



**Final Report
Process Evaluation of
2007 PG&E Smart AC Program
Study ID PGE0262.01**

**Pacific Gas and Electric
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1. Executive Summary

1.1 Introduction

1.1.1 Scope of the Evaluation

This report contains KEMA's process evaluation of PG&E's SmartAC Program after its first year of operation (2007). The program processes analyzed in this report include:

- Marketing, recruitment, and program information;
- Program enrollment and control device installation/operation;
- The implementation of control events; and
- The payment of program incentives.

In addition to discussing these program processes, this report also:

- Discusses some of the challenges of "scaling up" current program processes to accommodate the program's large planned expansion.
- Summarizes the satisfaction of program participants with the program as a whole and their plans for continued participation.
- Provides recommendations on program improvements.

These findings are based on following sources of information.

- *Interviews with program implementation staff:* The evaluators conducted in-depth interviews, and in some cases multiple in-depth interviews, with 14 persons who are significantly involved in the implementation of the SmartAC Program. These people work for PG&E and the SmartAC Program's two primary implementation contractors: GoodCents and Cannon Technologies. Most of these interviews were conducted in the October-November 2007 period.
- *Two surveys of EM&V special monitoring group participants:* In a July 2007 "pre-survey" and a November/December 2007 "post-survey" the evaluators asked 263 participants in the SmartAC Program's EM&V special monitoring group a wide variety of questions on their experience with and assessment of the SmartAC program processes.
- *Program materials and websites:* The evaluators reviewed SmartAC Program materials such as marketing collateral, program information, marketing analyses, and process flow diagrams. They also reviewed program websites.

We attempted to survey all 297 special monitoring group participants for both the pre-survey and the post-survey. We were able to complete pre-surveys with 247 monitoring group participants and post-surveys with 222 monitoring group participants. Since 16 of the post-survey respondents had not

responded to the pre-survey, a total of 263 of the monitoring group participants responded to at least one of two surveys.

This Process Evaluation covers the program's first year of operations (2007.) In January and February of 2008, preliminary evaluation results were discussed with PG&E, GoodCents, and Cannon Technologies. In March of 2008, these three parties submitted comments in response to the preliminary results, which include remedies to some of the problems identified in the preliminary results.

The findings and recommendations presented in this report refer to the process evaluation period. However, for the sake of transparency, this report includes statements from the parties regarding remedies they undertook in the first two months of 2008. These comments are noted as having been provided to the evaluators in March 2008. KEMA did not obtain corroboration regarding these claims.

1.1.2 Program Description

PG&E's SmartAC Program is a direct load control (DLC) program that first began enlisting customers in Spring 2007. As of January 2008 it had over 26,000 participants with installed devices and another 22,000 participants who are enrolled and awaiting device installations. The vast majority of these participants are residential customers. The Program began by recruiting customers in San Joaquin County but has since expanded to many other areas of the PG&E service territory.

The SmartAC Program uses paging signals to reduce the energy consumption of participants' air conditioners during times of peak system demand. The air conditioners are controlled either by a programmable thermostat or a switch that the Program installs at the participant's residence or business. The participants get to choose the type of control device they want installed. In the case of participants with programmable thermostats, during a control event the Program will raise the thermostat's temperature setting by no more than four degrees. In the case of participants with switches, the Program will switch the air conditioner on and off for brief periods of time (approximately 15 minutes out of every half hour).

The Smart AC Program pays all participants a one-time \$25 "thank you" payment. Participants that choose the programmable thermostat also receive the thermostat for free, which the Program advertises as a \$200 value.

PG&E manages the marketing efforts, initiates the control events, and manages the overall program. GoodCents handles the dedicated Program hotline, enrolls customers, schedules installation appointments, and installs the control devices. Cannon Technologies manufactures the control devices and manages the Yukon system that makes the control events possible.

1.1.3 Program Enrollment, Installation, and Satisfaction Goals

The SmartAC Program met most of its program goals for 2007. By the end of 2007, it had enrolled close to 40,000 participants (its goal was 32,000), and it achieved a satisfaction rate of 96 percent (same as its goal). PG&E installed 5,000 devices by July 2007 (same as its goal) and 24,700 devices by the end of December 2007 (its goal was 25,000)..

The Program's original goal of enrolling 500 small commercial and industrial customers was revised after the second half of 2007, when PG&E decided to focus on the Residential market for the remainder of the year.

1.2 Marketing and Program Information

1.2.1 Key Marketing and Program Information Findings

Key findings from this Chapter include:

- *Marketing methods:* The SmartAC Program relies almost exclusively on direct mail for marketing, with occasional telemarketing, media events, and bill inserts used to complement these mailings.
- *Recent marketing success:* At the end of June 2007 PG&E took over responsibility for designing and implementing the SmartAC Program marketing strategies from GoodCents. The main reason for the shift was PG&E's concern that marketing efforts were not producing the levels of new participation needed to meet program goals. After an initial slow start, starting in August 2007 PG&E began to have success after experimenting with new marketing messages. For example, it found that response rates were much higher if letters marketed the smart thermostat and control switch separately. PG&E also included new participant survey information in its recruitment letters that indicated that only six percent of participants had noticed the control events. The utility also founds that media events can help improve response rates.
- *Drawbacks of the marketing success:* Although these more successful direct mail campaigns created a surge in new participants, they also created challenges for program implementation. First they made it difficult for the Program's scheduling and installation contractor GoodCents to keep up. The mailings also created a large increase in the ratio of smart thermostats to control switches, reversing the earlier trend. Because thermostat installations require appointments and take longer to install, this made it more difficult for GoodCents to keep up with installations. GoodCents also reported some problems such as customers being disappointed because their cooling systems could not accommodate the thermostats, or some instances where customers had chosen one control device based on one letter and then later received another letter promoting the alternative control device, which they would have preferred given the choice.
- *Marketing gaps:* The PG&E SmartAC Program staff acknowledge that they have done little marketing to the small commercial and multifamily sectors. As of late 2007 the Program had fewer than 100 commercial participants. As for the multifamily sector, the Program staff have creative ideas for increasing Program participation in this sector, but these ideas have yet to be tested or implemented.
- *New marketing ideas:* Though recent marketing efforts have had some success, PG&E's SmartAC Program staff is currently studying new ways to attract new participants and retain the current ones. Some of these new marketing ideas include a wide variety of possible alternative/additional incentives besides the current \$25 payment – such as sweepstake entries, tree plantings, and home audits. The PG&E staff are also considering new marketing strategies such as customizing marketing messages based on customer demographics, marketing to customers with previous participation in other PG&E energy efficiency or demand response programs, marketing to people with inactive control devices due to move-outs, paying incentives to participants if they recruit friends for the Program, and paying incentives to charities and non-profits that recruit participants for the SmartAC Program as fundraisers.

- *Lingering barriers to marketing, participation:* These include the difficulty of crafting effective marketing messages for the winter period, and the increased incidence in parts of California of cooling systems such as swamp coolers and water-cooled systems that are less compatible with the SmartAC Program control devices. Potential effects of negative media and public perception of PG&E were noted by some interviewees.
- *Program awareness:* Nearly half of the participants were aware of PG&E's rebate programs, but awareness of other PG&E programs and services was relatively low.
- *Participation drivers:* Nearly two-thirds of the participants joined the Program for personal benefits – whether this was saving their own energy or getting the \$25 rebate. Interestingly there were no significant differences between participants with higher incomes and lower incomes as to their willingness to cite these reasons.
- *How they heard about the program:* Utility direct mail was, by far, the most-cited source of first Program information. Over half of the participants did not hear about the Program from more than one information source. Although the percentage of participants who heard about the Program through word-of-mouth is fairly low, our experience evaluating other direct load control programs indicates that this will increase over time as the Program ages and expands in size.
- *Recalling marketing messages:* Two-thirds of the participants recalled PG&E giving them a reason why they should join the Program. Of those who recalled such reasons, about half recalled PG&E telling them either that the Program would help the utility avoid power outages or would save them energy. Helping the environment was the next most-recalled reason (23% of respondents).
- *Rating general program information:* Eighty-percent of participants were satisfied with the Program information. Only eight percent said that anything was unclear about how the program worked.
- *Unawareness of opt-option:* Only about a quarter of the participants were aware that they could opt out of control events.
- *Rating thermostat instructions:* Almost a third of participants who read the instructions provided by the Program for operating the smart thermostats still found it difficult to operate after reading these instructions. Participants who were seniors, had no college education, and had household incomes of less than \$50,000 had much more difficulty operating the smart thermostat after reading the instructions than their counterparts. In addition, only a small minority of participants who received the smart thermostats have actually used the Program website to operate these thermostats.
- *Rating how well Program responds to inquiries:* The two participant surveys found that 65-77% of participants who called or emailed PG&E for additional Program information were satisfied with the outcomes of their inquiries. Based on our evaluation experience, satisfaction ratings below 80 percent suggest some need for improvement. For dissatisfied participants, the most-cited complaint (82%) was the PG&E's inability to answer or address their questions or concerns.
- *Preferred ways of receiving program information:* When asked what would be the best way to provide them with more program information, nearly three quarters of the participants said that a utility direct mail piece was their preferred way. Less than a quarter of them preferred some other way.

