Approaches to the Residential Market

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Between 1992 and 1995, Wisconsin Demand-Side Demonstrations (WDSD), in collaboration with several Wisconsin utilities, sponsored seven residential energy efficiency programs in Wisconsin. The programs were implemented in six small towns and distinct neighborhoods in Madison and Milwaukee. The programs used a variety of marketing approaches including energy fairs, door-to-door recruiting, volunteer assistance, direct mail, and newspaper and radio adds. Program components included energy audits, training and education, free and reduced-cost products, direct installation of low-cost measures, and appliance pickups. The evaluations of these programs were coordinated to support cross-program comparisons and leverage the information collected. This paper presents the most significant of the findings identified in a cross-cutting analysis of the programs. The paper compares the communities and programs to note differences that may have affected the outcome. It summarizes and compares the participation rates, customer satisfaction, and energy impact of the programs. The paper summarizes the lessons learned about targeting programs and presents conclusions about the effectiveness of the various marketing methods.

INTRODUCTION

Between 1992 and 1995, Wisconsin Demand-Side Demonstrations (WDSD), in collaboration with several Wisconsin utilities, sponsored seven residential energy efficiency programs in Wisconsin. These programs used a variety of marketing and delivery approaches in an effort to test innovative and cost-effective ways of capturing greater energy savings in the residential sector. The programs were focused on specific communities, targeting low and middle income neighborhoods in two larger cities and several smaller rural communities. This paper integrates the findings from the evaluations of six of these programs, comments on the effectiveness of various residential marketing and delivery strategies, and provides insight for the development of future energy efficiency programs.

METHODOLOGY

The program evaluations were conducted using process interviews, baseline surveys, participant surveys, nonparticipant surveys, control group surveys, tracking system analysis, engineering impact analysis, cost analysis, and residential billing analysis. At the conclusion of the WDSD effort, several integrated reports were prepared to draw together the lessons learned from each of the programs. This paper presents the results from one of those integrated reports, entitled ''Approaches to the Residential Market.'' To prepare this report, we compared each of the residential programs, focusing on the measures they offered, the delivery and marketing techniques employed, and the incentives used to influence program participation. We then compared the relative success of the programs in terms of participation rates, electric energy savings achieved, customer satisfaction, and educational value. Finally, we drew together the major lessons learned from marketing the WDSD residential programs and presented conclusions and recommendations.

OVERVIEW OF THE PROGRAMS

The six residential programs represented quite different approaches in design methods, marketing, program features, and technologies (see table 1).

The goals of the **Merrill Community Energy Conservation Project** (MCECP) were to involve all market sectors and community groups, incorporate community involvement in the planning, selection, design and delivery of energy efficiency and demand-side management program options, encourage the participation of a broad mix of community organizations such as businesses, schools, service clubs and environmental groups, and establish a community-based partnership with WPS. The basic program involved modifying an existing Wisconsin Public Service DSM program for increased community participation. The program included measures for all sectors of the energy market in Merrill, including residential, agricultural, commercial and industrial. Examples of measures include community volunteer door-to-door CFL sales in the residential sector, exit sign conversions in the commercial sector, and the creation of energy conservation committees for the industrial sector.

The **Neighborhoods Energize Wisconsin Program** (N.E.W.) focused on five individual neighborhoods in or near Madison. Participants in each neighborhood were recruited to go door-to-door to invite their neighbors to attend weekday evening and Saturday morning workshops.

