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Market-Based Utility DSM Programs

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Tables and Figures

Table A-1  Summary of major market-based DSM programs ..................... A-1
As utilities prepare for restructured, competitive electricity markets, many have found it necessary to cut costs. During this transitional period, what can utilities do to continue providing energy-efficiency services while minimizing program costs? How can energy users be induced to conserve without rebates, give-aways, and cash incentives? How can energy-efficiency efforts be supported now to provide continuity for future efforts? This paper presents five options for continued low-cost, participant-paid, market-based energy-efficiency efforts: low-cost outreach and educational programs, consulting for customers and other utilities, retail activities, financing, and innovative rate structures. We also explore market-transformation collaboratives and a market-based DSM experiment in New London, Wisconsin, that combines multiple approaches.
Introduction

As utilities prepare for restructured, competitive electricity markets, many have found it necessary to reduce costs as much as possible. One of the first costs many utilities have reduced or eliminated is energy efficiency, or demand side management (DSM) programs. Utility expenditures on DSM in Wisconsin have fallen from $152 million in 1993 to $72 million in 1995 (Public Service Commission of Wisconsin, 1996 and 1997).

While funding may be diminishing, the original justifications for DSM have not disappeared. The production of electricity still results in external costs, mainly pollution, that can be reduced by energy efficiency; the economic costs of inefficient energy use remain high to society; end users are not always aware of long-term energy costs or knowledgeable of alternatives; and the initial costs of more efficient equipment is often a barrier to implementation.

From the utility’s perspective, energy efficiency can still reduce the need for increases in generation and transmission capacity, reduce emissions and exposure to new environmental regulations, stabilize planning and decrease the risk of fuel cost fluctuations, and be a key component of customer service. Energy efficiency can also cost less than generation.

Recent scholarship suggests, though, that “while the principles that underlie DSM programs are unchanged—improve economic efficiency and reduce the environmental impacts of the electric system—the magnitudes are different.” (Hirst & Eto, 1995)

Due to the low cost of natural gas, excess generating capacity and competitive wholesale markets, utility avoided costs have declined significantly since 1980, from about 10¢ per kilowatt-hour to about 3.5¢. To be cost-effective, DSM efforts must cost less or the same as the avoided cost of power. On the other hand, improvements in technology and delivery methods have lowered the cost of many utility DSM programs. But even with lower avoided costs, there remain significant cost-effective energy-efficiency opportunities.

Due to more stringent regulations and improved control technology some environmentally damaging pollution has decreased, namely sulfur dioxide. Sulfur oxide emissions from Wisconsin coal plants have fallen 63 percent since 1980, even while coal use rose by 50 percent (Wisconsin Energy Bureau, 1995). Nonetheless, increased demand for electricity has raised emissions of nitrogen oxide and carbon dioxide. Also, because more is known about the sources and effects of small particulates and airborne toxins like mercury, new regulation is more likely.

And though competition seems to be coming to the electric industry, important parts of the utility system are likely to remain regulated monopolies. Regulated
distribution companies may take over traditional DSM programs, or they may be provided under public benefits funding mechanisms.

Moreover, current utilities that are transformed into “energy service companies” will probably offer energy-efficiency measures as a customer service. DSM programs offered now will provide important groundwork for energy service offerings in the near future.

It is critical for a utility in today’s market or in future markets to reduce costs. The question that needs to be answered in this transitional period is, what can utilities still do to provide energy-efficiency services while minimizing program costs? How can energy users be induced to conserve without rebates, give-aways, and cash incentives? How can energy-efficiency efforts be continued to provide continuity for future efforts?

This paper presents five options for continued low-cost, participant-paid, market-based energy-efficiency efforts: 1) Low cost outreach and educational programs, 2) consulting for customers and other utilities, 3) retail activities, 4) financing, and 5) innovative rate structures. Participation in market-transformation collaboratives is discussed as a multiple-category option. Finally, a discussion of a market-based DSM experiment in New London, Wisconsin, is included as a case study that combines multiple approaches.

Who Benefits?

The private benefits of energy efficiency—in the form of direct savings on power expenditures, for example—have always existed and will continue to exist under a restructured electric industry. A major concern for regulators, however, is that the public benefits of energy efficiency will cease to be valued. Under the current regulatory structure, many state utility commissions mandate energy-efficiency measures, financed by all utility customers. Utilities consider DSM a “resource acquisition”, since it reduces the need for investment in new plants and equipment. As long as the energy-efficiency measures reduce system costs, then all utility customers share in the benefit; it is fitting then that all should share the cost. Other public benefits of energy efficiency, such as reduced pollution and dependence on foreign energy sources, are theoretical justifications, but are not typically included in the cost-benefit calculations.

Moreover, energy efficiency faces a number of barriers to implementation. Energy efficiency is often less expensive than generation. Yet traditional utility regulation, which gives a return to investors based on capital investment in power plants and other equipment, acts as a disincentive for efficiency. Also, many efficiency measures justified in terms of private costs and benefits are not implemented due to high initial costs, lack of consumer awareness, and other market barriers.
Critics of traditional utility DSM point out that while all may enjoy the indirect benefits, a select few are enjoying the direct benefits of reduced electric bills. Moreover, many of those receiving subsidized efficiency measures would have made those improvements anyway—they are “free riders.” They argue that economic efficiency dictates that energy efficiency measures be made only when the benefits of making them exceed the costs.

Who Pays?

As market features are introduced to the utility industry, traditional DSM activity is being reduced or eliminated. Direct financial incentives, such as rebates and subsidies, no-interest loans and free audits, have been dropped as utilities seek to cut costs. Which measures survive in a competitive electricity marketplace will be determined by new regulatory structures, the market value of energy-efficiency services, and continued government interest in energy efficiency.

Recently experts have argued that some energy-efficiency measures will be adopted as marketing tools. Informational and educational energy-efficiency programs are “typical customer service activities,” they argue, and energy audits are an effective entrée to selling other energy services. Competitive electricity suppliers are likely to offer education and audits to retain customers and load. (Eto et al., 1996)

Utilities in competitive markets will likely shun other traditional DSM measures. Because of this, some argue, some DSM programs should be funded by mandatory fees on ratepayers. The California Public Utility Commission has advocated that ratepayer funds be used to educate residential and small business owners and for market transformation. (Eto, Goldman, & Kito, 1996)

The most commonly proposed mechanism for continued ratepayer funding of energy efficiency is a distribution charge (also called a systems benefits charge or line access fee). Proposals vary on the amount of the charge and who pays it, but most say that it should be non-bypassable and based on energy use. Washington Water Power has had such a charge in place since 1994 (Baxter, 1996). In many proposals, the fee would also fund low-income assistance, research and development, and renewables.

In Wisconsin, the Public Service Commission has developed a proposal for continued support for DSM under two Public Benefits Advisory Councils.

- The Low-Income Services Council would look at low-income weatherization programs, early identification programs, low-income energy bill-paying assistance, and proactive crisis management. This council would be a permanent entity attached to the Department of Administration
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- The Energy Council would address the development of demand-side management (DSM) markets; the efficient delivery of conservation services, research, development and demonstration of DSM; consumer education on the benefits of DSM and renewable energy; and research, development and demonstration of wind, biomass, and solar energy alternatives. This council would be attached to the PSC for a 7-year sunset period.

The annual budget for DSM work was set at $100 million. (For comparison, total DSM spending in 1993 was $152 million. In 1995, it was $72 million.) Funding would come from gas and electric utilities based on a BTU calculation. Each council would be an 11-member organization with representatives from diverse constituencies. (Public Service Commission of Wisconsin, 1996 and 1997)

Market-Based Energy Efficiency Programs

Traditional, participant-paid utility approaches to DSM include rebates and subsidies, free services (such as audits), cash incentives for interruptible load or load shifting (like air conditioner or water heater load control), and no-interest or low-interest loans. Utilities may continue to offer all of these measures, but against the backdrop of restructuring, many utilities are wondering what energy efficiency activities they can continue to offer without making large expenditures.

