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Residential Lighting Market Transformation Study

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Decision Sciences Research Associates, Inc.

236 West Mountain Street, Suite 103 • Pasadena, California 91103
Voice: (626) 793-9090 Fax: (626) 793-9051

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Preface

This study was developed in response to the California Public Utilities Commission's order (Decision 96-12-079) that the energy utilities conduct studies in 1997 designed to identify the market transformation effects of their previous DSM programs. In collaboration with other members of the California DSM Measurement Advisory Committee (CADMAC), Southern California Edison (Edison) selected several of its DSM programs to evaluate, including the High Quality Compact Fluorescent Lamp (HQCFL) program.

The series of studies ordered by the CPUC was for the most part intended to be a retrospective look at "traditional" DSM programs that were not designed to produce market effects. It was a "last look back" at impact programs before turning our attention to the design, implementation, and evaluation of programs *intended* to produce market effects, toward an eventual transformation of segments of the energy efficiency market. There were at least two goals: to look for *any* evidence of market transformation from past programs, and to develop tools for the evaluation of market effects resulting from the new era of market transformation programs.

However, the Edison HQCFL program was an exception. This program was an attempt to intentionally change how the market processes operated for residential lighting, a small segment of the total energy-efficient equipment market. In this 1996 pilot program, Edison hoped to demonstrate both *whether* this type of program could be implemented, and *how* to do it. Anticipating continued interest in residential high efficient lighting programs, Edison chose to gather some *baseline* data that would help determine in future years whether such programs do actually transform a market.

This program evaluation of the market effects of the HQCFL program was conducted according to a revised work plan that was approved by the members of the Market Effects Subcommittee of CADMAC. This study makes some unique contributions to the collective knowledge accumulated in the 1997 market effects studies, and its lessons should help the new program administrators design future market transformation programs. It should also provide important baseline data as program evaluators attempt to measure the influence of new lighting programs in the transformation of markets.

Executive Summary

The research presented in this volume focused on the residential retail lighting customer. This emphasis was chosen because Edison's 1996 Lightsaver Compact Fluorescent Program was designed to encourage sales of energy efficient lighting products directly to consumers. Our research consisted of observations at retail store settings, a review of advertising material pertaining to lighting products, and two telephone surveys which measured consumer knowledge, attitude and practice regarding residential lighting products.

Key Findings

- Availability of compact fluorescent bulbs is not a significant barrier to Southern California Residents who know what compact fluorescents are.
- An increasing variety of compact fluorescent products are sold at large Home Improvement retailers.
- Almost all respondents who have compact fluorescent bulbs installed in their homes indicate that they will purchase compact fluorescents again.
- Compact fluorescent bulbs are not found at grocery or drug stores.
- Compact fluorescent bulbs advertising was an insignificant proportion of all lighting advertising during the investigation.
- Conducting energy-related survey research may be increasingly difficult in a deregulated energy market due to customer defensiveness to marketing efforts.

Recommendations

Future Lighting Transformation Programs should...

- Be continuous and focused on the largest chains of home building supply and hardware stores.
- Encourage the use of point of purchase displays that differentiate energy efficient products from others.
- Educate customers about the new features and performance characteristics of compact fluorescents.
- Educate the public about the relative cost of residential lighting and the dollar savings that energy efficient lighting can produce.

Future Transformation Research should...

- Re-measure "benchmark" knowledge, attitude and practice variables.
- Develop strategies to talk to shoppers as they consider what to buy.
- Continue to monitor and archive information about retail merchandising of residential lighting products.
- Develop methods to track energy efficient lighting product distribution and sales data.

1

Introduction

1.1 Project Goals

The goal of this project was to collect data to use as a baseline for a multi-year measurement effort focused on the market for residential lighting products. The research project's approach was to take a wide-angle view of the market for residential lighting products, including all types of equipment used for lighting in residential locations, not just the high quality compact fluorescent bulb products that were the subject of the 1996 LightSaver program. Since we are at the beginning of the residential retail lighting market transformation study period, we believe that it is necessary to establish baseline observations for all significant market components against which later market observations will be compared.

Too often, studies of change are initiated after the fact in an attempt to measure the magnitude of the effects of program investments. Considering the scope of the retail lighting market, our plan was to collect observations in advance of market transformation interventions. Specifically, we focused on...

- Characterizing the retail sales environment for residential lighting products.
- Measuring customers' knowledge, attitudes and practices pertaining to shopping for and using various residential lighting technologies.

1.2 Research Plan

This research consisted of a suite of studies targeted to participants in the retail residential lighting market. The goals of these efforts were to develop a series of observational data to build knowledge about market barriers, market effects and transformation program intervention strategies. We hope that our efforts serve as a baseline to describe the state of the market in the beginning (or at this point, the years 1997-1998) of the changing market for retail residential lighting products. Data were collected from retail stores, program participants, and a random sample of customers in the SCE service territory. Each of these efforts is described below.

Retail Store Inspections – The purpose of these studies was to characterize the retail sales environment for residential lighting products. For this effort, we visited a sample of retail locations to collect information about the type and amount of retail lighting products displayed for sale. Inspections included the observations of shelved inventories of lighting products by manufacturer, model and price and about how residential lighting products were marketed and displayed at retail locations.

Participant Customer Survey – A follow-up telephone interview of customers who returned Edison's LightSaver Program response cards was conducted. These lighting buyers were asked about where and how they plan to use the high quality compact fluorescents and how they learned about and identified the products they purchased. The primary goal of this survey was to collect baseline data about where compact fluorescents buyers had installed program product and to collect their reports about average hours and time of use of these products.

Retail Residential Lighting Baseline Survey – A telephone survey of customers in Southern California was conducted using random digit dialing methods. Its purpose was to measure knowledge, attitude and practices associated with shopping for and using residential lighting products. The topics covered included information useful for developing customer segments (e.g. dwelling characteristics, owners or renter status, education, income, family composition, and labor force participation). We also identified which householders maintain the lighting, who shops for lighting products, where are purchases made, and what role does price, product performance, customer satisfaction, and energy efficiency play in lighting purchase decisions. In addition, respondents were asked about their familiarity with various lighting technology options and about their household's history of purchase and use of compact fluorescents. The final topics of this survey included a general test of knowledge about energy efficiency issues, again to serve as a baseline against which future survey findings may be compared.

1.3 Report Contents

Chapter Two of this report presents a description of Edison's 1996 LightSaver program that details its elements and goals. The second portion of this chapter describes our observations of the program in practice at participant retailers.

Taken together, Chapters Three and Four constitute a market characterization of the retail marketplace for residential lighting products. For this research, our focus was limited to retail end-user transactions – when residential electric customers shop for and purchase lighting products. Chapter Three deals with the retail setting, the ways in which lighting products are merchandized and promoted in various types of retail outlets. Topics include

shelving, point of purchase display, and advertising practices. Chapter Four identifies the customers for retail residential lighting products. In this chapter, we present results from survey interviews conducted with both LightSaver Program participants and with respondents to a more general Baseline Survey of randomly selected Southern California households. Chapter Five concludes with a discussion of findings in the framework of market transformation research.

The Appendix to this report will be published as a series of four companion volumes. These consist of two codebooks and two data file delivery document. Codebooks present frequency distributions for the responses to all survey questions. The two file delivery volumes accompany the survey response data files. They contain complete information about the meaning of all variable values. All four of these volumes also contain copies of the full survey telephone scripts The final product of this research is a collection of original materials obtained for archival purposes. The goal of this collection was to maintain an organized set of materials that can be used in comparison with studies of future retail residential lighting products and merchandizing strategies. Here as with other project data collection activities, our goal was to provide archival materials for use as baseline observations in future studies of the retail residential market for lighting products.

2

The LightSaver Program

2.1 Introduction

The first portion of this chapter presents a description of Edison's 1996 LightSaver program and explains how its goals differ from previous lighting DSM programs. The second section reports on the field observations that occurred during retail store site visits from December, 1996 through the first quarter of 1997 when LightSaver program product compact fluorescents were available at participating retailers.

2.2 LightSaver Program Description

The 1996 LightSaver program was designed to stimulate the sales of high quality compact fluorescent bulbs (CFB) through existing large volume retailers in Southern California Edison's territory. Edison's 1996 LightSaver Program was designated as the first year of a proposed long-term effort to produce a permanent, self-sustaining change in the retail residential lighting market to help achieve increased energy efficiency. The program goals include changing the attitudes and investment behaviors of manufacturers, distributors, retailers, and consumers of residential lighting products. In short, the goal was to change the retail lighting marketplace by helping to encourage the supply and to stimulate demand for a new class of energy efficient residential lighting products.

Unlike previous wholesale discount programs, Edison's 1996 LightSaver program provided funds to manufacturers to be used in unspecified amounts for combinations of advertising, sales promotions, and sales training, as well as reductions in the retail price of program qualifying compact fluorescents. In addition, Edison's program staff prepared a press release that resulted in a program launch announcement that was submitted to Southern California media outlets. The full text of this press release is included on page 2-10 at the end of this chapter.

Figure 2-1 illustrates the paths of program influence that describes the logical structure of Edison's 1996 LightSaver program strategy.

