Market Research, the Essential First Step to Market Transformation

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Market transformation in demand-side programs is the permanent alteration of markets for energy-efficient equipment and measures, so that improvements in efficiency continue to be obtained even after a program is changed or eliminated. While transforming the market has long been a goal of DSM programs, little of the up-front research has been conducted that will allow market transformation to occur. It is the authors' position that developing an understanding of the market the program is intended to transform is required for program success. The resulting intelligence provides the basis for program evaluation. In DSM, typically market targeting has been minimal, test marketing non-existent, and identification of customer needs anecdotal. Scrutiny of these issues will be required for program success to follow.

In this paper, we discuss the market research that is a necessary precursor to successful DSM market transformation. Examples of how manufacturers of efficient products transform markets through product placement, pricing, and analysis of markets follows. A case study of compact fluorescent lighting is used to demonstrate the application of the techniques.

Introduction

Market transformation has recently garnered the attention of the demand-side management community. While market transformation has always been an implicit goal of utility DSM programs, program design has usually centered on the explicit goal of acquiring negawatts that could be substituted for supply-side resources. Today, there is a growing realization that the best way to acquire a large quantity of negawatts is through transforming the market for electricity-using products and equipment.

Market transformation as a DSM strategy can be defined as long-term increases in energy efficiency that results from some aspect of the DSM program. The efficiency increases can result from a number of different effects including:

- Participants who take additional actions beyond those supported by the DSM program (stimulation);
- Non-participants, both within and outside the utility service territory, who take actions as a result of the program initiative (free drivers);
- Changes in promotional practices such as pricing, stocking, and display of products; and
- Long term changes in product development and production.

The change in utility efficiency strategies profoundly affects the provision of demand-side programs. Regulatory requirements, program design, implementation and evaluation all must change dramatically to meet the challenge of increasing energy efficiency for the long term. These new requirements are unprecedented in the utility industry and the race to meet them has left DSM professionals gasping along the way.

Fortunately a wealth of information and techniques has been developed for product markets on how to cause and how to measure market transformation. Product manufacturers have invested billions of dollars in tracking markets and measuring how specific actions affect consumer use and purchasing behavior for product development. Concomitantly, a body of experience in measuring the attitudes, behavior, and motivating influences of individual

consumers has developed in the market research and communication fields. The market research industry has succeeded in developing strategies for collecting detailed product manufacturing, shipping, and sales data, as well as methods for using these data to track market transformation and the effectiveness of advertising and promotion activities for evaluation.

While modifications of these methods will be required for most DSM uses, the utility industry is fortunate that it will not need to invent methods for carrying out its charge from scratch. This paper serves to develop useful parallels between the product market and the utility service market which will assist utilities in developing new programs to transform markets, realize the potential savings, and measure those savings in ways that can meet regulatory scrutiny.

Market research has two critical roles in supporting market transformation efforts. One, it must position the utility to understand and respond to customer needs for energy services, and two it must supply information that allows the utility to measure the extent to which DSM initiatives are successful in achieving market transformation. With these two roles as the foci, the remainder of this paper will contain an outline of how the need for market transformation must transform the planning of utility DSM programs.

Market Transformation in Utility DSM Program Design

Program Design

For a demand-side program to cause a transformation in the market, the program must reach at least one of the actors through which the change will be effected. Prahl and Schlegel (1993) have set forth a typology of actors and modes of behavioral change that outlines the strategies a utility may seek to use in changing the marketplace. Their typology is useful in describing the range of program design options that are available, but does not assist the utility in selecting a useful set of activities to undertake in order to cause the desired changes.

Leading consumer behaviorists, Lavidge and Steiner (1961), have characterized the process by which consumers have come to purchase a particular product. They have developed a hierarchy of effects model which states that consumers are transformed from being unaware of a product to purchasing that product in a hierarchical series of three stages:

- In the first stage (Cognitive), a consumer becomes aware of the product and gathers information about the product. Thus the model implicitly includes advertising, promotional programs, and other external influences. These attempts to influence and educate the consumer begin the series of stages that culminate in purchase of the product.

- During the second stage (Affective), the consumer develops a positive attitude about the product.

- Finally in the third stage (Conative), the consumer forms-a conviction about the product, tries to find it in the marketplace, goes through an analysis of whether this is a favorable time to buy, and finally purchases the product.

