PROGRAM DESIGN AND SUCCESS: A REVIEW OF TWO UTILITY LIGHTING PROGRAMS

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ABSTRACT

While many utilities in the US have planned and operated demand-side management programs, there has been very little effort to gather, evaluate, and apply the program experience and insights gained to the planning of future programs. The work described in this paper is part of a larger research effort at LBL to improve the understanding of both demand-side technologies and programs. In this paper two illustrative examples are analyzed, a residential and a commercial lighting program. The specific features of these programs were investigated in detail, including aspects of program design, the range products and services, information outreach to customers, involvement of trade allies, rebate mechanism, rebate level and its impact on customer's first cost, as well as characteristics of participants, participation rate, program costs and savings. Interviews with program managers responsible for these programs provided further supplementary information. This information was used to determine the effectiveness of the programs and its acceptance by customers.

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INTRODUCTION

A major goal of utility demand-side planning is to achieve specific program targets reliably within defined periods of time and with predictable program costs. Recent cross-cutting analyses of demand-side programs (such as recent EPRI reports) have given useful general insights into conditions for demand-side program success. However, such general guidelines alone are likely not sufficient to obtain program results with the desired predictability in terms of costs, speed, and cumulative impacts. This is because each technology and end-use targeted in a multi-area demand-side program is linked to a specific set of attribute preferences and acceptance issues on the customer side, to specific industry structures and marketing strategies on the manufacturing side, and to specific practices of installers, specifiers, designers, and other trade professionals. Lessons from past experience about how to design and implement effective demand-side programs must therefore be differentiated by technology, end-use, and customer type. Similarly, projections of program participation rates and other impact-defining parameters should be treated as specific to each technology, end-use, and customer type.

The object of this paper is to identify those elements in program design and implementation that were decisive in the effectiveness and customer acceptance of lighting programs. Our method of investigation was to first compile a list of utilities known to have lighting incentives programs, based on previous surveys of utility programs carried out by EPRI and others. >From contacts with these utilities, programs by other utilities were identified. The survey of programs covered in this work is not comprehensive, but is based on criteria that were felt important determinants of program success. The paper is also limited to programs in residential and commercial lighting and does not cover other demand-side measures.

Although providing a good overview of activities, these surveys were generally not adequate to determine the success and quality of programs. To supplement information obtained from these and other sources, individuals at several utilities who were, or had been directly involved in running the programs were contacted. After a preliminary study of several programs and telephone interviews with conservation managers, an initial six of these were selected for detailed study. These programs were chosen because data on program design, costs, and impacts were reasonably accessible and/or documented, while the circumstances and approaches taken in each program differed significantly.

A comparative evaluation of all six programs will appear in a forthcoming report. In this paper, only two programs are considered: the residential program by the Municipal Utility of Traer, Iowa, and the commercial program of the municipal utility of the City of Palo Alto. The present, more limited analysis deals with two aspects: illustration of the kinds of program parameters that were considered relevant to an assessment and thus evaluated in detail; and some preliminary observations that may be considered as lessons learned, at least within the particular approaches that each of the two programs represent. It should be noted that these conclusions are our own and do not always represent the views taken by the utilities or their managers.

THE GREAT TRAER LIGHT BULB EXCHANGE

Program objective: The main objective of the Great Traer Exchange in Traer, Iowa, was to estimate the savings possible from replacing in-place incandescent lighting with efficient lighting and to estimate the benefits of such a program for both the utility and the customer. The object was to obtain maximum participation in a single

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'exchange'.

Sectors served and total eligible customers: All the 923 residential customers and 117 commercial customers in Traer were eligible for the program. Some small commercial customers were also served and several street lights were replaced. Our discussion will focus primarily on the residential sector.

Program status and dates: The program took place in the form of an exchange over two separate days in which customers traded existing incandescent for more efficient lamps. The first of The Great Traer Light Bulb Exchange took place on 28th of February, 1987. 'Exchange II' was held on 24th March 1987 to complete the exchange for those not able to participate on the 28th of February.

Eligible lighting products and services: In the residential sector, approximately half the incandescent lamps were replaced by compact fluorescents (Philips type PL and SL) These fluorescents used around 20-25% of the energy of a standard incandescent lamp with the same light output. When fixture size or design did not allow the use of PL or SL fluorescents, low-wattage 'Econowatt' incandescents were used, for an average energy savings of 8-10%.