Figure 2-1 Paths of Program Influence

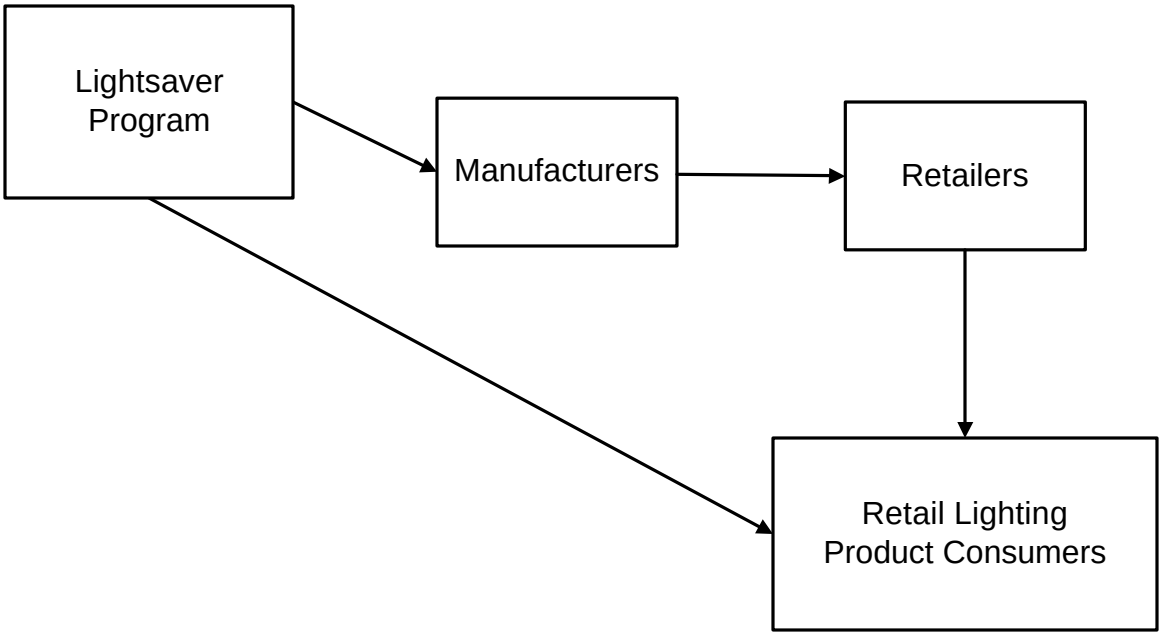


Figure 2-1 indicates that the LightSaver program was designed to directly affect the behaviors of both manufacturers and customers and indirectly to affect the behavior of retailers and their customers. In prior years, Edison sponsored wholesale buy-down programs that provided incentives to manufacturers to sell qualifying energy efficiency lighting products to distributors and retailers whose markets included Southern California Edison's service territory. These programs were designed to save energy, by indirectly encouraging consumers to substitute new efficient lighting technologies for less efficient ones. There were few constraints both on distribution channels and the ultimate end-user prices for these products. A figure drawn for those types of programs would have required only an arrow between manufacturer and retailers or distributors.

2.3 Program Product

Approximately 90,000 high quality compact fluorescents associated with the LightSaver Program were distributed in Southern California Edison's Service territory. These compact fluorescents arrived at the retail outlets beginning in late November 1996. The qualifying compact fluorescents were manufactured by Lights of America of Walnut, California. They consisted of two "screw-in" models of 13 watts or 30 watts with high power factor, good color rendition, low total harmonic distortion and instant-on electronic ballasts.

Figure 2-2 "Bulb Replacement" Compact Fluorescent

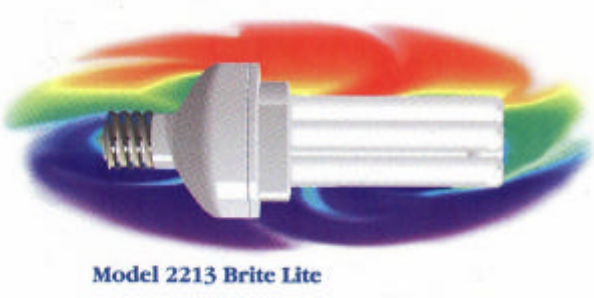


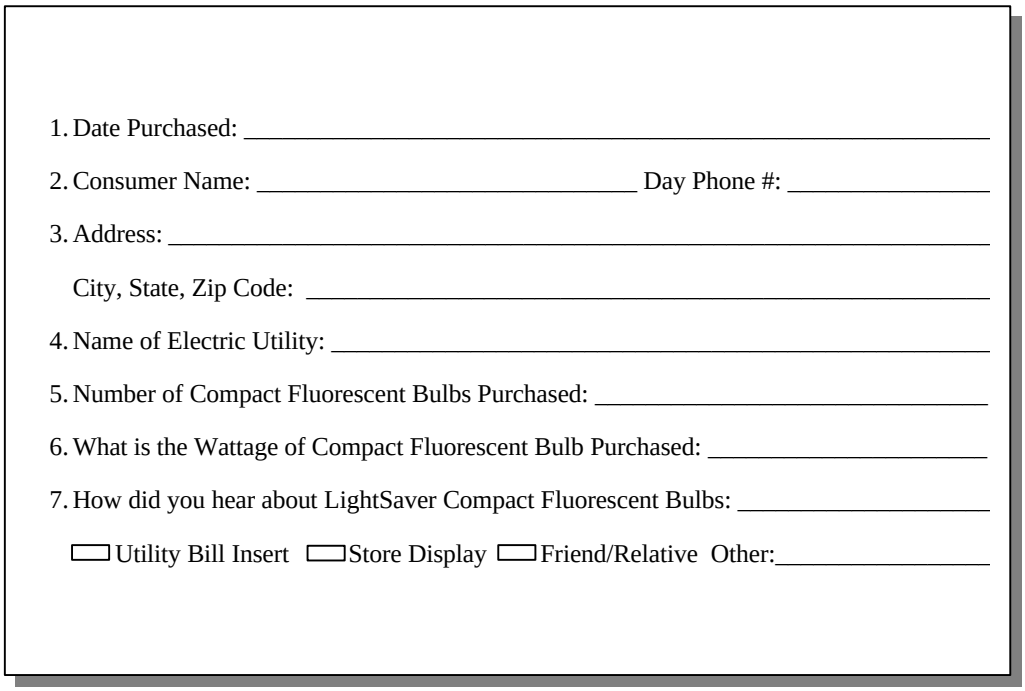
Figure 2-2 and Figure 2-3 identify of the two types of bulbs that were included in the 1996 LightSaver program. Figure 2-2 is model 2213 Brite Lite and Figure 2-3 is an example of model 2630 Electronic Circle Lite. Both bulbs are designed to replace incandescent bulbs in a wide variety of existing fixtures. Model 2213 will fit many fixtures that accept incandescent bulbs.

Figure 2-3 "Circle-Lite" Compact Fluorescent

Model 2630 is typically used in table lamp applications. These may require a lamp harp adapters in order for some lampshades to fit properly.

The program products retailed for approximately seven to ten dollars. Qualifying program product and retail displays were marked with a 1¾ inch round red LightSaver sticker and response postcards were taped to the back of product packages in order to collect participant end-user information. An example of the postcard survey addressed to the manufacturer is provided in this report as Figure 2-4. Initially products were available at a single retailer, Home Depot, a high-volume market-leading home improvement chain. Three additional retailers were added to the program in the early months of 1997 including Home Base, another warehouse home improvement chain, Fedco, a chain of discount department stores and Lamps Plus, a chain of specialty lighting stores.

Figure 2-4 LightSaver Response Survey Postcard


1. Date Purchased: _____

2. Consumer Name: _____ Day Phone #: _____

3. Address: _____

City, State, Zip Code: _____

4. Name of Electric Utility: _____

5. Number of Compact Fluorescent Bulbs Purchased: _____

6. What is the Wattage of Compact Fluorescent Bulb Purchased: _____

7. How did you hear about LightSaver Compact Fluorescent Bulbs: _____

☐ Utility Bill Insert ☐ Store Display ☐ Friend/Relative Other:_____

2.4 Program Implementation

The goal of the LightSaver program was to encourage manufacturers by providing money for wholesale discounts and to subsidize part of the costs of packaging design changes and the production of point of purchase materials with energy savings messages. Figure 2-5 pictures an audio display that the participating manufacturer, Lights of America, produced in response to the program.

Figure 2-5 Audio Program Display

This display was designed to occupy an eye-level shelf next to or above the LightSaver program stock. These displays were observed at some, but not all, retail outlets that participated in the LightSaver Program. In addition to the visual information provided, this display also included the following audio message (*activated by pushing a button*) that explained the cost and energy saving benefits of compact fluorescent bulbs.

> *Do you know you can save up to $127 each year just by changing a light bulb? Lights of America in cooperation with Southern California Edison, is offering compact fluorescent bulbs at a special price. Now you can cut your lighting costs way up to 80%. Compact fluorescents produce three times the light of a regular bulb with less heat and last up to 16 times longer. They turn on instantly and produce high quality flicker free illumination. Look for the special red and white sticker on Lights of America products to receive this special price.*

Figure 2-6 provides another example of a point of purchase advertisement included with the display of program products at many participating retail stores.

Figure 2-6 Point of Purchase Program "Sign Card"

This 12 by 18 inch display provides a quick identification of the program products and indicates that a "Special Low Price" is in effect. It also explains the benefits of compact fluorescent bulbs as follows...

Saves approximately 80% on lighting costs
Outlasts 16 standard bulbs
Fits standard sockets
Features replaceable bulbs

This display and a companion magnetic shelf sign (*not pictured*) were designed to attract customers to the products by identifying the LightSaver program compact fluorescents and providing information about their energy and cost savings benefits. Note that the inclusion of Edison's Logo and name help to differentiate the products from others stocked in the same section of participating stores.

Additionally, participating manufacturers were encouraged to work with retailers to attract customers to LightSaver products and to educate sales personnel regarding the savings and performance characteristics of program product. Edison's LightSaver program also included outreach directly to the consumer by publicizing the program with a launch day promotion and indirectly by providing incentives for retail advertising in store catalogs and residential flyer mailings.

2.5 Pricing Observations

Price continues to be a major factor in the purchase of all energy efficient lighting products, and consumers have traditionally viewed compact fluorescent bulbs as high-priced alternatives to incandescent bulbs. Figure 2-7 illustrates the variation in the pricing of compact fluorescent bulbs observed at five different retail locations on the same day during the active sales period in January, 1997. As can be observed, prices for these compact fluorescents range widely from a low of $6.97 to a high of nearly $20.00.

Figure 2-7 Price And Program Sticker Observation For The Same Item On One Day

Retail Chain	Location	Retail Price	Program Markings
A	1	$17.80	
A	2	$6.97	Yes
B	1	$19.99	
B	1	$8.88	
B	2	$8.88	Yes
C	1	$18.99	
C	2	$18.99	
D	1	$16.94	
D	2	$16.94	
E	1	$19.99	

We also observed that only two of the retail locations contained stickered program product and that both of them also stocked the exact same models at different prices without these stickers. Similar variations in price were observed at other times during the study period. This uneven pricing structure may help explain the uncertainty about the cost of compact fluorescents bulbs expressed by the respondents to the baseline survey test question discussed in Chapter Four.

An additional finding about pricing observed during the active program sales period was that some retailers' scanners did not recognize the UPC code stickers affixed to program products. At one large retailer, our inspectors attempted to purchase program product and the UPC was rejected at the cash register. This resulted in the register clerk calling for a "price check" in order to find out what the price of the item should be. Since at the time identical products were sold at two different prices, some marked with special sticker UPC barcodes and others marked with the preprinted UPC barcodes, the price-check runner had

difficulty verifying prices. All of this activity produced a backup at the cash registers lines and made purchasing program products inconvenient.

