The Use of Triangulation in the Measurement of Near-Term Market Effects: The Case of the California Residential Lighting and Appliance Program

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ABSTRACT

In 1999, the California Residential Lighting and Appliance Program, a market transformation program, was launched within the service territories of the four investor-owned California utilities. The appliance component of the Program provides incentives for retail stores for each qualifying appliance sold and training for sales personnel as well as an evaluation and redesign of point-of-purchase materials. The objectives are to increase the awareness and knowledge of sales personnel and their motivation to sell energy efficient lighting equipment and appliances and to increase the knowledge and awareness of customers. Achieving these two objectives will, over time, lead to an increase in the market share of ENERGY STAR®-qualifying equipment. In any market transformation program, there are near-term and long-term market effects. The primary near-term effects are a more knowledgeable and motivated sales force and a more informed consumer. The measurement of baseline near-term market indicators involved: 1) the conduct of 184 in-state mystery shops in retail lighting and appliances stores, 2) interviews with 1,003 in-state customers who have recently purchased lighting equipment and/or appliances, and 3) interviews with 109 managers of in-state retail lighting and appliance stores. While the collection of data from more than one perspective increases the reliability of the measurement, it remains a challenge to integrate these data into an internally consistent, coherent picture of the dynamic marketplace. Using the in-state data, this paper illustrates the use of triangulation in integrating these three perspectives. The data suggest that the sales force is neither well trained nor highly motivated to sell energy efficient appliances and that the point-of-purchase materials are, in many cases, difficult to see and understand.

Introduction

In 1997, the California Public Utilities Commission declared that the purpose of energy efficiency programs should be to transform the market so that individual customers and suppliers in the future, competitive market will make more rational

choices. Pacific Gas & Electric, Southern California Edison, Southern California Gas Company, and San Diego Gas & Electric (hereafter referred to as the "Sponsoring Utilities") developed designs for the 1999 portfolio of energy efficiency programs, with the major programs being statewide. One of these statewide market transformation programs was the Residential Lighting and Appliance Program (hereafter referred to as the "Program"), which was designed to improve the availability, promotion, and sales of energy efficient residential lighting and appliances by inducing sustained changes in the behavior of market participants. Through a competitive bidding process, an independent third party (Implementation Contractor) was hired to assume the implementation of these programs for the Sponsoring Utilities on a statewide basis.

The focus of this paper is on the use of triangulation in assessing baseline indicators associated with key near-term market effects of the appliance portion of the Program.

The Program

The appliance component of the Program involved the training of sales staff in retail appliance stores and an evaluation and redesign of existing point-of-purchase (POP) materials in order to more clearly explain the costs and benefits of energy efficient equipment. No customer rebates are permitted.

The appliance component of the Program covered four ENERGY STAR®-qualifying technologies: 1) refrigerators, 2) clothes washers, 3) dishwashers, and 4) room air conditioners. In this study, we also collected baseline information on gas water heaters, since, at the time, it was possible that this technology could be added to the portfolio sometime in the future[1]. For clothes washers, refrigerators, and dishwashers, the Program also promotes efficiency levels higher than ENERGY STAR®. An incentive is provided to appliance retailers in the form of a sales incentive (spiff) reimbursement for each qualifying appliance sold. The expectation is that retailers will pass a portion or all of this store incentive on to the sales personnel as a sales incentive.

Program Theory

An integral part of the evaluation was the development of a program theory. The use a theory-based approach in evaluations has been used in a number of policy fields for some time, and is especially germane in evaluating market transformation programs. The first lesson of TBE is that an evaluation must be fully informed by the causal theory that underlies the program intervention (Weiss, 1998). A program theory, or model, provides a framework for understanding the hypothesized mechanisms through which a program is anticipated to influence, and ultimately transform, the market. The model provides a basis for structuring data collection and analyzing the data to determine whether the hypothesized cause and effect relationships expected under the program in fact exist and whether they are working as expected. The model also provides the foundation for determining which processes are not working as anticipated and merit further attention and possible revisions.

[1] A decision has been made not to include gas water heaters in the PY2000 Program's portfolio of measures.

