A Wish List For Residential Direct Load Control Customers

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ABSTRACT

This paper provides results from a study about residential direct load control (DLC) that included 600 participants, past-participants, and non-participants that Quantum Consulting conducted in 2001. It presents key findings on utility customer preferences for direct load control and their willingness to accept different cycling strategies. While many utilities have what they consider a successful program, they may not be capitalizing on the true potential of the program. Also, given that DLC programs have once again become an important component of the utility portfolio, many utilities are designing and launching pilot programs. This paper can help utilities design more effective and successful programs by keeping customer preferences in mind when designing the DLC program.

Introduction

Direct load control (DLC) programs have changed dramatically in focus and content since the late 1970s, when they were implemented mainly as a result of regulatory requirements. While the need for load control has never gone away, events of the past few years have re-emphasized the importance of load control in maintaining a competitive edge in the modern electricity market. Price spikes, transmission system failures, generation shortfalls, and distribution system constraints observed during the last several years underscore the desirability, and sometimes the necessity, of curtailing demand on short notice. Fortunately, innovations in technology and service delivery now provide energy suppliers with a far wider set of options to offer a direct load control program that enhances customer satisfaction while addressing power supply and reliability concerns.

Quantum Consulting conducted a survey of 600 direct load control participants, past participants (people who have participated in utility DLC programs previously, but were not currently enrolled) and non-participants across the nation (divided into five regions— Northwest, West, Southeast, Northeast and Midwest) to understand their preferences for program design. This study was undertaken as a multi-client report, funded by Cinergy Corporation, GPU Energy, Mid American Energy Company and Portland General Electric. Figure 1 illustrates the distribution of participants interviewed and the appliances enrolled across the five regions assigned.

In order to identify, recruit, and retain the participants who will contribute the most to utility load management program success, this survey studied customer preferences regarding several program parameters, including control strategies, communication strategies, incentive strategies and technology choices. QC found that satisfaction with the load control program is able to increase overall satisfaction with the utility. The results from this survey will help utility managers gauge reactions of their customer base when designing or fine-tuning the utility load control program.



Figure 1. Geographic Distribution of DLC Participants Surveyed

What Participants Want

Participants and past participants of residential load control programs expressed that their main reason for participating is "lower electric bills" 47 percent. This can be achieved in two ways relative to the program: through bill credit as the means of compensation for program participation, and through reduced usage of appliances that most affect their bills. In most homes these appliances are the refrigerator (which cannot be cycled), the air conditioner (in summer), the water heater (in mornings) and space heat (in winter). Cycling these appliances in a DLC program does not typically save energy. Snapback—the increased energy use occurring immediately following the release of control as the appliance works to compensate for the control period-minimizes or negates any energy savings. (This Although DLC programs do not typically save energy, the is illustrated in Figure 2.) customer perception is that they "save substantial energy" (17 percent of participants and 10 percent of past participants) or that they "save (energy) during critical periods" (72 percent of participants and 54 percent of past participants) and thus they believe they are also lowering their bill through reduced usage.

Because participants want lower electric bills, they definitely prefer to receive their compensation in the form of a bill credit (87 percent) rather than a check (12 percent). Customers were also very specific in desiring money (66 percent) over energy efficient products (32 percent) as compensation. In order for them to choose energy efficient products over money, the value of the product would have to be more than \$30. The one area where there is not a clear preference is in fixed monthly or per event incentives. Customers were equally split at 46 percent each for "per month" (flat monthly fee) or "per interruption" incentives. Of those who prefer a per interruption incentive, 74 percent expressed their preference to have an option to override the interruption.

Figure 2. Illustration of "Snapback"



Having the option to override an interruption is important to customers because they want to feel that they are in control of their energy usage. Among all respondents, participants and non-participants, the option to override was preferred by 51 percent. What is noteworthy about this is that of this group, 73 percent expressed this preference as "moderate" to "strong." While all interruptions are inconvenient, our research has shown that many times customers do not know a control event has occurred. Even so, there are times when it is truly not desirable to have an interruption. The utility has enlisted the participant for the express purpose of controlling the appliance during peak times, therefore, the utility needs to find a means of giving the customer choice while not adversely impacting the utility's goals. This is now possible through the use of new technologies. Offering the option to override, but removing the monthly incentive in any month when the option to override is utilized gives the customer choice while reducing the likelihood that they will override except in the most extreme circumstance, satisfying the preferences of both the utility and the customer.

Customer satisfaction with the program can affect the overall satisfaction with the utility. It can also increase their household's willingness to enroll more appliances. The survey found that most respondents (88 percent) are so satisfied with the program that they would like to enroll additional appliances, particularly water heaters (39 percent). The greatest barrier to this is that they are not given the opportunity by their utility (about 30 percent).