On going project inspections observed that by April 1997 LightSaver Program marked products were no longer available for purchase at participating stores. At that time, project inspectors noticed that all LightSaver Program point-of-purchase displays had been removed from the lighting department aisles in the retail outlets visited. Subsequently, during follow-up visits to retailers during the second half of 1997 and the first half of 1998, project inspectors did occasionally find small numbers of 1996 LightSaver program products for sale. In some cases the 1996 LightSaver product packaging looked old and dusty as if it had been warehoused or moved. In another retailer in 1998, DSRA inspectors found 1996 LightSaver program product (with stickers and postcards) displayed with compact fluorescent products promoted under Edison's 1997 retail lighting program. This observations occurred in a store that had not stocked 1996 LightSaver program products during the third and fourth quarters of 1997.

The observation about late-arriving stock points out a serious problem for administering and evaluating energy efficiency programs of this type. That is, it may be difficult or impossible to predict when program product manufactured and shipped at some particular time, will actually reach store shelves, be sold, and placed into service by end users. Obviously, predictions about the energy savings benefits of these programs and products must account for delays based on distribution, warehousing and retailers promotional practices.

FOR IMMEDIATE RELEASE

Contact: Tracy O'Connell
(818) 302-7957
World Wide Web Address: http://www.edisonx.com

Southern California Edison, retailers promote high quality, efficient light bulbs

ROSEMEAD, Calif., March 23, 1997—Southern California Edison today announced a new consumer efficiency program to promote the use of high quality energy-efficient, compact fluorescent light bulbs for homes and businesses. Hardware stores, building and home improvement centers, lighting fixture retailers and mass merchandising stores within the Edison service area are offering the bulbs at a special price. The new style bulbs, manufactured by Lights of America in Walnut, CA are featured in in-store displays promoting their high quality energy-efficient aspects.

Compact fluorescent bulbs offer several advantages - they give off three times the light of standard light bulbs of the same wattage, and can last more than 15 times longer. In addition, they give off only about 10 percent of the heat generated by a standard light bulb. Because of this, they are also cooler to operate, and do not raise the temperature of a room by as much as standard bulbs, thereby helping to lower cooling and air conditioning costs in the summer months. Two high-quality styles of compact fluorescent bulbs are available, which fit into standard light sockets.

Last year Edison launched a consumer efficiency program with the U.S. Department of Energy, U.S. Environmental Protection Agency, and 31 Circuit City stores in which it promoted the purchase of highly energy-efficient refrigerators, dishwashers, and room air conditioners.

"By working with retailers, we are able to place information about these products where the purchase decision is being made, thereby assisting buyers in making informed decisions. Although energy-efficient products often cost more initially, because of the way in which they are constructed or produced, the energy savings which results from their more efficient operation offers a financial payback that makes them very attractive to use. And they give a quality of light that customers find attractive, as well. We show our customers the energy savings story on operating displays right where they shop for light bulbs. The special labeling and new displays help Edison's customers identify the compact fluorescent bulbs that provide the high quality, energy-efficient lighting," said Bill Grimm, Edison program manager. "A customer using just two of these new style bulbs for just two to three hours per day for a year, can see a savings of from about $10 to just under $20 that year, compared to the cost of operating two standard bulbs with the same amount of light for the same amount of time. Those using more bulbs longer hours would see a greater savings," Grimm added.

3

Retail Lighting Market: *The Setting*

3.1 Introduction

This chapter contains information to characterize the retail lighting market. Data were collected during visits to retail stores as part of a series of inspections during the LightSaver Program period (December, 1996 through the first quarter of 1997) and for the post program period, 1997 and 1998. These retail site inspections were designed to observe stocking and point of purchase practices both during and after the implementation of LightSaver program.

3.2 Methods

Our research strategy was to select a sample retail outlets that included both LightSaver participant and non-participant retailers of retail residential lighting products. DSRA inspectors visited these sites to record observations about stocking and display practices. In addition, we collected advertising materials used by these retailers to document advertising practices for residential lighting products.

3.2.1 Sample Design and Disposition

The goals for this project's store sample design were two fold. First, we choose a sample of retail locations to use to follow the LightSaver program product stock flow through retail outlets. For this purpose, we identified various locations of the large program participant retailers and planned several visits during the first quarter of 1997 when program product was released in stores. During this same time period, inspectors visited a sample of non-participant retailers as well as chain outlets of participant retailers in non-Edison Service Territories. Figure 3-1 shows the structure of this sample and indicates that our design involved visiting retail establishments that were program participants that had locations within and outside of Southern California Edison's service territory. At the same time, inspectors visited a sample of similar non-participant retail outlets, both in and outside of Edison's territory.

Figure 3-1 Retail Sites Inspected by Participation Status and Service Territory

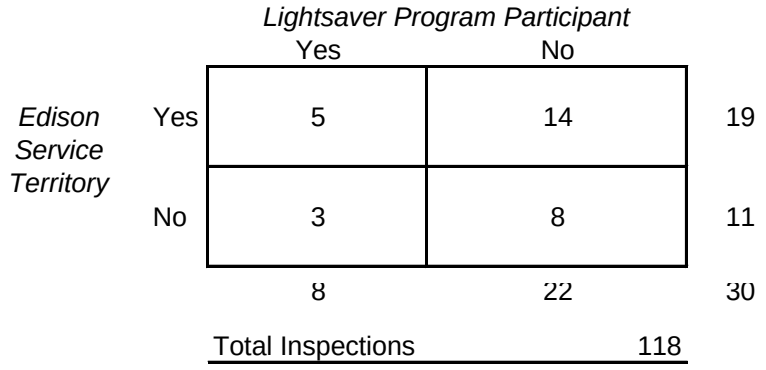


Figure 3-1 shows the structure of the sample chosen for our work. Note that 30 different retail locations were chosen and a total of 118 visits were completed. From early 1997 through May 1998, twenty-nine locations were visited a total of four times and one only twice during the study period. The comparisons of the product and marketing practice seen in these stores at the beginning and end of this time period, represent the interval for describing change among those locations.

Figure 3-2 shows the names of the particular stores and chains that were used to fill the cells of our retail typology. Note that we have identified seven types of retail outlets where residential lighting products are sold. These consists of convenience stores, groceries, drug stores, discount department stores, hardware stores, home building supply stores, and lighting specialty shops.

Figure 3-2 Types of Retail Stores Inspected

Type of Store	Store Names
Convenience Stores	Seven-Eleven, Circle K
Grocery	Vons, Pavilions, Hughes, Albertsons
Drug Chain	Thrifty, Payless, Savon
Discount	Fedco, Target, Walmart
Hardware	True Value, Virgils, McVeys
Home Building Supply	Home Depot, Home Base, Orchard Hardware Supply
Lighting Specialty	Lamps Plus, Carriage House, Modern Lighting

3.2.2 Data Collection

During the course of this study, DSRA inspectors were sent to the chosen retail locations. Initial visits to retail sites identified several problems. First, in home building supply and hardware stores, Inspectors introduced themselves to store or department managers. On several occasions, access to conduct the inspections was denied. Store managers indicated that they would require the permission of their corporate headquarters for researchers to conduct full and detailed studies of their products. Based on this experience, we developed a measurement strategy that could be implemented by inspectors posing as shoppers, similar to other shopper strategies for studying retail locations. From this point on, DSRA's inspectors used tape recorders and small notepads on their store visits to estimate the size of vertical shelf displays and to keep notes about types of products, quantities and prices observed. In most cases, inspectors could use the one foot linoleum tiles to measure the length of shelf displays. These data are summarized later in this chapter. We also found that limited photography was possible if done carefully, without flash. Using this method, it was possible to picture important aspects of retail store displays. DSRA inspectors also purchased a program and non-program product at various locations to obtain examples to be archived for comparison with other products, features and prices.

Additionally, our retail inspectors were instructed to note the presence or absence of Compact Fluorescent technologies and whether or not these products were identified as part of energy efficient lighting or whether they were marked with promotional stickers, rebates or other information that would indicate they were part of utility company-sponsored products. The final task was to identify the variety of Compact Fluorescent products available at our sampled retailers during this interval. The purpose of this goal was to see if that during the study period, the characteristics of a number of different products changed in a significant way. We also anticipate, as with all the findings of this study, that these observations will be compared to similar observations to be conducted perhaps two or five years from this date so that today's observations can be used as a benchmark for measuring change in a maturing market for energy efficient lighting products.

3.3 Lighting Product Inventory

Incandescent bulbs were sold at all of the sites that were visited. The most common types of bulbs found ranged from 60 watts to 100 watts. However, 40 watt incandescent bulbs were found at all but convenience and some drug stores. Various other types of incandescent bulbs were widely available as well. These included nightlight fixtures and replacement bulbs, candle bulbs, and pharmacy bulbs. Halogen outdoor floodlights and fluorescent tubes are also widely available. Findings about the types of products sold by retail outlets are summarized in Figure 3-3.

Figure 3-3 Retail Outlets for Residential Lighting Products

Type of Store	Products Sold
Convenience Stores	Limited supply of household replacement lighting including 60w -150w incandescents.
Grocery	Good supply of household replacement lighting products including 60w-100w Incandescent, bug lights, nightlights, fluorescent tubes, specialty candle bulbs, spotlights. One chain (Albertsons) stocks GE CFLs during 1st quarter 1998.
Drug Chain	Limited supply of household replacement lighting products including 60w-100w incandescents, bug lights, nightlights and holiday lights. One chain (Thrifty Drug) stocks GE and LOA CFLs during 1st quarter 1998.
Discount	Good variety of lighting products, but limited inventory of each product type, products include lighting fixtures, incandescents, halogen fixtures and bulbs, low voltage outdoor (flood and landscape), candle bulbs and CFLs.
Hardware	Fixtures, incandescents bulbs, fluorescent bulbs, CFLs, halogen fixtures and bulbs, floods, low voltage outdoor, various electrical supplies; switches, dimmers, timers, and wiring.
Home Building Supply	Extensive supply of lighting products, including fixtures, incandescents bulbs, halogen fixtures and bulbs, low voltage landscape lighting, outdoor floods and porch lights, candle bulbs and CFLs. Also sold is a wide variety of electrical supplies, controls, switches, dimmers, timers, and wiring. Home building stores offer both a large selection and a variety of all types of lighting.
Lighting Specialty	Fixtures include ceiling, table, desk and floor and outdoor spot lights. Incandescent, fluorescent and halogen bulbs are stocked as replacement bulbs for the fixtures sold. Program product and non-program CFLs were found at a participating chain (Lamps Plus). These stores offer a large supply of fixtures, but a limited supply of replacement bulbs. Specialty lighting stores offer to order all types of products from catalogs.