Market Barriers

One key step in our approach to analyze the effects of the Program was to identify probable market barriers that might impede the adoption of the efficiency products promoted by the Program. We started with the generic barriers defined by Eto, Prahl, and Schlegel (1996). Our review of the literature then identified the most likely barriers that impeded the adoption of efficiency measures in the lighting and appliance markets. The major barriers for *customers* were considered to be product availability, costs of acquiring information, information asymmetries between customers and providers, rules of thumb that limit the scope of considerations for a given decision, and uncertainty about product performance and the market. For *retailers*, the most significant barriers were considered to be product availability, information costs, and performance uncertainty. For *manufacturers*, the most significant barriers were thought to be transaction/hassle costs and uncertainty regarding the response of the customer in the marketplace.

Program Model

This subsection presents the program theory or model that we developed for the Program study and discusses the Program interventions, anticipated market barriers, potential market effects and indicators, and hypotheses linking the interventions, market barriers, market effects, and indicators.

Figure 1 illustrates the simplified model of the residential RL&A Program. In this Figure, there are 31 linkages that describe a variety of efforts in the environment that are designed to transform the market. At a minimum, these efforts include: 1) the RL&A Program, 2) utility rebate programs, and 3) the ENERGY STAR® Program.

The linkages that are the focus of this paper are: 1, 2, 4, 5, 6, 7, 8, and 25. The influence of all the Program activities (shaded boxes) that were hypothesized to increase the knowledge and motivation of sales staff and the attitudes, knowledge, and awareness of customers are represented in these causal linkages.[2] These linkages are described below in greater detail.

Program Activities, Market barriers Addressed and Hypothesized Market Effects

The Program was expected to have several direct effects, which, in turn, were expected to induce other changes in the market. All these direct and indirect effects can be formulated as hypotheses about the expected market effects of the Program. Table 1

[2] Note also that the extent to which the market potential is actually being achieved will be measured by the California Residential market share tracking System (RMSTS), which will track the market share of efficient equipment by examining both shipment and sales data. Information from the RMSTS passed along linkage #31 will be used to make any necessary modifications in the design and/or delivery of the RL&A Program.