Table 1. *Program Features and Satisfaction Levels*

	Mayville/ Horicon	Merrill	Milwaukee	N.E.W.	New London	Viroqua
Audits / on-site surveys	**Major**		**Major**	**Major**	**Major**	
Direct installs	**Major**		**Major**	**Major**	**Major**	**Major**
Rebates: customers	Minor	**Major**		Minor		**Major**
Rebates: distributors	**Major**	Minor				
Blower door	**Major**				**Major**	
General education/information	**Major**	**Major**	**Major**	**Major**	**Major**	**Major**
Appliance pick-ups		Minor		Minor		**Major**
Store discounts	Minor	Minor				Minor
Contractor arranging				Minor	Minor	
Energy fairs		Minor	Minor	**Major**	**Major**	Minor
PDN development	**Major**					Minor
Loans/PCF	**Major**				**Major**	
Community incentives	**Major**	**Major**				Minor
Weighted average satisfaction[A]	4.70	4.47		4.23		4.20
Percent of total:						
Very satisfied	72	68		38		38
Somewhat satisfied	27	20		48		54
Neutral	0	7		13		4
Somewhat dissatisfied	1	2		1		1
Very dissatisfied	0	2		0		0

Major feature
Minor feature
[A]Weighted average calculated by weighting Very Satisfied = 5 times percent giving this response, Satisfied = 4 times percent giving this response, etc., to Very Dissatisfied = 1 times percent giving this response. N.E.W. survey respondents were asked to rate the program as ''excellent, good, neutral, somewhat poor, and poor.'' ''Excellent'' was assumed to equal ''very satisfied'' for this comparison, ''good'' to equal ''somewhat satisfied'', etc.

At these workshops, participants received information and training on electric and gas efficiency measures and their household's environmental impact, based on their habits and energy use. Free energy saving materials (e.g., weather stripping, caulk, insulation) were distributed to participants to encourage the actions taught at the workshops. Following the workshops, participants who signed up received a ''home visit", which included a simple energy audit, the installation of low-cost electricity and gas saving measures, the identification of further energy efficiency measures, and the opportunity to sign up for appropriate follow-up services offered by MG&E or private vendors. Among the measures installed through the program were low flow shower heads and faucet aerators, and CFLs were given away and sold.

The principal objective of **Save Energy and Win** was to involve two low-income urban Milwaukee neighborhoods in the planning, development, and implementation of a residential DSM program. Wisconsin Electric Power Company retained primary responsibility for designing the program using recommendations from focus groups. Measures selected included interior lighting fixtures, table lamps, and exterior lighting fixtures with motion sensors. The program was promoted through traditional methods such as logos, billboard and transit signs, along with more community-specific methods such as word-of-mouth, ''energy carnivals", door-to-door canvassing, and registration drives. In each neighborhood, a community-based organization was used as a host agency to deliver the program to the customers. By participating in energy-related activities (such as volunteering for the program, completing household surveys or installing low-cost/no-cost energy-savings actions), customers earned points that could be redeemed for energy-efficient lighting packages.

The **EC2000** program was conducted in the neighboring communities of Horicon and Mayville. The program attempted to increase the public's awareness of the significant benefits of energy conservation, to increase the rate of adoption of energy-efficient technologies, and to influence the behavior of all segments of the community to produce a transformation of the energy-efficient market that will persist after the end of the project. The program was supported by two subcontractors and six community advisory committees. Marketing included in-home demonstration of audits and a Product Distribution Network for supplying retailers with energy conservation products. Program marketing served to promote the primary program feature, a residential direct install offer, and educate the public about energy conservation in general, as well as specific products.

The **New London Resource Project** (NLRP) (which was still ongoing at the end of WDSD) attempts to educate members of the New London community on the benefits of conservation and to foster the adoption of conservation measures through the use of community leaders and trade allies. A Community Advisory Committee gathered input from residents regarding program design, delivery and implementation. After assessing the needs in the community, the program was designed to include electric, water heating, water conservation and gas measures, targeted at residential and commercial customers, as well as an industrial and new construction component. Energy fairs in 1993 and 1994 were the primary method for introducing the program to the community, and to educate community members on the benefits of energy efficiency and water conservation. The program is currently marketed through traditional channels (direct mail) and the use of local businesses (retailers, restaurants), organizations (schools) or community members (volunteers). Examples of measures include demonstrations of CFLs and direct installation in both the residential and commercial sectors following energy audits. A key feature of this program is to substitute positive cash-flow financing for more traditional rebates.