Figure 3-3 demonstrates that home building supply stores provide the greatest variety of lighting products. While discount chains offer a good variety of lighting products, they only have a limited quantity of compact fluorescents. Incandescent bulbs only were found in limited quantity at convenience stores. At grocery and drug chain stores, the availability of compact fluorescent product was observed only during the most recent site visits (2nd quarter 1998), During these visits, inspectors observed compact fluorescents at Albertsons and Thrifty Drug.

3.4 Shelving Display Practice

Shelving display practices vary across different types of stores. We observed lighting products shelved by product type in some locations, while other stores shelved products by manufacturers. Figure 3-4 describes the type of displays that were observed at the sites that were visited during the survey year.

Figure 3-4 Shelving Display Summary

Type of Store	Shelving and Point of Purchase Displays
Convenience	Center store horizontal shelving.
Grocery	End-cap or aisle-end section, center horizontal shelving, hanging card displays.
Drug Chain	Center store horizontal shelving.
Discount	Center store horizontal shelving, end-caps, hanging card displays and aisle displays.
Hardware	Hanging-card displays and horizontal shelving.
Home Building Supply	Horizontal shelving, pallets, open cartons,handing card display, center aisle displays, cash register adjacent displays.
Lighting Specialty	Bulbs, tubes displayed behind the register.

As can be observed, all type of stores in the sample, with the exception of lighting specialty stores, have shopper-accessible, center-aisle horizontal shelving. These displays usually contain both hanging cards and stacked bulbs. End-cap displays were observed in grocery and home building supply stores. Specialty lighting stores generally display bulbs and tubes near the register and customers must usually ask store personnel for bulb products.

Figure 3-5 Horizontal Shelving Display

Figure 3-5, pictures the type of horizontal shelving that was observed at grocery, discount and drug chain stores. This actual display was observed in a grocery store and contained only incandescent bulbs.

Figure 3-6 Aisle End Cap Display

Figure 3-6 provides a view of a typical end-cap aisle display. These displays were observed in grocery stores and home building supply stores during the study time period. As can be seen, a wide variety of incandescent light bulbs are included in this display. The lighting

products include appliance bulbs, tube type bulbs, candle bulbs and a range of typical incandescent bulbs from 40 watts to 200 watts, 3-way incandescent bulbs and spotlights. Typically, all of the lighting products on an end-cap display are produced by a single manufacturer.

Figure 3-7 Mid-Aisle Pallet Display

Home building supply stores are unique with regard to using pallets as displays for lighting products. Based on their mid-aisle positioning, these displays communicate that the sale of these products is both special and temporary. Since pallet displays are physically in the path of shoppers, they provide high visibility for both products and point-of-purchase signs as shown in Figure 3-7.

Hanging-card packaging as shown in Figure 3-8 provides space for the manufacturer to put descriptive material such as comparisons of compact fluorescents and incandescent bulbs and the energy saving benefits of the product. This type of display is an instant source of education for consumers and helps them make informed choices when they are selecting lighting.

Figure 3-8 Hanging Card Package Display

Figure 3-8 shows an example of hanging-card display used by Lights of America for post LightSaver program products. In the upper right hand corner of this display, the manufacturer indicates that this product is electronic. In the lower left hand corner, there is an incandescent versus compact fluorescent equation in pictorial form that indicates that a compact fluorescent lasts eleven times longer than incandescent bulbs. The backs of these cards provide more product description than was the case in previous years to describe the longevity and energy efficiency of these products.

3.5 Advertising Material Review

Figure 3-9 provides an inventory of lighting advertisements from store flyers that were mailed to "resident". As you can observe, the majority of lighting product advertising found in flyers was from either hardware or home building supply stores. From our review of this material, we observed that only one advertisement for compact fluorescents was placed during the observation time period. This particular ad was for program bulbs sold at a discount chain.

Figure 3-9 Advertising Practice Summary

Type of Store	Advertising Practice
Convenience	None
Grocery	Occasional incandescent ads.
Drug Chain	Seasonal outdoor and holiday lighting, occasional incandescent bulb ads.
Discount	Occasional ads for incandescent bulbs, holiday and seasonal lighting. One-time ad for CFL program product.
Hardware	Seasonal outdoor and holiday lighting, occasional incandescent and fluorescent bulb ads.
Home Building Supply	Monthly advertising for a variety of lighting products. Expanded advertisements for outdoor lighting in the spring and summer.
Lighting Specialty	Occasional incandescent ads.

Much of the lighting that was advertised in flyers was for outdoor or landscape lighting. We did note that incandescent bulbs were advertised in flyers from most stores throughout the year. Seasonal or holiday lighting advertisements were also observed in flyers from drug, discount and home supply stores. Other seasonal effects include increased advertising for low voltage outdoor lighting and patio bug lights during spring and summer months.

Figure 3-10 Example April 1997 Store Mailer Advertisement

Figure 3-10 provides an example of an advertisement that was printed in a discount store catalog during April 1997. As can be observed, the advertisement makes a wattage comparison between incandescent bulbs and the advertised compact fluorescent bulbs, and indicates the cost effectiveness of these compact fluorescents. We note that although this ad appeared at the end of the active program period, it made no mention of the LightSaver program or products being sold as part of a utility company promotion. This may have been due to the fact that only some this retailer's locations are within Edison's service territory.

3.6 Summary of Retail Site Observations

The following sections provide additional detail about retail store inspections. Here the focus is on home building, discount and grocery retailers. Our inspectors also visited convenience and drug chains stores. During the study period, we found that lighting products sold at these stores were limited in scope to the most commonly used incandescent bulbs and some seasonal lighting.

3.6.1 Home Building Supply and Discount Stores

Of the stores that were visited, our inspectors observed that stores varied widely with regard to type of display and product stocked. This observation was noted in stores within the same chain as well as in stores of different chains. One participant chain had the most discernable difference between stores. Although program product was carried at all of the sites visited, the amount and type of product carried varied widely. While some stores had the lighting shelves consistently neat and well stocked, other stores in the same chain had limited stock displayed in a confusing way. We learned that the variations observed

between these stores was attributable to the individual store manager and/or lighting manager. For customers who knew which type of bulbs they needed, disorganized displays might not pose a problem. However, this type of display might tend to create a barrier for individuals who were uncertain about the type of lighting product that best met their needs.

In one instance, a participant store did not stock the advertised Program product in a section of the store devoted to lighting but rather in the hardware and automotive department. When interviewed about the position of the LightSaver Program display, the manager stated that manufacturers of non-program bulbs objected to discounted bulbs next to their products. Consequently, customers who were shopping for replacement bulbs in the lighting section would not have seen the display. Only those customers who had seen the advertisement or who had come across the display would have been exposed to the Program products.

3.6.2 Grocery Stores

Our inspectors observed similar shelf displays for incandescent light bulbs in all of the grocery stores in the study. Lighting products were found in the aisle that contained other household products. The lighting stock consisted of appliance, sconce and chandelier bulb, bug and flood lights, as well as regular incandescent bulbs and fluorescent tubes. The size of these displays ranged from 4 feet to 10 feet of horizontal full-height shelf space.

Periodically, lighting products are displayed on aisle end caps. Store managers reported that manufacturers pay for the space for a specified periods of time. These time periods generally coincided with the manufacturers' discount promotions. No compact fluorescents were observed in any grocery store in the sample during the LightSaver program period in 1997. One grocery store was observed to stock GE compact fluorescents in 1998. It is clear from our observations that for compact fluorescents to be sold in grocery stores in the future would represent a significant market change.

3.7 Observed Change during the Study Period

Our observations about the sale of compact fluorescent products over the study period of 1997 and early 1998 indicate that the proportion of all lighting shelf space in home supply stores allocated to compact fluorescent bulbs is increasing. Comparing the same stores a year later, we found that the total amount of shelf space allocated to residential lighting products had often increased. Additionally, the total amount of shelf space allocated to compact fluorescent products has increased although additional new *products (halogen, mercury vapor and lighting fixtures*) accounted for the overall increase. While the space for compact fluorescent products may not have changed significantly in some stores,

nevertheless the variety of different compact fluorescent products for sale in the market has increased tremendously. These include new sizes and shapes, features and wattage. Examples include compact fluorescent spotlights, dimmable and 3-way bulbs. In addition, lighting manufacturers have designed fixtures and diffusers for compact fluorescents to be used in new indoor and outdoor applications.

A significant finding over this study period is that the packaging of energy efficient products became much more descriptive. In previous years' observations of retail settings, we found that the packaging for compact fluorescents mirrored the box-shaped packages similar to those that contained incandescent bulbs. In the two study years, manufacturers began providing their compact fluorescent products in hanging card packages. These cards tend to occupy up to three times the shelf space of the previous type of packaging however they contain information significant information about the energy efficiency characteristics of these products.

Figure 3-11 below provides a comparison of total retail space allocated to a replacement bulbs during the observation periods January 1997 and May 1998. In addition, this table indicates if changes were observed in the stocking of compact fluorescent bulbs during those time periods.