Customers prefer to receive advance notification of control events (72 percent). Ideally, customers want 24 hours advance notice, but almost a third of respondents would be satisfied with one or two hours. With advance notice, customers could pre-heat or pre-cool their home and remain relatively comfortable through the control event. Further, the demand savings from the control period may be greater with pre-cooling. The Association of Energy

Professionals reported that "Pre-cooling space a few degrees in the morning can allow air conditioning systems to use less energy during peak load periods in the afternoon." That being the case, advance notice for the purpose of pre-cooling can serve both the customer and the utility. Many of the newer technologies make this easier to accomplish, so utilities should consider incorporating advance notice of control events into their programs. The customer preferred methods for advance notification are by a phone call (56 percent), mail (16 percent) or email (13 percent). In most cases mail is not practical, and phone communication would place a large burden on the utility, without guaranteed success in making contact. Email, however, will provide the personal contact that customers are looking for and can be done quickly and easily to the list of subscribers.

Through years of research on direct load control programs, Quantum Consulting has found that customers also desire contact from the utility acknowledging they are in the program and expressing appreciation for participating, especially after a major control event. This increases customer satisfaction with the utility. This too, like the advance notification of a control event, can be accomplished through email, although a postcard or other personal note from the utility enhances goodwill more. One effective way of accomplishing this is to send a yearly reminder to participants. In many areas direct load control is not used routinely, but only in more critical situations, and since these are infrequent, people tend to forget they are enrolled in the program. A postcard prior to the "control season" reminding the customer of participation, providing a phone number for questions or concerns, and thanking them for their continued support can greatly enhance the customer's satisfaction with their utility. Another idea is to send a reminder indicating how much the customer has saved on their utility bill (through the program incentive) over the length of their participation in the program.

Another potential problem that the yearly reminder can mitigate is for "inheritors" people who have moved into a controlled home. If the utility has not established an effective system for notifying the new occupant, the inheritor may become disgruntled when a control event occurs. In Florida Power and Light (FPL) territory, the utility sends out a mailer to the new occupant, a very effective way of telling them about the program. However, in an effort to maintain participation, the utility has an opt out program where inheritors are in until they say otherwise. FPL has found that follow up can help increase satisfaction. Use of a mailer or an annual postcard can turn a potentially negative experience with the utility into a positive one.

Based on interviews for this study, customers are not yet ready on a large-scale basis to accept the many new and exciting technologies currently becoming available for residential direct load control. Respondents repeatedly stated that they want equipment that is easy to use and understand. Further, past studies Quantum Consulting has conducted have shown a correlation between "difficult" equipment and program drop-outs. Customers are ready for smart thermostats¹, customer alert system units² and are starting to move toward wanting secure internet control of appliances (44 percent) and time of use rates with override

¹ Smart thermostats incorporate technology that allows them to identify incoming load control signals and enact load cycling commands, eliminating the need for a separate control unit. Some smart thermostats incorporate price signal technology, allowing the unit to specify which appliances will operate under each price level.

 $^{^{2}}$ Alert capability may provide a visual or auditory signal (or both) notifying the customer they are close to a peak level of demand. Some alert systems give customers the ability to decide whether they wish to participate in demand-reduction.

capability (50 percent), but they are not quite ready for time-of-use (TOU) rates³ based on utility website posting of rates (38 percent). The cost of some of the newer technologies still remains fairly high, reducing cost-effectiveness of some programs.

In terms of DLC equipment, customers want to be home when the equipment is installed (72 percent) and want the installation to be smooth and hassle free. Further, respondents expressed a slight preference for the equipment to be inside the home (58 percent) instead of outside. Another important issue for customers is that once they make the decision to sign-up for residential load control, they want the equipment installed in a timely manner. The potential for dissatisfaction becomes higher the longer it takes the utility to install the equipment. Table 1 shows customer preference for different technology choices as found in the national benchmark study.

	Percentage of all Respondants*		
	YES	NO	DK/Doesn't Matter
Satisfied with current thermostat	80	17	3
Thermostat with Built-In Load Control Device	61	31	8
Load Control Thermostat with addl features	15	68	17
Secure Internet Control of appliances	44	54	4
Override Option with TOU rates	50	45	5
Choose curtailment based on TOU Rates posted on Utility Website	38	59	3
Option to Override residential direct load control	51	47	2
Equipment Installed Outside of Home	31	58	11
Home During Installation of DLC equipment	72	28	0

Table 1. Customer Preferences Relative to Equipment

*Asked of participants, past participants and non participants

Customers who perceive that their quality of life was not affected by the load control program are much more satisfied with the program. As mentioned earlier, something as easy as providing advance notice so that participants can pre-cool or pre-heat their home can contribute to better quality of life during the control event. Comments about how all respondents think they would alter their lifestyle due to DLC program participation included:

- Choosing to run errands during control periods
- Closing off certain rooms to moderate the temperature better
- Taking a shower while there is hot water
- Washing clothes before or after the hot water control period
- Turning on fans to circulate the air
- Rearranging household chores around the event
- Cooking meals prior to the control event, or choosing to eat out

Advance notice is one method utilities can use to mitigate the quality of life issues associated with direct load control. As little as one or two hours notice would be desired by 38 percent of respondents, allowing them to plan their schedules around the event, maybe precooking something for dinner, or delaying errands until after the control begins. Advance

³ TOU rates are not direct load control, but are a demand response program option utilities are beginning to employ more frequently with their residential customers. Due to utility interest in TOU, some of the founding clients for the national benchmark study requested that willingness to accept TOU be tested.

notice has the potential to make a difference in how customers perceive their quality of life during control events, and thus improving their satisfaction with the program.

It is interesting to note that many air conditioning (AC) participants (33 percent) and over half of water heater (WH) participants (54 percent) would accept a greater cycling strategy than their utility employs. Utilities commonly employ a 33 percent (10 minutes out of 30), 50 percent (15 out of 30 minutes), or a 67 percent cycling strategy (20 out of 30 minutes). Very few utilities use a greater cycling strategy (e.g. 25 out of 30 minutes) or a "shed" strategy (30 out of 30 minutes) for their residential customers. Because demand reduction impacts are very small with a 33 percent strategy, a 50 percent cycling strategy was the assumed minimum starting point for air conditioning. Figure 3 below shows the progression of questions asked of respondents who answered affirmatively to increasing the cycling strategy (i.e., survey asked the 69 percent who would accept a 50 percent cycling strategy if they would accept a greater then 50 percent cycling strategy. Of those who responded "yes" to a greater than 50 percent cycling strategy, the survey then asked if they would accept 20, 25 or 30 minutes of control.)



Figure 3. Respondent Willingness for AC Control Duration

Quantum Consulting's experience in years of research on customer satisfaction with DLC programs contrasts with what we have found utilities to commonly believe. Many utilities believe that customer satisfaction is more directly affected by the cycling strategy— the intensity, the duration and the frequency of control—rather than the other issues associated with the program (e.g. ease of sign up and installation, equipment problems, utility contact, etc.) However, this is not the case. Typically less than 25 percent of customers notice control and less than 20 percent of those customers report that their dissatisfaction with the program is directly attributable to the interruptions. Many customers would accept greater cycling strategies than many utilities currently impose, especially if coupled with advance notice and option to override. Table 2 provides data on customer willingness for cycling strategies from the national benchmark.

	Percentage of all Respondants*		
	YES	NO	
Intensity of control			
AC 50%	69	31	
AC 67%	33	67	
WH at least 3 hours	87	13	
WH 4 to 6 hours	54	46	
Heat Shed at least 3 hours	96	4	
Heat Shed 4 to 6 hours	55	45	
Duration of control	Start time	Stop time	
Air Conditioning	11am	7pm	
Water Heat	9am	5pm	
Heat	8:45am	6pm	
Pool Pumps	9am	7pm	

Table 2. Customer Willingness for Control Intensity and Duration

Finally, customers do not feel they have a good understanding of their program. They want more and better information about the program. Our research has confirmed that many customers do not really grasp even the basics of their program. The most confusing aspects of DLC programs are control frequency—the number of days per season that control occurs (27 percent), duration—the number of hours per day that control is implemented (22 percent) and intensity—the cycling strategy used (i.e. the percentage of time that control is exerted per hour or half hour) (11 percent), as well as the misconception about how load control affects other appliances (12 percent).

When utilities structure their programs with the customer wish list in mind, participants and utilities alike benefit.

Conclusions

In order to increase cost effectiveness and maintain a high level of participation, utilities should consider customer preferences for program parameters, including control strategies, communication strategies, incentive strategies and technology choices. In addition, utilities need to consider how to target and market to the customers that will provide the greatest energy impacts. Structuring a program without understanding customer motivation for participation and the issues that customers consider important relative to DLC will reduce retention and demand savings, and contribute to higher program costs.

Summary of the "Wish List" for Residential Direct Load Control Customers:

To increase customer satisfaction and to get the most out of your residential load control programs, consider these customer desires:

- Lower electric bills
- Bill credit, not cash
- Money not energy efficient products
- Option to override the interruption
- Ability to enroll additional appliances
- Advance notice of an interruption
- Personal contact with the utility
- Equipment that is easy to use and understand
- To be home when the equipment is installed and for the installation to go smoothly
- Equipment installed inside the home
- Short time lapse between enrollment and equipment installation
- Annual program reminders
- Minimal interference with their quality of life
- More and better information about the program

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