Information outreach to customers: Several newspaper articles and advertisements well in advance of the pre-program survey ensured good awareness of the program in Traer. The program itself was advertized primarily by direct mail to customers, but local newspaper and media were very supportive and carried several news items on the project. To raise awareness of the program, Traer carried out an initial survey of interest in the Exchange and paid customers $5 rebate for filling out such information as the types of lamps installed in their homes.

Involvement of trade allies: Trade ally cooperation between the Traer utility and Philips Lighting was an important feature of the program. By providing the community with thousands of bulbs at attractive wholesale prices, Philips helped the program's economics in a major way. Philips also provided a substantial subsidy of the total program costs. Philips, which was initially approached by the Iowa Department of Commerce, expressed great interest in participating in the program. Our interview with Tom Craddock of Philips indicated that the company saw this as an opportunity to help a community in energy conservation, and in turn an opportunity for Philips to demonstrate their energy-efficient lighting and advertise their products. Little convincing was needed to solicit their support, once the utility simply approached them with the idea.

Rebate Mechanism: For the residential customers, the rebate was for the full cost of the efficient bulb minus the small cost of the incandescent exchanged (bulbs that were in use prior to the exchange). In the commercial sector, wholesale prices were provided by Philips to those customers who, chose to buy the more efficient lamps based on initial audit (carried out by Philips at no charge to the customer).

Rebate levels: In the commercial sector, customers were offered subsidized (wholesale) prices for efficient lamps. A four-foot fluorescent lamp was provided for $1.00, while an 8 foot lamp was available for $ 2.12 (compared with about an $8 retail value for the 8 foot lamp). Philips Lighting made a survey of each establishment's lighting use and potential for change. Based on this information, the customers were sent estimates of how much the relamping would cost them. Residential customers, as noted, took part in the voluntary exchange, of their old bulbs for new, more efficient compact fluorescent lamps. They did not have to pay for the new lamps, but had to invest the effort and time to obtain them. Funds for the street lights were provided by the Traer Municipal Utility. These costs were lowered by the subsequent sale of mercury vapor lamps that were removed, at $5 per lamp.

Impact of rebate levels on customer first cost: For the residential customers, the exchange meant that customers did not have to pay for their new efficient lamps. Commercial customers obtained a huge subsidy on their lamps (75% or more) compared to retail prices.

Participation rate: The initial survey yielded a high response rate. In the residential sector, 683 of the 923 customers (74%), replied to the request to fill out information relating to their lighting use. Although the small payment of $5 for answering an initial survey questionnaire was not as attractive to commercial customers, a similarly high response rate (76%) was received from the 117 commercial customers in the Traer service area.

The level of penetration in the exchange was itself quite high, although not as impressive as in the initial survey (this not altogether surprising considering the $5 payment given for each returned survey). In the residential sector, 526 customers, representing 57% of all households, took part in the Great Exchange. Forty-one of the 117 commercial customers also participated and bought large quantities of efficient lamps. A total of 23,840 bulbs were

distributed and exchanged (including all sectors: residential - 19,975, commercial - 3,540, and street-lighting - 325).

Each home acquired, on average, 38 new bulbs. Of these, 19 lamps (on average) were energy-efficient fluorescents (Philips SL and PL) and the rest 'Econowatt' incandescents.

Impact of rebate level on participation rates: Since the rebate for residential customers was equivalent to a free lamp, this presented adequate incentive to participate in large numbers. For the commercial sector, the huge discount on the retail price of efficient lamps again provided an attractive incentive to participate. The initial (free) audit of commercial buildings provided an additional incentive to participate.

Program costs: The total program costs of the exchange, for residential customers and street lighting, were about $200,000. The bulk of the program cost (about 90% of the total) was the cost of the lamps themselves. Philips sold these lamps at a highly subsidized rate to Traer (representing about 40% of retail price of these lamps).

The total cost of the bulbs changed (based on the bulk rate offered by Philips) was estimated to be $181,182. In addition to offering a "bulk purchase price", Philips gave also 60 percent of this cost (another $109,796) towards the program.