Figure 3-11 Detailed Retail Observations

	Total Retail Space Allocated to Lighting Products			Compact Fluorescent Products Sold		
	Observation Period		Change in Space	Observation Period		Product and Marketing
	Jan-97	May-98	Observed	Jan-97	May-98	Changes Observed
Convenience Stores						
Seven-Eleven	2' wide by 1' wide	2' wide by 1' high	none	none	none	none
Circle K	2' wide by 1' high	2' wide by 1' high	none	none	none	none
Grocery						
Hughes	7' wide by 6' high	7' wide by 6' high	unchanged	none	none	GE Miser Halogen and Incandescents
Albertson	8' wide by 6' high	8' wide by 6' high	unchanged	none	GE 15,20 and 25 watt Ultra CFLs ($19.99)	CFLs now being displayed
Vons	10' wide by 6' high	10' wide by 6' high	Permanent space allocation unchanged. Occasional end caps	none	none	GE Misers Halogen and Incandescents
Pavilions	4' wide by 6' high	4' wide by 6' high	unchanged	none	none	No fluorescents at all
Drug Chain						
Thrifty Drugs	11' wide by 6' high	11' wide by 6' high, additional area 2' high by 4' wide	deeper stock to accommodate increased variety of products	none	LOA circle lites magnetic and electronic $9.99 to 19:99 and GE Ultra 15 and 20 $22.99	Increased variety of products, both LOA and GE CFLs
Payless	4' wide by 6' high	4' wide by 6' high	unchanged	none	none	No fluorescents at all
Savon	16' wide by 6' high	20' wide by 6' high	expanded by 25%	none	LOA 22 watt circle line and 15 watt u-tube tube CFL	An additional type of CFL
Longs Drugs	14' wide by 6' high	14' wide by 6' high	unchanged	none	none	Great variety of incandescent bulbs, GE and Longs Brand
Discount						
Fedco	16' wide by 6' high plus 2" by 3' aisle display	37' wide by 6' high	removed program product display space	LOA program product	GE Energy Choice	Larger lighting display entirely GE
Walmart	12' by 6'	12' by 6'	unchanged	none	GE LOA and Phillips CFLs	Limited stocking of CFLs
Target	6' wide by 6' high	26' wide by 6' high	400% increase	LOA circle line	GE 15 watt tri-tube, 28 watt quad	Greater variety of Incandescents and halogens mostly GE products

Figure 3-11 Detailed Retail Observations (continued)

	Total Retail Space Allocated to Lighting Products			Compact Fluorescent Products Sold		
	Observation Period		Change in Space	Observation Period		Product and Marketing
	Jan-97	May-98	Observed	Jan-97	May-98	Changes Observed
Hardware						
True Value (South Pasadena)	26' wide by 5' high	26' wide by 5' high	unchanged	none	CFL night lights	Store clerks didn't know CFLs
Virgils Hardware (Glendale)	31' wide by 6' high plus 5' wide by 6' endcap	31' wide by 6' high	less space given no special sale end cap	Abco CFL tubes and ballasts	GE 15 watt and 28 watt quads	Addition of electronic and one piece products
True Value (Pasadena)	2 20' wide by 8' high displays	2 20' wide by 8' high displays	unchanged	LOA circle line and u-tubes, Abco replacement tubes	Full range of LOA products, Abco tubes and ballasts	Increased variety of CFL products
Mc Veys (Temple City)	16' wide by 6' high	16' wide by 6' high	unchanged	13 watt Feit	Feit Econobulb and magnetic ballasts	Very little CFL demand
Home Building Supply						
Home Depot (Monrovia)	54' wide by 15' high	108' wide by 15' high plus pallet displays	100 % increase given new store location	LOA program and non-program product, Phillips CFLs	Greatly increased variety of LOA, Phillips, Feit and Abco CFL products	Increased use of aisle display and demonstrations products stocked with fixtures, register adjacent pallet displays, CFL Fixtures
Home Depot (Glendale)	54' wide by 15' high	90' wide by 15' high	near 100% increase	Non-program product only	Greatly increased variety of LOA, Phillips, Feit and Abco CFL products	Increased use of aisle display and demonstrations products stocked with fixtures, register adjacent pallet displays
Home Depot (Rancho Mirage)	90' wide by 15' high	90' wide by 15' high	unchanged	LOA program and non-program product, Phillips CFLs	Greatly increased variety of LOA, Phillips, Feit and Abco CFL products	Increased use of aisle display and demonstrations products stocked with fixtures and register adjacent pallet displays
Home Base (El Monte)	72' wide by 15' high	72' wide by 15' high	unchanged	LOA program and non-program product, Phillips CFLs	More product variety and manufactureres.	Increase variety of lighting total store re-design old products on shelf
Home Base (Glendora)	72' wide by 15' high	81' wide by 15' high plus 8' by 8' end cap	increased	LOA program and non-program products	More product variety and manufacturers and 1996 Program product present.	Increase variety of lighting total store re-design old products on shelf
Orchard (South Pasadena)	34 wide by 6' high	40' wide by 6' high	18% increase	LOA circle lite and u-tubes	Increased variety of LOA products	Increase in CFL replacement bulbs and indoor and outdoor CFL fixtures
Lighting Specialty						
Lamps Plus (LA County)	15' wide by 5' high	30' wide by 5' high	100% increase (bulb products only)	LOA program product	LOA program product and Feit	Program product returned to display after being absent for a year.
Lamps Plus (Glendale)	15' high by 5' wide	30' wide by 5' high	100% increase (bulb products only)	none	3' by 5' of CFLs Sylvania and Feit	New displays by register counter
Carriage House	8' wide by 5' high	8' wide by 5' high	unchanged	none	18 watt Feit	By catalog order
Modern Lighting	none displayed	none displayed	unchanged	none	none	By catalog order

During this study period (1997-1998), we also observed that point of purchase displays appeared for this class of energy efficient product. As previously mentioned, Edison's LightSaver program encouraged the development of point-of-purchase displays that included shelf cards and magnet signs as well as button activated voice descriptions of the energy efficiency of these products. We noticed during this same period that other manufacturers also supplied point-of-purchase displays to retailers in home supply stores. One major retailer, Home Depot, also posted a comparison chart to assist their shoppers making decisions among different types of lighting products. This display showed the longevity, light output and wattage for products shelved below it. Recently in 1998, some retailers have placed additional demonstrations and point of purchase materials to help promote compact fluorescents. These include thermometers to demonstrate that compact fluorescents produce less heat.

Figure 3-12 Marketing Changes Observed

Type of Store	Changes Observed 1997 - 1998
Convenience	None
Grocery	Expanded specialty displays and occasional end-cap displays.
Drug Chain	None
Discount	Increased variety of CFLs.
Hardware	None
Home Building Supply	Expanded CFL displays, both on shelves, aisle displays and point of purchase displays.
Lighting Specialty	None

During the study period, the inventory of compact fluorescents increased in discount chains, hardware stores and building supply store. This is true of the variety and quantity of bulbs and compact fluorescent fixtures. The expanding fixture market should have an effect on the overall sales of compact fluorescents in the future.

We observed that energy efficient lighting products were identified for special promotions and sales even if these products were not part of the utility company or state-sponsored project. Figure 3-12 notes that in-aisle displays were observed in January 1998, well beyond the time that the 1996 LightSaver program product was available in these retail outlets. At the same time, we also observed that several manufacturers products were sold in locations in home stores that were adjacent to cash registers. These were accompanied by special signs that made reference to both the discounts and the energy use characteristics of these products.

3.8 Discussion

We consider the results of these retail site studies to be important for judging the extent to which retail supply and product presentation change over time. For example, we have observed that supermarkets and convenience stores stock common household lighting products, which consist mostly incandescent and specialty (*e.g. candle*) bulbs. Fixtures and energy efficient lighting products including high quality compact fluorescents are sold in different types of outlets, particularly hardware and building supply or home improvement stores. Discount, club and warehouse stores stock and sell a mixture of products; some low priced incandescent bulbs (*often in volume*) and some energy efficient compact fluorescents and fixture lighting. As evidence that the market is being transformed, we would expect that high quality compact fluorescents will expand into new retail niches. So, we may see sales of these products move into more grocery stores and convenience outlets and assume shelf space now occupied by conventional lighting types. Similarly, we would expect to see shifts in retail point-of-purchase displays and retail advertising from conventional lighting to focus on high quality compact fluorescents or other new types of lighting.

4

Retail Lighting Market: *The Customers*

4.1 Introduction

This chapter contains a summary of findings from the two telephone surveys used to measure consumer knowledge, attitudes and practices with regard to residential lighting technologies. The purpose of both of these studies was to establish a knowledge base of information about retail lighting product consumers in the study period 1997 and 1998, so that we could document present-day residential lighting consumer characteristics for later comparison to future consumers. Throughout this discussion, we refer to two surveys, (1) the Participant Survey, a follow-up based on the receipt of response postcards submitted by consumers of Lightsaver program products and (2) the Baseline Survey, a random digit dial survey of Southern California households.

4.2 Survey Samples and Dispositions

As previously mentioned, customer opinion, knowledge, attitude, and practice were measured by two different surveys: a participant survey, the sample for which was generated by the use of follow-up response postcards and a baseline market research survey that used a random digit dial sample of Southern California households. Both surveys were implemented as Computer Aided Telephone Interviews (CATI) using Decision Sciences' Pasadena California outbound telephone survey facility.

4.2.1 Participants Survey

The sample used for the LightSaver participants follow-up survey was generated from postcards returned by consumers who purchased 1996 program products (*see example postcard in Chapter Two*). These postcards were returned to the manufacturer who in turn provided them to Edison program managers for this research. Once these were key entered, a sample of records with names and phone numbers were provided to Decision Sciences for the LightSaver participants follow-up survey. By using this method, we do not know the extent to which the sample provided represents an unbiased subset all LightSaver products consumers. Only a small proportion of postcards (*perhaps less than 10 percent*) may have been returned, and on these returned cards, consumers often failed to specify their phone numbers or names and addresses in sufficient detail for telephone

number look-ups to be successful. Nevertheless, given the structure of the LightSaver program, this data source was the only one available to contact residential users of program products.

Table 4-1 shows sample accounting detail for the Lightsaver Program participant sample. The participant sample consisted of 1,022 postcards for which telephone numbers could be obtained. Only 25 sample members were not called before the response quota of 500 was achieved. Other calls resulted in phone problems or reaching answering machines. Among those contacted, additional wrong phone numbers were identified because, for the participant survey, we asked for particular people. Only 67 sample members refused to participate in this survey. Another 76 asked that they be called back at a more convenient date or time for the interview. Some household members reported that the particular subject would be gone during the interview period, or the household reached had no one by that name. In all 521 valid surveys were conducted. Five responses were eliminated as invalid and eight others were used as pretests and were also eliminated from the analysis.

Table 4-1 Lightsaver Program Participants Sample Accounting Detail

Total Participants Postcard Sample	1,022	
Not Contacted		
Not called	25	
Not In service	49	
No answer	76	
Answering machine	140	
Busy	6	
Other phone problems	1	
Total Non-Contact	297	29.1% of sample
Contacted, Non-Response		
Wrong Number	26	
Refusal	67	
Call Back Requests	76	
Language Problem	9	
Ill or Infirm	2	
Gone for duration of study	11	
Responses		
Pretest	8	
Invalid	5	
Valid Responses	521	
Total Response	534	73.7% of contacts
Total Contacts	725	72.7% of attempts

Table 4-2 summarizes the telephone effort required to collect responses from LightSaver program participants. In total, 997 sample members were called at least once. A total of 2,535 calls were made to these numbers. Table 4-2 shows that 2.5 calls were dialed to each number attempted and almost 5 calls were required to obtain a valid response. This experience is typical for survey calls made to a name and address list of residential households.