1.2.2 Marketing and Program Information Recommendations

- *Do more marketing to commercial customers:* Compared to other similar California DLC programs such as the SDG&E Summer Saver Program, the PG&E SmartAC Program has done almost no marketing to commercial customers. Marketing to commercial customers requires a different delivery mechanism – e.g., face-to-face meetings instead of direct mail. Because it is a different delivery mechanism, it will be useful for PG&E to gain experience with it sooner rather than later. The program will also need to do some data mining of PG&E’s CIS system to identify those commercial customers that are likely to have businesses types and air conditioning equipment best suited for the Program.
- *Do more marketing to multifamily customers:* The PG&E SmartAC Program staff has done little marketing to multifamily customers. Some DLC programs have found that effective multifamily participation strategies can provide cost-effective load relief. In addition, in many parts of PG&E’s service territory, multifamily residences represent a large proportion of the residential sector. The PG&E SmartAC Program staff has some good ideas for marketing to these customers such as providing “bounties” to landlords who recruit tenants or seeking CPUC approval for “opt out” tenant participation rules. The Program should begin implementing some of these ideas.
- *Do targeted mailings to high-potential residential customers:* Two groups of residential customers that have great potential for joining the program include those who have participated in other PG&E energy efficiency programs and those who have moved into a house that already has a control device installed (but which has been deactivated). The PG&E SmartAC Program staff has contemplated marketing campaigns for these residential subgroups and should move forward on these efforts, including conducting the data mining needed to identify customers in the former group.
- *Improve instructions for thermostat operation:* Evidence from participant surveys indicate that the SmartAC Program installers need to provide more user-friendly instructions, conduct additional customer training or even program the thermostats on the customers’ behalf -- when they encounter senior customers, for example. There is also some survey evidence that Program call center staff need better training in how to instruct participants to operate their thermostats. Additionally only a small minority of participants who received the smart thermostats have actually used the Program website to operate these thermostats. This suggests that the Program needs to do more customer education in this area – possibly by providing a brief case study of a participant who finds this feature useful.
- *Use the customer interaction during the thermostat installation process to market other PG&E energy programs:* One advantage of the recent increase in popularity of the smart thermostat is that the Program has more interaction with PG&E customers. The low level of awareness of other PG&E energy programs among SmartAC Program participants, indicates that the SmartAC Program is missing an opportunity to promote these other energy programs.
- *Feature the opt-out option more prominently in Program materials:* Only a quarter of the surveyed participants were aware of the Program’s opt-out option. This is not surprising since some Program materials have included no mention of this option and other materials have given it little prominence. Interviews with Program staff suggested that this de-emphasis was intentional due to concerns about high opt out rates. However, the participant surveys indicated that these concerns were unfounded. When informed of this option, few of the participants said that they were likely to use it. Only a handful of participants opted out of the control events that were conducted in 2007. However, we also note that a few of the EM&V sample participants that were subject to frequent control events decided to drop out of

the SmartAC program entirely. Experience from other direct load control programs indicates that high levels of opting out usually occur when the means of opting out are relatively easy – e.g., lowering the thermostat settings or pushing an “override button” at the device, instead of remotely. The SmartAC Program’s means of opting out – either logging on to a program website that very few participants have used or calling the Program in advance of the control event – are not so “user- friendly.” It is also possible that the absence of information about the opt-out option in the program materials might discourage PG&E customers who value such an option from joining the program.

1.3 Program Enrollment and Control Device Installation/Operation

1.3.1 Key Program Enrollment and Control Device Installation/Operation Findings

- *Program installers having difficulty keeping up with demand:* GoodCents’ control-device installers have had difficulty keeping up with the recent surge in new participants. Representatives of PG&E and GoodCents disagree as to whether GoodCents could have been better prepared for this increase in program participants. However there is general agreement that two factors have made it more difficult for GoodCents to keep up with demand for installations. These include PG&E requirements that GoodCents hires IBEW members for the installations, and the significant increase in demand for smart thermostat as opposed to switches, reversing the previous trend. GoodCents also reported difficulty finding HVAC technicians who could pass drug or background checks. In March 2008, GoodCents said that it has recently come to an agreement with the IBEW that would support its ability to recruit technicians from a much larger pool of qualified applicants that was “more than sufficient to meet the Program’s highest installation goals.” GoodCents also indicated that the IBEW had become a proactive part of the recruiting process.
- *Increasing the number of field technicians:* In response to the increased participant demand, from September 2007 to November 2007 GoodCents increased its permanent field staff from 10 field technicians to 25. It also was able to bring in one subcontractor SWAT team with five technicians who will install only switches. In March 2008, GoodCents reported that its field staff had increased to 39 technicians with another 5 technicians in training.
- *Concerns about manual data collection processes:* PG&E SmartAC Program staff expressed concerns about GoodCents’ field data collection and compilation processes, which rely heavily on manual processes. They noted that field technicians hand deliver their work orders and the data entry people then enter these by hand. These processes are more labor intensive and cause delays in reporting installation data to PG&E. PG&E staff are also concerned how effective these manual processes will be when the program scales up. In March 2008, GoodCents indicated that in early 2008 it initiated a project to upgrade its corporate solution footprint to introduce automation in a number of areas including the processing of work orders.
- *The supply of control devices was able to handle the surge in demand:* Although the large and somewhat unexpected demand for programmable thermostats taxed Program installation efforts, the process of insuring that adequate numbers of thermostats were available for installation went much more smoothly. Representatives of Cannon Technologies, which supplies the devices for the program, indicated that this was due to good communications with PG&E about forecasted demand and adequate manufacturing capacity.

- *Satisfaction with the enrollment process:* Half of the participants used the sign-up card to enroll in the program and about a third used the toll-free number. Participating seniors were much less likely (3%) to use the Internet to enroll than non-seniors (18%). However, satisfaction with enrollment process was very high – almost 97 percent -- regardless of the enrollment method used (card, telephone, or Internet).
- *Choosing the control device:* The participants who received a smart thermostat cited a number of reasons for choosing this control device, with the most-cited reason being the need/desire for a new/better thermostat. The participants who received the switch also cited a variety of reasons for choosing this control device with “seemed like less of a hassle” being, by far, the most cited.
- *Satisfaction with scheduling and control device installation:* Ninety-three percent of the participants who recalled the process for scheduling and installing the control device were satisfied with this process. However, it is important to note that these participants had their scheduling and installation experiences in Spring 2007, long before the recent surge in customer demand.
- *Satisfaction with control device performance:*
 - *Thermostats:* The November/December post-survey found that 74 percent of those who received smart thermostats were satisfied with them. The two most common complaints were that the thermostats were too complicated to use and that they had concerns about the quality of these devices. Interviews with GoodCents representatives who were very familiar with participant feedback cited similar complaints. GoodCents representatives also reported 60-70 service calls a month due to thermostats malfunctioning.
 - *Switches:* Sixty-nine percent of participants surveyed in November/December 2007 said that their control switch was working, while 16 percent said that it was not working and 15 percent did not know. Interestingly, of the 20 participants that said their switch was not working, 95 percent of them said that it was because their HVAC contractor disconnected it.
- *Introduction of a more user-friendly thermostat:* In 2008 the SmartAC Program is planning to introduce a new, user-friendlier smart thermostat. This thermostat will have a much larger touch screen, backlighting, and enhanced communication capabilities. Most of the interviewees were looking forward to the new thermostats as a big improvement over current models. Yet some of the problems with the current thermostats have made the Program cautious about introducing this new model too soon without adequate testing
- *CAC performance problems:* Evaluations of other DLC programs have found that a common problem is program participants blaming the program’s control device for problems with air conditioning equipment that are not related to it. However, only seven percent of the SmartAC participants reported air conditioner mechanical problems since they became involved with the program and only half of those reporting problems thought that these problems were related to their participation in the program.

1.3.2 Program Enrollment and Control Device Installation/Operation Recommendations

- *Require a long-term plan for field technician staffing levels:* KEMA recommends that PG&E require a long –term plan for fielding technician staffing levels. Although GoodCents increased its field staff

from 11 to 25 field technicians late in 2007, the number of required installations will increase from 25,000 in 2007 to over 100,000 in 2008. According to some PG&E forecasts, as many as 60 field technicians will be needed to keep up with this higher volume. The union hiring requirements in the PG&E service territory that made it more difficult for GoodCents to find qualified technicians. For these reasons it is crucial that GoodCents present PG&E with a long-term plan for field staffing levels that is based on forecasts of the expected number of new participants. Because of the inherent uncertainty of the success of Program marketing efforts this plan should be used as a guideline rather than a mandate and should be adjusted periodically based on new information.

In March 2008 GoodCents said that in January 2008 it completed, with PG&E staff, a new implementation plan for the SmartAC program for 2008 and beyond. GoodCents said that this new plan “includes all pertinent information required to closely monitor the Program’s marketing, enrollment, field manpower, and installation goals” along with weekly status call-in meetings. As discussed in the previous subsection, in March 2008 GoodCents also said that it had reached agreements with IBEW that would increase its chances of hiring more installers.