Viroqua Conserves offered six energy efficiency programs to residential customers providing free installation of low cost measures, education on energy conservation, discounts on compact fluorescent light bulbs and energy efficient appliances, and cash incentives for the removal of freezers and second refrigerators. Commercial customers were offered free walk-through audits, rebates for efficient indoor lighting retrofits, and free installation of low cost measures. The main marketing channels included traditional methods and door-to-door canvassing. The project had several goals: to demonstrate a community-based marketing strategy to maximize the penetration of electric energy efficient measures by involving the community in the planning, design, implementation and delivery of energy efficiency programs; to increase public awareness of the benefits of energy efficiency; to increase adoption rates of energy efficient technologies and behaviors.

RESULTS

To set the stage for examining the results, we compared the communities and the programs.

Comparison of the Communities

We looked at a variety of demographic data and found that the communities were quite similar on a number of key features.

Across the target communities, lighting, refrigeration, and water heating typically contributed the most to residential electricity consumption. Refrigeration and air conditioning were generally the largest loads contributing to peak demand. With the exception of Milwaukee, a quarter to a third of the

homes had second refrigerators. Again, with the exception of Milwaukee, half the homes had freezers. Viroqua, Mayville/Horicon, and Madison had penetrations of dehumidifiers that exceeded 50%. Approximately one-half of the households with electric water heaters had natural gas space heating.

Electricity use per household was highest in Viroqua. Viroqua's higher use was probably attributable to its larger home size and its greater incidence of electric space and water heating compared to most of the other communities. Viroqua also had the highest penetration of electric ovens and electric clothes dryers.

The Milwaukee communities had the lowest electricity consumption and a lower rate of adoption of energy efficiency improvements than other communities. However, residents indicated a high rate of participation in previous programs, particularly programs in the year prior to Save Energy and Win.

Electricity use per household was second highest in Merrill, whose residents indicated some of the highest rates of installed efficiency improvements. Merrill residents had the lowest rate of previous participation in conservation programs among those communities who had already been exposed to utility programs in the recent past.

The neighborhoods in the Madison area community program had the highest rate of participation in previous programs and a moderately high rate of installation for efficiency improvements. Madison had the highest rate of penetration for central air conditioners.

Despite not having had access to an electric utility energy conservation program, New London households had some of the highest rates of pre-program installation of efficiency improvements. New London also had the highest penetration rate of electric space heating.

Mayville and Horicon had average rates of installation for efficiency improvements. These communities had second highest percentage of households with air conditioners and the highest percentage of households with more than one refrigerator.

These findings suggest that:

- Improvements to the efficiency of lighting, refrigeration, and water heating may potentially yield the greatest electric savings.
- There is significant savings potential for refrigeration measures including elimination of freezers and second refrigerators, and replacement of older appliances with new equipment.
- It appears there is potential for electric to gas conversion of water heaters.
- Demand might be reduced by controlling central air conditioners and dehumidifiers.
- There is evidence that the potential for major measures may be limited.

Comparison of the Programs

As would be expected, the WDSD residential programs contained a number of similarities and differences between the various programs, including the following:

- The Mayville/Horicon, N.E.W., and New London programs included energy audits. An in-home survey in Milwaukee contained questions about many of the issues addressed in the audits.
- All of the programs except for Merrill featured a direct install component.
- The Merrill, N.E.W., and Viroqua programs included appliance pick-ups.
- All of the programs except Milwaukee included a load control component.
- The Merrill program was unique in offering door-to-door sales of equipment (CFLs).
- All of the programs included some free measures but in some cases (New London and Milwaukee) these measures were reserved for low-income households.
- Trade ally involvement was somewhat limited in most of the programs.