At the same time that consumers' opinions are changing over time, so is the availability and cost of the product in the marketplace. For the purchase to be carried out, the consumer must be able to locate the product and accept its sale price. In most new products, the manufacturer produces the product and then must create the demand through advertising and promotion. In the utility case, DSM programs may create demand for a product that is not yet readily available. Recognition of the hierarchy of effects is important when designing DSM programs. It is useful to consider the following lessons:

Effects are gradual and can take time to develop. Utilities can jump start the process by affecting change first in consumers that are most ready to make that change, or by concentrating on influential consumers who are most likely to convince others to change. Early innovators can help other consumers develop a positive attitude about the product or service and move others through the second stage. To follow this strategy, programs and promotions should address the characteristics most important to these groups of consumers.

Each individual moves through the process differently. No one technique or one promotional message is universally applicable at one point in time. Programs must be geared to target audiences of consumers and should address consumers at different stages of the hierarchy.

The role of distant trade allies can not be overestimated. Not only local retailers, but also wholesalers, distributors and manufacturers share a role in the diffusion of efficiency in the marketplace. If the product cannot be found when the consumer is ready to buy, or if the price exceeds the value consumers place on the product, the product will not sell, Utilities can help to influence the development of efficient products, create demand for new products or tie in rebates with other promotions to reduce the price of the product.

Possessing detailed knowledge of the market and consumer preferences is a prerequisite for the successful introduction of any new product. Product manufacturers in the competitive marketplace conduct extensive market research, similar to the types of studies described below, to set the stage for a new product. Monitoring of the market is then continued throughout the lifetime of the product. When particular advertising or promotional activities are attempted, a protocol is designed and followed to evaluate the program's success.

These same types of activities should be a stronger component of DSM program planning. Full-scale programs should not be introduced until program trials have been successfully demonstrated. Program trials need to be better designed to make known the particular attitudes of customers and the match between the customer, product and the promotional activities. Finally, for utilities, market research prior to program start-up has secondary benefit beyond improved program design. For utilities, this market research establishes a more certain measure of baseline characteristics needed in the evaluation of the programs.

Market Research Techniques that Are Relevant to the DSM Program Experience

Information Needed to Effect Long Term Changes in the Market for Energy Efficiency Products

It is helpful to use the new product development paradigm to understand the types of techniques that are available to utility researchers to aid in planning market transformation programs. Techniques used in the process of new product development can be adopted by utility program planners to help further DSM market transformation. The types of research that are useful in molding market transformation need to concentrate both on the consumer aspects of the products and services and the distribution network for products and services. (Note: The term "consumers" can mean individual purchasers or companies or firms that purchase products.) Lack of understanding of the interaction between consumer needs, perception and behavior, and the market characteristics of the distribution method will impede long-term market transformation.

To attain the market intelligence that is necessary to transform the market for high efficiency products, utilities must develop the following information:

Product Information

- What are the needs of the consumers?
- What are the competitive products?
- How do we compare the competitive strengths and weaknesses of efficiency products?

Consumer Decision Information

- How do consumers get information about energy-efficiency products?
- How effective are the consumer information and advertising programs currently used?
- How do consumers evaluate the information that they receive?
- What factors can influence purchase decisions?
- How do consumers value the efficiency product?

DSM Program

- What consumer characteristics define the groups that the DSM program should first target?
- What is the best way for us to get efficiency products distributed in the marketplace to this target?
- What factors will influence the future outlook for efficiency products?

Types of Research and Research Techniques that Can Be Useful in DSM Program Planning

Utility program planners need to focus their attention on four major research areas: product-related research, distribution-related research, pricing-related research, and promotion-related research. A variety of market-research techniques is available to help address these issues. To date, these techniques have seldom been used to provide strategic input into DSM program planning. Rather, market-research techniques, when they have been used, are subsumed under the evaluation umbrella and document activities in the past rather than identifying strategies for promoting technologies in the future. Table 1 shows typical chronological decisions needed in performing product research. Table 1 also shows the typical research tools used to support these decision points. Not all decision needs may be equally applicable to the promotion of DSM products and programs, although all have a place in the DSM toolbox.