- *Reduce reliance on manual data collection process:* GoodCents’ current field data collection and compilation processes rely heavily on manual processes such as field technicians hand delivering their work orders and the data entry people then entering these by hand. These processes are more labor intensive and cause delays in reporting installation data to PG&E. PG&E staff are also concerned how effective these manual processes will be when the program scales up. GoodCents should consider using more in-field data reporting devices. In March 2008 GoodCents indicated that in early 2008 it initiated a project to upgrade its corporate solution footprint to introduce automation in a number of areas including the processing of work orders.
- *Facilitate the introduction of the new smart thermostat:* Both GoodCents representatives and surveyed participants reported problems with the current smart thermostat model including difficulty of operation and equipment malfunctions. The Program is planning to introduce a new smart thermostat model in 2008 that will have a much larger touch screen, backlighting, and enhanced communication capabilities. Due to the experiences with the current thermostat model, the program is cautious about introducing this new model without adequate testing. For this and other reasons, the new thermostat models are not expected to be introduced until the second quarter of 2008 at the earliest. We recommend that the Program do what it can to accelerate this product testing and phase-in process. The new thermostat is likely to not only reduce participant complaints but also be an attractive marketing feature.
- *Explore ways to limit the potential of device tampering:* Of the 16 percent of participants who said that their control switches were not working, 95 percent of them said that this was because their HVAC contractor had disconnected the switch. This information suggests that the PG&E SmartAC Program staff needs to do more education and outreach to the HVAC community. Educating the HVAC community about SmartAC could reduce device tampering. Other ways could include educating the customer about mentioning the device to HVAC technicians, or applying labels to the devices or their surroundings.

1.4 Implementation of Control Events

1.4.1 Key Control Event Findings

- *2007 control events:* In 2007 PG&E initiated 15 control events that affected the 297 SmartAC Program participants that made up the special monitoring group. Two of these control events – one in July 2007 and one in September 2007 -- affected all SmartAC Program participants. All these control events were either called by the evaluators or by PG&E.
- *The control events processes went smoothly:* Interviews with the PG&E Smart AC Program staff, the PG&E Transmission Operations staff, and representatives of Cannon Technologies all indicated that the control events went very well. The interviewees could only identify two minor glitches in the control event process. One involved the paging system has since been fixed and the other is inconsequential.
- *New flexibility planned for the control system:* Cannon Technologies is planning to improve the flexibility of its Yukon system to control certain device subgroups. Cannon is hoping to change its system so that it will allow operators to control based on “scenarios” rather than default control areas.
- *Home occupancy during control events and CAC usage:* Issues of importance to DLC program managers include how many participants are actually home during the weekday summer afternoons when most control events take place and how frequently participants use their air conditioning. Eighty-two percent of the participants said that there was somebody home during summertime weekday afternoons. However, over half of the program participants say that they typically only use their central air conditioners on the hottest days.
- *Awareness of control events was relatively low:* Although PG&E initiated 15 control events for the special monitoring group from July through September 2007, only 40 percent of those surveyed in November/December 2007 recalled these events. In addition, when participants who recalled control events were asked to estimate how many events had occurred since they joined the program, the average estimate was only three events. The likelihood of recalling a control event did vary to a significant degree for some participant categories. Not unexpectedly, recall of a control event increased the more frequently a participant used his/her air conditioner. Yet there were also some differences that the evaluators did not expect. Participants with control switches were more likely to recall a control event than those with smart thermostats. Interestingly senior participants, who one would expect to be home more often than other participants, were less likely to be aware of the control events.
- *Discomfort during control events was low:* Only about a quarter of the participants who recalled a control event experienced some level of discomfort. One reason for this is that 38 percent of them said that they turned on fans during the control event. Other ways to keep cool included closing blinds/shades, leaving the house, and drinking something cool.
- *Yet thermostat participants were more likely to be uncomfortable than switch participants:* The thermostat participants recalling the event were more likely to be uncomfortable (49%) than the switch participants (20%) who recalled the events. One possible reason for this is that for the switch participants, the air conditioner fan kept running during the control event. The post-survey also asked the few thermostat participants who had recalled control events (n = 29) whether they tried to lower their thermostat settings when they thought that PG&E was remotely raising them. Over half of them (52%)

tried to do this and found that they were unable to change their thermostat settings. Not surprisingly, those participants who said that they used their air conditioners only on at hottest days or not at all were less likely (13%) to say they were uncomfortable during the control events than those who used their air conditioners frequently or on most days (41%).

- *Few participants expected to use the opt-out option:* Once participants were told that they had this “opt-out option,” they were asked how likely they were to use this option in the future. Less than 10 percent of respondents expressed any likelihood of using this option in the future. Of those indicating they might use the opt-out option, the most cited reasons included an occupant or visitor with heat sensitivity or health problems (18%), a party or family event (18%), and a long heat wave (12%).

1.4.2 Control Event Recommendations

- *Consider initiating control events for the whole Program population more often:* Although PG&E initiated 15 control events for the special monitoring group from July through September 2007, only 40 percent of those surveyed recalled those events and only about a quarter of those recalling the events experienced some level of discomfort. In 2007 the SmartAC Program only exposed its entire participant population to two control events, but the evidence from the special monitoring group indicates that they could initiate more control events than this without causing too much discomfort.
- *Increase the flexibility of the control system:* We support the efforts of Cannon Technologies to change its Yukon system so that it will allow operators to control based on “scenarios” rather than default control areas.
- *Allow same day EM&V control events:* As the PG&E SmartAC program expands, measurement and evaluation will continue to be important for measuring program success. Currently PG&E does not allow evaluators to have a control event occur on the same day it is requested, although this is allowed for non-EM&V control events. Evaluators should have this same flexibility.

1.5 The Payment of Program Incentives

1.5.1 Key Findings Concerning the Payment of Program Incentives

Delays in incentive payments: The evaluators found some evidence from program implementer interviews that delays in incentive payments were a problem for the Program. One likely cause of this problem was that GoodCents was not working with the most up-to-date customer data. There was disagreement between PG&E and GoodCents on the reasons for these delays and the extent to which it continued to be a problem. They both agreed, however, that working with outdated customer data made it difficult to verify enrollments, which could delay incentive payments.

In March 2008, GoodCents indicated that progress was being made on these customer data exchange problems. GoodCents reported that after several discussions, GoodCents and PG&E established formats, content, scheduling and timelines for the processing of monthly updates. GoodCents said that with the January 2008 customer data exchange it had developed a process to automate the import of data and that this automatic process worked for the February data exchange without incident.. GoodCents also said that it had begun other initiatives to better monitor how long it took for incentive payments to be paid.

One of these was “a proactive approach to incentive check processing by monitoring the interval between installation and customers’ receipt of checks.” It also said that it had designed an exception handling process for customers that had not received their incentive checks six weeks after installation of the control device. GoodCents said that it would implement this process after further discussion with PG&E.

- *The Program is considering additional/alternative incentives:* PG&E SmartAC Program staff indicated that they were studying whether to give their existing participants additional incentives to help maintain program retention levels. Ideas they were considering included gift cards, charitable contributions, free home energy audits, certificates for free CFLs, sweepstake entries, tree plantings, and many other possible incentives. The Program staff is also considering similar incentives as additional inducements (besides the \$25) for new participants.
- *Some Program implementers believe that higher incentives are needed:* GoodCents representatives felt strongly that Program incentives should be raised both to retain current participants and attract new ones. They suggested that while \$25 might be sufficient for early adopters, higher incentives will be needed as the Program expands. PG&E staffpersons noted that the \$25 incentive was picked based on its market research prior to program deployment and on GoodCents’ recommendations, and that it was sufficient to meet and exceed its first year enrollment goals. PG&E plans to re-evaluate the incentive level for future program expansion.
- *Participant feedback on incentive receipt and timeliness:* Surprisingly although the post-survey was administered at least seven months after they had joined the program, only 61 percent of the respondents said that they had receiving the \$25 payment, with 22 percent claiming that they had not received it and 16 percent saying that they did not know. When asked how many weeks it had taken for the payment to arrive, the mean estimate was five weeks and the median estimate was four weeks.
- *Participant feedback on incentive adequacy:* Both the July pre-survey and the November/December post-survey asked the participants whether the \$25 thank you payment was sufficient compensation for PG&E cycling their air conditioner over the summer of 2007. Seventy-one percent of the pre-survey respondents and 77 percent of the post-survey respondents said that it was adequate compensation. Possible reasons for this satisfaction level despite 15 control events include low incidence of control-event discomfort among the participants, the fact that most participants did not cite the financial incentive as a reason for joining the program, and the possibility that some participants did factor in the additional special monitoring group incentives (up to \$110) that they expected to receive in considering whether the \$25 thank you payment was adequate.
- *Participant interest in alternative incentives:* The post-survey asked participants about their level of interest in a variety of alternative incentives. Participants showed the greatest interest in an additional \$25 payment or a gift card of \$25 value. The evaluators also looked to see how these levels of interest might differ among different demographic groups. As a general rule, the lower the participant’s income group, the greater that he/she was interested in these additional or alternative incentives, although there were additional differences based on gender, age, and level of education. Finally, in order to help the program figure out alternative incentives that might attract new participants, the participants were asked to imagine that they were joining for the program for the first time and to choose between the existing \$25 payment and a number of possible alternative incentives. Participants preferred the \$25 payment to any of the possible alternatives, with a charitable donation of \$25 value being the most popular of these.