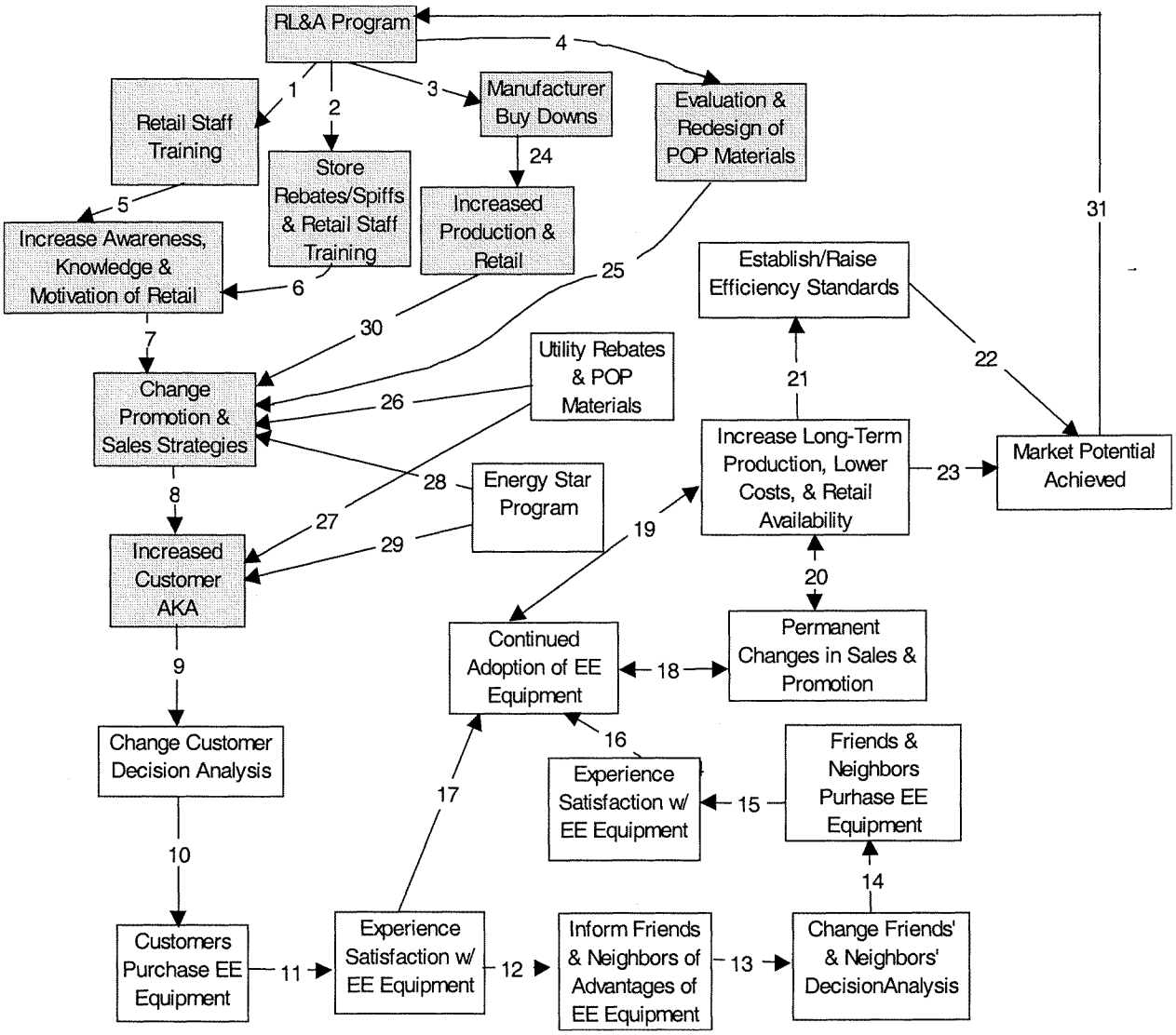

Figure 1. Program Model

presents: 1) the 11 linkages from the program model in Figure 1, 2) the related hypotheses, 3) the near-term and mid-term indicators that will be used to measure these market effects, and 4) the market barriers potentially addressed. We also included in Table 1 are our assessments of whether we can reasonably expect to see market effects as measured by their associated indicators in the near-term (NT - within the first year after the Program intervention), the mid-term (MT - within the second and third years after the Program intervention), or the long-term (LT - more than 3 years after the Program intervention).

Table 1. Program Linkages, Hypothesized Market Effects, Indicators and Market Barriers

Linkage	Market Effects Hypotheses	Near-Term & Mid-Term Indicators	Barriers Potentially Addressed
2 & 6	Providing store incentives/spiffs and training will increase the awareness and knowledge of and motivation to sell energy efficient appliances.	Knowledge, awareness and behavior of sales staff with respect to efficient appliances (NT/MT)	Retailer information costs Retailer performance uncertainties
1 & 5	Training sales staff in retail appliance stores will increase their awareness, knowledge, and motivation.	Knowledge, awareness and behavior of sales staff with respect to efficient appliances (NT/MT)	Retailer information costs Retailer performance uncertainties Customer information costs
4 & 25	Evaluating and modifying the POP materials will result in changes in retail promotion and sales strategies.	Type and frequency of advertising regarding efficient appliances (NT/MT)	Expected near-term/mid-term outcome of the Program
7	Increasing the awareness, knowledge, and motivation of sales staff regarding energy efficient appliances will result in changes in retail promotion and sales strategies.	Type and frequency of advertising regarding efficient appliances (NT/MT)	Expected near-term/mid-term outcome of the Program
8	Changes in promotion and sales strategies will increase customer awareness and knowledge of efficient appliances	Customer awareness of ENERGY STAR®/efficient appliances (NT/MT/LT) Customer knowledge of ENERGY STAR®/efficient appliances (NT/MT/LT)	Customer information costs Customer performance uncertainties Customer asymmetric information

Triangulation and Data Integration

The complexity and size of the residential California appliance markets argues for multiple measures of key variables. Such complexity virtually guarantees that any one measure of a phenomenon will be less reliable than multiple measures from different perspectives. The use of multiple measures, often referred to as triangulation, involves the collection of data related to a particular phenomenon from multiple sources, both primary and secondary, in as objective and consistent a manner as possible.

Data were collected from in-state customers by telephone, from in-state retail appliance store managers by telephone, and from in-state retail appliance store sales staff by

mystery shoppers.[3] Using these three data collection instruments, we constructed what we called a triangulation matrix, consisting of the research hypotheses and their associated indicators down the left side and the questions from the three instruments across the top. For each hypothesis, we then indicated which specific questions from each of the three instruments that addressed each hypothesis. With this guide, we examined all the relevant data, both quantitative and qualitative[4], contributed by the three data collection efforts in testing each hypothesis and attempted to integrate these data into an internally consistent baseline story. Such integration is the essence of triangulation.

