

# Market Transformation Programs Help Utilities Meet Customer Needs and Environmental Challenges

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Market transformation programs are growing in importance to help deal with growing concerns about greenhouse gas emissions on a global perspective and with high energy costs in certain areas of the United States and Canada. Market transformation (MT) generally refers to the process by which collective action, policies, and programs affect a positive, lasting change (or market effect) in the market for energy-efficient technologies and services.

The market transformation effort should ensure that these technologies and services are produced, recommended, and purchased in increasing quantity. Market transformation programs focus on changing the operation of a particular market. They are designed to create long-term impacts that continue to occur after the MT intervention has concluded, thus creating permanent market changes. The objective of an MT program is to reduce or remove specific market barriers, such as performance uncertainties of energy-efficient technologies, lack of information available to consumers, lack of financing, or risk tolerance (consumers may not want to be the first to try a new technology). Reducing market barriers is expected to have short-and long-term effects that increase the proportion of customers who decide to acquire more-efficient equipment or efficiency practices. The immediate objective and action is the reduction of the barrier, not necessarily affecting the final purchasing decision, which may not occur for years to come. The performance metrics or indicators of market effects developed to track program success must be sensitive to the issue that program results will not be immediate, but will likely be achieved gradually.

Utilities such as Boston Gas Company have developed indicators designed to measure market changes due to the implementation of such programs. It is necessary to measure indicators of program market effects not only because of the difficulty in measuring the final purchase behavior, but also because changing these market elements is truly the objective for which the MT program is designed.

Planning MT efforts involves examining the market elements, steps, and actors involved in the purchase decision process. From this, market barriers are identified and strategies are designed to overcome those barriers. Most MT approaches are attempting to overcome a barrier that is stalling the adoption cycle for a particular efficiency technology or moving up in time the technology adoption cycle. In essence, the benefits are achieved by moving forward the accelerated portion of the market penetration curve, or S-curve.

Measurement of the benefit of the MT effort is derived from the space between the old and the new adoption curves as shown in **Exhibit 1** below.

### **Industry Restructuring**

What is driving the demand for market transformation programs? It is driven by regulation of gas and electric utilities in the United States and Canada. In the 1970's through the early 1990's the regulatory paradigm incorporated investing in energy efficiency first as a response to fear of fossil fuel shortages and rising oil prices, then to increase national security; least-cost utility planning (comparing supply-side to demand-side options); and lately, adverse environmental impacts of energy usage and production. Associated with these changing perspectives was the movement from examining the costs of energy provision from the viewpoint of the utility to a broader view of the overall costs to society.

The framework for these regulatory directions took place in a largely vertically integrated utility industry with strong federal and state regulatory review. The energy-efficiency investments were made as part of a philosophy of low-cost resource acquisition (least-cost planning and demand-side management (DSM) in place of acquiring additional supply resources). This philosophy became part of the planning process of resource acquisition in the 1980s known as the integrated resource planning (IRP) framework.

As changes in regulation (deregulation) and industry restructuring has occurred in the 1990s, the supply acquisition framework has changed to a less-vertically integrated utility industry. In many U.S. states, Canada and many foreign countries, the supply portion of utilities has been deregulated. The remaining regulation is more focused upon the transmission and distribution element of energy provision. The IRP model, which focused on least-cost planning for new supply and demand-side energy resources, no longer fits well in a distribution-only framework. Nevertheless, policy-makers still see the positive societal and environmental benefits of energy efficiency. Both justification for and how energy efficiency investments should be made within this new environment are examined in this paper.

### **IRP model, which focused on least-cost planning for new supply and demand-side resources, no longer fits well**

Generally, the societal benefits are seen as warranting utility funds (often a surcharge or a nonby-passable wires charge on the utility bill to fund efficiency programs). Rather than purchasing resources in the form of energy saved (“negawatts”) as in the long-term planning perspective of IRP, today the impetus is to encourage the development of energy efficiency and the reduction or removal of market barriers in order to avoid societal costs such as negative environmental impacts.

An important step in the process in California was the adoption of the philosophy that the justification for intervention in these markets was that the market did not operate efficiently to produce the energy-efficiency levels that appear cost-effective for customers to choose. This created the backdrop for work on the barriers in the markets that were not allowing these more-efficient technologies and/or services to be more widely adopted.<sup>1</sup>

The philosophy of market transformation (MT) efforts is to use innovative initiatives to assist in permanently changing markets so that energy efficiency can be obtained at the lowest cost and with reduced long-term utility intervention and subsidization. Once there are no market barriers in the way of this demand or of its supply, sustainable markets that allow for adoption of energy efficiency at a level commensurate with its benefits are expected to be achieved.