1.5.2 Recommendations Concerning the Payment of Program Incentives

- *Consider increasing the Program incentive amount for both current and prospective customers:* Advocates for keeping SmartAC Program incentives at the current \$25 level point to survey evidence that shows that few participants cite the incentive as their reason for joining the program. The problem with this argument is that the fact that current participants do not value the incentive does not mean that customers who have not joined the program also do not value the incentive. In fact, the reasons why these customers have not joined the program may be because they do not view a \$25 payment as adequate compensation for the inconvenience of their air conditioner being cycled. It is well known in the program evaluation literature that there are adoption curves for new technologies or programs and usually the customers that are “early adopters” are different than those who adopt the technologies or programs later. It is likely that the participants who joined the SmartAC Program in 2007 were “early adopters” who are different than the customers that the Program is trying to recruit in 2008. Furthermore the PG&E SmartAC Program incentives are much lower than those for other DLC programs in California. With the exception of a few customers lost to the San Joaquin Irrigation District DLC program, this incentive disparity has not impacted the PG&E program directly. However, growing awareness of higher DLC program incentives elsewhere in California could cause resentment among SmartAC Program participants.
- *Perform an analysis of the timeliness of incentive payment and develop a late check monitoring capability:* If it has not already done so, PG&E should conduct an analysis of the average amount of time that passes between the date that a Program device is installed and the date that the incentive check is sent out to the participant to see if a problem exists. It also should develop the capability to get a warning when an incentive payment is taking longer than expected so that it can troubleshoot the problem. In March 2008, GoodCents said that it had begun some initiatives to better monitor how long it took for incentive payments to be paid. One of these was “a proactive approach to incentive check processing by monitoring the interval between installation and customers’ receipt of checks.” It also said that it had designed an exception handling process for customers that had not received their incentive checks six weeks after installation of the control device. GoodCents said that it would implement this process after further discussion with PG&E.

Increase the frequency customer data updates: The evaluators found some evidence from program implementer interviews that delays in incentive payments were a problem for the Program. One likely cause of this problem was that GoodCents was not working with the most up-to-date customer data. There was disagreement between PG&E and GoodCents on the reasons for these delays and the extent to which it continued to be a problem. They both agreed, however, that working with outdated customer data made it difficult to verify enrollments, which could delay incentive payments.

In March 2008, GoodCents indicated that progress was being made on these customer data exchange problems, as described in subsection 1.5.1.

1.6 Scaling Up the Program

Although the PG&E SmartAC Program had a goal of 25,000 control devices installed by the end of 2007, its long-term goal is to get 400,000 control devices installed by June 2011. PG&E expressed interest in knowing how current program processes will fare as the program grows much larger.

- *Scaling up control device production* Representatives of Cannon Technologies anticipated no problems scaling up production of control devices. They pointed to strong relationships they have with a handful of contract manufacturers that will give them plenty of “line time” – dedicated resources to meet demand. They also pointed to their comprehensive production planning tool in which Cannon inputs the forecasted needs of all its demand response customers as well as other considerations.

Scaling up scheduling, device installation, and related processes:

The difficulty that GoodCents had in keeping up with SmartAC Program installations in the last third of 2007 raised legitimate questions about their ability to handle the even higher volume of installations that will be required during the 2008-2011 period. GoodCents representatives point out that between September and November 2007 they increased field staff from 10 technicians in September 2007 to 25 technicians in November 2007. However, some PG&E Program staffpersons pointed to forecast scenarios where GoodCents would need at least 60 technicians to keep pace with program installation goals.

One GoodCents representative, who worked closely with the Program’s data management, said the company’s system for managing and scheduling installation appointments will likely have to be upgraded to handle the higher volume. He noted that GoodCents was hoping to introduce an online scheduling tool in 2008 that would allow customers to enroll and schedule appointments without having to contact the GoodCents call center.

PG&E SmartAC Program staff also expressed concerns about the difficulties GoodCents will face in scaling up their current field data collection and compilation processes. “My sense is that GoodCents does a lot of things manually that I think could be more problematic when you really ramp up to a big, high-scale program like we’re planning to do in 2008,” said one PG&E staffperson.

Regarding call center scalability, another GoodCents representative, who was familiar with the company’s call centers, said that the San Bernardino call center, which handles the calls from the three California DLC programs that GoodCents runs, has room for expansion. She also noted that GoodCents has a backup call center in Georgia which has staff trained to handle the SmartAC Program.

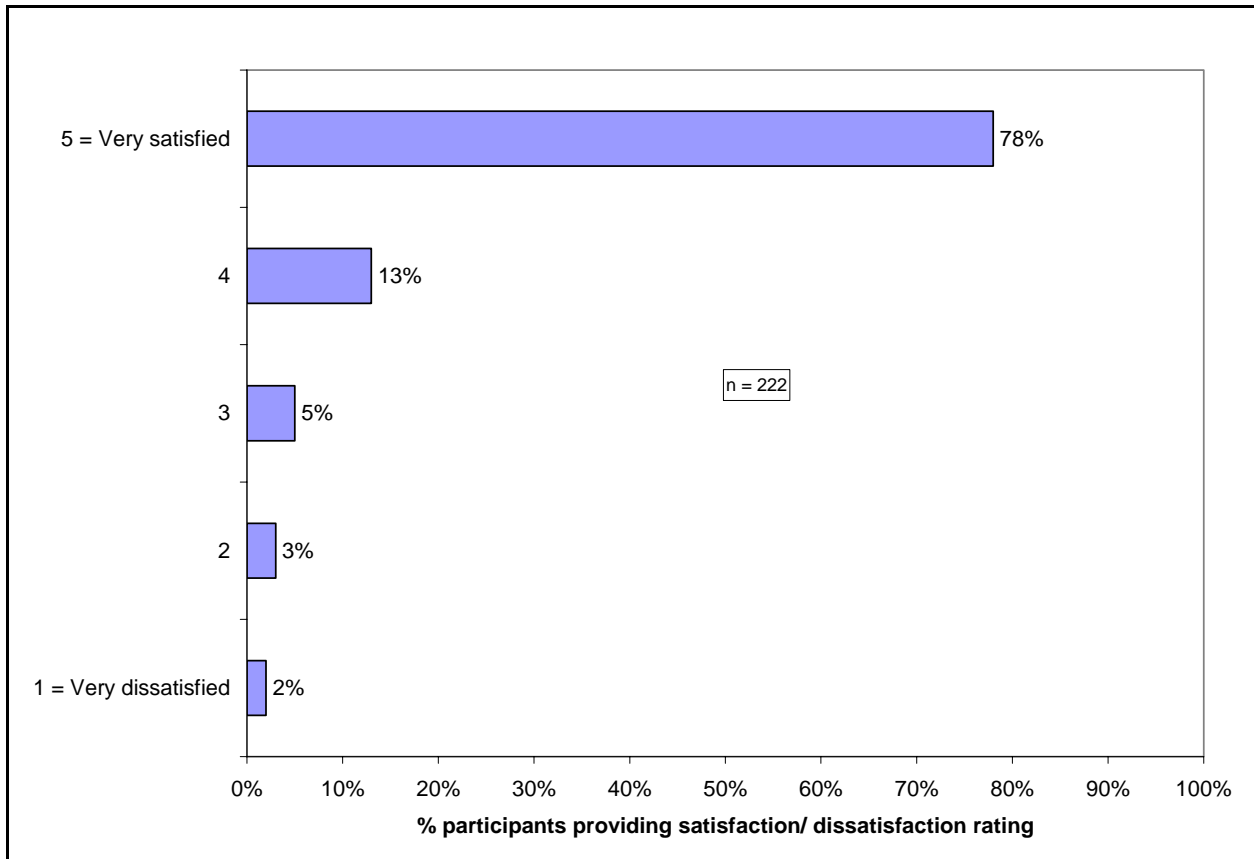
In response to these concerns, in March 2008 GoodCents reported that: (a) it had further increased its field staffing level to 39 with another 5 technicians in training. As discussed in subsections 1.3.1 and 1.3.2, GoodCents said that it completed a new staffing implementation plan with PG&E and reached agreements with the IBEW that should help field staff hiring efforts going forward; (b) it was in the process of upgrading its Customer Information System with expanded routing and scheduling capabilities and wireless work order processing for field technicians, and that, when fully implemented, these system upgrades would provide on-line enrollment capabilities, increased flexibility with process automation, business driven metric reports for the key processes, and improved reporting capabilities for customers; (c) in early 2008 it initiated a project to upgrade its corporate solution footprint to introduce automation in a number of areas including the processing of work orders; and that (d) the call center has added staff and currently there were 18 full-time customer service representatives, that in anticipation of the project office adding more technicians, the call center would be adding five additional customer service representatives as well as a 6-hour shift on Saturdays.

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- *Adding other vendors* Large deployments of similar programs in other service territories have benefited from utilizing more than one installation vendor. PG&E representatives indicated that they will consider supplementing their current installation vendor with other vendors, and pointed to the example of South California Edison – SCE’s DLC program installed approximately 175,000 thousand devices using three different vendors.

1.7 Overall Program Satisfaction

In the post-survey participants were asked to indicate how satisfied they were with the SmartAC Program in general. Despite the fact that they had been exposed to 15 control events, participant satisfaction was very high (Figure 1) with over three quarters of the participants saying they were “very satisfied” with the program in general. Satisfaction levels (4 or 5 on the satisfaction scale) did not vary much based on the demographic categories of the participants except that senior participants gave higher average satisfaction ratings (96%) than non-senior (87%).