It was possible to make only rough estimates of the material and time costs. In arranging and carrying out the exchange, time spent by Traer staff on various activities was as follows:

Prior to the bulb exchange: 300 person-hours
On the 28th of February (1st exchange): 300 person-hours
On the 24th of March (2nd exchange): 100 person-hours
Tabulation of final results (adding up all bulbs): 50 person-hours

This adds up to 750 hours of staff time @ $12 per hour, or a total cost of $ 9,000. Other costs, such as for the use of computer, were not available. Philips took care of all the costs incurred in the commercial sector and no estimates of these were available. Besides $9,000 accounted for by the staff time spent, the rest of the expenditure on posting of direct mail, printing of promotional material and other material and handling costs amounted to another $10-12,000. Total program cost of around $200,000, therefore, consisted of around $20,000 in administrative costs and around $182,000 in payment for the lamps.

Program savings: For a total of 23,840 lamps changed over as a result of the program, Philips has estimated savings of the order of about 550,000 kWh per year (an average of 23 kWh/lamp/year). Annual electricity sales by the Traer utility is about 13,225,000 kWh. Savings, therefore, represent about 4% of total sales.

Program cost-effectiveness: A detailed assessment of the cost-effectiveness of the Traer program is somewhat complex since a mixture of technologies was involved and insufficient data are available on what lamps were installed in fixtures of what utilization. Also, the changeover to more efficient lightbulbs brings, in the case of the compact fluorescents, not only electricity savings, but also a considerable number of avoided bulb replacements and installation labor, due to the much longer lifetime of the compact fluorescents. These can reduce the net cost of compact fluorescents by 50-75 percent, depending on the operating hours and discount rate (Krause et al. 1987).

We can, however, make some approximate calculations. Using the societal perspective, the simple payback time for the give-away of compact fluorescents -- the dominant element of the Traer program -- would be about three years (an estimated 75 percent or ca. 400,000 kWh/year of electricity savings attributable to compact fluorescents, valued at $ 0.07/kWh or $ 28,000/year, against an estimated $ 160,000 share in hardware cost minus a conservative fifty percent saving from avoided incandescent purchases, and a $ 15,000 share in program administration costs, for a total cost of $ 95,000 ignoring all discounting and electricity price escalation).

Since the Traer program mainly achieved its electricity savings through the installation of compact fluorescents, we can conclude that the societal benefit of the program was large.

PARTNERS ELECTRIC INCENTIVE PROGRAM

Program objective: The objective of the PARTNERS Electric Incentive program has been to achieve a 14 MW reduction in peak demand over a four-year period. Besides lighting, the program included HVAC improvements, window films and solar screens, energy-efficient motors, thermal energy storage and 'other' measures

including installation of acrylic doors or plastic strip curtains, lighting and HVAC controls, and other process related measures. Our discussion, however, will be limited to the lighting measures.

Sectors served and total eligible customers: The Utility has approximately 24,000 residential and 2,500 non-residential meters. Only the 2,500 non-residential customers were eligible for the program. Of the commercial customers, around 750 are demand-metered customers (with demand greater than 500 kW or energy use above 100,000 kWh/year). These form the target population for the program, and account for around 70% of the utility's peak demand.

Program status and dates: Ongoing since January 1985; the Program Period runs from January to October. The 1989 program may be the last year.

Eligible lighting products and services: Up until October 1987, PARTNERS offered rebates on retrofit systems only. Since November 1987, new construction projects were also made eligible. Lighting equipment installed through the PARTNERS program has varied; products have included low-wattage incandescents, energy-saving fluorescent lamps (F40 and F96 type), screw-in fluorescents, electronic ballasts, and optical reflectors. Following the first year of operation, the program allowed some flexibility over the type of measures installed and the range of products available. The City provides a free audit to who need it (for their own satisfaction) before making a decision to retrofit. This is not a requirement imposed by the utility but an additional free service.

Information outreach to customers: A variety of methods have been used by the utility to advertise the program. The distinguishing feature of their outreach efforts is to assign a customer "caseload" to each employee. This person, over a period of time, has the opportunity to collect information regarding each customer's facility and to identify individuals responsible for retrofit decisions. Person-to-person contact with these individuals has been a main feature responsible for the high level of participation reached by the utility among the primary target group. By comparison, the high participation rates in the case of Traer, were related more to the development of strong community spirit and awareness of the program, rather than person-to-person contacts.

Other methods of advertising the program have been used throughout the program. These included direct mail and utility-sponsored workshops attended by customers and vendors. The advertising for the program when it first began, in January 1985, preceded the program start by two months at most. However, by the end of the program year, awareness of the program was extremely high. Among non-participants, more than 90% had read brochures, and 44% had talked the program over with others. Even among the non-participants, a few people (18%) followed the program in detail and surveyed the possible actions that they could take to participate.