Table 4-2 Lightsaver Program Participants Sample Telephone Call Summary

Total	
Sample member attempts	997
Total phone calls	2,535
Calls per...	
Attempt	2.5
Valid Response	4.9

4.2.2 Random Digit Dial Baseline Survey

Table 4-3 shows the distribution of random digit dial telephone numbers and responses to the Baseline Survey. For this survey Decision Sciences purchased a sample of 5,000 residential telephone numbers from a national survey sample provider. These numbers were then cleaned of disconnected numbers and business numbers resulting in a total of 4,312 likely residential phone numbers.

Table 4-3 Geographic Distribution of Sample and Response

	1995 Population		*RDD Sample*		*Response*	
County	*Count*	*Percent*	*Count*	*Percent*	*Count*	*Percent*
Kern	617,528	4%	161	4%	30	6%
Los Angeles	9,138,789	57%	2,474	57%	280	54%
Orange	2,563,971	16%	716	17%	73	14%
Riverside	1,379,801	9%	380	9%	37	7%
San Bernardino	1,569,586	10%	397	9%	66	13%
Ventura	710,018	4%	184	4%	29	6%
Total	15,979,693		4,312		515	

Samples of this sort are drawn from lists of active telephone numbers. Using such lists provides an efficient way to reach residential households without calling businesses and unassigned telephone numbers. Table 4-3 shows that residential numbers in our sample of

4,312 came from six Southern California counties served, at least in part, by Southern California Edison.

The goal in choosing this sample was not to call Edison's residential customers, but rather to call a wider sample of residential households in the Southern California market area. Note that the distribution of numbers is approximately proportional to the populations of these counties, although it should be noted that differential telephone listing rates may have some effect with studies of this sort. Table 4-3 shows that the responses were similarly distributed to the samples selected. For example, 54 percent of our responses came from Los Angeles county, which represents 57 percent of the sample. In general, the proportion of responses track the sample and population of these counties as well.

Table 4-4 Baseline Random Digit Dial Sample Accounting Detail

Total RDD Sample	4,312	
Not Contacted		
Not called	729	
Not In service	534	
No answer	480	
Answering machine	452	
Busy	40	
Other phone problems	17	
Total Non-Contact	2,252	52.2% of sample
Contacted, Non-Response		
Refusal	1,078	
Call Back Requests	360	
Language Problem	51	
Ill or Infirm	10	
Gone for duration of study	5	
Responses		
Pretest	15	
Invalid	26	
Valid Responses	515	
Total Response	556	27.0% of contacts
Total Contacts	2,060	57.5% of attempts

Table 4-4 shows the detail distribution of these telephone calls. We began with a random digit dial sample of 4,312 telephone numbers. From this sample, we contacted a total of 2,060 households, the balance are accounted for by numbers not called, not answered, not-in-service or by answering machine contacts. From the calls that resulted in a personal

contact, the greatest number resulted in refusals, over 50 percent. The next largest number included requests for callbacks. We consider that both of these dispositions were indications from our sample members that they did not want to participate in this survey.

These rates were higher than we would normally expect for random digit dialed telephone surveys. Part of the reason for this observation has to do with the fact that the survey was introduced with language that it was being conducted for the "State of California and the Electric Utilities that it regulates." A number of sample members expressed cynicism about whether or not we were selling something. Many of them also mentioned deregulation and their concern that now they will be receiving annoying telephone calls for electric service from electricity marketers the way they were used to receiving phone calls for long distance telephone service providers.

The bottom panel of Table 4-4 shows that in total, we interviewed 556 respondents, which represents 27 percent of those contacted. Of this number we considered 515 to be valid responses. Fifteen cases were used for pretests while language and question wording was in development. The results from these responses were discarded for analysis. An additional 26 responses consisted of “break-off” cases when respondents stopped answering before the end of the survey. Several cases were also eliminated for respondents who seem not to understand or take the process seriously enough to trust their answers.

Table 4-5 Random Digit Dial Baseline Sample Telephone Call Summary

Total	
Sample member attempts	3,583
Total phone calls	9,494
Calls per...	
Attempt	2.6
Valid Response	18.4

Table 4-5 summarizes the telephone effort associated with the Baseline random digit dial survey. Note that a total of 9,494 calls were placed to 3,583 sample members. The bottom two rows of Table 4-5 shows that on average, 2.6 telephone calls were placed to each number called at least once and over 18 outbound telephone calls were required for each valid response.

4.3 Experience with Common Residential Lighting Technologies

The research Baseline Survey asked a series of questions about common residential lighting technologies to learn about consumers' direct experience with a range of lighting technologies. These included:

- Fluorescent lighting
- Halogen lighting
- Skylights
- Specialized lighting controls
- Compact fluorescents

The following tables summarize respondents' answers to a series of questions about the type of lighting installed in their homes, whether they installed that lighting and if it does a good job. In Table 4-6, we note that 67 percent of residential respondents report that they have fluorescent lighting installed in their homes. Of these respondents, nearly 50 percent indicated that they purchased at least some of the fluorescent lighting currently in use.

Table 4-6 Experience with Fluorescent Lighting

Percent of Households with...	
Fluorescent Lighting Installed	67.4%
Of those with Fluorescent Lighting installed...	
purchased all of them	36.6%
purchased some of them	13.0%
and agree that...	
Fluorescent Lighting does a good job	94.5%
or they would prefer something else	4.9%

Ninety–four of these respondents indicate that fluorescent lighting does a good job. Only 5 percent of respondents report they would prefer some other type of lighting product in place of these fluorescent tubes.

Table 4-7 Experience with Halogen Lighting

Percent of Households with...	
Halogen Lighting Installed	36.5%
Of those with Halogen Lighting installed...	
purchased all of them	81.4%
purchased some of them	1.1%
and agree that...	
Halogen Lighting does a good job	93.6%
or they would prefer something else	5.3%

Table 4-7 presents customers' satisfaction with halogen lighting. This type of lighting is increasingly found in homes and for sale at retail outlets. Nearly 37 percent of the respondents indicated having some type of halogen bulbs or fixtures in their residence. Over 80 percent of the respondents indicated that they installed at least some of the halogen lighting. Nearly 94 percent of respondents reported that halogen lighting does a good job. Only 5.3 percent of the respondents indicated a preference for replacing halogen lamps currently in use with some other type of lighting.

Table 4-8 Experience with Skylights

Percent of Households with...	
Skylights Installed	13.6%
Of those with Skylights installed...	
purchased all of them	45.7%
purchased some of them	1.4%
and agree that...	
Skylights help save electricity	84.3%

In addition to questions about types of lighting installed, respondents were also asked about the installation of skylights in their home. This series of questions was included because skylights are a source daytime overhead illumination that does not involve the use of electricity. Table 4-8 indicates that 13.6 percent of respondents currently have skylights in their home. Of these, 84 percent agree that these skylights are beneficial because they help save electricity.

Table 4-9 Experience with Lighting Controls

Percent of Households with...	
Motion Detectors, timers, sensors	40.6%
Of those with Lighting Controls installed...	
purchased all of them	80.9%
purchased some of them	0.0%

Respondents were asked about their experience with lighting controls, that is, if they had timers, sensors or motion detectors in use in their homes. Table 4-9 indicates that 40 percent of respondents report having specialized lighting controls installed in their residences. Of these, more than 80 percent report that they purchased and installed these lighting controls rather than having inherited them from the previous occupants of their homes.

Table 4-10 Experience with Compact Fluorescents

Percent of Households with...	
Compact Fluorescents Installed	15.0%
Of those with Compact Fluorescents installed...	
purchased all of them	85.7%
purchased some of them	1.3%
and agree that...	
Compact Fluorescents do a good job	80.5%
or they would prefer something else	15.6%

Table 4-10 presents results to the questions about experience with compact fluorescent lighting. As can be observed, only 15 percent of the respondents from the Baseline survey indicated that they have compact fluorescents in use in their homes. Of those respondents, nearly 86 percent purchased all of their currently installed compact fluorescents and 80 percent of those respondents agree that compact fluorescents do a good job of providing appropriate light in their applications. This important finding indicates that although the penetration of compact fluorescent bulbs in residential locations is still small, when compact fluorescents are installed, use satisfaction results are positive.

4.4 Use Satisfaction with Compact Fluorescents

As previously noted, few consumers expressed dissatisfaction with compact fluorescents in use at their homes. We note in Table 4-11 that among Lightsaver Program participants, only about 5 percent would choose to replace an existing compact fluorescent with another type of lighting.

Table 4-11 Program Participants Dissatisfaction with compact fluorescents

Proportion of participants with CFLs in use who...	
will not replace at least one CFL	5.1%
Reasons...	
Bulb(s) not bright enough	46.2%
Bulb(s) too expensive	38.5%
Bulb(s) make noise	15.4%

Baseline Survey respondents were also prompted for their objections to these compact fluorescents they provided the reasons shown in Table 4-12.

Table 4-12 Baseline Survey Reasons Cited Disliking Compact Fluorescents

Bulb(s) not bright enough	58.3%
Bulb(s) not "instant on" or dimmable	20.8%
Bulb(s) too expensive	8.3%
Bulb(s) not attractive enough	4.2%
Bulb(s) not right for setting	4.2%
Bulb(s) flickers	4.2%
Bulb(s) do not fit light fixtures	4.2%

We did note that some of the respondents who reported that they would replace at least some compact fluorescents, also said that they would maintain compact fluorescents in use for other lighting applications at their residences.

4.5 Shopping For Residential Lighting Products

Our measures of the buying habits of residential consumers included asking about who shops for what types of products as well as several questions designed to find out whether the homeowner respondents are likely to install lighting products themselves or rely on electricians or contractors to do so.

The Baseline Survey began this line of questions by asking our respondents who in the household made the last purchase of lighting supplies or equipment.

Table 4-13 Household Member Who Made Last Lighting Purchase

Respondent	84.6%	308
Spouse	11.3%	41
Family/Household Member	4.1%	15

Table 4-13 presents the results of this question and indicates that our respondents themselves are the household members most likely to have made the last lighting purchase. This finding increased confidence in the use of telephone surveys for this type of research because we largely contacted respondents who were recent consumers of retail lighting products.