**Figure 1
Participant Satisfaction with Program as a Whole**

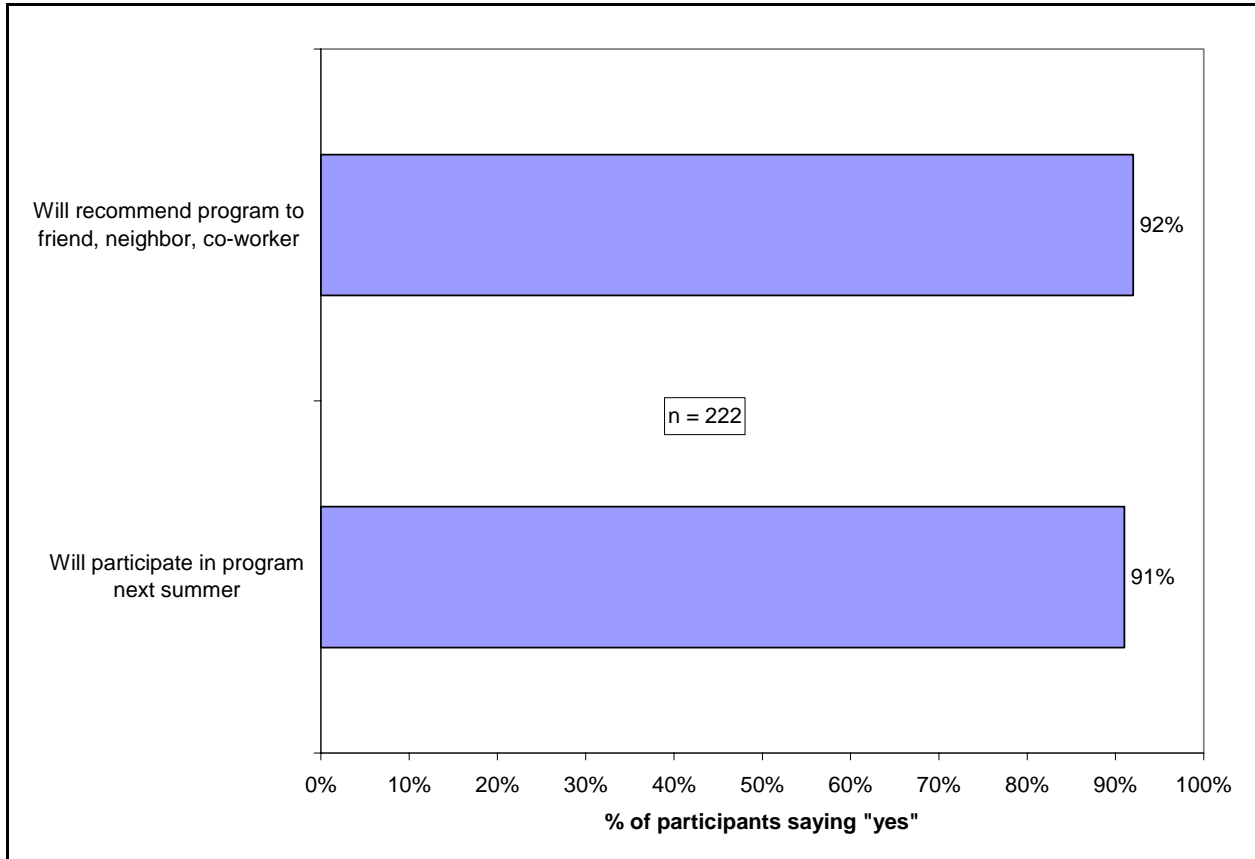


Note: Source is November/December 2007 Post-Survey.

The 28 participants who were dissatisfied with the SmartAC program expressed a variety of reasons for their dissatisfaction. The most cited reasons included too-frequent cycling, inadequate incentives, and problems with the thermostat.

The post-survey also asked the participants whether they would participate in the SmartAC program next summer and if they would recommend the SmartAC program to a friend, neighbor, or co-worker. Figure 2 shows that over 90 percent of participants said yes to both of these questions.

Figure 2
Future Participation, Recommendations to Friends



Note: Source is November/December 2007 Post-Survey.

2. Introduction

2.1 Scope of the Evaluation

This report contains KEMA's process evaluation of PG&E's SmartAC Program after its first year of operation (2007). The program processes analyzed in this report include:

- Marketing, recruitment, and program information;
- Program enrollment and control device installation/operation;
- The implementation of control events; and
- The payment of program incentives.

In addition to discussing these program processes, this report also:

- Discusses some of the challenges of "scaling up" current program processes to accommodate the program's large planned expansion.
- Summarizes the satisfaction of program participants with the program as a whole and their plans for continued participation.
- Provides recommendations on program improvements.

These findings are based on following sources of information.

- *Interviews with program implementation staff:* The evaluators conducted in-depth interviews, and in some cases multiple in-depth interviews, with 14 persons who are significantly involved in the implementation of the SmartAC Program. These people work for PG&E and the SmartAC Program's two primary implementation contractors: GoodCents and Cannon Technologies. Most of these interviews were conducted in the October-November 2007 period.
- *Two surveys of EM&V special monitoring group participants:* In a July 2007 "pre-survey" and a November/December 2007 "post-survey" the evaluators asked 263 participants in the SmartAC Program's EM&V special monitoring group a wide variety of questions on their experience with and assessment of the SmartAC program processes. Participants in the EM&V special monitoring group agreed to have a meter connected to their air conditioner so that the evaluators could measure their air conditioner operating behavior during Program control events. They also were also subject to 15 control events -- compared to only two control events for other SmartAC participants. As compensation, members of the special monitoring group could receive up to \$110 depending on how many surveys they completed and how long they allowed their air conditioners to be metered.
- *Program materials and websites:* The evaluators reviewed SmartAC Program materials such as marketing collateral, program information, marketing analyses, and process flow diagrams. They also reviewed program websites.

We attempted to survey all 297 special monitoring group participants for both the pre-survey and the post-survey. We were able to complete pre-surveys with 247 monitoring group participants and post-surveys with 222 monitoring group participants. Since 16 of the post-survey respondents had not responded to the pre-survey, a total of 263 of the monitoring group participants responded to at least one of two surveys. A fuller description of the methodology appears in Appendix A.

This Process Evaluation covers the program's first year of operation (2007). In January and February of 2008, preliminary evaluation results were discussed with PG&E, GoodCents, and Cannon Technologies. In March of 2008, these three parties submitted comments in response to the preliminary results, which include remedies to some of the problems identified in the preliminary results.

The findings and recommendations presented in this report refer to the process evaluation period. However, for the sake of transparency, this report includes statements from the parties regarding remedies they undertook the first two months of 2008. These comments are noted as having been provided to the evaluators in March 2008. KEMA did not obtain corroboration regarding these claims.

2.2 Program Description

PG&E's SmartAC Program is a direct load control (DLC) program that first began enlisting customers in Spring 2007. As of January 2008 it had over 26,000 participants with installed devices and another 22,000 participants who are enrolled and awaiting device installations. The vast majority of these participants are residential customers. The Program began by recruiting customers in San Joaquin County but has since expanded to many other areas of the PG&E service territory.

The SmartAC Program uses paging signals to reduce the energy consumption of participants' air conditioners during times of peak system demand. The air conditioners are controlled either by a programmable thermostat or a switch that the Program installs at the participant's residence or business. The participants get to choose the type of device they want installed. In the case of participants with programmable thermostats, during a control event the Program will raise the thermostat's temperature setting by no more than four degrees. In the case of participants with switches, the Program will switch the air conditioner on and off for brief periods of time (approximately 15 minutes out of every half hour).

The Smart AC Program pays all participants a one-time \$25 "thank you" payment. Participants that choose the programmable thermostat also receive the thermostat for free, which the Program advertises as a \$200 value.

PG&E manages the marketing efforts, initiates the control events, and manages the overall program. GoodCents handles the dedicated Program hotline, enrolls customers, schedules installation appointments, and installs the control devices. Cannon Technologies manufactures the control devices and manages the Yukon system that makes the control events possible.

3. Marketing, Recruitment, and Program Information

3.1 Summary of Program Activities

This section summarizes the program's marketing and recruitment activities. It discusses who is responsible for developing the marketing strategies and messages, which marketing channels and messages are currently being used, and what performance benchmarking the program does of its marketing efforts.

3.1.1 Marketing Strategy/Message Development

When the SmartAC program first started in early 2007, GoodCents was responsible for marketing the program; yet in Spring 2007 PG&E took over management of the marketing effort while employing a subcontractor to develop the marketing collateral. The reasons for shifting the program marketing responsibilities are discussed in subsection 3.2.1.

The SmartAC Program mostly develops its marketing strategies and messages at weekly marketing meetings. "We all talk about our ideas and strategies and beliefs and what we think will work and what will not work," said one program staffperson. "And then we come to a consensus [on the marketing message] so that we can then use it for the messaging in the letters that we send out." In addition to these brainstorming sessions, PG&E also has information from focus group studies that were conducted before the SmartAC Program was launched. It has also used information from program evaluation surveys to craft its marketing messages. For example, when one post-control-event survey indicated that only six percent of participants noticed the event, PG&E incorporated this information in its direct mail pieces. The program staff also gains feedback on marketing efforts from weekly meetings with the program implementation contractors.

3.1.2 Marketing Channels

The SmartAC Program relies primarily on direct mail for its recruitment of new participants. Table 1 summarizes the program's most recent and largest direct mail campaigns. To try to boost the response rate of these direct mail campaigns, PG&E has conducted media events (press releases and press conferences) and telemarketing that follows up on the arrival of the direct mail piece. PG&E has also promoted the program through bill inserts.

