENERGY STAR [®] Appliance Purchaser	Standard Appliance Purchaser
% with household income > \$75,000	61%	42%
# Observations	28	155
Most Important Decision Factor		
% citing purchase price	13%	30%
% citing features/appearance	53%	38%
% citing size/space/capacity	37%	27%
Reason for Appliance Purchase		
% citing home remodeling	18%	7%
% citing appliance failure	42%	59%
# Observations	38	181

The Long Island mystery shopper surveys found that nine out of ten stores had ENERGY STAR[®] POP materials for clothes washers, but less than one-half had such materials for other appliances. The California study found that one-half of stores had energy efficiency POP material for appliances. While the Long Island mystery shopper found that the materials were generally visible and well displayed, the materials were sometimes difficult to understand. The mystery shoppers in California rated only about one-third of the stores as having POP materials that were ‘easy to see’, ‘easy to understand’, and ‘nicely displayed’ (XENERGY 2002b; XENERGY 1999).

Lighting Products

In this section, we discuss key findings from Long Island and California on ENERGY STAR[®] lighting products. These findings focus on customer knowledge and market segmentation as well as the condition of the retail environment.

Customer knowledge. The Long Island study found that 60% of customers who were aware of CFL technology were also aware of the ENERGY STAR[®] label; the figure is 38% for those not aware of CFLs (Table 5). However, only 8% of all respondents had seen the ENERGY STAR[®] label on lighting products and just 4% reported using the label to guide their purchase (XENERGY 2002a). The California study found that roughly 20% of customers believed they bought an energy efficient lighting product. Most, about one-third, cited point-of-purchase materials as the reason for believing so; 13% of hardwired-fixture purchasers cited the ENERGY STAR[®] label compared to zero CFL bulb purchasers (XENERGY 1999). These findings suggest that, in the past, customers have not used the ENERGY STAR[®] label to identify CFL products.

General knowledge of the benefits of CFL bulbs is good but specific knowledge is weak: on Long Island, most customers (60%) knew that CFLs use less energy than incandescent bulbs, however far fewer (23%) knew CFLs use about one-third as much

energy. In addition, two-thirds of customers knew that CFLs last longer than incandescents, however very few (just 8%) knew that CFLs typically lasts ten times longer (XENERGY 2002a).

Table 5. Findings on Lighting Product Purchases and Awareness

Study	Characteristic
Long Island	<ul style="list-style-type: none"> • 60% aware of ENERGY STAR® of those aware of CFLs • 38% aware of ENERGY STAR® of those unaware of CFLs • 8% saw ENERGY STAR® label on lighting products • 4% used ENERGY STAR® label to guide purchase of lighting products
California	<ul style="list-style-type: none"> • 20% believed they bought an energy efficient lighting product • 13% of hardwired fixture purchasers citing ENERGY STAR® as reason for purchase • 0% of bulb purchasers citing ENERGY STAR® as reason for purchase

Customer segmentation. In the Long Island study, customers who reported purchasing at least one CFL bulb were categorized as ‘adopters’ (Table 6). These customers own a fair number of CFL bulbs, one-quarter reported making recent repeat purchases, and most project a high-level of future purchases. In addition, their initial CFL bulb purchase appears to be an ‘impulse buy’ because little effort was expended beforehand to research their first purchase. Fifty-two percent of adopters mentioned energy efficiency or lower operating cost as a product benefit and 55% mentioned longer life or less frequent replacement (XENERGY 2002a).

Customers who were aware of CFLs but had not yet purchased a bulb were classified as ‘aware non-adopters’. Thirty-nine percent of these customers mentioned energy efficiency as a product benefit and 33% mentioned longer life. In addition, 35% mentioned higher price on an unaided basis as the major barrier to purchasing a CFL bulb. Those customers who are unfamiliar with CFL technology were categorized as “unaware”: in terms of demographics, these customers were not substantially different from adopters nor aware non-adopters (XENERGY 2002a).

Table 6. Findings on Lighting Purchaser Segmentation from Long Island

Segment	Characteristic
Adopters	<ul style="list-style-type: none"> • High # of CFL bulb purchases: average 5.8 • Moderate level of repeat purchases: 28% • Project high level of future purchases at rebated prices • First purchase appears to be an ‘impulse buy’ • Product benefit: <ul style="list-style-type: none"> 52% cite efficiency or operating cost 55% cite longer life or less frequent replacement
Aware Non-adopters	<ul style="list-style-type: none"> • Product benefit: <ul style="list-style-type: none"> 39% cite efficiency 33% cite longer life • Primary barrier to purchase: 35% cite higher cost
Unaware	<ul style="list-style-type: none"> • Similar demographics to adopters and aware non-adopters

Retail environment. Customers in search of lighting products tend not to engage sales staff in the retail store: only 16% of Long Island CFL bulb purchasers reported speaking to sales staff; this figure was 20% for all lighting product purchasers in California (XENERGY 2002a; XENERGY 1999). The mystery shopper research found that salespeople generally do not show CFL products or promote energy efficiency unless explicitly prompted by the customer. The California research found that only 5% of sales staff were “very knowledgeable” about the ENERGY STAR® label and that just 11% mentioned energy efficiency “a great deal” in their sales pitch. In addition, only 12% of products initially shown were ENERGY STAR® models (XENERGY 1999).