Involvement of trade allies: Trade-ally cooperation has been limited to informing vendors in the service area about the program and conducting workshops for them. The objective in communicating with the vendors has been to obtain their support in informing their customers about the program. It was hoped that vendors would be able to deal with participating customers more effectively if they were aware of eligible products and program objectives. The utility has at no time tried to recommend specific vendors, but instead provided customers with a list of all vendors in the service area. The approach has been to encourage customers to shop around to find "best deals" for their retrofit needs.

Rebate mechanism: Applications must be submitted between January 1st and October 31st. Obtaining the rebate requires several steps from the time a formal application is submitted. An auditor does calculations for an acceptance letter which is sent to the customer for signature. Specific deadlines are assigned to the projects, which may be 3, 6 or 12 months depending on the complexity of the project. These deadlines were strictly observed in the first year of program operation, but have subsequently been relaxed to allow more customers to complete their projects. Technical assistance has also been provided, from the second year on. Inspections are carried out by the utility, both before and after installation. Itemized invoices are received from the customer before a rebate request form is sent to the city Finance Department. After this, the customer is presented with his rebate. Customers may choose to accept the rebate as either a credit on their account or as a separate check. An audit is not required by the utility. Verification is done by means of inspection. However, if a customer requests an audit, this is carried out by the staff at the Utility office and is usually of the walk-through type, for the identification of potential projects eligible for the rebate. One of Utility's field staff person follows each application from start to finish to simplify customer contact with the utility. Various staff have developed areas of technological expertise.

Rebate levels: Rebate levels for each lighting product are specified by the utility. The customer may include the cost of installation (labor etc.) as part of the project cost. The total rebate cannot exceed 50% of the total cost of the project. The utility pays either the rebate level specified on each product or half the cost of the total project, whichever is the lower. For early installations (by a date specified by the utility), the customers receive 25% bonus on their rebate. For customers who take benefit of this "early installation bonus", the maximum rebate is not allowed to exceed 60% of the project costs. In the first year of operation, the "early installation bonus" was limited to 10%. This bonus was increased to 25% in the next two years, following a recommendation from the evaluation carried out at the end of the first year of the program by outside consultants (Barakat, Howard & Associates). Subsequently, the utility also allowed customers to include costs of feasibility studies, some material and in-house labor costs as part of the overall costs eligible for the rebate. In the fourth year of the program, the early installation bonus is being removed as a feature due to changes in the value of the load reductions to the utility. The utility will introduce a different rate structure to their customers which would increase demand charges while decrease energy charges. The utility expects that the rate structure change will itself provide adequate reason for customers to lower demand without the need for huge incentives. The Utility will, therefore, lower rebate levels and also eliminate the "early installation bonus".

Impact of rebate level on participation rates: $250 rebate offered in 1985-87 for each kW of lighting replaced is quite high in comparison to offers by other utilities, for example, by Sacramento Municipal Utility District (which pays $150/kW of demand reduction and other utilities which more commonly allocate $200/kW reduction). These favorable rates should have some bearing on the high level of participation the Utility has been able to attain. A total of 259 projects in lighting had been completed by March 31, 1988 accounting for 2707 kW of savings thus far.

Although no direct impact of the rebate level on participation rate was assessed, the evaluation carried out by outside consultants indicated that participating customers found the rebate level to be 'more than ample' for most measures. Most customers, of course, believed that the rebate stimulated their attention to energy management issues and increased the likelihood of their making the changes earlier than they would have done on their own incentive. Most customers apparently indicated that their actions were being brought forward by some 2-4 years.

A large majority of the customers did not rush their program to take benefit of the 10% 'early bird' bonus (provided to customers who approved and installed their measures in a certain specified period of time from the start of the program each year; this bonus was increased to 25% in the third year of the program). The bonus was found more attractive generally to smaller-sized customers and retail facilities of whom only few have thus far participated in the program.

Program costs: Initial budget allocation for the 4 years of the project was $4.3 million. A complete breakdown of expenditures for various components is not available except for the sum offered in incentive or rebate. By November 1987, a total of approximately $800,000 had been spent in rebates for PARTNERS as a whole and less than $500,000 on completed projects in lighting. Actual program costs for the installation and operation of lighting projects are not available.