Table 1
Summary of Recent SmartAC Program Direct Mail Campaigns

Date of Mailing	# of Pieces	Targets	Notes
8/22/2007	333,602	Residential customers and PG&E employees in Fresno, Merced, Stanislaus, and San Joaquin.	Did follow-up telemarketing with some of the mailings.
9/24/2007	729,152	Residential customers in Fresno, Solano, Sacramento, Yolo, El Dorado, Contra Costa, and Alameda	Some pieces promoted the thermostat, some promoted the switch, but no piece promoted both devices.
10/22/2007	720,217	Residential customers in Fresno, Solano, Sacramento, Yolo, El Dorado, Contra Costa, and Alameda	

3.1.3 Marketing Messages

Over its short duration the SmartAC Program has experimented with many different marketing messages and some of the lessons learned from this experimentation are discussed in Section 3.2. In its most recent mailings the program has the following messages:

- *Community spirit:* The October 2007 recruitment letters lead off with: “With PG&E’s SmartAC™ program you can help your community conserve energy when it really counts.” The letters also talk about the program helping to “meet [your community’s] energy needs when demand for electricity peaks,” with the customer’s actual community/region name inserted in the bracket.
- *Comfort:* The October 2007 letters note that the switch “reduces your air conditioner's power consumption when resources reach capacity, while still keeping you comfortable. In fact, only 6% of participants surveyed said they noticed a change in temperature during activation.” The letters also tell the customer that their air conditioner fan will run during the control event, that on average there are only two control events per year, and that “at any time during an event you can go online or call us to return your air conditioner to previous settings.”
- *Cash:* The \$25 incentive is mentioned over a half-dozen times in the October 2007 letters.
- *Convenience:* The October 2007 letters tell the customer “you won’t have to lift a finger” and describes the program as a “simple, easy way” to meet their community’s energy needs.
- *Control device-differentiated messages:* As discussed below, PG&E discovered that they got higher response rates when they marketed the thermostats and switches separately. Although the switch and thermostat letters contain many common messages, there is some differentiation based on the control device:
 - *Thermostat letter:* This letter has a picture of the thermostat and mentions three times that the thermostat is a \$200 value.
 - *Switch letter:* Although this letter has no picture of a switch, it emphasizes the greater convenience to the customer of the switch installation. The letter says: “There’s no appointment necessary—just sign up and we’ll install the switch.”

3.1.4 Marketing Benchmarking

The SmartAC Program regularly monitors the response rates for its direct mail pieces. It looks at these response rates differentiated by a number of criteria including:

- The messaging in the direct mail piece;
- The size of the direct mail piece (e.g., 11" x 17" letter vs. 14" letter);
- The quantity of pieces mailed;
- The geographic areas where the pieces were mailed;
- Whether any telemarketing accompanied the mailing, and
- The class of postage used.

The Program also monitors how the customers respond to the mailings whether by sending a response card, calling the program hot line, or enrolling on the program website.

In addition to monitoring response rates, the Program also measures the relative cost-effectiveness of its marketing strategies. For example, it recently conducted a comparative analysis of the relative cost per lead and cost per enrollment of direct mail vs. telemarketing.

3.2 Findings from Program Implementer Interviews

This section discusses the findings from the program implementer interviews concerning marketing responsibilities, strategies, and messages including best practices and lessons learned. It also talks about some of the new marketing ideas that the SmartAC Program is considering as well as some of the lingering barriers to participation.

3.2.1 The Shifting of the Marketing Responsibilities

In May 2007 PG&E notified GoodCents that it was moving responsibility for designing and implementing the SmartAC Program marketing strategies from GoodCents to its own in-house staff. This transition of responsibility was completed at the end of June. The main reason for the shift was PG&E's concerns that marketing efforts were not producing the levels of new participation needed to meet program goals (5,000 participants by the end of July 2007 and 25,000 participants by the end of December 2007).

Interviewees from PG&E and GoodCents agreed that the early marketing efforts did not yield the response rates that were expected but there was disagreement as to why.

Although the lack of early marketing success was the main impetus for PG&E bringing the marketing responsibilities in-house, PG&E saw other advantages to the new arrangement including:

- *Easier coordination with other PG&E marketing efforts:* "PG&E is currently really trying to work on a holistic communication plan," said one PG&E staffperson. "And I think that if I could do it again, I would probably keep the marketing in-house from the beginning because you have so many different programs, you really need to coordinate with them."

- *Faster approval of marketing materials:* One PG&E staffperson acknowledged that GoodCents had been having difficulty getting quick approval from PG&E for some of its program marketing materials. Although PG&E is still using a contractor to develop the marketing collateral, the staffperson noted that this contractor has worked on marketing other PG&E programs and “is much more plugged in to what PG&E’s expectations are.” Therefore in-house approvals have been quicker.

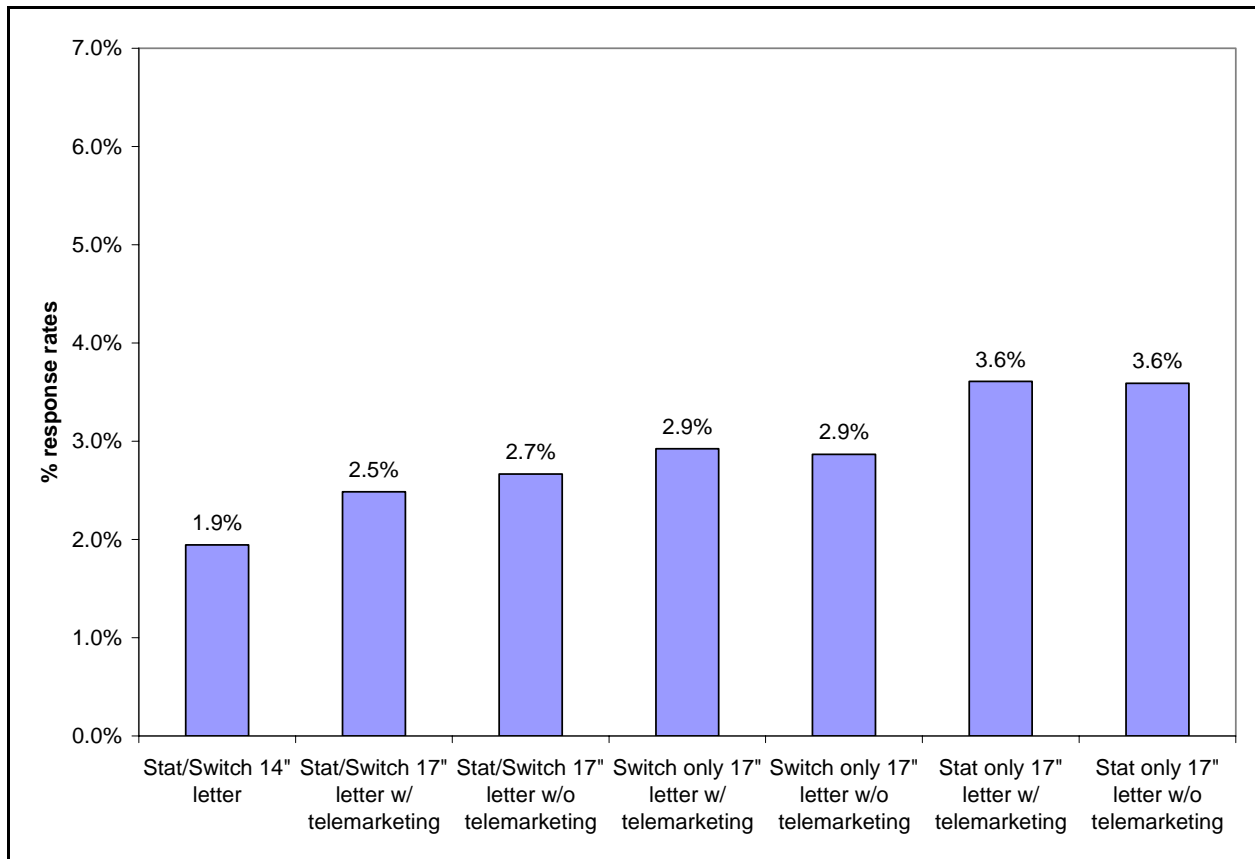
3.2.2 Improving the Marketing Effectiveness

When PG&E first took over the program marketing responsibilities at the end of June 2007 its first mailings used the same language that had been used by GoodCents, and produced similar responses rates to those from the GoodCents mailings. However, the utility began to experiment with new marketing messages and strategies and by August 2007 it was seeing improved response rates.

One discovery that PG&E made through this experimentation was that it could get higher responses rates with letters that promoted only the switch or only the thermostat than it could with a letter that promoted both control devices in the same letter (Figure 3). One theory for this effect was that given a choice of control devices, some customers find it difficult to make a decision. Another possible explanation is that for customers who are predisposed to favor a certain device – e.g., a customer who has an old thermostat – the single-device letter allows more space to make a stronger case for that device. For example, the thermostat-only letter includes a picture of the thermostat, which the PG&E staff thought made the thermostat seem a more tangible reward, and contains seven references to the thermostat being a \$200 value.

Of course, if a customer is predisposed to favor a certain control device, PG&E does not know which one they would prefer. Therefore if the SmartAC Program sent a thermostat-only letter to a customer that was inclined to prefer the control switch, it would have a harder time recruiting that customer. So in September and October of 2007 the Program began implementing a direct mail strategy that involved sending both letters to some customers. For example, if a customer received a switch-only letter and did not respond, he/she would then receive a thermostat-only letter. In theory this direct mail strategy would allow the Program to appeal to all tastes. Yet this strategy is also causing some customer service problems as is discussed in the next subsection.