The integration of data from multiple sources is quite challenging and required regular meetings to decide how much weight to give the data from each of the three sources based on an assessment of the error and bias associated with each and how to integrate these data in an internally consistent manner. In these meetings, the analysts also attempted to identify coherent and important examples, themes, and patterns in the data. The analysts looked for quotations or observations that went together and were relevant to the behaviors of the customers, the store managers, and the sales staff. This process has been called "convergence," i.e., the extent to which the data hold together or dovetail in a meaningful way (Guba and Lincoln, 1984).

Sometimes, all the data clearly pointed in the same direction while, in others, the preponderance of data pointed in the same direction. Other cases were more ambiguous. In order to maximize reliability, more than one person was involved in analyzing the same data. Each person examined the data separately and the group then compared and discussed the results. Important insights usually emerged from the ways in which two or three different analysts looked at the same set of data. Ultimately, differences were resolved and a case was made for a particular point of view or conclusion.

Data Collection

While this study involved telephone surveys of random samples of 1) in-state customers, 2) out-of-state customers, 3) in-state managers of retail appliance stores, and 4) out-of-state managers of retail appliance stores and 5) in-store mystery shops of in-state retail appliance stores, this paper is based only on the in-state data.

Customers

There were 9.3 million California households eligible to be called in this study. The eligible pool of California households consisted of households with active telephone numbers within the service territories of the Sponsoring Utilities. The sample was stratified

[3] Mystery shoppers are people who posed as shoppers in order to determine how well informed and motivated sales staff were regarding energy efficient equipment. As the name implies, the mystery shoppers never reveal their true purpose and are trained to maintain their disguise as ordinary shoppers.

[4] The *quantitative* techniques relied on objective, closed-ended questions that allow for statistical analyses. However, *qualitative* techniques can be equally useful (Patton, 1986). *Qualitative* methods stress in-depth, open-ended interviews, direct observation, and written documents, including program records. There is wide agreement on the value of using *both* qualitative and quantitative data in the evaluation of many kinds of programs.

by utility service territories with the aim of completing an equal number of surveys within each. Only customers who had purchased at least one of the appliances within the last two years were eligible to be interviewed. Questions relevant to the linkages that are the focus of this paper included:

- A description of the advertising or information materials noticed at the store
- Whether the message of the materials was understood
- The main message of the materials
- Whether the customer talked with the sales person
- Whether the customer asked the sales person about energy efficiency
- Whether the sales person mentioned energy efficiency to the customer
- The extent to which the sales person emphasized energy efficiency
- What the sales person said about energy efficiency
- How confident the customer was regarding the energy efficiency information provided by the sales person.

Interviews were eventually completed with 1,003 in-state customers and lasted an average of 20 minutes.

In-State Retailers

The in-state retailer frame was designed to serve two surveys: 1) the mystery-shopping survey and 2) the store-manager survey.

Mystery shops. Prior to actually collecting the data, three training sessions were conducted in Berkeley, Pasadena, and San Diego to make sure that the mystery shoppers understood the objectives of the study, the data collection protocols, and the survey instrument. It was also important that they could identify the equipment being shopped for and the types of point-of-purchase materials that they might encounter.

Among other issues, these three surveys attempted to collect information on the following:

- Perception and understanding of POP materials
- The number of appliances shown to a mystery shopper and whether they were described by the sales person as being energy efficient and whether they were ENERGY STAR® qualifying
- How knowledgeable the sales person was regarding energy efficiency, the ENERGY STAR® Program, utility rebate programs, manufacturer rebate programs, and store rebate programs
- If the sales person discussed energy efficiency, what did he or she say
- Product exposure and share of sales floor (i.e., How many units were shown to the shopper (total v. energy efficient)? What percent of the total product shown had the ENERGY STAR® label? Mystery shoppers were asked to record a variety of information about the appliances they were shown, including price,

- manufacturer, model number, availability of a rebate, the amount of the rebate, and its sponsor.
- Salesperson knowledge (i.e., How knowledgeable were salespeople about energy efficiency, the ENERGY STAR® Program, and various rebate programs?

Mystery shops were eventually completed with 89 in-state appliance stores.

