

# **The Increased Importance of National Market Transformation Strategies for Accomplishing Energy Efficiency**

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As utilities reduce their reliance on traditional energy efficiency programs, market transformation efforts become more important as means by which to accomplish long-term energy savings.

This paper will examine the value which market transformation efforts bring to utilities faced with changing regulatory environments. It will examine case studies of nationally-based market transformation initiatives and explore the benefits which these efforts have generated. It will also look at the challenges which these initiatives have faced and assess their success in trying to overcome them.

This paper will analyze the evolution in the means by which utilities have participated in market transformation initiatives—from cost-intensive involvements to less expensive approaches—and evaluate their relative effectiveness. An outline of some upcoming potential market transformation projects will also be offered.

The paper will conclude with an analysis of the future of market transformation. It will look at likely utility responses under a variety of possible future scenarios, explore how market transformation would fare if competing for pooled conservation dollars, and examine other marketplace players to whom market transformation projects can provide benefit (governments, bulk purchasers, etc.) and project their likely activities in this area.

## **BACKGROUND—MARKET TRANSFORMATION AS A STRATEGY FOR ENERGY EFFICIENCY**

Market transformation efforts provide an effective means of accomplishing energy efficiency on a national level. Market transformation strategies help utilities, states, and manufacturers overcome many of the traditional barriers of individual utility programs. Market transformation approaches also help overcome some of the new challenges facing the energy industry in light of utility restructuring.

Individual utility projects in most cases have not resulted in large enough markets to encourage the long-lasting presence of energy efficient products and applications at a reasonable price. After spending millions on individual rebate programs, utilities have all too often seen the price, availability, and purchasing behavior related to high efficiency equipment return to pre-program levels. In contrast, by involving large numbers of utilities and other leaders in the energy industry, market transformation initiatives have shown manufacturers that large potential markets exist for their energy-efficient products, and have encouraged manufacturers to market these products broadly. In the past, manufacturers have lacked clear targets as to what constitute energy-efficient products. Market transformation initiatives provide

manufacturers with consistent energy-efficiency targets used by large numbers of utilities and other stakeholders. As the volume of energy-efficient products becomes large, the per-unit cost of each item decreases, thus enabling these products to do well in the marketplace and enabling utility or other programs to have clear end points.

The Consortium for Energy Efficiency, Inc. (CEE) is a not-for-profit organization whose mission is to bring utilities and other key participants together to promote market transformation strategies that will have a long-term impact on the energy efficiency of products and applications.<sup>1</sup> CEE's utility membership currently serves approximately 30% of the nation's customers. This paper will examine various market transformation approaches that have been shown to have benefit thus far.<sup>2</sup>

## **WHY MARKET TRANSFORMATION PROJECTS ARE ESPECIALLY ATTRACTIVE TODAY**

Over the past several years, some utilities have reduced their funding of energy efficiency programs. With changing utility priorities in the face of industry restructuring, utility energy conservation programs often now lack the level of resources that they had during the height of DSM spending. Many utilities have also changed the emphasis of their energy conservation programs from prescriptive incentive programs

to programs stressing customer service and relationship-building with their key customers.

In light of these changes, market transformation projects are especially attractive today. Even if a utility has fewer energy efficiency dollars to spend than in the past, its dollars, in addition to other utilities' expenditures, can have a significant impact. By being part of a national market transformation effort, cost-conscious utilities can maximize the yield of limited energy efficiency spending.

Utilities can still participate in national market transformation efforts even if they do not have funding for rebates. Utilities can participate in educational or promotional efforts that encourage customers to buy efficient products. To be successful, these educational or promotional efforts must be substantive. At a recent CEE roundtable discussion, elements of a substantive educational or promotional program were discussed. A focused program should identify the regional market barriers that exist for the product or application being promoted, plan a methodology for addressing the major market barriers, and include a means by which to evaluate the impact that the educational or promotional program is having on the local market conditions. In educational and promotional programs, program specificity will result in more impact. Material developed and distributed through an informational program effort should specify names and model numbers of products meeting efficiency objectives, as well as the names, addresses, and phone numbers of retailers or distributors that supply these products. Alternatively, a utility could offer a toll free number service that would provide this service for consumers.