There are a number of existing and proposed approaches to utility DSM that do not involve direct financial incentives, or even substantial utility outlays. These market-based approaches shift the cost burden to those who benefit. They take advantage of market forces to improve the economic viability of the programs. Some of the measures require investments, but also offer direct financial returns, like any normal business venture. While no utility efficiency activity is completely “free,” these approaches offer low-cost alternatives to traditional rebates, subsidized loans, and incentive programs.

Market-based approaches have been gathered here into five categories.

- **Outreach programs** include informational and educational programs, product certification, and cooperation with trade allies and retailers.

- **Consulting** includes offering the in-house expertise of utility staff to both customers and other energy companies. In either case, full cost is charged for the service.

- **Retail activity** includes offering energy-related services (such as appliance repair), leasing energy-efficient equipment, and retailing energy-efficient equipment directly to customers. Also, the utility can arrange bulk purchases of equipment for groups of customers, acting as a wholesaler.
• Financing has been an option for many utilities in the past. Utilities or third parties can offer standard loans at profitable rates, or offer other innovative financing methods such as “positive cash flow” financing. Performance contracts are another approach, where customers pay only for each kWh of energy saved.

• Innovative rates can be offered, such as time-of-use pricing and demand charges, real-time pricing, and demand-side renewables funded through green pricing.

Another major activity that falls into multiple categories is market transformation, in which utilities pool their funds in collaboratives to provide incentives for fundamental market change. As an outreach activity, it may involve setting standards and promoting awareness; as a retailing activity it can involve bulk purchases of a particular technology (such as energy-efficient refrigerators).

A common feature of many innovative utility programs is that they incorporate multiple objectives and methods. An efficiency program directed at a school, for example, provides savings as well as customer education; it may incorporate innovative financing methods; and because of a school’s visibility in the community, it provides a high-profile marketing method, creating good will among customers and free publicity.
Outreach Programs

Informational and Educational Programs

Informational programs are probably the most common non-subsidy method of promoting energy efficiency. Bill stuffers, newspaper and TV advertising, and billboards have all been used to promote not only DSM but also the sponsoring company. As utilities prepare for competition, informational approaches have been a popular way to achieve two objectives: low-cost energy efficiency and market positioning.

Educational programs and materials are another way to increase efficiency without cash incentives. An additional benefit to the utility is that educational efforts can also promote the company as a knowledgeable provider of gas and electricity, energy services, and information. Many utilities offer schools programs, informational pamphlets and books, and other outreach efforts.

Examples

One study of the advertising for British Columbia Hydro’s Power Smart program used time series modeling to estimate the effects of advertising on consumer awareness and efficiency decisions. After four years of operation, the program had an awareness level among BC Hydro customers of 95 percent. Advertising and other promotional programs in 1991 and 1992 resulted in a 13 percent increase in weatherization sealing, and a five percent increase for insulation, windows, and doors. Advertising had less influence on “soft” measures—behavioral changes such as turning lights off. BC Hydro spent only $2.4 million per year on communications and advertising but the study identified savings of almost 20 GWh per year. (Keane & Tiedemann 1996)

Although specific Power Smart programs had varying effects, the single most important influence on energy savings was time. A key feature of advertising is that while it takes longer to have an effect, the effects can last longer than traditional hardware replacement. Other research has argued in favor of “social marketing,” educational approaches that reduce market barriers to energy efficiency and prolong the savings. While outreach programs can be difficult to measure, they can have a greater overall effect by reaching more people. (Kiefer, LeBlanc, & Feldman, 1994)

There are equally numerous examples of utility education programs. One new approach is a collaboration between the Dane County Library Service, Madison Gas & Electric Company, and the Energy Center of Wisconsin. Funded by a grant from the Wisconsin Environmental Education Board, the collaboration involves community outreach through seminars and events for library patrons as well as providing energy-efficiency material for library collections.
While it is true that government and foundation grants are not always available, education programs can recover costs through other means. From 1990 to 1995, Madison Gas & Electric sold over 300 copies of the “New Home Planning Book” for $10 per copy to prospective home buyers. The book was advertised through bill-stuffers and ads in a real estate magazine. Since 1995, however, the company has stopped advertising the book and instead given away about 150 copies to libraries, schools and builder training sessions. MG&E has reprinted the book, and may again start selling it. (Dave Borski, Madison Gas & Electric Company, personal communication, 1996)

The Bonneville Power Administration has taken a similar approach with compressed air efficiency. Bonneville developed Air Master software from audits at seven industrial plants. The software presents a “self guided tour” for plant managers to assess their own compressed air systems. Through a series of twenty questions, Air Master helps determine if an audit should be undertaken and where the problem areas are likely to be found. Bonneville began selling the software in the fall of 1996. (Karl Vischer, Bonneville Power Administration, personal communication, 1996)

In New York State, a study of Niagara Mohawk residential customers found that education enhanced the effectiveness of a low-income weatherization program. Two groups of low-income customers were studied for the persistence of energy savings at one and three years after initiation of the measures. One group was given only weatherization, while the other was also given education and a programmable setback thermostat. The educated group had greater savings in the first year (24 percent versus 14 percent) and more in the third year as well (20 percent versus 13 percent). (Harrigan & Gregory, 1994)

The U.S. Environmental Protection Agency is testing a different approach to information and education. Their Energy Star Billing program promotes efficiency by providing residential customers with detailed information about their electricity use and comparing it with similar households. Municipal utilities in Iowa and California are testing a bill format that gives a household a graphical representation illustrating how their electricity use compares with similar households in their neighborhood. In a pilot program in the 1980s, Madison Gas & Electric provided an annual report to customers, comparing current energy use with the previous three years. This report resulted in audit requests from 15 percent of their customers. Since Energy Star Billing involves only a computer programming change and slightly more printing on a bill, implementation costs are very low. (Lord et al., 1996)
Certification and Labeling Programs

Another approach to customer education is to provide them with expert advice on energy use when they make purchasing decisions. Product certification or endorsement can be a way to provide customers with simple and clear direction at the time when it may be most effective. The program could involve choosing or testing the products to certify, making arrangements with manufacturers and retailers, and promoting the certification to the public.

The process of testing and certifying a product could be as elaborate as full in-house testing, or as simple as using manufacturers’ data. It could also involve using the ratings of a third-party certification company, such as Green Seal, Scientific Certification Systems, or Power Smart. While some of these companies rate products on a wide range of environmental impacts, a utility’s certification program could be limited to energy use.

Once products have been selected and certified, it may be necessary to make contractual arrangements with manufacturers and retailers. Some programs charge fees to manufacturers and involve using a certification logo on the product itself. At the very least, utilities likely need to get permission from the companies to use their products in a promotion.

Finally, buyers must be made aware of the certification. One approach is to use publications and advertising to promote endorsed energy-efficient products. Another is to get manufacturers to include the certification logo on their products. A third method is to use point-of-purchase labels, shelf signs that promote the product in the store.

Examples

The Northwest Energy Efficient Manufactured Homes Program arose from the Manufactured Housing Acquisition Program (MAP), a cash incentive program for builders of manufactured homes. The MAP program was an effort funded by the Bonneville Power Administration to transform the market for manufactured homes in Washington, Idaho, Oregon and Montana. It provided a direct cash payment to builders who followed the energy-efficiency specifications of the program, which were more demanding than codes required by the Department of Housing and Urban Development (IRT, no. 30). The $100 million program was very successful, garnering virtually 100 percent participation while active, and permanently transforming 75 percent of the market (Peach, Brandis, Bonnyman, & Persson, 1996).