**The philosophy of market transformation (MT) efforts is to use innovative initiatives to assist in permanently changing markets so that energy efficiency can be obtained at the lowest cost on a sustainable basis**

**The long-term perspective of market transformation holds with it the hope that it may be much more cost-effective in the long run than the resource acquisition (prior DSM) perspective. As MT efforts begin to work, the market itself begins to increase the adoption of energy efficiency and increase energy savings. A self-sustaining market that is transformed to include large penetrations of energy-efficient products/services will obtain energy savings without continual utility costs or rebates necessary to purchase those savings. Examples of Market Transformation Projects**

Many examples of this new approach exist today in the United States and Canada.

### ***Gas Heating Equipment in Massachusetts***

Boston Gas Company and other gas utilities in the Massachusetts Gas DSM Collaborative are currently conducting baseline and market assessment studies of the high-efficiency gas heating equipment market to determine how to increase the penetration of high-efficiency units. These studies are using a range of market research techniques :

1. Characterizing the operations of the high-efficiency gas heating equipment marketplace and how the various market actors interact
2. Identifying barriers preventing the installation of high-efficiency equipment
3. Assessing baseline efficiency levels of recently installed equipment
4. Identifying the quality of installation practices and procedures used by installers of gas furnaces and boilers

Market research techniques being used include mail surveys, site inspections, in-depth interviews with market actors (plumbers and contractors who install equipment, equipment distributors, and design engineering firms) and content analyses of advertising being done by utilities and heating equipment trade allies.

The seven gas company members of the Massachusetts Gas DSM Collaborative have completed 100 site inspections of residential high-efficiency furnace and boiler installations, and an additional 100 site inspections of commercial installations of high-efficiency equipment for the baseline installation assessment. The site surveys are designed to collect detailed information about whether installers are

following equipment installation procedures and practices recommended by manufacturers. The installation practices covered by the site surveys include equipment placement, equipment exhaust venting, air intake, condensate drains, equipment controls, physical mounting of the unit, and heat distribution systems. The site surveys also collect information about the customer's perceptions of the performance of high-efficiency furnaces and boilers. Detailed findings from the site surveys were filed with the Massachusetts Department of Telecommunications and Energy in November 1998. The members of the Gas DSM Collaborative will measure the quality of installations of heating equipment again in 1999 to determine if the collaborative's high-efficiency heating equipment market transformation program is having a positive effect on installation quality. This indicator of market effects is one of many indicators being used by collaborative members to determine the success of its market transformation programs.<sup>2</sup>

#### ***Studies for Utilities in Massachusetts and Rhode Island***

Nine electric utilities in Massachusetts and Rhode Island are developing market assessment and baseline characteristics for the residential new construction market in southern New England. Primary research tools include a mail survey, site surveys of new homes, in-depth market research interviews, and content analyses. These utilities completed a market progress report summarizing the state energy efficiency practices in the new construction market in late June 1999.

#### ***Market Transformation Planning for Boston Edison***

Boston Edison (BECo) is required to spend approximately \$250 million over a five-year period to implement energy efficiency, renewables and market transformation programs. Since May 1997, Boston Edison has been very busy developing market-transformation-program designs, evaluation plans, and budgets for the company's five-year energy efficiency plan. The Boston Edison plan includes over a dozen new market transformation programs. BECo also conducted cost-effectiveness screening for all of the new initiatives included in the plan. The initial five-year plan was filed with the Massachusetts DPU on September 2, 1997, and was updated in July 1998. During the fall of 1997 Boston Edison combined numerous market transformation program initiatives and developed performance indicators for these programs. Boston Edison has been assisted in its MT planning efforts by GDS Associates and other

subcontractors, including the American Council for an Energy Efficient Economy (ACEEE), CNEX, Energy Access, Shel Feldman Management Consulting, and Megdal & Associates.