Since the utility is an independent party with strong credibility to consumers relative to energy issues, its educational campaign can be of great value to manufacturers and can help accomplish market transformation. This is especially true where new products that utilize innovative technologies are introduced to consumers for the first time. For instance, in the case of highly efficient clothes washers, which may operate differently than traditional models, utilities' communication of support for these products adds a significant voice to a manufacturer's own promotion of its product.

Since CEE does not include manufacturers as members of its organization, it also serves as a credible, third party independent source concerning the energy efficiency of products. Manufacturers have sought to take advantage of CEE's credibility. When CEE announced its high efficiency clothes washer program, two major American manufacturers intending to market such products asked CEE to be on their press releases. Other credible, third party independent sources such as the Department of Energy and the Environmental Protection Agency can also play this kind of important role in market transformation.

In this period when customer retention is a key issue to utilities, market transformation projects can provide real value to utility customers. A utility identified with helping to bring its customers energy efficient products fosters customer loyalty, encouraging customer retention. In recruiting prospective program participants, CEE has received positive response to its emphasis on this theme. To be successful, however, a utility needs to make sure that its customers know its role in helping to bring them these energy efficient products. This can be accomplished through various promotional pieces, retail site displays, lists of efficient models, and other material that can be produced nationally but imprinted locally with the local utility's name and logo.

In a restructured energy environment, utilities and other parties may be required to perform energy efficiency or to pay into some form of energy efficiency fund. National market transformation projects that go beyond utility boundaries will provide an effective means of accomplishing energy efficiency. Independent power producers and other players, lacking extensive experience in how to accomplish energy efficiency, will seek turnkey projects. CEE, with its comprehensive market transformation program designs, will be in a position to support these needs. If a wires charge energy efficiency fund is created, the monies will not be dictated by utility borders. Whereas in the past, manufacturer incentive programs or product awareness programs of utilities were difficult to administer due to varied utility borders, national market transformation projects are well-aligned with the needs of energy efficiency projects in a restructured energy environment. CEE hopes to play a key role in offering such national projects to utilities, states, regional organizations, or other entities seeking to accomplish market transformation.

## **SUCCESSFUL MEANS OF ACCOMPLISHING MARKET TRANSFORMATION**

A technology needs to be examined individually to determine the market transformation approach that will work best for its particular type of product. Four key market transformation approaches have been shown to be successful and should be considered: (1) common energy efficiency specifications; (2) a contest; (3) other types of direct manufacturer incentives; and (4) bulk purchase procurements. Each approach brings benefits and challenges.

### **Common Specification Initiatives**

Many of CEE's initiatives involve sets of equipment efficiency specifications that utilities in turn use as a basis for all or a part of the efficiency levels of equipment promoted in their programs. By promoting equipment based on speci-

fications consistent with a large group of other utilities' programs, utilities leverage the impact of their programs and demonstrate large markets for energy-efficient equipment. Thus far, CEE has utilized this approach in initiatives concerning high-efficiency clothes washers, commercial air conditioning, residential central air conditioning, and geothermal heat pumps.

In these programs, utilities voluntarily adopt a set of non-exclusive efficiency specifications to help create markets for efficient products. Utilities incorporate the specifications into their own rebate, financing or educational and promotional programs. Utilities benefit from participating in these initiatives in several ways. Since utility and other energy industry experts pool their expertise to develop the efficiency specifications for CEE's initiatives, an individual utility does not have to make a significant investment of resources to analyze products' efficiencies when developing its own program. Also, by using common efficiency specifications, a utility sends a stronger signal, consistent with that of other utilities, to manufacturers relative to the potential market size for high efficiency equipment.

### **The Contest Approach**

In a contest approach, a large pool of funds serves as a prize to encourage the production of a highly efficient product. In such a contest, there may be only one manufacturer who is the winner, but that manufacturer's competitors may also be motivated to come out with more highly efficient products in order to remain competitive. The Super Efficient Refrigerator Program (SERP), which will be discussed below, is an example of a market transformation initiative utilizing the contest approach.

### **Manufacturer Incentives**

Another market transformation approach is to use manufacturer incentives—as in the SERP program—but to offer them to more than one manufacturer whose products meet certain efficiency specifications or rank high in an overall scoring process. Manufacturer incentive programs are based on the principle that utilities can best leverage their incentive dollars when these dollars are given to manufacturers and are applied early in the product development and production process—before distributors and retailers take their commissions—so that commissions are based on a lower starting price. Manufacturer incentives serve then as an alternative to rebates at the retail level. CEE's residential and small commercial lighting program, which involves compact fluorescent lighting, is an example of this type of approach.