When Bonneville reduced funding for DSM in 1995, the MAP program was taken on by various state energy offices in the Pacific Northwest, which transformed it into a certification program. Home builders who still built to the
higher code were certified by the program as energy-efficient, and the certification was promoted by the states and participating utilities. The program is fuel-blind and is not subsidized by utilities. (Eklund, Hewes, Lineham, & Lubliner, 1996)

In a similar approach, Bonneville has operated a home appliance labeling program that builds on the US Department of Energy’s standard appliance label. The “Blue Ribbon” program is a point-of-purchase label that endorses certain appliances that are in the top of their category for energy efficiency. The program uses manufacturer data on energy use. (Abt Associates, 1994)

Power Smart, a Canadian firm founded as the in-house DSM program of British Columbia Hydro, offers an extensive labeling program for energy-efficient products. Currently, Power Smart has certified 2000 products from 130 manufacturers in 55 categories ranging from appliances and lighting to motors and faucets. Products endorsed by Power Smart must be in the top 20 percent of their category for energy efficiency and meet environmental guidelines as well. Endorsed products are permitted to carry the Power Smart logo, which is the same as that used by member utilities for their energy-efficiency programs. Surveys of customer awareness have found that 50 percent of Canadians surveyed were familiar with the program, with awareness as high as 90 percent in British Columbia. (Peter Vickery, Power Smart, personal communication, 1996. See also the Power Smart web site at http://www.powersmart.ca)

The U.S. Environmental Protection Agency’s Energy Star program offers a certification for computers, printers, and copiers that have specific energy saving features. When the certification was combined with an Executive Order that required government purchases to be Energy Star-certified, participation by the computer industry rose to over 60 percent. Recently, EPA has begun the Energy Star HVAC program, promoting efficient heat pumps, air conditioners, furnaces, and thermostats. The program involves certifying products, offering the use of a logo, running consumer and dealer awareness promotions, and working with lenders to promote financing for energy-efficient equipment. (May et al., 1996)

By promoting Energy Star equipment, utilities avoid the cost of developing certifications on their own. Moreover, EPA’s promotional efforts would complement their own and give added credibility.

Cooperating with Trade Allies and Retailers

A common way to keep costs low is to share them with others. By collaborating with trade allies and retailers, utilities can leverage their efficiency efforts and provide a source of income for companies that sell energy-efficiency services and products.
Cooperative ventures may be difficult under a restructured utility industry. As utilities become competitive energy service providers, trade allies may become trade competitors. The energy service provider of tomorrow may wish to keep energy efficiency services in-house, competing with current allies. This conflict may be more acute in retail activities.

**Examples**

In California, Palo Alto’s municipal utility offered an innovative compact fluorescent light rebate program where the utility bought CFLs in bulk for $12 apiece and sold them to customers for nine dollars each. They were promoted with coupons and sold through hardware stores at the subsidized rate. Although the stores got no mark-up on the bulbs, they accepted this in exchange for increased foot traffic in their stores. 2,620 bulbs were sold and the program cost only $20,200. (The program would have cost even less if they had sold the bulbs at cost.) The cost of the energy saved was less than 2¢ per kWh. (IRT, no. 87)

Although Madison Gas & Electric’s residential lighting program started out as a CFL rebate and coupon program, monetary incentives were phased out starting in 1994. A major goal of the program was to increase familiarity with CFLs and to create a retail infrastructure. Both goals were met: 28 percent of MG&E’s customers redeemed 149,978 coupons, and the number of CFL retailers grew from four in 1990 to 62 in 1994. As a way to follow up on this success, MG&E now “emphasizes market support and maintenance activities” such as customer education and retailer training. The utility also works with manufacturers to help them with distribution channels and sales goals and continues to promote the program in newspapers and other local media outlets. (IRT, no. 93)
Charging Full Cost of Energy Consulting and Audits

Free audits have been a staple of utility DSM programs in recent years, but are commonly being phased out. An obvious solution to the cash drain of providing free audits is to charge customers for them, essentially making the utility an energy efficiency consultant. While industrial and large commercial customers are often willing to pay for audits, what about residential customers? There are a number of ways to reach customers other than audits, and there are ways of making audits more attractive to residential and small commercial users.

Examples

Some utilities have offered to reimburse industrial customers for the cost of an audit, provided the customer implements the recommended measures. BC Hydro, for example, has offered a compressed air efficiency program since about 1990, although many of their DSM programs are likely to end soon. Their audits consist mostly of identifying leaks. If the customer meets the leak reduction goal set by the leak audit, the utility refunds the cost of the audit (Jordan & Nadel, 1993). While this still results in a subsidized audit, it at least ensures that the money spent on the audit is not going to waste. It would be easy enough to have the customer finance the audit cost from the energy savings using “positive cash flow” financing.

In a test project in New London, Wisconsin, audits were offered at below cost in order to encourage customer contact. The loss was then made up in the sale of energy-efficient equipment, at standard retail mark-ups. Among residential customers, compact fluorescent bulbs were popular items. In retail terms, the audit was a “loss leader” that drew customers into the program.

Wisconsin Public Service is currently offering in-depth residential audits under its “ComfortWise Home Analysis” program. For $249, WPS staff perform a blower-door test, infrared heat loss analysis, appliance safety checks, carbon monoxide detection, and backdraft testing, and offer results and recommendations in a written report. They also have a $99 “Comfort Value” option and offer Home Energy Rating System (HERS) certification for an additional fee. The cost of the analysis can be financed in monthly installments for as long as five years, and is paid on the utility bill. (Paul Wozniak, Wisconsin Public Service Corporation, personal communication, 1996)

The full audit requires four hours from two staffers, while the Comfort Value option requires just two hours from one auditor. Adding HERS certification, which can be used to qualify for energy-efficient mortgages, presents a potential new market for audits, that of new home buyers and realtors. The pilot
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The program is funded through the end of 1997 and is offered only in Oshkosh and Green Bay. Since early 1995, WPS has audited about 200 homes through the program. (Paul Wozniak, Wisconsin Public Service Corporation, personal communication, 1996)

While full recovery of costs is a goal, ComfortWise is now partly funded by the utility as a DSM program. Paul Wozniak, the program manager, points out three issues to address: 1) the program has required new staff training, especially for air pressure diagnostics; 2) infrared cameras are very expensive ($30,000); and 3) the concept of home energy audits is new to most homeowners, as is the idea of paying for utility services.