Program savings: The electric utility has a current annual peak demand of 185 MW and annual sales of roughly 1 billion kWh's. Program savings for PARTNERS till November 1987 are believed to be 3,770 kW (2,481 kW reduction due only to lighting measures) and 11,705,000 kWh cumulatively for all projects installed as of this date. Projects that are applied for and not as yet installed are estimated by the municipal utility to contribute an additional 4,680 kW and 10,965,000 kWh. The program has obtained reductions of the order of 1.5 MW per year. Program savings from a numeric standpoint have been off somewhat from initial projections since it was hoped that by the end of 1987 a total of 12.3 MW savings will be achieved (compared with 8.5 MW possible by all measures installed or in the process of being installed including lighting).

Program cost-effectiveness: A total of $4.3 million was allocated to the project at its start in the FY 1984/85. In the three years of the existence of the program, between one-third and one-half of this sum has been used and although some projects are nearing completion (and will therefore absorb some finance soon), there is enough money left in the program to see it through another year. A fifth year of the program is in planning stages.

At the same time, anticipated total savings (MW reductions in peak demand) were also higher than have been achieved in the three years of the existence of the program. Correspondingly, benefits which were expected to be in the order of 3 to 4 times the total cost, have not been achieved, although the left-over money, which will allow the existence of the program for a fifth year, will raise the anticipated benefits to an as yet unknown amount.

Although PARTNERS has not achieved fully the goals set out in the initial projections, the utility considers it economically viable. By the time projects already approved are installed, the savings of 8.5 MW represent 70% of savings set out in the goals to be achieved by the end of 1987. More detailed assessments of the cost-effectiveness of the lighting components are not available.

EVALUATION AND LESSONS LEARNED

The object of any demand-side management program is to encourage customer participation in conservation programs by the provision of appropriate rebates and incentives. Although in planning such programs, it is often assumed that the size of the rebate has a strong correlation with the level of participation, the object of our research has been to determine to what extent, given a certain level of the rebate, other factors may also affect program success. Discussed below are several items emerging from a review of the two programs outlined. These may be viewed as 'lessons learned' with regard to the specific program approaches represented by the two cases. A broader evaluation as to what other program approaches (such as bidding, third party financing, etc.) might yield similar or better results is beyond the scope of this paper, and our evaluation should not be taken as an endorsement of the designs pursued in the two cases over other program designs.

Providing Sufficiently Large Rebates

Certainly the size of the rebate has a lot to do with program acceptability, as in the case of Traer, where success may be attributed to the 'free' exchange of efficient lamps for existing, standard ones. Similarly, the size of the bonus provided by the utility in Palo Alto was thought by the customers to be 'more than ample' and evaluation of their program shows that it stimulated their attention to installing conservation measures earlier. Impact of a rebate on customer first-cost may therefore be an important consideration. The size of the rebate thus has an important function in getting the customer's attention. As the two cases suggest, providing a large or full rebate (full coverage of first cost) can be a tool for reducing the uncertainty in customer participation and assuring high overall participation rates. However, the discussion detailed below indicates the need to consider other factors which increase program attractiveness.

Effective Outreach.

Our review of both programs indicates the value of making the customer recognize that action on their part will lead to direct (financial) savings and will also help in energy conservation in general. Notably in a small cohesive community such as Traer, appeals to community values can be important in gaining greater penetration in a program. Traer's mottos 'we all save money' and 'everyone wins' engendered community spirit and created greater awareness of the program objectives. Such community spirit was also generated by the media which was very supportive of the program and voluntarily carried several articles on the program. Local media was an effective means of communication in a small community such as Traer.

For the City of Palo Alto, on the other hand, program success owed a great deal to enhanced interaction between the utility and its largest customers. This has been particularly evident for contact established with the utility's largest customers, which account for approximately 70% of the electric utility's revenues. An important reason for the success of the program with this group of customers is the assignment of specific account representatives who have marketed the program to them. The utility also used a variety of outreach methods including utility-sponsored workshops for customers and vendors.