Table 4-14 Last Type of Lighting Purchased Lighting Purchased

Incandescent	78.7%
Lamps	9.8%
Fluorescent	4.9%
Light fixture	4.1%
Energy Efficient Lighting	2.2%
Other specialty	0.3%

As indicated by Table 4-14, 78 percent of the respondents indicated that their last lighting purchase was incandescent bulbs. Only just over 2 percent of respondents indicated that their last purchase was for some type of energy efficiency lighting product.

Table 4-15 Who Is Most Likely To Shop For Incandescent Bulbs

Female	53.8%
Male	40.2%
Other Family Member	5.7%
Non-Family Member	0.2%

To help understand segments of the retail lighting market, we asked respondents about which household member would be most likely to shop for different types of lighting products. Table 4-15 identifies the household member most likely to shop for regular incandescent lighting. As can be observed, nearly 54 percent of respondents indicated that the adult female members of households would be most likely to shop for incandescent bulbs as compared to 40 percent of adult male household members. Since these bulbs are found at grocery stores, this difference may be attributed to the fact the women purchase these bulbs while grocery shopping. Table 4-16 confirms these results with a question about where these shopping trips that include purchasing regular incandescent bulbs would occur.

Table 4-16 Where Do They Typically Shop For Incandescent Bulbs?

Grocery Stores	46.5%
Home Building Store	21.1%
Discount Store	18.3%
Local Hardware	4.6%
Large Discount	3.6%
Drug Stores	3.4%
Other	1.8%
Specialty lighting store	0.6%

As can be seen in Table 4-16, the grocery store is the place where the respondents would typically shop for incandescent bulbs. Here, 46.5 percent of respondents indicated that grocery stores are the place where they purchase incandescent bulbs.

Table 4-17 Who would most likely shop for specialized lighting products?

Female	48.4%
Male	45.5%
Other Family Member	5.9%
Non-Family Member	0.2%

Table 4-17 indicates that there is very little difference as far as gender is concerned when purchasing specialty lighting. Most respondents report that adult female household members would be likely to shop for specialized lighting products. Examples used for this question included specialty bulbs and table and floor lamps.

Table 4-18 Where would they shop for Specialized Lighting Products?

Home Building Store	63.1%
Discount Store	12.3%
Lighting Specialty Store	11.3%
Local Hardware	6.2%
Grocery Stores	3.6%
Large Discount or Club Store	2.5%
Drug Stores	0.6%
Other	0.4%

Table 4-18 provides a clear picture when it comes to shopping for specialty lighting. Over 63 percent of respondents indicated a home building supply store as their choice for specialty lighting shopping.

In order to determine how retail consumers approach buying wired-in fixtures, the Baseline survey asked whether homeowners would do it themselves or have a friends or contractors install new or replacement fixtures.

Table 4-19 Who would install wired-in lighting fixtures?

Install by self	43.6%
Have a friend do it	28.5%
Hire a contractor	27.9%

Table 4-19 shows that a majority of our survey respondents would propose to have someone else install wired in lighting fixtures. However, 43 percent did indicate that they would install this type of fixture themselves. Nearly 28 percent stated that they would chose an electrical contractor for the job. Table 4-20 shows that of those who would use a contractor for installation over two thirds would nevertheless shop for fixtures themselves.

Table 4-20 Method for Selecting New Wired-In Lighting

Shop for the fixture by yourself	69.3%
Have a contractor help	30.7%

4.6 Talking to store personnel and other sources of information

Since future energy efficiency lighting programs may choose to invest in training retail personnel, we were interested to ask whether consumers remember talking to sales staff when they purchased retail lighting products. A related question is whether or not consumers were encouraged to buy compact fluorescents or received information about their advantages. In short, whether store personnel make or could make a difference in consumers' decisionmaking.

Table 4-21 Remember Talking With Salesperson

Yes	13.7%
No	86.3%

We note less than 14 percent of respondents remember talking with salesperson about compact fluorescents. However, of those respondents who did speak with salespeople, 70 percent indicated that they were encouraged to buy the high-efficiency products because of information store personnel provided.

Table 4-22 Encouraged to Buy Efficient Lighting

Yes	70.0%
No	30.0%

To get another view consumers' reliance on face-to-face communications in retail setting, the Baseline Survey asked a general question about the influence of store personnel on purchase decisions. Results of this question are reported in Table 4-23.

Table 4-23 Amount of Influence of Salesperson

No influence	12.5%
Very little influence	25.0%
Some influence	50.0%
A great deal of influence	12.5%

Here, we see that among those respondents who indicated that they spoke to store personnel, most (87 percent) reported that salespeople had at least some influence on their purchase decisions.

Table 4-24 reports the results of asking consumers who had compact fluorescents in use if they could recall the reason they bought their first compact fluorescent bulb.

Table 4-24 Reason For Purchasing First Compact Fluorescent Bulb

To Save Electricity	75.0%
To Change Bulbs Less	10.0%
Because of a Rebate or Discount	8.3%
Some other Reason	6.7%

We were surprised to note in Table 4-24 that only 8.3 percent indicated that a rebate or utility discount made the purchase attractive. The more common answers were that they purchased these bulbs to save electricity, with 75 percent of the respondents indicating that response. Only 10 percent stated that their reason for purchasing compact fluorescents was to change the bulbs less often.

Comparing Lightsaver Program participants to a Baseline survey respondents who had compact fluorescents, in Table 4-25 we see that the most common locations for compact fluorescent bulbs are living rooms or family rooms, offices or dens and outside locations. We are not surprised to note that program participants report higher saturation than do other compact fluorescent owners, but we can see that the most common locations of use are the same.

Table 4-25 Where Compact Fluorescent Bulbs Are Used

	Participants	General Population
Outside	33.6%	16.2%
Living or Family Room	58.7%	22.7%
Office or Den	19.4%	8.4%
Dining or Breakfast Room	10.0%	5.8%
Kitchen	22.6%	5.2%
Bedroom	40.9%	19.5%
Bathroom	16.1%	7.1%
Garage, Shop or Basement	14.8%	8.4%
Hallways or Closets	18.2%	3.9%
Other	1.9%	2.6%

4.7 Products Advertisements and Information From Other Sources

To understand the sources of information that bring lighting product and energy efficiency knowledge to consumers, our Baseline survey asked a number of questions about sources of their information.

Table 4-26 Where Lighting Advertising or Information Was Recalled

	Pct
Radio, TV (Ads or Home Shows)	33.5%
Newspaper	28.1%
Store Flyers or Catalogs	19.4%
Magazine and Other Print Media	8.2%
Point of Purchase Displays	7.0%
Utility Company Bill Inserts	2.2%
Some other source or person	1.6%

Table 4-26 presents these sources of information in response to a question about where respondents recall seeing lighting advertising. Radio and television advertising was most frequently mentioned, followed by newspaper ads and store flyers. Table 4-27 presents the results of a question that asked where respondents remember hearing or seeing advertising or other information about compact fluorescents specifically.

Table 4-27 Where Compact Fluorescent Advertising Or Information Was Recalled

Store Flyers or Catalogs	38.2%
Newspaper	18.2%
Point of Purchase Displays	16.4%
Radio, TV (Ads or Home Shows)	14.5%
Magazine and Other Print Media	9.1%
Friend or relative	3.6%

As can be observed from Table 4-27, 38 percent of respondents indicated that they had seen information about compact fluorescents from store flyers or catalogs, while newspapers and point of purchase displays were mention by 18 percent and 16 percent of respondents, respectively.

Table 4-28 Where Compact Fluorescents Were Seen In Use

	Have CFBs	Don't Have CFBs
Family member or others homes	52.1%	39.6%
Workplace	20.8%	22.6%
Store that sell lighting products	14.6%	11.3%
Other store or office	6.3%	17.0%
Other location	4.2%	7.5%
Church, school or public building	2.1%	1.9%

Table 4-28 shows another source of knowledge about compact fluorescents. Here we compared Baseline Survey responses for those who have CFLs with those who do not have CFLs with respect to where they have seen compact fluorescents in use. Most frequently cited places where compact fluorescents are used are at family members or friends' homes. The workplace compact fluorescents were the next most frequently mentioned.

Respondents told us that they recognize these products because they are unusual looking light bulbs. We wonder about the process of making energy efficient light bulbs look more and more like lighting products that are not energy efficient. The very different look of compact fluorescents may cause people to question others about them and learn about energy efficient lighting technology. On the other hand, if compact fluorescents become indistinguishable from less efficient lighting technologies, the performance uncertainty associated with CFLs would likely decrease.

4.8 A Baseline Test Of Knowledge About Energy Efficiency Issues

An important part of the Baseline survey was to administer a generalized test of energy efficiency knowledge to a randomly selected sample of respondents. For this purpose, we designed a number of questions to be administered near the end of the survey to test respondents' general knowledge about energy efficiency issues. The strategy for doing this is based on our interest in using these data as a baseline against which future studies may measure increase in knowledge about these issues.

4.8.1 Residential Electric Use

The first item asked respondents which component of the average Southern California home used the most electricity. Respondents were provided with a list of five items and asked to choose the first one. After choosing which end-use used the most electricity, we asked them to rank the next two end uses. These items as shown in Table 4-29.

Table 4-29 What uses the most electricity in the average Southern California home?

	Rank	
Heating and cooling	1	← **Correct**
Refrigerators and freezers	2	
Cooking and washing	3	
Electronics - TVs, Computers	4	
Lighting	5	
Won't Guess	2.9%	

We observe that our respondents indicated that heating and cooling would use the most electricity in an average Southern California home followed by refrigerator/freezers, cooking and washing, electronic components, televisions and computers and finally by lighting. Only 3 percent refused to guess at this particular item. Since lighting is on average the greatest use of electricity, these results indicate that most respondents underestimate the amount of electricity used for lighting in the average home.

4.8.2 The cost of electricity

The next question in this series asked how much a kilowatt hour costs. Table 4-30 we observe that a very large proportion of respondents stated up-front that they didn't know the cost of a kilowatt hour. Nearly 72 percent of respondents refused to guess what a kilowatt hour costs. Of the remaining respondents 83 percent the answers were reasonably accurate.

Table 4-30 How much does a kilowatt hour cost?