In product development the results from the research activities are fed back into the planning process and are used to guide and formulate strategic decisionmaking. In

Table 1. Product Development Needs and Research Response

Chronological Decision Needs	Typical Research Response
Market Definition	Market profile analysis, market segmentation, situation analysis
Idea Generation	Suggestion boxes, attribute listing, brainstorming, and gap analysis
Idea Screening	Focus groups
Concept Testing	Quantitative concept tests; simulation models, conjoint analysis
Concept and Product Positioning	Attribute mapping; perceptual mapping to assess positioning
Product Test Designs	Product test designs such as paired tests, conjoint analysis
Name Research	Strategic naming decisions, evaluating brand names, generic name tests, brand equity analysis
Packaging Research	Tests of functional effectiveness, visibility and distinctiveness, image perception and overall preference
Test Marketing	Designing test market studies, selecting markets, developing test market simulations,
Product Commercialization and Tracking	Retail audit; consumer panels; attitude, trial, and usage tracking

programs designed to transform the market for efficient measures and equipment, these research activities would result in a cogent program. That program is explicitly designed to meet identified needs of a targeted group of consumers with marketing materials that highlight how the program meets those needs.

Market Definition

Not all residential customers have an equal desire to purchase energy-efficiency products, yet utility DSM planners view residential customers as homogeneous in nature. Utilities do not know the buying characteristics of the customers who have taken advantage of existing programs, and whether these participants should be considered to be early adopters. Nor do the utilities know with any certainty whether later adopters will embrace a product given the continuation of current programs. It is quite possible that definable groups of customers have not tried these lamps or are unhappy with the product that was given to them as a sample.

Utilities need to perform customized market segmentation studies to determine who has bought these products, either on their own or through participation in a utility program, see for example Cameron (1993). This type of study should isolate the benefits that consumers sought, the need that the products fill, the attitudes of consumers towards these products, and the experience they had in purchasing these products. By gathering this type of information and performing a segmentation analysis, utilities can refine their marketing messages, identify how the energy-efficient product can be compared to standard products, and isolate the most beneficial distribution channels. This type of strategic market intelligence will result in better programs that will have more long-lasting effects on the marketplace.

Idea Generation

Idea generation is used to identify the types of offerings that should be made in a particular market. A technique routinely used to generate ideas is gap analysis. A gap

analysis provides a measurement of the difference between perceived value of particular attributes of a product and the actual rating of the particular attribute. Segmentation studies and gap analyses are often performed at the same time using the same surveys for data collection. Meshing these techniques allows for valuing attributes by segments. This allows the utility to hone and refine its marketing approach to different groups of customers.

Idea Screening

Idea screening techniques are used to identify which ideas should be pursued based on predefine criteria. Product manufacturers make comparisons between risk criteria such as profit and revenue. In the case of utilities, focus groups can document the range of responses that consumers may encounter with particular program design concepts. For utilities that have had active DSM programs and are now reducing, though not eliminating their commitment, it may make sense to perform focus groups with customers to find out which types of program concepts are most attractive.

Concept Testing

Concept testing serves to determine which group of technologies and delivery system options are best for customers. Once the utility has an understanding of the market and the subtleties between groups of consumers, it makes sense to perform some concept testing. Concept testing can occur at program inception or as programs are refined. Concept testing relies more heavily on quantitative tests than does idea screening.

Awareness, trial, and usage (ATU) tracking surveys are often used to provide a quantitative assessment of the performance of a new product or service. It would be useful to determine purchase intent among those customers who are aware of the utility program. Customers would be surveyed at some point in the future to identify those that are aware, the percentage of aware customers who have purchased the product, and then to determine the actual experience in purchasing and repurchasing the product. Data collected through ATU surveys are often used in simulation models to determine how products will fare over time in the marketplace.

Conjoint analysis, another technique used in concept testing identifies the preferences expressed by the respondents for combinations of product attributes. Conjoint techniques must be structured thoughtfully, because it is difficult to look at attributes that are non-concrete. Respondents can rate and tradeoff between attributes like quality and price, but they would not be able to assess environmental benefits. Conjoint analysis can be particularly useful in helping determine appropriate pricing, or incentives.

Product Positioning

Product positioning studies seek to determine the changes that need to be made to the final product. The area of interest would be to identify which attributes affect purchase decision and how attributes of competitive products can be compared. Attribute and perceptual mapping techniques are often used in product positioning studies. It is important to recognize that the intended position of a product may not be congruent with the perceived position of the product. Additionally, the current position of a product or a group of products may be changed through appropriate repositioning strategies.