### **Bulk Purchase Procurements**

CEE has implemented another market transformation program strategy based on helping to aggregate markets for high efficiency products. CEE organizes bulk purchasers who specify high efficiency as a purchasing criterion. Thus far, CEE has utilized this approach with regard to high-efficiency apartment-sized refrigerators. This approach has also been successfully utilized by NUTEK in Sweden and has resulted in the procurement of a wide variety of products utilizing new technologies—not only for the bulk procurers but for the marketplace at large as well.

## **CASE STUDIES**

The above market transformation approaches have been used in the following initiatives.

### **Residential Clothes Washer Initiative**

One of CEE's most significant initiatives is a clothes washer initiative aimed at promoting residential washers that consume as little as half of the energy and a third less water than standard vertical-axis models. This initiative is based on the use of common efficiency specifications. Until recently, the only washers meeting the CEE efficiency specifications were European horizontal-axis (H-axis) models. Three major American manufacturers, however, will soon be producing efficient clothes washers meeting CEE's specifications.

Already, utilities representing nearly 10% of the nation's residential customers have indicated their intent to adopt CEE's specifications and to offer clothes washer programs. Pacific Gas and Electric, together with local California water utilities, is currently using CEE's specifications in offering incentives to customers that will help cover the incremental first cost of the higher efficiency products. In the Northwest, a group of electric, gas and water utilities is planning to utilize CEE's specifications in a major program to encourage high efficiency clothes washers. Some utilities will offer rebates; others will encourage these products by educational/promotional campaigns.

CEE's clothes washer initiative was introduced late in 1993. One of the biggest challenges of this program has been that, although worth the wait, it will have taken nearly three years until American clothes washer manufacturers will have begun marketing new high efficiency products. This initiative exemplifies the need for patience when undertaking market transformation efforts. As one official from NUTEK, the pioneering market transformation arm of the Swedish government, recently stated at an international workshop on market transformation, "For a good program, what you need

is time'' (Ofverholm 1995). This initiative shows the need to focus on the long-term picture when it comes to market transformation. ''If CEE had not persevered in its clothes washer efforts, U.S. manufacturers may not have gotten the signal that the program was likely to last and may not have developed plans to develop new models'' (Synergic Resources Corporation 1996).

## **Commercial Air Conditioning Initiative**

CEE's commercial air conditioning initiative emphasizes common efficiency specifications for unitary packaged equipment, which represents approximately two thirds of commercial air conditioning electricity demand. Utilities serving more than 15% of the nation's commercial customers have programs that utilize CEE's efficiency specifications. The CEE initiative is based on two tiers of efficiency specifications, one representing the best of products that are currently commercially available, and another that encourages manufacturers to market even more advanced products that for the most part are not yet offered in the marketplace. The number of available models meeting CEE's first tier of efficiency specifications has tripled (from 1300 models to over 4000) since CEE's initiative was launched over two years ago. In contrast, when the program concept was conceived, there were very few available models meeting these specifications. Also, the new proposed ASHRAE 90.1 standards recommend efficiency levels similar to CEE's first tier. Although there are many factors at play, CEE's high efficiency commercial air conditioning initiative is one of the contributing factors to these dramatic advances in the commercial air conditioning market.

Implementing the higher efficiency specifications of CEE's program, known as Tier Two, has proven to be more difficult than implementing Tier One. When the second tier was introduced, it was recognized that the efficiency levels were to be goals for manufacturers to try to meet in two years, though no models were available at those levels at the initiative's introduction. Though the intent was for this second tier to take effect in 1996, there is presently very little product available at these efficiency levels. In retrospect, these Tier Two levels were set too aggressively. A subcommittee within CEE, comprised of utility and other energy experts, has been reviewing CEE's efficiency specifications as well as equipment efficiencies of the highest efficiency equipment presently commercially available. Input has been sought from members of the ASHRAE 90.1 Committee, ARI, and manufacturers. The CEE subcommittee will soon determine whether to revise the specifications for CEE's 1997 and 1998 programs.