Figure 3
Direct Mail Response Rates
August 2007 Mailings to Fresno Residential Customers



Note: Source is PG&E. Each mailing had 20,000 pieces.

One major effect of this new marketing strategy has been a large increase in demand for programmable thermostats. “Everybody that’s doing a switch-thermostat choice program is up somewhere between a 80-20 and a 70-30 [ratio of switches to thermostats] and that’s what we did here up until this very last marketing campaign,” said one GoodCents representative. “Now in the last marketing campaign we’re getting almost 80-85% of the enrollments are thermostats vs. switches.” A PG&E interviewee noted that during program planning, PG&E had forecasted that 60 percent of all participants would opt for a thermostat, and that this was listed in the request for proposals and to used to estimate the contract values signed with its vendors. As such, she felt that GoodCents should be prepared to meet the increased demand in thermostats.

The Program also learned that media events can increase the effectiveness of the direct mail pieces. In August 2007 the Program conducted six media events and although some were more successful than others, both PG&E and GoodCents representatives agreed that the overall impact was positive. “The news media department for the area that we were doing the [mail] drop in did a really good job of generating buzz on the news,” said one PG&E staffperson . “And so we noticed that when we do a drop matched with a media blitz, the direct mail performs really well.” “Getting some media coverage is a huge plus,” a

GoodCents representative commented. “That’s an area where I think that [PG&E] can continue to try and expand.”

3.2.3 Drawbacks of the New Marketing Success

Although the interviewees universally acknowledged that recent marketing efforts have been more successful in recruiting new participants, there have been some negative consequences of this success. One consequence of the greatly increased demand for thermostats has been a slowdown in the installation rate. This is discussed in Chapter 6.

Could PG&E have done something to better prepare GoodCents for this surge in new participant demand? When asked this question, one GoodCents representative said:

I don’t think so. I think it’s as much of a mystery to them as it is to us. When you design a marketing campaign, you always go into it with an expectation of a certain take rate. The history – our history and their history – had proven that that is not what we had experienced with other projects. And so when they came out with their latest campaign, everybody obviously had some guarded optimism as to whether it would do a better job or not. And it ended up doing a much better job I think than anyone expected.

A PG&E staffperson indicated that the surge in program recruitment was intentional, and thus, expected. Considering that customers are less responsive to direct mail during the holidays, the PG&E staffperson said that the utility signed-up as many customers as possible during the fall, so that GoodCents could continue to install devices during the winter season and so that PG&E could meet its enrollment goals by the end of the year.

Another GoodCents representative thought that PG&E could have helped relieve the situation by spacing out their mailings. He said:

They asked my opinion: “We’re going to do 700,000 pieces, do you guys want it all in one shot or should we break it up in two-week spans?” And my opinion was that something that large should be broken up rather than it going out in one mailing. “You should do 200,000 in one week and 200,000 in the next. You’ve got to break it up,” I said. “You’ve got to give the call center time to take care of one wave and the operationals and the installers take care of that same wave... and then so on and so forth.” But unfortunately they dropped it all at one time.

One interviewee raised two other concerns about the Program’s recent success in promoting the thermostats. The first concern was that some customers might be so attracted by the prospect of getting a free \$200 thermostat that they might join without understanding what participation in the SmartAC Program really entails. The second concern was that customers who have cooling systems that are not compatible with programmable thermostats may be disappointed. “We have unfortunately gone into some homes where the thermostat is not compatible with their units,” the interviewee said. “So that’s kind of a turnoff.”

One drawback of the current marketing approach of sending customers both a switch-only and a thermostat-only letter is that customers do not initially realize that they have a choice of control devices. A GoodCents representative who was very familiar with the call center activities, explained how this could cause problems:

I think the one that's the most obvious [problem] during these times is the customers are getting the business reply cards where first they get advertised one device and then a couple of weeks later they get advertised the other device. So they may get the first [mailer] and because they don't have any more information, they sign up for that [device] and then they get the other [mailer] and then they're like: 'Well now I want this one.' And they've already got one installed and now they want the other one. So it can be a little bit convoluted. So it's just a matter with us inquiring with the customer, verifying what's the status of their installation – whether it's done, not done – and see if it can be done.

Currently GoodCents tries to accommodate all participant requests to change their control device.

A PG&E representative indicated that their procedures are designed to prevent customers that have already signed up for the first device from receiving promotional materials for the second device. However, the PG&E representative said that the weekly data they receive from GoodCents regarding enrollment and installations is not entirely up to date. In addition, even if the customer data was processed by GoodCents immediately, there could still be customers who sign up for the first device late enough after receiving the first letter as to allow enough time to receive the second letter, promoting the alternative device. At this point, it is not clear how extensive this problem is, or how minimal it might be if the update process was quicker.

3.2.4 Gaps in Marketing Strategies

The PG&E SmartAC Program staffpersons acknowledge that they have done little marketing to the small commercial and multifamily sectors. As of late 2007 they had fewer than 100 commercial participants. The Program dropped one small mailing to small commercial customers and got very little response. However, Program staffpersons realize that effective marketing to small commercial customers involves hiring field representatives to conduct face-to-face meetings. The Program has yet to test these methods, although there is some talk of doing so in 2008.

As for the multifamily sector, the Program staff shared some creative ideas they had for increasing Program participation in this sector. These included paying incentives to landlords that recruit their tenants or even getting the CPUC to approve an “opt-out” tenant participation rule in which tenants who moved into an apartment with a control device could only leave the program if they affirmatively opted out. However, it appeared that these ideas have yet to be tested or implemented. The Program staff also noted that there were some challenges to working in the multifamily sector such as the lower per-AC unit load savings and master-metered apartment buildings.

3.2.5 New Marketing Ideas

Even though their recent marketing efforts have had some success, PG&E's SmartAC Program staff is currently studying novel ways to attract new participants and retain the current ones. Some of these new marketing ideas include:

- *Possible alternative/additional incentives.* The SmartAC Program is considering offering some other incentives, besides the current \$25 payment, to new participants, existing participants, or those who help bring new participants into the Program. Some of the new incentives being considered include:
 - Tickets for sweepstakes with possible prizes such as Energy Star appliances or bicycles;

- Gift cards;
- Certificates for the purchase of CFLs;
- Free home energy audits;
- Planting trees in the name of participants;
- Contributions to a participant's preferred charity; and
- An incentive payment higher than the current \$25.
- *Possible new marketing/ customer retention strategies.* Some of these include:
 - Customizing marketing messages based on customer demographics;
 - Customizing marketing to customers with previous participation in other PG&E energy efficiency or demand response program;
 - Targeted marketing to people with inactive control devices due to move-outs;
 - Paying incentives to participants if they recruit friends for the SmartAC Program;
 - Paying incentives to charities and non-profits that recruit participants for the SmartAC Program as fundraisers;
 - Promoting the new, user-friendlier programmable thermostat that Cannon is planning to introduce to the Program in 2008;
 - Offering a "retention" premium/incentive for existing customers;
 - Paying landlords who recruit tenants for the program;
 - Getting CPUC approval of an "opt-out" participation rule for multifamily residents where landlords could sign up a whole apartment building for the SmartAC Program and tenants can only leave the Program if they affirmatively opt out;
 - Doing face-to-face marketing to commercial customers; and
 - Using HVAC contractors to recruit participants.

3.2.6 Lingerin g Barriers to Marketing, Participation

Although recent marketing efforts have been more successful, interviews with the program implementers revealed the existence of lingering barriers to expanding the Program participation levels including:

- *Difficulty of marketing the program in the wintertime:* The SmartAC Program conducted no direct mail campaigns in the November 2007-January 2008 period. Although there were probably many reasons for this, one important consideration was likely the difficulty of crafting an effective winter marketing message for an air conditioning program. "It's harder to market in the winter," said one PG&E staffperson.
- *Greater frequency of less compatible cooling systems:* As the SmartAC program expanded beyond San Joaquin County to areas of the Central Valley Region such as Bakersfield and Fresno, field technicians started to encounter more cooling systems that were less compatible with programmable thermostats or switches. These included evaporative coolers ("swamp coolers") and "hydro units" – cooling systems that operate off of cold water pumped in from underground. "We're running into, down in Fresno, a lot of swamp coolers or water-cooler type air conditioners," said a GoodCents representative. "So when we get to there home and the technician is doing his pre-checks to make sure that the installation is going to go smooth and he says: 'Well sorry you can't have a t-stat because it's not compatible with your system.' People get

pretty upset about that.” A PG&E representative indicated that the marketing materials state that a central air conditioning unit is required, and that the type of unit is double-checked with the customer before the site visit, which should limit the number of cases where the device installation is rejected in the field due to unit incompatibility. Another PG&E representative pointed out that some customers do not know what type of unit they own, and they may use “central air conditioner” to describe an ineligible unit. It is unclear whether these instances of field rejection are a result of not screening customers, or if the screening mechanism is not as effective in some of these geographical areas.

- *Negative perception of PG&E with some customers/media:* Some PG&E interviewees felt that negative attitudes toward PG&E by customers and the media were a challenge in marketing the program. Other interviewees did not think PG&E’s public perception problems were that bad, although they conceded it was of some concern, especially for a program in which the utility controls the customer’s air conditioner. “I think that some people are concerned about Big Brother and potentially not trusting PG&E,” admitted one PG&E staffperson. Other PG&E representatives noted that the SmartAC Program itself has received very favorable press coverage in several areas of the service territory.