Name Research

Name research is generally the responsibility of manufacturers, however, name recognition can have a big influence on the ultimate success of DSM program efforts. Good marketing can establish the perception that a particular product is energy efficient, even if it should not be perceived as one.

Utilities need to be aware of these perceptions in order to re-educate consumers. Name research has little practical importance for individual utility DSM programs, although it should be considered when all the DSM programs will be marketed under one umbrella.

The Wattmiser™ lamp is an example of a successful name selection. Residential customers often perceive this product to represent the most efficient lighting offering in the marketplace, when, in fact, it is relatively inefficient. The choice of the word Wattmiser™ positioned the lamp in the minds of consumers.

Packaging Research

Packaging research is largely the domain of manufacturers and distributors. Packaging research serves to set up tests of functional effectiveness, visibility and distinctiveness, image perception, and the customer preferences. Utilities can help with product distribution by working cooperatively with retailers in sponsoring studies that will experiment with different product displays and marketing materials. Program packaging involves the development of billboards, brochures, catalogs, product displays, and any other materials that are intended to encourage participation. Research into consumer perceptions of these materials can more effectively entice participation by target groups.

Product Test and Test Marketing Designs

Product testing is used to decide what changes need to be made to the final product. Product testing and utility pilots should be thought of in the same way. Basically, the intent is to determine which program structure will reap the best benefits. For example in the case of residential lighting programs, utilities have designed "pilots" that provided rebates, used the Lions Clubs to distribute lamps, and used mail order fulfillment centers to test distribution routes for compact fluorescent lamps (CFL) dissemination. What has been overlooked in most DSM pilots is the whole nature of experimentation and control. True product testing in the marketplace requires that markets are set up where outside influences with respect to the product are controlled and often limited. Advertising and other interactions are applied for treatment areas or groups of consumers while other similar areas or groups of consumers are maintained untreated as a control. The pilot, or test market, can then be evaluated for successes and needed changes before designing a full-scale product launch. Certain cities in the United States have been typically used for test marketing products. Similar strategies effectively utilized in product testing are needed in DSM pilots.

Product Commercialization and Tracking

Product commercialization and tracking studies form the foundation for actually measuring market transformation. There are numerous sources from which sales data can be collected: manufacturers production levels, manufacturers shipping amounts, distributors received/shipped amounts, and wholesale and/or retail sales. However, the data are seldom in the form that exactly meets the needs of a specific evaluation.

Data tracking of products has become vastly easier with the widespread use of checkout scanners, since each product sold has a Universal Product Code (UPC). Individual stores can track sales quickly, and chains can aggregate this data for regional sales information. The issue is how best can utilities tap into this information.

Distributors, buying groups, and retailers are not always willing to provide sales data due to the time and expense required. In some cases, utilities have offered monetary and human resources to summarize and collect the data. Another approach is to use Stock Keeping Unit (SKU) numbers that are recorded at the sales register to track the sales of products promoted by utility programs. These SKU numbers are an inventory control device and track quantities of goods sold.

An effective means of attracting trade ally cooperation is to stress the benefits that can be mutually gained by setting up a sales tracking system. Data collected is useful to the supporting product developers, marketers, and retail outlets. Large data tracking syndicates now collect scanned information from a large sample of retail stores nationwide. Information on a product or series of products can be purchased. These services have yet to be extended to include a representative sample of hardware stores and home centers, so many products can not be measured using the available syndicated sales data systems.

For a utility program, the advent of hand-held scanners, and services that can install and maintain the equipment and the data collected are now available. These units could be given or loaned to distributors or retailers to track specific products. For some types of programs, it may be sufficient to collect data from worksheet or from other hard-copy sources. For any of these sources to be useful, utilities will need to develop plans well in advance of the point that the data are needed. With this careful planning most data can be routinely and efficiently collected.