Simplifying the Rebate Process

The procedure for obtaining a rebate has to be easy enough so that the customer is not put off by the effort involved in obtaining it. For Traer residential customers, the exchange was a simple procedure requiring the

customers to bring buckets filled with their 'old' incandescents and exchanging them with available range of more efficient lamps on a certain day at a fixed location. Utility staff on site helped these customers in obtaining the right type of lamps for their requirements. The Utility in Palo Alto, on the other hand, eased the process of obtaining the rebate (which was more involved than Traer's residential exchange) by appointing field staff persons who followed and assisted each applicant from start to finish. Although this required extra effort on part of the utility, it proved valuable in obtaining a high response rate by helping to ensure that those customers who showed a willingness to participate, did not give up after their initial contact with the utility.

Introducing Flexibility:

Another important feature of a successful DSM program needs to be flexibility. In adopting programs arranged by a utility, customers (and external or internal evaluators) often provide very useful insights and suggestions for improving program effectiveness. Some flexibility in program design allows the utility to incorporate modifications to their program as needed.

Both Palo Alto and Traer incorporated changes to their programs after they were initiated. After outside consultants pointed the need for greater flexibility, the Utility in Palo Alto introduced a policy of granting extensions to their (previous) strict 3-month project completion deadline. At the same time, the utility allowed customers to propose special measures not outlined within the list of eligible measures and also made provision for technical assistance. They ex[rebate to include labor and feasibility studies, not just materials, as part of project costs, and allowed in-house labor to be counted as part of the cost. Other features were added as necessary, which greatly aided in increasing the acceptability of the program and its final impact. In the case of Traer, such flexibility was demonstrated by the response to high demand for the lamps: the utility announced a second day for the exchange, which was not in the initial plans.

Offering a Range of Products

A program may be made more attractive by increasing the range of eligible products available and allowing customers some choice in recommending their own measures which are energy efficient and cost-effective. There is a vast range of efficient lighting products that were not available a few years ago; it would be beneficial for utilities to continually update and increase the range of efficient measures made available to their customers.

Following the first year of the PARTNERS program, the Utility in Palo Alto allowed some flexibility over the type of measures installed, while the range of products specified in the program was also increased. Since November 1987, new construction projects were also made eligible for rebates. These changes greatly increased the attractiveness of their program. On a similar note, although Traer exchange was highly successful, their program could have benefited from incorporating more hardware options such as photocells in outdoor lighting, other types of efficient fluorescent lamps, and lighting management options for the commercial sector such as electronic ballasts, improved light reflectors, timing devices and daylighting options.

Soliciting Trade Allies

Another feature of program design that deserves mention is the value of trade-ally cooperation. In such cooperation, the manufacturer or vendor usually provides some form of assistance which is generally a subsidy on the products or an attractive bulk rate. Such cooperation can be seen as valuable to all parties concerned. The manufacturer sees this as an opportunity to extend his business in the long term or simply as an opportunity for immediate benefits from increased sales. At the same time, the utility benefits either in terms of reduced overall costs or indirectly by passing the benefit on to the customer (by increasing the size of the rebate). If the size of the rebate is increased, this directly benefits the customer and increases a program's attractiveness, which in turn yields a higher response rate. Once it has been decided that soliciting trade allies may be beneficial, the next consideration is how such cooperation may be achieved. Program experience in these two cases suggests that manufacturers may be persuaded to provide such support when the benefits are made clear to them. Allies may also be brought on board by simply negotiating a bulk purchase. In the case of Traer, the utility greatly benefited in its cooperation with Philips Lighting. Besides providing a huge subsidy which greatly reduced program costs for the utility, Philips also assisted Traer in other ways (e.g. by providing manpower in running some of the program).

Planning Ahead While Staying Flexible

In ensuring program success, some thought needs to be given to timing of various phases of the program and the rigidity with which planned timing is observed. To achieve greater response rates, a utility needs to provide ample advertising time before a program is started, appropriate timing between various procedures and deadlines, and prompt response to customer queries. At the same time, there seems to be value in allowing some flexibility over deadlines. In its first year, the City of Palo Alto started its program after two months of advertising at most. As this was the very first time the utility had launched such a program, two months was not sufficient time for creating widespread awareness of the program. Specific deadlines may often get decided on an ad hoc basis by the utility or may be based on experience with a small sample of customers. Such time frames may not suit some commercial customers' budget cycles and planning schedules. It is evident from Palo Alto's experience that stretching of deadlines (or provision of some flexibility) allows more customers to benefit from a program. In Traer's case, timing can be seen as having some beneficial effect on program acceptability. The program, started by a survey of all households, was promoted sufficiently far in advance of the exchange, and was combined with well-timed advertising and media support.

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