The California mystery shopper visits found energy efficiency POP materials in 28% of retail stores. In addition, POP materials more often exist for CFL bulbs than CFL fixtures; however, this trend may partially be due to lack of availability of CFL fixtures. The California research found that a minority of POP materials were effective: 38% of the POP materials were rated as ‘easy to see’ and 28% were ‘nicely displayed’ and ‘easy to understand’ (XENERGY 1999).

Conclusions

In light of the findings presented, we now draw conclusions about the effectiveness of the ENERGY STAR® label and the associated programs. The national mail survey of residential customers on the ENERGY STAR® label revealed the following findings.

- Local market transformation programs appear to have had a measurable effect on customer awareness of the ENERGY STAR® label. Fifty-two percent of customers were found to be aware of the ENERGY STAR® label in regions with existing market transformation programs; in comparison, this figure is 37% in regions without such programs.
- There appears to be a substantial base of customers who should be receptive to program marketing efforts: approximately 40% of customers were found to have a good understanding of the ENERGY STAR® label.
- Certain products, such as refrigerators, may offer a better opportunity for successful ENERGY STAR® branding, while CFL products may require more effort in order to achieve market penetration. Almost one-half of customers reported seeing the ENERGY STAR® label on refrigerators and about one-quarter reported seeing it on clothes washers, dishwashers, and room air conditioners. However, only 13% reported seeing the label on CFL products.

Appliances & Lighting

Because the appliance and lighting research in Long Island and California was conducted in support of existing residential market transformation programs, the findings are representative of these particular market conditions at the time of data collection. These markets conditions are influenced by the operation of market transformation programs and may have changed since our research was conducted (see Methodological Issues section for more discussion of this issue). However, our findings do provide insight into customer awareness, understanding, and use of the ENERGY STAR® label in the context of these

associated programs. Thus these findings may have implications for other market transformation programs that incorporate the ENERGY STAR® label.

Appliances. Below is a summary of our findings on the ENERGY STAR® label and the associated appliance market transformation programs in Long Island and California.

- Customer confusion regarding the identification of energy efficient appliances may present a major obstacle to program outreach efforts. Roughly 90% of customers believe they bought an energy efficient appliance regardless of whether or not they actually purchased an ENERGY STAR® appliance.
- Customers need further explanation in order to reduce their confusion regarding the identification and intention of the EnergyGuide and ENERGY STAR® labels. As an example, some customers cited the presence of the EnergyGuide label as the reason they believed their purchased appliance was energy efficient.
- Customers tend to underestimate the incremental costs of ENERGY STAR® appliances but significantly overestimate the energy cost savings. While this misunderstanding is biased in favor of ENERGY STAR® appliances, it is essential for customers to have more realistic expectations.
- Sales staff have a major untapped opportunity to influence appliance purchases. The vast majority of appliance purchasers interact with salespersons yet these staff tend to not promote ENERGY STAR® appliances until prompted about energy efficiency by the customer.
- On Long Island, past purchases of ENERGY STAR® appliances appear to be motivated more by the desire of wealthier consumers for better styled, high quality appliances than for an energy efficient product. This finding suggests that promotional efforts should emphasize benefits such as enhanced appearance, premium features, higher performance, and higher quality as well as the energy cost savings.

Lighting. Below is a summary of our findings on the ENERGY STAR® label and the associated lighting market transformation programs in Long Island and California.

- Branding of ENERGY STAR® CFL products may require substantial effort. Few customers reported seeing the ENERGY STAR® label on lighting products or being influenced by it. This finding is supported by the national research.
- The lower operating costs and longer life spans of CFL products should continue to be emphasized in marketing efforts. Compared to non-adopters, adopters more often cite energy efficiency and longer life as product benefits.
- Point-of-Purchase displays offer a good opportunity to influence customer purchase decisions on lighting products. Few customers consulted with retail sales staff on their lighting purchases; instead, more customers cited POP materials as their method of identifying energy efficient lighting products. However, our mystery shopper surveys found that POP materials are generally ineffective.
- There appears to be little customer information on which to segment potential target markets: our research found no significant demographic differences between CFL product adopters and non-adopters.

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