Home Performance is a recently founded coalition of residential energy consultants created by Madison Gas & Electric, the State of Wisconsin, Wisconsin Energy Conservation Corporation (WECC), and the Energy Center of Wisconsin. Home Performance offers four home inspections, ranging from $50 to $200, that evaluate energy use and safety issues such as lead paint, carbon monoxide, and microwave radiation. Currently in its pilot stage, MG&E is promoting the assessments to 3000 customers via direct mailing. WECC delivers the assessments while Firstar Bank provides financing. Initial results indicate that comfort is the driving force for customers, and that safety issues are not as important. Paul Berkowitz of WECC says that “it will take a while to get customers used to paying for services” and that it may be necessary to offer “added value” services such as home security services. (Paul Berkowitz, Wisconsin Energy Conservation Corporation, personal communication, 1996)

Two California utilities have customer-oriented centers that promote energy-efficient technologies, primarily to businesses and building designers. Pacific Gas & Electric’s Pacific Energy Center provides a showcase of energy-efficiency technologies in San Francisco, aimed at building and design professionals. With an annual budget of about $2.5 million, it offers training sessions, exhibits, information services, and a tool lending library. Likewise, Southern California Edison’s (SCE) Customer Technology Application Center offers demonstrations and engineering assistance for residential, industrial, and commercial technology, lighting design, and commercial cooking. Their assistance covers not only energy efficiency but also pollution prevention that helps industrial customers stay within the SCE service territory (the Los Angeles basin airshed). (IRT, no. 105, no. 84)

Southern California Edison also provides consulting to customers for energy-efficient new construction. Some recent projects include a city aquarium, a chain of restaurants, a travel reservations center, a drum-maker, and a county government. Although SCE did not charge these customers for consulting, they point out that these expert services cost the utility “very little effort, [and] provide far greater value than that provided by a one-time financial
incentive.” An added benefit, they say, is that this expertise will set a utility apart from its competition in a deregulated industry. (Johnson & Broberg, 1996)

Packaging Energy-Efficiency Services to Other Utilities

Utilities can also offer their expertise as consultants to other utilities. In anticipation of electric industry restructuring, a number of utilities have set up energy service companies as corporate affiliates in their holding company. Others have offered their services without changing corporate structures.

Examples

Power Smart Inc., mentioned above for their product certification activity, is also an energy services company. Founded in 1988 as the DSM department of BC Hydro, it is now a collaborative owned by six provincial utilities, with 30 other contributing members from around the world. With 15 core employees and various contract consultants, it provides DSM services to its owners and members as well as to other utilities in Canada and around the world. The utility members of Power Smart continue to have their own efficiency departments, using Power Smart as consultants to set up and manage specific programs. (Peter Vickery, Power Smart, personal communication, 1996. See also the Power Smart web site at http://www.powersmart.ca.)

In Oregon, the Eugene Water and Electric Board (EWEB) developed a program to promote solar water heaters to residential customers in Eugene. After many years of providing free advice to other utilities on solar water programs, EWEB recently decided to start selling the program as a package. The “Bright Way to Heat Water” is a fairly traditional rebate program sold as a pre-packaged solar water heater program to other interested utilities. Among the services are a license to use the program identity, specifications forms, documents such as a program description, and legal agreements with contractors. Other services include technical and administrative support, training, and consultations. (Ohrenschall, 1996)

The base package for Bright Way—license, documents, and forms—costs in the range of $2,000 to $2,500, plus five cents for each meter served by the purchasing utility. This price was set mostly to recover development costs of the program. Although the program has not been heavily marketed, it has been sold to three other utilities in Oregon, with a fourth buying a training session. (Ohrenschall, 1996)
Charging for Energy-Related Services

Before the 1970s it was common for utilities to sell and service home appliances. State utility commissions encouraged sales of electric appliances as a way for utilities to build load. With the energy crisis of the 1970s such "promotional" activities were abandoned (Phillips, 1993).

Now, as utilities become competitive marketers, some have looked toward appliance repair and other services as related business opportunities. For appliance repair, the interest for utilities is not to build load but to provide a full range of services to retain customers. Utilities are also taking advantage of their fiber optic infrastructure to offer telephone, internet and cable television services, as well as online billing and energy management. In the future, there may be more activity in managing the energy systems of "smart houses."

Examples

Dozens of utility companies are already testing the market for telephone and internet services. According to McGraw-Hill, 80 electric companies are entering the telephone business and at least 20 of these intend to offer internet services (Rafter, 1997).

In August 1995, Detroit Edison announced a new appliance-repair plan. Customers can pay $9.99 monthly for an appliance repair contract, which will cover repairs due to normal mechanical failures on major appliances, such as furnaces, water heaters, refrigerators, and ranges. Other appliances can be added for additional fees (Detroit Edison, 1996). Seattle City Light, a municipal utility, also offers appliance repair.

Leasing Equipment

A significant barrier to energy efficiency is the high initial cost of energy-efficient equipment and a lack of familiarity with what is sometimes new and innovative technology. By leasing equipment to customers, a utility can overcome both of these barriers. Customers get equipment that is less expensive to operate—and often better performing as well—without the risk of investing in untried technology. What the utilities lose in electricity sales, they gain in the profits from equipment rental and the satisfaction of their customers. Moreover, since the choice of equipment often determines the type of fuel used, guiding customers toward an efficient electric appliance, for example, can prevent them from switching to a different fuel.
Leasing can also be a tax benefit for business customers. Since a lease payment is an operating expense, it can be deducted from taxes. (A loan also results in low up-front costs and monthly payments, but because the equipment is owned by the customer, it is taxable and must be depreciated over time.)

Leases can be combined with alternative financing methods. Positive cash flow financing, for example, pays for the lease from the energy savings of the new equipment.

Examples

Southwestern Electric Co-op is a small electric utility in Illinois. Their “Geolease Program” encourages customers with electric heat to install ground source heat pumps instead of switching to natural gas or propane. The program is a combined lease and loan program. The underground loop is sold to the customer, but with financing from the co-op. The heat pump equipment—which is removable—is owned by the co-op but leased to the customer. These two approaches eliminate the high initial cost of heat pump systems, while retaining electric customers and increasing efficiency. Customers then pay for the loan and lease as part of their monthly bill. (IRT, no. 120)

Madison Gas & Electric offers two lease programs, for small and large commercial and industrial customers. After a six-week residential pilot program, the small customer program was launched in 1991. To date, they have leased mostly water heaters to 200 commercial customers, primarily restaurants. The program offers a five-year lease with an option to buy at the end of the lease period. Greg Smith, manager of the program, thinks it would be successful for residential customers as well, provided that truth-in-lending laws be clearly followed regarding disclosure of terms and interest rates. He also thinks that the minimum threshold for financing would be no less than $1000. In that case, the program would require leasing multiple appliances, such as furnaces, water heaters, and air conditioners. (Greg Smith, Madison Gas & Electric Company, personal communication, 1996)

The MG&E small customer program was initially based on a much older lease program offered by Wisconsin Gas. Wisconsin Gas has offered leases for 35 years, and currently has about 4000 lease customers, mostly for commercial water heaters. Their “Evergreen Lease” is a five-year contract with no option to buy; the heater is always owned by Wisconsin Gas. The lease is structured to recover the cost of the water heater in five years; if it is renewed, the water heater will earn a profit for as long as it lasts beyond five years (the average life is about eight years). (Greg Smith, Madison Gas & Electric Company, personal communication., 1996)

MG&E’s large customer lease program is still in its early stages. The minimum threshold for bank financing in this program is $80,000. The two leases processed so far are for large diesel generators in the $200,000 to $300,000 range.
When MG&E needs peak capacity, the customers have agreed to generate their own power in exchange for an interruption credit. The credit is designed to be comparable to the monthly payment on the lease. The customer has reduced purchase costs, while the utility has direct control over a significant amount of peak load. (Randy Popp, Madison Gas & Electric Company, personal communication, 1996)

Small equipment, such as compact fluorescent bulbs, can also be leased. Électricité de France, the French national utility, is required by French law to sell power on Martinique and Guadeloupe at the same rate as in France, thus causing them to lose $163 million per year on the two islands. To reduce these losses, they implemented a compact fluorescent lightbulb lease program, “Operation LBC,” in 1992 and 1993, leasing over half a million CFLs to the 750,000 residents of the islands. The $12 bulbs were leased at a rate sufficient to pay off the lease in 18 months, with payments of about two dollars every three months. (IRT, no. 119)

The Taunton Municipal Lighting Plant in Massachusetts and the Burlington Electric Department in Vermont have also offered CFL leasing programs. In Burlington, the lease was 20¢ per month for 60 months. Provided the light was used an average of 1.5 hours per day, the lease cost less than the energy savings (IRT, no. 3). The Taunton program charged an additional $1 for interest, which over a five-year payback amounted to a 1.7 percent annual financing rate (IRT, no. 42).