Decision Needs in Planning Better Residential Lighting Programs

Residential utility lighting programs generally have introduced CFL to residential utility consumers by either giving the lamps away for free or reducing the cost through rebates. Utilities have made some broad assumptions about the introduction of this new technology. These assumptions include:

- Once introduced to the product, consumers will want CFLs, consumers know how to use the product,
- Consumers have a positive attitude towards CFLs and will repurchase the lamps,
- Consumers value the energy savings from the CFL above other attributes of incandescent,
- Consumers have access to the product and understand how to select replacement products,
- Retailers are amenable to utility lighting programs because they will sell more merchandise,
- Retailers understand CFLs, and
- Lighting manufacturers are wholly behind utility programs which stimulate the purchase of CFLs.

These assumptions generally have not been borne out in reality. In spite of the number and duration of utility programs, CFLs are not ubiquitous in the residential

market. The research process as outlined in Table 1 is completed below to assess how a residential lighting program could be designed for Big Utility Company (BUC) to better transform the market for CFLs.

BUC has just completed a typical CFL rebate program. The evaluation of that program revealed interesting results similar to those experienced in utilities across the country. Many of the participants in the program were somewhat aware of the benefits of CFLs before the program started. A poll of non-participants indicated that these persons were not familiar with CFLs. The evaluation showed that nearly a third of the respondent participants were less than completely satisfied with the new CFLs. The two principal reasons given were that the CFL did not fit in the desired fixture or the CFL was not bright enough. In an effort to enhance future residential lighting efforts, BUC conducted market research before initiating their next residential CFL program.

BUC decides to conduct a segmentation study to determine which customer groups would be easiest to move to purchase CFLs, and which groups would be most difficult. As part of this study, respondents are asked to rate and value CFL attributes. As they anticipated, participants in the first program are more highly educated than the population as a whole, and more likely to be motivated by the environmental benefits than the energy-savings benefits of CFLs. At first blush, these individuals should have served as an effective group to disseminate the virtues of CFLs to other consumers. The segmentation study which focused on the characteristics of non-participants finds that most of the population are different from the program participants. The non-participants do not normally read newspapers, news magazines, or special-interest research, but instead get their information from TV talk shows, and gossip magazines. It is also determined that there is little interaction between these two groups, thus inhibiting the idea that marketing to the early adopter, (green consumers) would filter information on CFLs down to the unaware consumers.

The results of the combined gap/segmentation approach indicate that the price of a lamp and lamp brightness is very important to elderly consumers. A survey determines that, on average, CFLs score very low on the price variable. The current marketing of CFLs as "green" products by manufacturers has helped reach the environmentally aware customers. The environmental benefits of the lamp are found to be more important to the "green" consumer than price. Other results from the segmentation analysis show that consumers who are unaware of CFL's have ill-defined preferences for lamp qualities and type.

The utility then realizes that to maximize market acceptance, they will need to identify persons with characteristics similar to the broader population who will serve as early adopters within the subset of customers not associated with current CFL acceptance. Focus groups with non-participant customers reveal that most of non-participants would be most influenced in purchasing new technologies by their friends whom they consider to be more practiced in home repair. Results from the gap/segmentation study alert BUC to the need to spend more of its dollars on working with buyers at large building suppliers and hardware stores.

Discussions by BUC representatives with a major lamp manufacturer reveal concern about residential CFL programs because they send consumers inappropriate long-term price signals. The manufacturer voices concerns that his market could evaporate if future buyers expect the current rebated price to be permanent. Conjoint analysis is used to determine the best alternative pricing schemes for CFLs. When the CFL benefits are explained and visibly demonstrated, many persons are willing to pay a price that is not substantially below the true retail price of the CFL. The customers' greatest doubts are raised regarding the applicability of these products in their particular home lighting fixtures.

BUC wants to test the acceptance of delivery approaches by segment. They distribute lamps to one group of customers at malls, and arrange to have one of their staff professionals install a lamp for another group. Consumers participating in the test are asked to keep diaries of use for a two-week period after the bulbs are installed. Quick follow-up surveys are conducted with both sets of participants recruited.

Results show that those individuals who have been directly given sample CFLs, especially the elderly, more often find the lamps to be inferior to their existing lamps. Many complain that the particular lamp did not fit the fixture they used most often. The group of households where utility representatives install lamps have far fewer complaints about the light quality. They note that at first lamp installed by the professional did not fit or did not produce adequate light. However, in most cases, the professional eventually found a lamp that fit the fixture and consumers are now receiving adequate lighting from the fixture.