WDSD residential programs promoted a variety of energy efficiency measures. All programs included compact fluorescent lights and all but Milwaukee included low-flow shower heads, faucet aerators, and direct load control of air conditioners. In most programs water heating measures were distributed or installed free. None of the programs included direct installation of major measures, such as attic insulation or new furnaces, although most promoted such measures and some included financing mechanisms to cover the cost of the measures. From a technology perspective, the Milwaukee program was the most limited, offering mainly lighting measures.

Each of the WDSD community-based residential programs included some feature that brought program personnel or volunteers into direct contact with the participants in their

homes to perform an energy audit, educate, or sell, install, or distribute energy conservation products.

WDSD programs used a combination of traditional residential customer marketing methods and other more unique and grass-roots approaches. Most of the programs employed several marketing methods, relying primarily on three to five methods which formed the core of the marketing effort. Traditional approaches included direct mail, telemarketing, and newspaper ads. Mayville/Horicon and New London depended on these methods more than the other programs. Less traditional approaches included use of volunteers or community organizations to go door-to-door, energy fairs, and radio contests. N.E.W. and Milwaukee relied more on non-traditional methods than did the other programs.

Comparison of the Results

Participation rates. The participation rate ranged from 4.2% of the population to 44.2% (Table 2). The participation rates of other traditionally-marketed programs often do not exceed 10%. However, direct install programs have had participation rates in excess of 60%. Thus, the participation rates for the Viroqua and Mayville/Horicon programs are quite high when compared to more traditional offerings and quite modest compared to direct install campaigns.

To some extent the resources available to conduct the program limited the participation in each of these programs. For example, in Milwaukee, the program was stopped because it had reached its termination date. The demand for the program was potentially several times the actual participation. In Merrill, the door-to-door CFL sales were limited by too few volunteers. Thus, only a tenth of the city was covered. In Madison, once the program had passed through a specific neighborhood, there generally were no more opportunities for customers to participate. Furthermore, there was some constraint in inviting customers to workshops due to the limited number of volunteers.

Table 2. *Participation Rates by Project*

Mayville/Horicon	36.8
Merrill[A]	13.5
Milwaukee	4.1
N.E.W.[B]	16.8
New London[B]	22.5
Viroqua[A]	44.2

[A]Participation in at least one component of the program
[B]Participation in energy audit or home assessment component

There were fairly high levels of penetration for minor measures and low to modest levels of penetration for major measures. Thus, although participation was sometimes high and penetration of minor measures was quite good for some programs, the low penetration of major measures limited the overall savings. The absence of gas measures in some communities may have reduced the attractiveness of participating in the programs.

Electricity savings. Each program evaluation included an engineering estimate of electric energy savings. In addition, a combined billing analysis was performed using data for N.E.W., Mayville/Horicon, and Viroqua. The electricity savings per participant for these residential programs were fairly modest. The participant savings, based on the engineering estimates, ranged from 299 kWh annually to 770 kWh. The engineering estimates of savings as a percent of average annual kWh usage per residential customer ranged from 3.9% to 9.4%. Due to the low penetration of major measures, savings were low on a per participant basis. Part of the lack of success with major measures may be due to past participation in programs. However, the WDSD programs failed to place enough emphasis on certain measures which potentially offered the largest electricity savings, namely, the removal of second refrigerators, conversion of electric water heaters to natural gas (the net energy savings would be much smaller than the gross electrical savings because of the fuel substitution), and possibly, installation of new refrigerators.

The cost of achieving these savings was sometimes quite high. The cost of conserved energy varied from $0.030 per kWh to $0.404 per kWh. The high cost of conserved energy in some programs is due both to the low savings and high program costs. While integration of multiple components was believed to be a necessary ingredient in the success of several programs, lack of sufficient integration may have led to wasted efforts, missed opportunities, and increased cost. Furthermore, the design of some programs imposed significant costs. For instance, the Milwaukee program called for the fixtures to be hard-wired to ensure that they remained in place. For a typical installation, the costs of the installation excluding the cost of the fixture could easily be $100 or more.