## **Residential Central Air Conditioner and Heat Pump Initiative**

CEE's residential air conditioning initiative is based on common efficiency specifications promoting several tiers of efficient air conditioners. Utilities representing more than 15% of the nation's residential customers (and an even higher percentage of the nation's residential air conditioning market) run programs that use CEE's specifications. When the initiative was introduced in late 1994, a readily achievable efficiency tier (Tier Zero) was set into place with the intention that it would no longer be part of CEE's initiative after 1995. By the end of 1995, over 40% of available models met this efficiency specification. As planned, CEE no longer promotes this Tier Zero as part of its residential air conditioning initiative since the market has already been substantially transformed. Instead, CEE is now focusing on Tier One as well as its other, more advanced tiers (Tiers Two, Three, and the Advanced Tier) which promote more stringent efficiency levels starting at 13 SEER and going to 15 SEER and above.

The CEE effort has also contributed to market transformation in other areas. When the initiative was launched, discussions with manufacturers and trade organizations took place to encourage making data available that would allow utilities to better gauge the impact that their programs will have with regard to peak energy demand on peak cooling days. This information in the form of an energy efficiency rating (EER) is now incorporated in the ARI equipment database, which is the key industry source for equipment information.

## **Geothermal Heat Pump Initiative**

This CEE initiative has been aimed at encouraging the continued improvement in efficiency of geothermal heat pumps through the development of common efficiency specifications approximately 10–30% better than found in today's average models. This program is an example of how utilities' focus may change over time. Originally, there seemed to be a number of utilities who wished to promote the most highly-efficient geothermal heat pumps, but it since has become clear that most electric utilities currently wish to encourage almost all geothermal heat pumps. Standard geothermal heat pumps already consume less energy than standard electric heat pump equipment; this may account for why the focused promotion of the most efficient of such models is not a high priority among utilities, except in certain limited parts of the country. A national consortium, the Geothermal Heat Pump Consortium, has formed with the purpose of promoting virtually all geothermal heat pumps. CEE serves as liaison to this national consortium.

## **Super Efficient Refrigerator Program (SERP)**

A second key market transformation approach is the contest approach, best exemplified by the Super Efficient Refrigerator

tor Program (SERP). CEE evolved following the launch of SERP, in which 24 electric utility companies pooled approximately \$30 million to create a contest for the development of a new, highly efficient refrigerator. Whirlpool won the contest and is currently producing approximately 250,000 units that are 30–40% more efficient than the 1993 U.S. standards require. Substantial energy savings, totaling more than 1 billion kWh over the 15 year life cycle of SERP refrigerators, will result based on the installation of the SERP units. The SERP strategy was to achieve high cost-effectiveness as a result of providing the incentive directly to the manufacturer instead of the customer. Though the SERP unit itself may not continue after the program ends, other long term market transformation impacts have resulted. SERP has shown that high-efficiency models that do not use chlorofluorocarbons (CFC's) could be built. The SERP model also showed those who develop Federal refrigerator standards what levels of efficiency can be achieved with presently available technologies. This case study is evidence that even market transformation efforts that do not result in a long-lasting market for a particular product model can nonetheless have an impact. More efficient refrigerators utilizing various individual components of the SERP refrigerator may result from this effort. Additional market transformation refrigerator initiatives should help encourage these more efficient models.

A key lesson learned from the SERP effort is that the detailed tracking which Whirlpool offered to perform has proven to be quite complicated. Thus, future market transformation programs need to be evaluated not based on the tracking of each end-user, but on various measurable market indicators. A discussion of various potential means of evaluating market transformation projects may be found in the market transformation guidebook commissioned by the National Association of Regulatory Utility Commissioners (Synergic Resources Corporation 1996).

## **Residential and Small Commercial Lighting**

A third key market transformation approach involves direct manufacturer incentives as an alternative to consumer rebates. CEE's lighting initiative is aimed at increasing the market penetration of compact fluorescent lighting (CFLs) in residential and small commercial applications through manufacturer incentives. In marketing the initiative, a lot of discussion took place regarding the effectiveness of manufacturer subsidies as opposed to the commonly supported coupon approach for CFLs. A number of Northwestern utilities are currently implementing a CFL program based on CEE's program design, as is the Sacramento Municipal Utility District (SMUD). CEE, the U.S. Department of Energy, and local utilities are presently co-funding the measurement and evaluation of the Northwest project to measure the success of this manufacturer subsidy strategy. The results of

this study will be informative not just for the CEE lighting initiative and for evaluating the success of a manufacturer subsidy program but also for the evaluation techniques utilized to measure this market transformation initiative.