Selling Energy-Efficient Equipment Directly

One approach to leveraging scarce DSM money is to cooperate with trade allies. In this scenario, the utility promotes businesses that provide energy efficiency services and equipment. On the other hand, the utility could compete with those trade allies, providing sales and services itself at standard profit-maximizing rates. Since a utility has a unique and intimate relationship with its customers, it is well-positioned to promote retail sales of energy-efficient products.

In fact, the utility may be too well-positioned. Under the current regulated structure, this approach has been controversial. Past attempts by utilities to operate retail stores have met with strong resistance from retail competitors, and even legal action. As regulated monopolies, utilities are able to cross-subsidize their operations, selling equipment at cost or even at a loss. Retailers sued successfully, claiming unfair business practices.

A fully competitive electric industry is less likely to run into such a problem, but how can utilities offer retail product sales in the meantime? One way to do this would be to create an unregulated retail subsidiary. But even an unregulated subsidiary would likely be under scrutiny from regulators and competitors. A
further obstacle is that a retail outlet would be expected to turn a profit, and thus would not be given explicit cross-subsidies. Furthermore, being a specialty store, it may have difficulty competing with home improvement supermarkets like Menards or Home Depot.

Another option might be to offer energy equipment through a catalog, especially one included as a bill stuffer. But would a catalog sent directly to customers increase the market for energy-efficient products, or would it simply take business away from vendors? Would customers prefer the convenience of shopping by mail or the familiarity of shopping in person?

Examples

Conservation and Renewable Energy Systems (CARES), a coalition of eight public utilities in Washington state, is investigating a number of low-cost approaches to DSM. Until recent cutbacks, the CARES utilities were heavily dependent on Bonneville Power Administration funding for energy efficiency programs. One low-cost approach they have proposed is the “CARES Catalog.” The Catalog would be a periodic newsletter/catalog designed to sell energy-efficient products to residential customers, in addition to providing education and promoting other CARES services. Other services include promoting weatherization and energy-efficient manufactured homes. (Hewitt et al., 1996)

Although many utilities have customer service centers or “energy centers” (like PG&E and Southern California Edison, mentioned above), utilities with storefront retail outlets have become difficult to find. The only known utility with a retail store in Wisconsin was Madison Gas & Electric, which had a store-front in Madison from 1986 to 1994. This store provided demonstrations, a bill payment counter, and sold CFLs, window sealant, and high-efficiency gas water heaters. Operated as a DSM program rather than a profit center, the store sold energy-efficient products that were not generally available in retail stores. By the mid-1990s, these products were commonly available. Interested in cutting costs, MG&E closed the store. Joanne Kelley, former manager of the store, says it would be much more difficult to run such a store today, due to opposition from other retailers. (Joanne Kelley, Madison Gas & Electric Company, personal communication, 1996)

Blue Earth Light and Water, a municipal water and electric utility in Minnesota, offers a number of services, including a retail store. Blue Earth sells power and water, district heat, electric generators, uninterruptible power supplies, energy-efficient lighting, electric water heaters, and bottled water. Smaller items are sold through a retail store located in the front of the utility office building. Before opening the store, the utility polled 300 people, and only four thought that the utility should leave energy-efficient product sales to private stores. While the utility board was “sensitive to the issue of government intrusion into the domain of private business,” they saw a retail store less as a revenue source than as an opportunity to increase customer service in preparation for competi-
tion. “Electricians are not promoting electric water heaters,” said General Manager Jeff Jansen. “They think that gas is the way to go. If they’re not going to market it for us, we’ll do it.” The utility sells water heaters with load management switches, accompanied by a $5 monthly credit. (Minnesota Municipal Utilities Association, 1996)

Five municipal utilities in Oregon considered the “importance of supporting trade allies rather than competing with them” when opening the Energy Outlet in a mall in Eugene. Although some members argued that retail sales was the “surest route to success,” they decided that the store should not sell energy-efficient products. Instead the store offers product demonstrations, a lending library, and information. One indicator of the success of the store, they say, is that home improvement stores in the area have reported “brisk sales” of compact fluorescent lamps. (Cliburn, 1995)

A number of utilities have started to branch off into non-energy services, such as cable television, home security services, and telecommunications. Duke Power Co. of North Carolina has recently started offering wireless telecommunication services. It sells cellular phones alongside refrigerators and clothes dryers at its retail stores. (Kerber, 1997)

**Bulk Purchasing of Energy-Efficient Equipment**

In the transition to a more competitive electric industry, many utilities have placed a premium on retaining large customers. Large customers provide a reliable stream of income and a steady baseload that can counteract the fluctuations caused by numerous small customers entering and leaving a utility system. In addition to the traditional approach of offering lower rates for industrial and large commercial customers, many utilities offer a range of services. Arranging bulk purchases of energy equipment can be a low-cost way of providing energy expertise, meeting customer needs, and saving energy.

In some cases equipment is bought for a single customer, such as the New York City Housing Authority. In other situations, the utility acts as a broker for large groups of customers, taking competitive bids, making awards, and arranging for implementation. Both of these approaches are different than direct retailing by the utility. The utility encourages others to take targeted actions that can lower overall power supply and system costs.
Examples

The New York City Housing Authority purchases 10,000 refrigerators per year for its 180,000 housing units. It is the largest single buyer of refrigerators in the country. The “Golden Carrot” program was an effort to develop and promote 22 cubic foot energy-efficient refrigerators. Since NYCHA buys only apartment-sized refrigerators (14 cubic feet) it was unable to buy Golden Carrot refrigerators. In its own market transformation effort, NYCHA teamed up with its utility, the New York Power Authority (NYPA), to arrange bulk purchases of smaller energy-efficient refrigerators from Maytag. (Nolden & Morgan, 1996)

NYPA agreed to provide $38 million in DSM financing in exchange for a 10-year commitment from NYCHA to be a NYPA customer. NYPA is ordering and installing 20,000 refrigerators a year for NYCHA over a four year period. The utility is financing the purchase and providing engineering and construction management. They are getting paid for materials, labor, and a management fee in monthly payments from NYCHA, financed at six percent per year over ten years. Annual savings from replacing the refrigerators is expected to be 53 million kWh, or about $7 million. (Nolden & Morgan, 1996)

Outside Stockholm, Sweden, a small utility was facing transmission and distribution constraints due to load growth. Electric water heaters were identified as a major component of load in the area, and 440 homeowners were offered a chance to participate in a group procurement of new water heaters. Almost 300 of them accepted the offer. The utility, Nacka Energy, took bids from local installers to perform the work. Three hundred water heaters were installed, resulting in annual electricity savings of 1700 kWh each, or 510 MWh total. The installation cost fell from 12,000 kroners, if bought and installed individually, to 7000 kroners per heater through bulk procurement. (Nilsson, 1992)

As noted above, the City of Palo Alto bought compact fluorescent light bulbs in bulk, selling them through hardware stores at a modest discount. In that case, the utility relied on a trade ally to provide a convenient way to market the bulbs. Palo Alto could have marketed the bulbs on their own, as a retailer, or arranged purchases of bulbs for large customers.

Finally, the utility can encourage a market for energy-efficient products through procurement guidelines by buying energy-efficient equipment for their own needs. Both the US government and the Swedish National Board for Industrial and Technical Development (NUTEK) have actively promoted new technology through procurement guidelines. (National Board for Industrial and Technical Development, 1993)
**Financing**

**Financing at Market Rates**

In 1994, 297 utilities offered some form of loan program to their customers for DSM (Meal, Monsen, Selting, & Morse, 1996). A typical utility loan program sets an interest rate at the utility’s cost of capital plus enough to cover loan administration, servicing costs, and loan losses. Loan processing is handled either in-house or by a third party, such as a bank. Since regulated utilities have access to favorable rates of capital, the interest rate for a utility-financed loan is often lower than from other sources.