5 cents	8.1%	
10 cents	48.5%	← **Correct**
15 cents	34.6%	
20 cents or more	8.8%	
Don't know	71.7%	

Most of our respondents guessed about ten cents or between ten and fifteen cents. These answers accurately bracket the average kilowatt hour cost for Southern California home owners. This item allows us to learn more by respondent refusal to answer than from the answer itself. Again, considering the fact that this set of survey questions will be used as a baseline against which to measure change via some future survey effort, we would expect that if the knowledge of electrical efficiency issues increases the proportion of respondents who will venture a guess about the cost of a kilowatt hour should increase over time.

4.8.3 The cost of residential lighting

Table 4-31 How much of the average residential electric bill goes for lighting?

5 percent	5.7%	
10 percent	19.2%	
20 percent	31.8%	
30 percent	34.1%	← **Correct**
50 percent or more	9.2%	
Don't know	32.2%	

Table 4-31 shows respondents answers to a question about what percentage of the average residential electric bill goes for lighting. Here we can see that the most common answer was about 30 percent with about a third of our respondents providing that answer. In total, 32 percent of respondents refused to guess on this issue. With regard to those who did

guess but guessed some value other than "about 30 percent," the vast majority of them guessed that lighting played a smaller role in the average residential electric bill. These results are consistent with our observation as shown in Table 4-29 where lighting as an end-use application was rated last.

4.8.4 The cost of various lighting products

We posed two additional questions about the cost of commonly purchased lighting products. Respondents were asked to estimate the cost of a four-foot fluorescent tube. Their answers turned out to be quite accurate with most indicating that a four foot fluorescent tube would cost about three to five dollars. A related question was to ask about the cost of the regular incandescent light bulbs. Here we encountered some communications difficulty because light bulbs are sold in packages of two or four. Of those who did answer, most said correctly that a four pack of incandescent bulbs would cost about two dollars.

Table 4-32 How much does a compact fluorescent cost?

$2.00	13.0%	
$5.00	28.3%	
$10.00	47.8%	← **Correct**
$20.00 or more	10.9%	
Don't know	50.8%	

Table 4-32 presents the results of the same question posed about the cost of a compact fluorescent. Note that interviewers were careful to screen respondents on this question so that only those who clearly knew what a compact fluorescent bulb were included. Fifty percent of our respondents who knew what a compact fluorescent bulb was still refused to provide a guess about what they cost, but of the remaining 50 percent, nearly 48 percent guessed that it was about ten dollars. Only 11 percent guessed that compact fluorescent bulb would be twenty dollars or more. The remaining 41 percent of the respondents provided answers of two or five dollars for the cost of a typical compact fluorescent, one that would provide the same amount of light.

4.8.5 Performance characteristics of compact fluorescents

The final questions in this section pertain to the operating costs of compact fluorescent bulbs and the longevity of compact fluorescent bulbs when compared to incandescent bulbs. Again, we note that a significant proportion (31 percent) of our respondents refused to guess on these items but among those who did, we find that they over-estimate the amount of electricity and under-estimate the longevity of fluorescent products.

Here we asked respondents, "How much longer a compact fluorescent lasts when compared to an incandescent bulb that produces about the same amount of light?" Table 4-33 shows the distribution of these responses and we see that our respondents dramatically under-estimate the longevity of a compact fluorescent bulb. Fifty percent of those who ventured to guess said that they last about twice as long. An additional 30 percent indicated that a compact fluorescent could last about five times as long. Fewer than 10 percent provided the correct answer that they last more than ten times as long. Again, these answers were recorded only for the respondents who knew about compact fluorescents.

Table 4-33 How long do CFLs last when compared to incandescent bulbs?

About the same	2.3%
Twice as long	50.4%
Five times as long	30.2%
Ten times as long	7.8%
More than ten times as long	9.3% ← **Correct**
Don't know	31.0%

Table 4-34 shows that survey respondents over-estimate the amount of electricity compact fluorescents use when compared to incandescent. The question was phrased, "How much electricity do compact fluorescent bulbs use when compared to incandescent bulbs that produce about the same amount of light?" Of our respondent population who knew what compact fluorescent bulbs were, approximately 35 percent would not venture a guess, but of those who would only about 20 percent correctly guessed that compact fluorescent bulbs used less than one-fourth the amount of electricity as do incandescent bulbs.

Table 4-34 How much Electricity do CFLs use when compared to incandescent bulbs?

About the same	4.9%
About half	56.6%
About one-fourth	18.0%
Less than one-fourth	20.5% ← **Correct**
Don't know	34.8%

5

Establishing Baseline Measures for Transformation Research

5.1 Introduction

This chapter presents the findings from our studies in terms of testable research hypotheses and a number of selected market barriers. In this context, market barriers refer to those inhibiting factors that delay consumer's adoption of energy efficient lighting technologies in residential settings. As previously mentioned, our report focuses on the barriers closely associated with retail residential customers, rather than the barriers which are presented to manufacturers, retailers or distributors. We have chosen to further limit our concern for residential lighting effect efficiencies to the types of products that are purchased in retail settings by homeowners and renters.

5.2 Testable Research Hypotheses

Our research approach follows the general strategy described in the CADMAC-sponsored scoping study (*Eto, Prahl and Schlegel, July 1996*) to:

1. assess the residential lighting market
2. identify market barriers
3. measure market effects
4. identify linkages between Lightsaver Program interventions and market effect outcomes

Our research recognizes that observing and measuring market transformation will be a long-term process. This project's immediate goal was to establish baseline data as part of a general review of the state of the residential retail lighting market so that future studies could make inferences about the strength of market effects induced by energy program interventions.

Market barriers are those inhibiting factors that suppress investment or behaviors that would otherwise be cost-beneficial to residential customers. Our studies sought to identify these factors and build operational variables (obtainable measures) from survey responses

and other direct observations. We identified and measured residential lighting market barriers including: high first cost, product availability, performance uncertainty, information search, hassle costs, and asymmetric information (*about savings).*

As previously stated, our project goals were to conduct a pilot study designed to characterize the market for retail residential lighting products and to prepare to measure the magnitude of change observed in market effects outcome measures. Together, these research strategies demonstrable causal connections between programs and changing elements of its target market. Since the residential lighting market will naturally change in response to non-program events, we attempted to isolate program effects from those naturally occurring market effects by developing and testing a set of research hypotheses. These take the form of affirmative statements about program effect observations pertaining to different types of market participants as shown in Figure 5-1.

Figure 5-1 Research Hypotheses

1. The proportion of consumers who can identify compact fluorescents will increase.
2. Knowledge about the energy savings benefits of compact fluorescents will become more accurate.
3. Knowledge about other compact fluorescents performance characteristics will increase.
4. The number of compact fluorescents per household (saturation) will increase.
5. The average number of residential lighting “sites” for compact fluorescents will increase.
6. The practice of replacing compact fluorescents with incandescent bulbs will decrease.
7. Reported customer satisfaction with compact fluorescents use will increase.
8. Intent to purchase additional compact fluorescents will increase.

We present these hypotheses here as predictions of what as researchers we could expect to observe at some future date as the market for retail residential lighting transforms towards increasing energy efficiency. Of course, it will be a future research challenge to measure the magnitude of program induced effects that flow from market interventions like the LightSaver program. One way to attribute effects to particular programs will be to ask consumers about sources of information. Obviously, if in their answers they cite program informational materials, we would be willing to link program investments to consumer knowledge outcomes. Absent that type of observation, researchers will be faced with observing consumption and use of energy efficient products in locations (*States*) where market transformation programs have been active and comparing them to locations where there have been no such programs. Of course, as such programs become national or spread widely, such quasi-experimental designs will be increasingly difficult to implement.

5.3 Comments about Market Barriers

5.3.1 Barrier: Availability of compact fluorescents

The question of the availability of compact fluorescent bulbs was dealt with in both surveys by asking respondents if they knew where a compact fluorescent bulb could be purchased. Most of our respondents from the Baseline Survey indicate that they have recently purchased lighting products at locations where compact fluorescent bulbs are typically sold and further that they would be likely to shop for incandescent light bulbs in those same locations. These findings suggest that availability of compact fluorescent bulbs seems not to be a significant barrier for the respondents to our surveys. We come to this conclusion even though our retail observations indicate that compact fluorescent bulbs are found in larger retail locations, discount and home supply hardware stores, rather than in grocery, drug or local hardware stores. This observation may simply reflect the fact that retailing for household products continues to aggregate to larger and larger retail settings. These trends may increase the power of retail-based programs designed to encourage efficient light technologies because such programs can focus on a small number of high-volume retail outlets without negotiating participation with too many different retail chains.

5.3.2 Barrier: Customer Awareness

The first measures of customer awareness for efficient lighting technologies pertain to whether survey respondents can accurately identify different types of residential lighting equipment. Results from the Baseline Survey suggest that only about 40 percent of respondents were certain that they knew what a compact fluorescent was without significant interviewing prompting. It is clear that improvements in customer awareness for this particular energy efficient lighting technology should be a goal of future market transformation programs.

5.3.3 Barrier: Understanding Prices

The most frequently mentioned barrier to the adoption of compact fluorescent technology is price. Here, prices need to be considered in several contexts. The price of the bulbs and fixtures themselves, the operating costs for these products given comparable light output, and the component replacement costs (tubes).

Consumers readily react to the initial purchase price of products in a retail setting. During shopping, consumers compare price and features based on information available to them in that setting. So, for example, in shopping for a replacement light bulb consumers may be faced with the relative prices of incandescent versus fluorescent bulbs. We know that on this basis alone the price of the incandescent bulb and its familiarity would make it the overwhelming choice. Consumers need to have refined knowledge about the operating costs

and replacement costs of these products in order to understand the economies that would accrue from an investment in compact fluorescents.

Having asked our respondents these generalized questions about lighting energy efficiency and compact fluorescent bulbs, we can observe that respondents tended to under-estimate the cost of lighting in their residential electric budgets. A related issue is that less than 30 percent could accurately guess about what a kilowatt hour cost, few knew the real cost of electricity and few understood what proportion of their total electric bill goes for lighting.

It is obvious then that the proportion of respondents that accurately know the dollar cost of lighting in their residential settings is small. With regard to energy saving technology, specifically compact fluorescent bulbs, our respondents were similarly misinformed about the efficiency of this technology. They had a tendency to under-estimate both the savings in terms of the cost of electricity and they under-estimate the longevity of compact fluorescent bulbs. We conclude from these observations that public information and education programs can do much to spread the word that compact fluorescent bulbs save substantial amounts of electricity and also that they last substantially longer than do compact fluorescent bulbs.