Store managers. Random samples of managers of the 89 retail appliance stores that had been mystery shopped were then interviewed by telephone. Again, this was considered essential if we were to gain an additional, important perspective on the performance of retail stores. Questions relevant to the linkages that are the focus of this paper included:

- Whether the store uses any in-store advertising to promote energy efficient appliances
- The types of in-store advertising used to promote energy efficient appliances
- Whether the store uses any in-store advertising to promote energy efficient appliances
- How often in-store advertising is used to promote energy efficient appliances
- Whether in-store advertising to promote energy efficient appliances is effective
- The training of sales staff in general
- The training of sales staff with respect to energy efficiency
- How often training on energy efficiency takes place
- How effective is this training with respect to the knowledge and motivation of the sales staff
- Whether the store has specific overall goals for energy efficient appliances
- Whether the sales staff have specific goals for energy efficient appliances
- The extent to which the sales staff routinely recommend energy efficient appliances to customers

Interviews were eventually completed with the managers of 56 appliance stores.

Results

The key appliance findings with respect to the linkages that are the focus of this report are presented below. We first discuss the in-store experience from the perspectives of the customer, the mystery shoppers, and the store managers. We then discuss the in-store POP materials from these three perspectives. After each discussion, we present our conclusions based on an integration of all the evidence.

The In-Store Experience

This section describes the in-store experience as viewed from the perspectives of the customers, mystery shoppers, and retail store managers. The in-store experience refers to customer interactions with the sale staff. Data were available from the 1) customer surveys, 2) the mystery shops, and 3) the retail store manager surveys.

The customer perspective. Of all the consumer purchases captured in the customer survey, in 72% of cases, customers reported that they talked with a sales person. Of the 72% who talked to a sales person, a discussion took place about energy efficiency initiated either by the customers *or* sales person in 72% of these cases. Thus, of *all* customers who shopped for an appliance, approximately 52% (.72 x.72) reported having a discussion about energy efficiency. These results are very consistent with a prior survey that also addressed refrigerators in which 46.3% of the customers reported that salespeople discussed energy efficiency with them (Hagler-Bailly, 1998).

Of the 72% who talked with a sales person about energy efficiency, about 40% of the sales staff said it would lower their utility bills. Only 8% reported that the sales person discussed environmental benefits. In addition, slightly more than 32% indicated that the sales staff emphasized energy efficiency a "great deal." An additional 57% indicated that the sales staff mentioned energy efficiency "some." Of those customers who discussed energy efficiency with the sales person, nearly 76% stated that they were very confident or mostly confident that the information provided by the sales person was accurate. Thus, with respect to energy efficiency, the sales staff appear to be reasonably credible.

The retail perspective. Information on appliance retailers was obtained from two sources: the mystery shops and interviews with in-state appliance store managers.

Mystery shoppers were trained to request to see three models for the appliance they were shopping for. Each mystery shopper was initially shown approximately 2.5 units on average with about 0.60 units on average being voluntarily described by the sales person as energy efficient (i.e., 24% of the units shown). Approximately 0.40 units (or 16%) on average were ENERGY STAR®-qualifying, an outcome that may in part be due to the possibility that there is a lag in getting ENERGY STAR® labels and other promotional materials into the stores.

If the sales person did not mention "energy efficiency", mystery shoppers were trained to ask to see up to three additional units. Approximately 21% of the shoppers were shown additional units (usually, two additional units). Of these, the average number of the additional units that were described as energy efficient rose to 1.1 with the average number of these additional units that were ENERGY STAR®-qualifying remaining essentially the same (i.e., 0.40 as per above). These patterns are what one might expect given the series of prompts provided to the sales person by the shoppers regarding energy efficiency. Consistent with these results is that only slightly more than 13% of the sales persons mentioned energy efficiency a great deal in their sales pitch. Of those who mentioned energy efficiency, "lower utility bills" and annual "operating costs" were most frequently mentioned.

Mystery shoppers were also instructed to evaluate the extent to which salespeople were knowledgeable about energy efficiency and the ENERGY STAR® Program. Overall, only 17% of the sales staff were considered to be knowledgeable about energy efficiency and 12% were considered to be knowledgeable about ENERGY STAR®. Less than 20% mentioned annual operating costs, payback period, lifecycle costs, or lifecycle savings.

These data suggest that energy efficiency receives far less attention when customers are shopping for an appliance and that the information provided to them by the sales staff may not be all that accurate.

With respect to store managers, 84% indicate that their staff receive specialized product training. More to the point, 71% indicate that their sales staff receive training specifically on the benefits of energy efficient appliances, with most of the training provided by manufacturers and internal staff. As a result of this training, the vast majority of store managers believe that their sales staff are more knowledgeable, more motivated, and that sales of efficient appliances have increased as a result. However, only 22% indicate that they have specific overall sales goals for energy efficient appliances. In addition, only 17% indicate that their sales staff have specific overall sales goals for energy efficient appliances. In light of these responses, it is interesting to note that 48% indicated that their sales staff almost always recommend energy efficient appliances to customers.