The costs of mounting a program can be significant. In general, it may be very difficult to achieve sufficient residential electrical savings to be able to make door-to-door direct

contact programs cost-effective. It is critical to cost-effectiveness that door-to-door and other high-cost programs successfully promote the implementation of major measures such as appliance turn-in, efficient new appliances, and water heater fuel conversion. Where possible, they should promote both gas and electric measures at the same time.

Customer satisfaction. While the WDSD programs were not always successful at delivering cost-effective energy savings, the majority of participants were quite satisfied with their experience. On a scale from 1 to 5 with 1 being very dissatisfied and 5 being very satisfied, the average satisfaction level ranged from 4.06 in New London to 4.7 in Mayville/Horicon, in other words, the average participant was between ''satisfied'' and ''very satisfied'' with their experience. One quarter of the participants in New London were between neutral and very dissatisfied. (See table 1)

Program targeting lessons

We analyzed demographic and social characteristics as indicators of the likelihood of program success and the effectiveness of different marketing strategies in promoting customer awareness, participation, measure penetration, and knowledge about energy efficiency. This analysis enabled us to identify lessons related to the marketing of residential programs.

Homeowners participated. With the exception of the Milwaukee project, none of the projects attracted more than a few participants who were renters and there was a clear association between home ownership and participation. Owners participated and renters did not. In part, this was because renters were not specifically targeted by the programs. There is some evidence, particularly from Mayville and Horicon, that renters might have been interested in participating if the program were geared more to their needs.

Length of residence irrelevant. On average, the residents have lived in their towns or neighborhoods for between 10 and 14 years. The length of residence was not strongly correlated with the participation levels in the programs.

Age is a mixed bag. In all programs but N.E.W., participants were older than nonparticipants, on average. Much of this pattern is due to large numbers of retirees among the participants. There was evidence from the Viroqua program that the association with age may have been a function of program design. The program focused on daytime delivery of services, which made it more difficult for those who were employed outside the home to participate. It may also be that people with significant time commitments may be more careful about choosing how they use their available time. Furthermore, households on fixed incomes, including many retirees, are more likely to be interested in a program that will reduce their energy bill if their initial investment is minimal, as it typically was with WDSD programs. Since energy use tends to be highest among people in their 40's and 50's, programs that achieve higher participation among retirees do not reach households with the most potential for savings.

Education is not a determinant. Participants within a single program tended to have higher educational levels than nonparticipants. However, this relationship did not hold when comparing participation rates across programs. Thus, while energy efficiency can be marketed effectively to people with more education, targeting a community with more educated people does not guarantee that participation will be higher. Marketing is clearly the difference and effective marketing strategies must recognize differences in the educational level of the target audience.

Program marketing strategy lessons

Program participation rates appear to be directly correlated with the amount of repeated and direct contact during marketing efforts. Viroqua had the highest participation rate. Its program implementers went door-to-door to sign up participants and followed-up with phone calls. The program also included a wide range of marketing and promotion efforts. Mayville/Horicon and New London had the second and third highest participation rates. These programs had a strong home assessment component which brought project personnel into direct contact with people in their homes. These programs also included a wide variety of marketing measures. N.E.W., with the fourth-highest participation rate, had an aggressive marketing plan using volunteers to canvass door-to-door in their own neighborhoods. However, people interested in participating had to attend a neighborhood meeting and this undoubtedly reduced participation some. Most of the Merrill program relied on traditional marketing methods more than the other programs and had fairly low participation. However, the direct door-to-door sales in the Merrill program resulted in quite high participation rates in those neighborhoods where there was direct contact.

The major components of most of the WDSD residential programs were not particularly innovative. With the possible exception of the motion sensor equipped outdoor fixtures that were installed in the Milwaukee neighborhoods, no new technologies were tried. The basic program activities were often variations of previously tried concepts.