Financing offers a number of benefits over “traditional” or rebate-based DSM programs. Financing reduces controversy by “minimizing ... customer cross-subsidies and claims of unfair competition between customers.” It reduces rate impacts in a period when “all costs—no matter how small—are suspect.” And “by lending customers money, rather than giving it away” utilities can create new business units and profit centers that will be critical in more competitive markets. Moreover, customers may learn to value energy-efficiency services and equipment more now that they pay for it themselves. (Flanigan, Barton, & Potter, 1995)

Interest rates could be set at market rates, equal to what other lenders would offer. Customers often value convenience. By offering financing as a service, a utility may be able to offer the same rates. Rates could also be set below competitors’ but above the utility’s cost of capital. This would offer a greater incentive to customers, resulting in more energy-efficiency investments, though it would also result in lower interest income for the utility.

Alternatively, utilities may want to use a third party lender to implement the loans, or even offer no-interest loans. “Many utilities have found that the interest rate charged to offset administrative costs barely covers the costs associated with the separation of interest and principal on the incoming payments. The difference between a $3000 loan for 60 months at zero percent versus eight percent is only $11 per month.” By offering a no-interest loan, processing costs are reduced. Likewise, a third-party lender like a bank may have lower operating costs. (Higgins, 1996)

Ironically, as the utility industry transforms into a competitive market, the cost of capital is likely to increase to reflect greater risk. Financing provided by energy companies will thus be no more attractive than that provided in other competitive industries. Energy companies may still want to provide low-interest loans to encourage sales and retain customers. A parallel example is in electronics retailing, where stores provide various financing gimmicks (no down payment, no-interest financing for 12 months, and so on) to encourage sales of...
Market-Based DSM Programs

stereos, TVs, and other equipment. In a competitive electricity market, companies may provide efficiency financing in order to sell equipment and services and to retain customers.

Examples

Many utilities offer financing directly or through third parties, such as banks and savings and loans. The Sacramento Municipal Utility District (SMUD), for example, has built a portfolio of $40 million in loans for efficiency measures, and expects that amount to grow by $10 to $20 million per year (Meal et al., 1996).

Shared Savings, Performance Contracting, Energy Service Charges, and Positive Cash Flow Financing

A number of variants on standard utility DSM lending exist. An “energy service charge” is a line item included on a utility bill to collect loan payments for energy efficiency measures. Often these are structured so there is a “positive cash flow” for the customer. In this case, the amount and rate of repayment is set at a level that is slightly below the energy savings. For example, a $400 lighting retrofit that saves $20 per month might be paid back at $19 per month, resulting in a positive cash flow for the customer.

“Shared savings” financing or “performance contracting” are similar. With shared savings, the efficiency measures are installed by a utility (or an energy services company) and the cost is repaid from the energy savings, which are split between the utility and the customer. In performance contracting, the energy-efficiency supplier is paid for each unit of energy saved (per “negawatt”) calculated against an initial baseline. The customer thus pays only for services that are delivered, not for equipment installed. This reduces risk for the customer and results in only the most cost-effective measures being installed.

A common approach is for a utility to hire a third-party energy service company (ESCO) to provide the DSM work. From the perspective of the utility, however, performance contracting with ESCOs may result in “cream skimming,” where the ESCO gets the most profitable projects, leaving less desirable projects for the utility. Also, in a time of pending competition, many utilities are wary of giving ESCOs access to their customers, since those ESCOs may become power marketers in the near future. However, there is no reason utilities themselves cannot enter into performance contracts with their own customers.
Examples

Southern California Edison’s “Envest” and PacifiCorp’s “FinAnswer” programs both offer energy service charges with a positive cash flow. The FinAnswer program (pronounced “financer”) offers loans at the prime rate, for “resource” measures that the utility determines are cost-effective, and at prime rate plus three percent for “supplemental” measures that customers choose to undertake. Loans are repaid on the customer’s bill, and the utility has the recourse to shut off power if the customer defaults. PacifiCorp has offered financing since 1990 and through 1996 had implemented almost 1000 projects, with no defaults on repayment. (Higgins, 1996)

In Edmonton, Alberta, the Environmental Resource Center’s (ERC) “Destination Conservation” program promoted an energy conservation program for schools. The three-year program uses money saved from low or no-cost energy conservation measures to pay for capital improvements in subsequent years. The low-cost energy efficiency measures consist of awareness training for students, teachers, and staff, energy audits, and simple “lifestyle” changes, such as turning off lights. A new option for the program allows schools to make capital investments earlier in the process, by getting financing assistance from corporate sponsors (most often utilities). Corporate sponsors share in the energy savings, with five percent of money saved going to the sponsor, five percent to the ERC and 90 percent to the school to pay off the financing. (IRT, no. 82)

A recent high-profile example of performance contracting is a project done by CES/Way International to increase the efficiency of lighting, HVAC, and energy control systems at the Statue of Liberty. The $1 million cost of the project was fronted by CES/Way and will be recovered over a 15 year period. The measures are anticipated to save $2.4 million over that time frame. (CES/Way Inc., 1996)

Competitive Bidding

Competitive bidding for energy-efficiency suppliers can be a simple way to lower program implementation costs. Whether the DSM program is participant-paid or a traditional rebate program, bidding is a market-based approach to ensuring least cost. It can be applied externally, to third party energy service companies that provide utility DSM service, or internally, to select among competing customer proposals for efficiency measures.
Examples

Sierra Pacific Power Company offers rebates through its “Peak Performance Program.” Rebates are awarded to commercial and industrial customers through competitive bids from those customers. The utility then selects those bids that yield the most cost-effective returns. Rebate expenditures have decreased by 25 percent compared to their previous first-come, first-served rebate program, while increasing energy and demand savings. Sierra Pacific also offers financing to customers seeking improvements of more than $10,000. These loans are not low interest (13 percent) but are only given to projects that yield savings greater than the installments. (IRT, no. 110)
Demand-Side Renewables Funded through Green Pricing

The most common definition of “demand side management” is to reduce energy demand by customers through more efficient equipment. An alternative approach is to put small-scale electric generators at the customer’s location. Both approaches can reduce a utility’s peak demand and loads on transmission and distribution systems. “Distributed generation” can be done on a relatively large scale, using small gas turbines at industrial sites, or on a very small scale, putting solar electric or solar thermal panels on the roofs of houses.

While small scale generation is more expensive than centrally generated power, it offers many of the cost saving benefits of DSM. And since most small energy sources are renewable, customers may be willing to pay more to promote them. In “green pricing” pilots in Sacramento, Detroit and elsewhere, residential and small commercial customers have paid higher rates or monthly fees to support renewable energy generators.

Examples

The Sacramento Municipal Utility District (SMUD) offers the “PV Pioneers” program to its residential customers. Participating customers pay four dollars per month to have a utility-owned four kW solar electric panel installed on their roof. Since the PV system is installed on the utility side of the meter, the customer continues to pay the standard residential rate for all power used. SMUD limits the program to 100 new customers per year and have fully subscribed the program since 1993. (Holt, 1996; IRT, no. 111)

Even without green pricing, demand side renewables can be cost-effective in reducing transmission and distribution upgrades. A study for Boston Edison found that installation of solar water heaters, solar ventilation air preheaters (the Solarwall) and other mature renewables costs less than increasing the capacity of local distribution systems. (Union of Concerned Scientists, 1995)

Time-of-Use Pricing with Interruptible Load and Load Shifting

Since the 1970s, utilities have given incentives to customers to install interruptible load controllers on water heaters and air conditioners. During periods of peak demand, the utility could use a one-way transmitter to turn appliances on
and off to reduce load. Utilities have long offered on and off-peak pricing as well. With advances in telecommunications, utilities are now able to offer time-of-use pricing, real time pricing, and other innovative rate structures to all customer classes. These variable rates are often accompanied by a demand charge based on peak demand.