BUC decides that customers need more help in selecting the proper lamp, and need a trial period in which to experiment with the lamp. They develop a new program in which lamps are loaned to customers from building centers. The service will give the customer assistance in selecting the right lamp and wattage level for a particular application. The service will then loan the customer a particular lamp for a week to see if it fits. If it does the customer can keep the lamp or return the sample and borrow another lamp for another trial in another fixture.

Customers returning to the building center to purchase additional lamps receive a $2 rebate on all CFL's purchased. This is a one time offer. BUC decides to bundle its CFL efforts by extending the program to commercial and industrial customers as well. Using the same building center displays, commercial and industrial professionals can try out several different lamps in their businesses and also receive the rebate.

BUC's marketing materials are designed to be both eye catching and evocative. They set up their displays to mimic the popular TV show *Home Improvement.* At the same time, the retail product display shelves need to have a "high-tech" and premium product look. The manufacturers using the market research determine that certain changes are needed in their packaging. Most importantly, they decide to lower the recommended wattage replacement capabilities of their current CFLs to better reflect the true foot-candle equivalents and not the lumen output. In addition, a display of the recommended lamp types for different fixture types is developed by BUC to be tested at the building centers and hardware stores.

BUC decides to conduct a pilot of its proposed CFL program, setting up their display and lending lamp program at the largest home builder center in the service territory, and simple displays with no lending programs at another large store. Manufacturers are invited to participate on separate weekends. Store tracking data is used to measure short-term sales impacts. Other retailers soon pressure BUC to join the program. Advertising is restricted at first to allow the program to get started, but soon competitive advertising is initiated by the stores and the manufacturers themselves. Once larger scale advertising is initiated, manufacturers and BUC sponsored ATU surveys to be used in modeling market penetration as well as to provide feedback on consumer experience. The study stresses the behavior of consumers who voice displeasure with the fact that some lamps are inappropriate for certain fixtures. Data from consumer experience with the CFL's is fed back to manufacturers who begin to refine and adjust the product mix to suit the market and consumer needs. BUC employees find that they are not needed at these large stores anymore as store employees have gained the knowledge necessary to promote CFLs. BUC then begins to concentrate on smaller stores and begins conceptualization of a supermarket display.

Working with the manufacturers, chain stores, and a scanning syndicate, BUC develops a tracking system that reports on the types and quantities of CFLs sold. These data help the manufacturers assess marketing, help the retailers stock inventory, and help BUC evaluate the effectiveness of the market transformation efforts.

Challenges in Implementing Market Research to Support DSM Program Planning

Market research has a substantial role to play in the development and planning of successful market transformation programs. Recognize that true market transformation efforts must evolve over time and that utilities alone cannot affect market transformation solely by their own efforts. By working with the key actors, utilities can hope to stimulate market transformation more effectively.

A number of challenges exist in initiating market research to support DSM market transformation programs. Because of regulatory requirements, program planners may have a very small window of opportunity to initiate market research efforts in support of program planning. It is unrealistic to think that programs that have to be planned and implemented in three months can be affected by the type of market research we have described. An additional challenge is that many utilities have very little real world experience in conducting market research. While utilities generally have market research departments, research techniques used in product development are generally underutilized. Finally, and perhaps most critically, utilities may be constrained financially to support extensive market research activities.

These challenges can be addressed effectively. If a program has a short implementation lead time, it becomes beneficial for the planner to identify the most critical questions needed to move the program forward. The research technique must thoughtfully match strategic planning needs. The fact that utility market research departments have little experience in conducting product development type research can be alleviated by either hiring personnel or contracting out to companies that have this experience. Nor should financial constraints impede thoughtful DSM planning efforts. DSM market transformation programs not only benefit the utilities and their customers, but the programs also benefit manufacturers, distributors, and retailers. The best market transformation will occur when utilities enter into shared financial ventures with these potential partners.

Conclusions

Market research has a substantial role to play in the development of market transformation programs. The techniques that have been used in developing new products can often be applied to DSM programs. While some techniques have limited usefulness for utility DSM programs, diversity of "tried and true" techniques offer the

planner a cornucopia of methods to answer key strategic questions related to moving the market for energy efficiency products and services. The DSM industry stands to gain long term benefits through understanding the complex relationships that exist between utilities, consumers, manufacturers, distributors, and retailers of energy efficiency products. In the long run, better more informed market transformation programs will be developed by using these techniques.

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