## **Apartment-Sized Refrigerator Initiative**

Bulk procurement initiatives are another means of achieving market transformation. In today's changing regulatory environment, new approaches to market transformation may include additional market players besides utilities. Bulk procurement initiatives may be of particular interest to housing authorities and government entities.

CEE has recently launched a bulk procurement initiative involving energy-efficient apartment-sized refrigerators as a means of encouraging market transformation. This program could serve as a model for other bulk purchase initiatives which CEE may launch in the future.

This project seeks to leverage bulk purchases by utilities, public housing authorities, and certain other large purchasers to help create a sizable market for significantly more efficient 14-ft<sup>3</sup> size refrigerators. A new model has been produced by a leading American manufacturer that will be 30% more efficient than federal standards and will be competitively priced for this bulk purchase in 1997. This effort is based on a bulk purchase initiative of the New York Power Authority in conjunction with the New York City Housing Authority and is being strongly supported by the U.S. Department of Energy.

As a result of the success of this initiative, CEE is exploring other possible bulk purchases including a possible clothes washers bulk procurement effort based on retrofitting residential models for small commercial use. CEE is also considering a bulk procurement initiative for heat pump water heaters.

## **New Trends in Market Transformation**

Utilities' motivations for participating in market transformation efforts have evolved as a result of utility restructuring. For many utilities, customer retention is a higher priority than demand side management, and utilities are seeking customer loyalty by becoming more service-oriented. Several utilities that have recently joined CEE have cited the goal of achieving customer loyalty as part of their motivation for participating in CEE's initiatives.

Commercial and industrial programs are becoming increasingly important subjects for market transformation projects as a result of utility restructuring. Commercial and industrial customers are important to utilities because of the size of the loads that they represent. Market transformation programs in

these areas not only save a significant amount of energy, but are also important to utilities because of the value that they help utilities offer to large customers whom they are eager to retain.

For over a year, CEE's motor systems subcommittee has been exploring the launching of a CEE initiative to encourage market transformation with regard to motor systems. A first step in this effort has involved the drafting of a proposed set of high-efficiency tiers for motors.

Another CEE subcommittee is investigating the market transformation value of a chillers system initiative. The emphasis of this proposed initiative has evolved during the course of this subcommittee's work from emphasizing prescriptive incentive programs to a focus on training materials that would help train utility engineers and others on how to implement the most efficient chiller systems. This movement towards increasing the efficiency of applications in addition to the products themselves reflects a growing CEE trend in designing market transformation initiatives.

## **REQUIREMENTS FOR SUCCESSFUL MARKET TRANSFORMATION INITIATIVES**

Market transformation initiatives in the future will need widespread geographical support in order to be successful. They will require the involvement of large markets from many states. State policies concerning market transformation must be established in advance so that utilities within a state will know whether they can participate in national market transformation initiatives that are offered to them.

Consistency of efficiency specifications is also very important. It is important that large numbers of utilities from various states use common efficiency specifications as the basis for all or part of their efficiency specifications in their programs for a technology. It is also critical that multiple market transformation efforts promoting a particular technology support consistent efficiency specifications. In the

case of CEE's residential air conditioner initiative, for example, two other market transformation efforts—the Energy Star Program and the Green Seal effort—both encourage efficiency levels consistent with CEE's Tier One efficiency specifications.

Market transformation efforts in the future will also require appropriate, cost-effective means of measuring and evaluating the impact of such efforts. Methodologies may be new and may rely on general sales data and projections rather than on tracking individual end-users. After programs are evaluated, and the evaluation is positive, utilities need to receive the appropriate credit for the resulting market transformation. Without such credit, utilities might not be willing to undertake market transformation efforts. With proper acknowledgment, more participants are likely to take part in market transformation initiatives, contributing further to their success.

## **ENDNOTES**

1. CEE's work is made possible in part thanks to grants from the U.S. Department of Energy and the Environmental Protection Agency.
2. An earlier analysis of CEE's programs may be found in Tatsutani, M., "Market Transformation in Action: A Report from the Consortium for Energy Efficiency," *Energy Services Journal*, Vol. 1, No. 2, December, 1995.

## **REFERENCES**

Ofverholm, E. (NUTEK). Communications at the U.S. DOE TIPS/IEA Annexe III Conference, Washington, D.C., November 15, 1995.

Synergic Resources Corporation, "Market Transformation in a Changing Utility Environment, A Guidebook for Regulators," Final Draft prepared for the National Association of Regulatory Utility Commissioners, January, 1996, p. 2–21.