Since production costs change throughout the day, time-of-use pricing sends more accurate price signals, giving customers the opportunity to control electricity use in response. While this may or may not result in an overall energy savings, it can reduce system peaks, reducing required capital investments, and increasing utilization of plants and equipment. An additional pricing structure is to offer interruptible rates, where customers pay less for “non-firm” power during peak periods; if system loads are too high, their service could be interrupted.

While many large customers have participated in time-of-use pricing methods, it is unclear whether residential customers will be as interested. Commercial and industrial energy users are able to commit to the effort necessary to respond to price changes; residential customers seem unlikely to accept more than on and off-peak rates.

Examples

A recent study by the Lawrence Berkeley National Laboratory found that at least 21 utilities were offering two-way telecommunication services that performed a variety of functions: automated meter reading, outage detection, remote control of appliances, load control, time-of-use pricing, energy information, and non-energy services like home security and cable TV. A single focus group was held to gauge customer attitudes. This study found that customers were not willing to pay for many of the services, but were willing to sign up if the services were free. Time-of-day pricing and rate information were popular, while utility controlled load management and automation services were not. (Goldman et al., 1996)

Currently, Wisconsin Electric is offering a pilot program with Ameritech and Johnson Controls to develop and test a two-way energy services system. The “Energy Oasis” system features a “smart meter” for automated meter reading, appliance load control, and in-home displays of information. It is being phased in gradually to 20,000 homes. (Rufo, 1996)

A study by the Wisconsin Center for Demand Side Demonstrations (now the Energy Center of Wisconsin) found that direct load control of air conditioners is cost-effective and offers significant load relief. At the time, all five major Wisconsin utilities offered load control. (Hackner et al., 1994)

Another study of real-time pricing in the UK reported that among 340 large commercial and industrial customers of Midlands Electricity, 35 to 50 percent
shifted consumption patterns due to price fluctuations. Those customers most able to shift worked in pit mining, chemical production, and rubber and plastics processing, and were more likely to shift between days than within a day. (King & Shatrawka 1994)
Market Transformation

Perhaps the broadest approach to energy efficiency has been to promote transformation of the markets that sell energy-using goods. A “market transformation” program is a market intervention that reduces barriers to more efficient products or behaviors, with effects that last after the intervention has been completed (Eto, Prahl, & Schlegel, 1996). While any DSM effort has the potential to change a market if it is successful enough, a market transformation effort seeks a higher goal. By striking at the root of energy inefficiency, market transformation can ensure permanent change with wide-ranging benefits.

Market transformation efforts have included both “market push,” working with manufacturers and suppliers to bring more efficient products to market, and “market pull,” working to promote sales of better products to end-users. Market transformation can be small, such as promoting compact fluorescent lightbulbs in a town in the hopes of creating familiarity and a self-sustaining interest from buyers and retail marketers. It can also be much larger, such as setting standards or creating national guaranteed markets for efficient goods.

No single utility is in a position to effect such a change alone, so utilities have joined together in partnerships with state and federal governments, industry associations, and non-profit organizations. Transforming an entire market can be an expensive proposition; typically, funding is shared between government, industry and utilities. It can also take a long time. In a recent review of seven market transformation efforts, significant market transformation took at least five years and sometimes as much as ten years (Suozzo & Nadel, 1996).

Once high-efficiency products have a substantial market share, codes or efficiency standards may be needed to complete the transformation. For a few products, however, which have very low incremental cost, are highly cost-effective, or are heavily promoted, market transformation may be possible without standards (Suozzo & Nadel, 1996).

One example of market transformation that was thought to not need standards were the efforts undertaken in Wisconsin for high-efficiency gas furnaces. However, recent research on the sales of residential gas furnaces in Wisconsin questions this thinking. Utilities actively promoted high-efficiency furnaces between 1982 and 1989, providing audits and installations for low-income customers, rebates for all customers, and active contractor training and support. When the market seemed successfully transformed in 1989, promotions and rebates were phased out. While the market held for a few years, sales of furnaces with greater than 90 percent efficiency have declined recently in parts of the state, especially near Milwaukee. The results suggest that market transformation may require some ongoing level of market intervention. (Energy Center of Wisconsin, 1997)
**Examples**

As mentioned above, a regional market change effort was undertaken by the Bonneville Power Administration and northwest utilities, who sponsored a $100 million market transformation effort to improve the energy efficiency of manufactured housing in the Pacific Northwest. The Manufactured Housing Acquisition Program (MAP) offered incentive payments to home manufacturers who built to MAP specifications, primarily relating to efficient use of electric heating. While active, the program was able to raise the efficiency of virtually 100 percent of the market. (Peach et al., 1996)

Due to DSM budget cuts at Bonneville, the MAP program ended in July 1995 and was succeeded by the Northwest Energy Efficient Manufactured Home Program. Instead of offering rebates to home builders, the program certifies homes that meet their standard. The manufactured home industry developed the state level certification programs with state energy offices in Idaho, Oregon, and Washington; they wanted to continue what they saw as a competitive advantage against site-built homes. The program is funded primarily by license fees paid by manufactured home builders. Total utility expenditures in the three states fell from $33 million per year under MAP to $680,000 per year. Participating companies continue to build 75 percent of their homes to certified standards. (Eklund et al., 1996)

A number of national market transformation attempts have been undertaken, often led by the U.S. Department of Energy. For the Super Efficient Refrigerator Program, or the “Golden Carrot,” 24 utilities pooled $30 million in guaranteed markets for whichever manufacturer could produce a refrigerator that exceeded DOE standards by 30 percent and used no chlorofluorocarbons. This program led to the creation of the Consortium for Energy Efficiency (CEE), a non-profit that promotes market transformation projects, such as for geothermal heat pumps, commercial and residential air conditioners, and clothes washers. Participating utilities share the costs of the program and then promote the winning product to their customers through educational efforts or rebates. (Alexander & Marge, 1996)
The Wisconsin Energy Conservation Corporation (WECC) has designed and delivered two projects that tested the potential for market-driven energy-efficiency services. The New London Resource Project and the Energy Smart project in Park Falls, Wisconsin, both offer energy-efficiency services to residential and small commercial customers. Services included audits, free installation of low-cost efficiency products, help with choosing contractors for larger efficiency measures, and arranging financing through banks. While most services were paid for by participants, the program was not intended to be purely market-driven. Instead, it was an experimental program to discover “how far customer-pay financing programs [could] be taken” to overcome first-cost barriers in lieu of rebates. (Edgar, 1995)

The projects looked at cost recovery and subsidy minimization in three main areas. First, customers were billed directly for expert assessments of energy saving potential in their homes and businesses. WECC found a willingness to pay about $35 or $40 for a “complete assessment” and $15 for a 30-minute “minor assessment.” However, this fee alone was not sufficient to cover the total delivery cost of the program. A second way to recover costs was by charging a 20 to 30 percent retail markup for all products offered through the assessment. (Berkowitz, Carl, & Edgar, 1996)

A third way of recovering program delivery costs was through customer financing for efficiency installations. A financing mechanism called “positive cash-flow financing” was used, where monthly repayments on utility bills are made from the monthly savings earned by the energy-efficiency investment. The financing was arranged at interest rates of six or seven percent to recover program costs. WECC argues that customers are not just “rational economic actors” and that other features such as convenience and risk are as important as price.