***California Board for Energy Efficiency (CBEE)***

The California Board for Energy Efficiency (CBEE) is directing its utilities to work cooperatively towards statewide market transformation programs. Though organizational structure for future administration of these programs is still being decided, the changes are being undertaken with the thought of there eventually being one statewide entity that will manage market transformation programs in California. All of the utilities are moving towards common programs as seen in their 1999 Advice Filings and as recommended in the CBEE's 1999 Advice Filing. Many of these efforts have a market transformation focus with program descriptions that include identification of market barriers, interventions that target these barriers, and expected market effects to be caused by the programs. Pacific Gas & Electric Company is leading the effort to have baseline studies and market characterizations created for markets targeted by a number of their programs. (For example, the commercial energy audit program (BEMS) has such a study being conducted by Quantum Consulting, Xenergy, and Megdal & Associates, and PG&E's commercial-industrial rebate program is also being examined by this same team under Xenergy's leadership.)

***Northwest Energy Efficiency Alliance***

The Northwest Energy Efficiency Alliance (NEEA or the Alliance) is a nonprofit consortium of energy organizations in the Pacific Northwest of the US serving the states of Washington, Oregon, Idaho, and the western portions of Montana. NEEA was organized in October 1996 and is currently providing over \$65 million from 1997 through 2000 concerning over 30 market transformation efforts. Almost all market transformation efforts conducted by the utilities in NEEA's region are conducted through NEEA. Generally, these MT efforts receive initial measurement and process evaluations and then have measurement efforts providing market progress reports every six months to a year thereafter.

### ***Northeast Energy Efficiency Partnership (NEEP)***

The Northeastern United States also has a regional MT effort supported by the Northeast Energy Efficiency Partnerships (NEEP). NEEP started in 1996 and is a nonprofit supporting regional MT efforts in New England and the mid-Atlantic states of New York and New Jersey. Somewhat different than NEEA, currently NEEP has regional initiatives, while many of the utilities in the NEEP region also have additional MT programs on-going. NEEP's projects through 1998 include:

- Energy-efficient commercial lighting design
- Energy-efficient residential lighting fixtures
- High-efficiency clothes washers and ENERGY STAR appliances
- Premium motors
- Energy-efficient air conditioning (HVAC) equipment and practices, both residential and commercial
- Improved energy codes for homes and buildings

### ***National/International Initiatives by the Consortium for Energy Efficiency***

The Consortium for Energy Efficiency (CEE), headquartered in Boston, has membership from a wide range of local utilities, regional organizations, national, and international organizations. CEE was organized in 1991 as a public benefit corporation to actively work in conjunction with these organizations to promote and support national market transformation initiatives. It facilitates market transformation by helping to establish common specifications for the definition of high-efficiency being promoted, direct contact and members with manufacturers, and encouraging common programs by local and regional entities so the efforts may work synergistically to promote transformation throughout North America. Local efforts without this coordination may otherwise be conflicting with one another and be seen as transitory by suppliers. CEE's initiatives has thus far included the following initiatives:

- Super-efficient apartment-sized refrigerators
- High-efficiency clothes washers
- High-efficiency commercial central air-conditioners and heat pumps

- High-efficiency residential central air-conditioners and heat pumps
- Residential and small commercial lighting
- Premium-efficiency motors
- Super-efficient home appliances

***Direct program implementation occurs at the local utility or regional cooperative level. As such, most of the initial measurement and evaluation has occurred at these levels. Some of the first evaluation efforts for CEE's component of market transformation is just being undertaken***  
***Ontario Gas Utilities Examine Market Transformation Approach***

The major gas utilities in Ontario, Canada, Union Gas Company and Enbridge Consumers Gas, have begun incorporating market transformation approaches in their demand-side management plans. They are also working together to examine the advantages of the MT approach and how best these should be used and measured in their region.<sup>3</sup>

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<sup>1</sup> An oft-cited study examined the issue of market barriers and market transformation in the field of energy efficiency, based upon many of the concepts from transaction cost economics: Joe Eto, Ralph Prah, and Jeff Schlegel, *A Scoping Study on Energy-Efficiency Market Transformation by California DSM Programs*, (California Demand-Side Measurement Advisory Committee (CADMAC) Project 2091T, Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, California: LBNL-39058, 1996).

<sup>2</sup> These measurement and research studies are being conducted by GDS Associates and subcontractors, to include Megdal and Associates, Shel Feldman Management Consulting, CNEX, DataStar, Aspen Systems, and others



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<sup>3</sup> They are receiving some technical assistance in this matter from Megdal & Associates with Richard Spellman of GDS Associates as a subcontractor.