Clearly, many store managers feel their staff are well trained regarding energy efficiency and that they routinely recommend energy efficient appliances to their customers.

Conclusions. Compared to the customers and the store managers, mystery shoppers provide a much lower estimate of the extent to which appliance sales staff are knowledgeable about and motivated to sell energy efficient appliances. The perspective of the mystery shoppers was considered to be very valuable since they were trained to observe systematically the POP materials and engage sales staff in a discussion of energy efficiency and ENERGY STAR®. The more positive evaluations of customers may be colored by the passage of time[5] and the desire to provide answers that are socially acceptable. The perceptions of store managers may perhaps self-serving in their evaluation of the effectiveness of the training. Moreover, it may be that the effectiveness of the training is also diminished, in the current robust economy, by sales staff turnover. As a result, even though there may be a fair amount of high quality training about energy efficiency, the chances of encountering a well-informed and motivated sales person may be small due to high rates of staff turnover. Finally, that management may be out of touch with the day-to-day experiences of their sales force would not be surprising.

In the end, we concluded that the reports of the mystery shoppers were very likely less biased and more current than either of the two other perspectives. This is not to say that these other two perspectives are without any value but that the in-store experience is better captured by the mystery shoppers. Thus, taking all the data into account along with our estimation of its accuracy and reliability, we concluded that the sales force is neither well-trained nor highly motivated to sell energy efficient appliances.

In-Store Point-of-Purchase Materials

This section describes the in-store POP materials as viewed from the perspectives of the customers, mystery shoppers, and retail store managers. Again, data were available from the 1) customer surveys, 2) the mystery shops, and 3) the retail store manager surveys.

[5] Recall that customers were interviewed who purchased at least one of the targeted appliances within the last *two* years.

The customer perspective. Almost half (47%) of all customers said that they noticed some form of display in the store. Almost all (96%) of the respondents who claimed to have noticed display materials could identify what they saw (i.e., a banner, a poster, a flyer, etc.). A similar percentage of those who saw display materials said that they understood the message presented in these materials. However, in their unaided responses regarding the message of the display materials, under half of the respondents (46%) said that the material had something to do with energy efficiency or operating cost, while about two-thirds of the respondents claimed that the message concerned other product attributes. Thus, approximately 22% (0.47 x 0.46) of California appliance customers report noticing POP materials related to energy efficiency or operating cost.

The retail perspective. Information on appliance retailers was obtained from the mystery shoppers and appliance store managers.

While half of the mystery shoppers (50%) saw energy-efficiency-related point-of-purchase materials on display in the store, only 36% of those who noticed it found it easy to see and understand. This is reasonably consistent with the store managers of whom 56% report that they use some form of in-store advertising to promote energy efficient appliances. Combining the percentage of mystery shoppers reporting that point-of-purchase materials were easy to see (36%) with the percent of stores displaying POP materials (50%) reported by the mystery shoppers, it appears that customers see energy efficiency POP material about 18% of the time. This corresponds well with the customer survey data where 47% of the California customers say that they saw any point of purchase material, with 46% of that material being related to energy efficiency, yielding 22% of the customers seeing energy efficiency POP materials.

In addition, store managers claim to use the in-store materials at least monthly. Much of it is used daily. Finally, most retailers believe that in-store promotional materials are effective at increasing sales of energy efficient appliances.

Conclusions. POP materials are, in many cases, difficult to see and understand. Considering that retailers believe that energy efficiency POP materials increase the sales of energy efficient appliances, Program efforts to increase the amount and visibility of the display material appear to be appropriate.

Overall Conclusions

In this paper, we have identified some consistencies with respect to point-of-purchase materials. With respect to the POP materials, the three data sources converged reasonably well. However, with respect to the in-store experience, we identified some serious discrepancies in the perceptions of the level of training and motivation of the sales staff. Our decision was to place more weight on the findings of the mystery shoppers because of their training in the informed and systematic collection of data. As a result, we increased considerably the reliability of our assessment of the training and motivation of sales personnel. The Program's emphasis on more formal training of retail sales staff in the year 2000 is reasonable in light of these findings. Clearly, triangulation can be an effective way at obtaining more reliable information. However, collecting information from different

perspectives, while producing some agreement regarding certain issues, will also produce some inconsistencies. Any method for resolving these inconsistencies must be systematic and involve both quantitative and qualitative data.

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