In New London, WECC found a participation rate of 27 percent for homeowners, 54 percent for commercial customers, and a number of the few industrial customers in town. Many of them took advantage of financing at six percent interest—the 158 participating commercial and industrial customers cumulatively borrowed $582,000 for lighting, space heating, and water heating measures. The 555 participating homeowners bought an average of five CFLs each. Residential customers took financing of $137,500 total, mostly for insulation improvements. Residential energy savings as of late 1995 were 491 MWh of electricity and 42,000 therms of gas; commercial and industrial customers have saved 2,831 MWh and 419,941 therms. (Berkowitz, Carl, & Edgar, 1996)

WECC researchers have described some lessons learned from the market-based energy-efficiency projects they have performed. (Edgar, 1995; Berkowitz, Carl, & Edgar, 1996) Because savings opportunities for the residen-
tial sector are dispersed broadly, it is vital to identify the most promising homes quickly and cheaply, and to share the costs of energy improvements with those who benefit. They also found that a time-consuming part of the process was arranging for contractors to install energy-efficiency measures. Closer participation with trade allies would streamline this process and would also encourage trade allies to “franchise” commercial program services through ongoing marketing and customer contact. Finally, while financing was important to commercial and industrial customers, it was less important to residential customers, and no more important for any customers than reducing the “hassle factor.”
References


## Appendix: Summary of Programs

Table A-1: Summary of major market-based DSM programs

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<th>Program</th>
<th>Description</th>
<th>Examples and Sources</th>
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<tr>
<td><strong>Outreach</strong></td>
<td>Informational and educational programs</td>
<td>• BC Hydro’s Power Smart (Keane &amp; Tiedemann, 1996)</td>
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<td></td>
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<td>• Public Libraries: Partnerships ... Dane County Libraries project</td>
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<td>• Bonneville Power Administration’s Air Master software (Karl Vischer,</td>
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<td>Bonneville Power Administration, personal communication, 1996)</td>
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<td>• Madison Gas and Electric’s “New Home Planning Book” (Dave Borski,</td>
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<td>• Niagara Mohawk (Harrigan &amp; Gregory, 1994)</td>
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<td>• Energy Star Billing (Lord et al., 1996)</td>
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<td><strong>Certification programs</strong></td>
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<td>• Northwest Energy Efficient Manufactured Homes Program (Ekhund, 1996)</td>
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<td>• EPA’s Energy Star (May et al., 1996)</td>
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<td>• BPA’s “Blue Ribbon” shelf label (Abt Associates, 1994; Harris &amp; Casey-McCabe,</td>
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<td>• Power Smart labeling program (Peter Vickery, Power Smart, personal communication,</td>
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<td>1996. See also the Power Smart web site at <a href="http://www.powersmart.ca">http://www.powersmart.ca</a>.)</td>
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<td><strong>Cooperation with trade allies</strong></td>
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<td>• Madison Gas &amp; Electric’s “Residential Lighting Program” (IRT, no. 93)</td>
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<td></td>
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<td>• City of Palo Alto Utility’s “CFL Point of Purchase Pilot” (IRT, no. 87)</td>
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### Table A1 (continued): Summary of major market-based DSM programs

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<th>Program</th>
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<th>Examples and Sources</th>
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<td>Consulting</td>
<td>Charging full cost of energy consulting and audits</td>
<td>• BC Hydro’s compressed air audits (Jordan &amp; Nadel, 1993)</td>
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<td>• Wisconsin Public Service’s “ComfortWise Home Analysis” (Paul Wozniak, Wisconsin Public Service Corporation, personal communication, 1996)</td>
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<td>• Home Performance (Paul Berkowitz, Wisconsin Energy Conservation Corporation, personal communication, 1996)</td>
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<td>• Pacific Gas and Electric’s “Pacific Energy Center” and Southern California Edison’s “Customer Technology Application Center” (IRT, no. 84)</td>
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<td>• SoCal Edison as a consultant for new construction (Johnson &amp; Braberg, 1996)</td>
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<td>efficiency services to</td>
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<td>• Detroit Edison’s appliance repair (Detroit Edison, 1996)</td>
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<td>• Home energy services (Goldman et al., 1996)</td>
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<td>Leasing equipment</td>
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<td>• Southwestern Electric Co-op’s “Geolease Program” (IRT, no. 120)</td>
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<td>• Madison Gas and Electric’s commercial water heater and diesel generator leasing programs (Smith, 1996; Randy Popp, Madison Gas &amp; Electric Company, personal communication, 1996)</td>
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<td>• Wisconsin Gas’ “Evergreen Lease” (Smith, 1996)</td>
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<td>• Electricité de France’s “Operation LBC” (IRT, no. 119)</td>
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<td>• Taunton Municipal Lighting Plant and Burlington Electric Department CFL leasing (IRT, no. 3; IRT, no. 42)</td>
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<td>Selling EE equipment</td>
<td>CARES Catalog (Hewitt et al. 1996)</td>
<td>• Madison Gas and Electric’s retail store (Joanne Kelley, Madison Gas &amp; Electric Company, personal communication, 1996)</td>
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<td>directly</td>
<td>Blue Earth Light and Water retail store (Minnesota Municipal Utilities</td>
<td>• Duke Power (Kerber, 1997)</td>
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<td>Association, 1996)</td>
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<td>Bulk purchasing of EE</td>
<td>NYPA and NYC Housing Authority (Nolden &amp; Morgan, 1996)</td>
<td>• Nacka Energy (Sweden) water heater group purchase (Nilsson, 1992)</td>
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<td>equipment</td>
<td>NUTEK and EPA procurement guidelines (National Board for Industrial and</td>
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<td>Technical Development, 1993)</td>
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Table A1 (continued): Summary of major market-based DSM programs

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<thead>
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<th>Program</th>
<th>Description</th>
<th>Examples and Sources</th>
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<tr>
<td>Financing</td>
<td>Financing at market rates</td>
<td>Numerous examples (Meal et al., 1996; Flanigan et al., 1995; Higgins, 1996)</td>
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<td></td>
<td>Shared savings, performance contracting, energy service charges and positive cash flow financing</td>
<td>• Southern California Edison’s “Envest” and PacificCorp’s “FinAnswer” (Higgins, 1996)</td>
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<td>• Environmental Resource Center’s “Destination Conservation” (IRT, no. 82)</td>
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<td>• CES/Way International’s performance contracting at the Statue of Liberty (CES/Way Inc., 1996)</td>
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<td>Competitive bidding</td>
<td>Sierra Pacific Power Company’s “Peak Performance Program” (IRT, no. 110)</td>
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<td>Innovative Rates</td>
<td>Demand-side renewables, funded through green pricing</td>
<td>• SMUD PV Pioneers (Holt, 1996)</td>
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<td>• Boston Edison study (Union of Concerned Scientists, 1995)</td>
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<td>Time-of-use pricing with interruptible load and load shifting</td>
<td>• LBL study of home energy services (Goldman et al., 1996)</td>
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<td>• Wisconsin Electric’s “Energy Oasis” (Rufo, 1996)</td>
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<td>• Midlands Electricity (UK) real-time pricing (King &amp; Shatrawka, 1994)</td>
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<td>Market Transformation</td>
<td>Collaboratives with other utilities to leverage market transformation efforts</td>
<td>• Bonneville Power Administration’s Manufactured Housing Acquisition Program (Peach et al., 1996)</td>
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<td>• Golden Carrot refrigerators (Alexander &amp; Marge, 1996)</td>
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