While the program approaches were fairly standard, most contained some unique or innovative elements, primarily relating to marketing methods. The program marketing measures used in these WDSD residential programs were quite diverse, ranging from door-to-door solicitation

to radio ads to direct mail. Many marketing measures were not significantly different from standard marketing efforts. **Direct mail was widely reported as the most important method for reaching customers followed by local media, mainly the local newspaper.** Where they were used, canvassers proved to be important and many participants heard of the program through word-of-mouth. At least two communities sponsored well attended public events but in only one of the communities was the community event mentioned by participants as an important source of information.

Cross-component marketing was neglected. One of the most seriously neglected aspects of the direct sale efforts was the potential for promoting other program components during the in-home program activity. **Some WDSD programs did not take sufficient advantage of the opportunities presented by in-home activities to market other program components.**

Marketing was exceedingly diverse and often fragmented for the WDSD residential programs. The tendency to treat each component of a residential sector program as a separate and distinct activity resulted in unnecessary effort and diminished effectiveness. The various activities may have been linked in the project managers' minds but not necessarily in the eyes of customers.

CONCLUSIONS

The WDSD residential programs were not as innovative as they could have been and the electricity savings were fairly modest. However, there were some notable bright spots. The programs were well received by the communities and participants. Some of the programs successfully mobilized community volunteers and organizations to effectively market and implement components. The programs also added to the knowledge of the pitfalls and advantages of organizing community-based programs in rural and urban settings.

Most of the larger problems stemmed from failings in the program design not with the program delivery. These included failures to include gas measures and to ensure that adequate mechanisms were in place to encourage major measure installations. Some of the less important problems can be attributed to failings in program delivery such as failing to market all program services when in contact with customers.

Several other program marketing, design, and delivery lessons came out of the evaluation of these programs:

Program Marketing

- WDSD programs did not reach renters effectively. If they are an important target, either programs need to be tailored to renters or the rental market should be reached through appeals to landlords.

- Participation rates were very strongly related to the amount of repeated and direct contact during marketing efforts.

- WDSD residential programs featured some innovative, although not always successful, elements, including the use of community-based organizations for program promotion (Milwaukee), door-to-door sales of CFLs (Merrill), the use of a hockey club to pick up appliances (Viroqua), positive cash-flow financing (New London), the use of environmental themes (N.E.W.), and Energy Savers Card financing (Mayville/Horicon).

- Traditional marketing methods (direct mail, newspaper ads) were the most effective in informing customers about the programs.

- The programs did not take sufficient advantage of the opportunities presented by in-home activities to market other program components.

- On average, participants were older than nonparticipants. Some programs under-served customers in the 40—50 year old age group relative to other age groups. Residential programs may need to give additional consideration as to how to reach customers in that age group, as they tend to have the highest annual energy use. Reaching more of these customers would require adjustments in marketing as well as flexibility in scheduling door-to-door activities, since these customers typically work during the day.

Program Design and Delivery

- For programs that incur the expense of sending program staff into participants' homes, the list of included services should be as wide as possible to gain the most impact for the effort. Once the in-home contact is made the incremental cost of promoting multiple measures is low.

- The innovative financing mechanisms employed met with mixed success. The Energy Savers Card (Mayville/Horicon) was not implemented as planned because of consumer credit law requirements. The results from New London's positive cash-flow financing were inconclusive. Though the financing arrangement was used by 40% of the participants, there is no strong evidence that it had a significant impact on the penetration of measures.

- If not well designed, financing and payment mechanisms may present barriers to participation. This was most evident in Viroqua, where the requirement that customers buying CFLs have their utility account number effectively eliminated the possibility of spontaneous purchases of CFLs.

- Problems with scheduling program activities and with the time of day chosen for program marketing efforts reduced the impact of some of the programs.

- In general, program follow-up was not adequately emphasized by the programs. In many cases this failure reduced the impact of program activities.

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