3.3 Findings from Pre-and Post-Surveys

This section summarizes the findings from the pre- and post-surveys that concern marketing of the SmartAC Program. These findings address customer awareness of PG&E energy programs, drivers of program participation, sources of program awareness, recall of Program marketing messages, satisfaction with program materials, satisfaction with calls/emails seeking program information, and preferred ways to receive program information.

3.3.1 Program Awareness

All of the pre-survey and post-survey respondents were aware of their participation in the SmartAC program. This was not surprising considering that they joined the program fairly recently and those in the special monitoring group were exposed to 15 control events. All of the pre-survey and post-survey respondents were also aware of their participation in this special monitoring group.

In the pre-survey we asked the participants what other PG&E programs or services to help customers save energy that they were aware of. Table 2 shows that nearly half of the participants were aware of PG&E’s rebate programs, but awareness of other PG&E programs and services was relatively low. The participant’s level of education made some difference as to whether they were aware of the PG&E programs. People with at least some college education were more likely (51%) than those with no college education (36%) to be aware of the PG&E rebate program.¹ They were also more likely to have heard of PG&E’s home audit programs.

¹ For this and all subsequent comparisons in this memorandum, a difference in the level of responses between two categories is only noted in the text if the difference is statistically significant for at least the 90 percent confidence level.

Table 2
Awareness of PG&E Programs, Services

PG&E Program, Service	# of Participants (n = 247)
Rebate programs, rebates	46%
Energy assistance/weatherization	15%
Recycling used appliances	10%
Energy savings information	7%
Home energy audits	6%
Other programs*	12%

Note: Source is July 2007 Pre-Survey. Respondents were allowed to name multiple programs/services.
**Other programs/services include renewable energy/green power, SmartAC, TOU/peak shifting information, 20/20 program, new construction/Energy Star new homes, and other programs/services.*

3.3.2 Participation Drivers

In the pre-survey we asked the participants about their main reason for joining the SmartAC program (only one response was allowed) as well as about their other reasons for joining the program (multiple responses were accepted). Table 3 shows that nearly two-thirds of the participants joined the program for personal benefits – whether this was saving their own energy or getting the \$25 rebate. Interestingly there were no significant differences between participants with higher incomes and lower incomes in terms of their willingness to cite these reasons.

Whether a person had some college education or not did make a difference for some of the main reasons for joining the program. People without college educations were more likely (21%) to cite saving money as their main reason for joining the program than those with at least some college education (9%). Yet people with at least some college education were more likely (20%) than people without some college education (4%) to cite receiving the \$25 PG&E rebates as their main reason for joining the program.

Table 4 shows that the secondary reasons for joining the program are very similar to the primary reasons – although “saving Stockton’s energy” appears as a new reason. Once again the household income of the participants had no real influence on the reasons cited but the participants’ level of education did have an influence for some reasons. Participants with at least some college education were more likely (11%) than those with no college education (4%) to cite “helping the environment” as a secondary reason for joining the program. On the other hand, participants with no college education were more likely (17%) than those with at least some college education (7%) to cite “helping PG&E avoid power outages” as a secondary reason for joining the program.

**Table 3
Main Reasons for Joining the SmartAC Program**

Main Reason for Joining	# of Participants (n = 245)
Saving my energy	45%
Getting \$25 rebate from PG&E	16%
Helping the environment	9%
Helping PG&E avoid power outages	8%
To save money	8%
Other reasons*	12%
Don't know	1%

Note: Source is July 2007 Pre-Survey.

**These included: Don't use CAC that much, saving Stockton's energy, getting a new programmable thermostat, better controlling/monitoring my energy use, fighting global warming, and other reasons.*

**Table 4
Other Reasons for Joining the SmartAC Program**

Other Reasons for Joining	# of Participants (n = 245)
No other reasons	30%
Saving my energy	19%
Getting \$25 rebate from PG&E	15%
Helping the environment	10%
Helping PG&E avoid power outages	10%
Saving Stockton's energy	8%
Other reasons*	8%
Don't know	6%

Note: Source is July 2007 Pre-Survey.

**These included: Don't use CAC that much, better controlling/monitoring my energy use, getting a new programmable thermostat, fighting global warming, getting a new programmable thermostat, helping PG&E avoid building more power plants, and other reasons.*

One survey question that the PG&E marketing staff requested was: "Is the SmartAC program something you would expect to be offered by a company like PG&E?" Sixty-percent of the participants responded "yes" to this question, 26 percent responded "no" and the remainder didn't know or weren't sure. When asked why they expected PG&E to offer such programs, the most-cited reasons including "helping save energy" (31%), "helping save consumers money" (14%), and "expect energy companies to offer programs like this" (14%).

3.3.3 Marketing and Program Information

3.3.3.1 How They Heard About the Program

In the pre-survey we asked the participants how they first heard about the program. Utility direct mail was, by far, the most-cited source of program information. Table 5 shows the most-cited first sources of program information. Seventy percent of the participants said their program information source was either a utility letter or utility bill insert and another five percent cited a utility postcard or unspecified type of utility direct mail. This corresponds with the nature of the SmartAC marketing efforts to date, which have primarily involved direct mail.

Table 6 summarizes other ways that people heard about the program. It shows that over half of the participants did not hear about the program from more than one information source. Although the percentage of participants who heard about the program through word-of-mouth is fairly low, our experience evaluating other direct load control programs indicates that this will increase over time as the program ages and expands in size.

Table 5
First Sources of Program Information

Source of First Program Information	# of Participants (n = 247)
Utility letter	39%
Utility bill insert	31%
Phone call	9%
Newspaper	7%
Other sources*	12%
Don't know	2%

Note: Source is July 2007 Pre-Survey.

**These included word-of-mouth, utility postcard, utility website, television ad, unspecified type of utility direct mail, magazine, and other information sources.*

**Table 6
Other Ways Heard About Program**

Other Ways Heard About Program	# of Participants (n = 247)
No other ways	54%
Newspaper	10%
Utility letter	9%
Word-of-mouth	7%
Television	6%
Phone call	5%
Other sources*	8%
Don't know	6%

Note: Source is July 2007 Pre-Survey.

**These included utility bill insert, utility website, radio, and other information sources.*

Gender, age, and income were factors in how people first heard about the program. Female respondents were more likely (39%) to cite the bill insert as their first source of program information than male respondents (24%). Male respondents were more likely (13%) to identify a phone call as their first source of program information than female respondents (4%). Seniors were also more likely (15%) to identify a phone call as their first source of program information than non-seniors (3%). People with annual household earnings of more than \$50,000 were more likely (39%) to cite a bill insert as their first source of program information than people in lower income groups (15-27%). People with annual household earnings of less than \$30,000 were more likely (13%) to cite the newspaper as their first source of program information than people with incomes greater than \$50,000 (3%).

3.3.3.2 Recalling Marketing Messages

To help gauge the effectiveness of the program's marketing efforts, the pre-survey asked the participants whether they recalled why PG&E said that they should join the SmartAC program and what reasons they recalled. Two-thirds (67%) of the respondents recalled PG&E giving them a reason why they should join the program. Table 7 shows that about half of the participants recalled PG&E telling them either that the program would help the utility avoid power outages or would save them energy².

² The SmartAC marketing materials do not advertise that customers will save energy. However, customers may expect that a device that reduces air conditioner energy consumption would ultimately result in the customer saving energy. One of the pieces deployed in question and answer format describes that the program reduces the amount of electricity that the air conditioner uses, but that since the program is enabled only a few times during the summer, the money savings resulting from these energy savings are negligible.

Table 7
Participant Recall of PG&E Reasons for Joining Program

PG&E Reasons for Joining the SmartAC Program Recalled by Participants	# of Participants (n = 159)
Helping PG&E avoid power outages	52%
Saving my energy	45%
Helping the environment	23%
Saving Stockton's energy	14%
Getting \$25 rebate from PG&E	10%
To save money	8%
Other reasons*	8%
Don't know	1%

Note: Source is July 2007 Pre-Survey.

Total exceeds 100% because respondents were allowed multiple responses.

**These included saving local/regional energy, fighting global warming, helping PG&E avoid building more power plants, getting a new programmable thermostat, and other reasons.*

The marketing messages that participants recalled did vary somewhat by age, gender, and education. Seniors were more likely (61%) to recall PG&E saying that the program would help reduce power outages than non-seniors (44%). Female respondents were more likely (54%) than male respondents (38%) to recall PG&E saying that participants would save energy by joining the program. Participants with some college education were more likely (15%) than participants with no college education (5%) to recall PG&E saying that the program would save energy for Stockton.

3.3.3.3 Rating Program Information

To help judge the completeness of the program information, the pre-survey asked the participants, using an open-ended question, whether anything was unclear about how the program worked. Only 8 percent of the participants said something was unclear. Table 8 shows the program issues that this group was unclear about.

Table 8
Things Unclear About the Program

Things Unclear About the Program	# of Participants (n = 24)
How the whole program works	27%
When and how the cycling works	25%
The phone surveys	14%
The monitoring program	11%
How the switch works	6%
The programmable thermostat installation process	5%
Other topics*	12%

Note: Source is July 2007 Pre-Survey.

**These included whether you can override the switch and other program attributes.*

Note that the pre-survey did not ask questions about the “opt-out option.” This was done with the purpose of not communicating to EM&V participants that opt-outs were an option beyond of what they may have assimilated from the program materials that were provided to them. Nevertheless, we found it somewhat surprising that more participants did not cite the opt-out process as something they were unclear about, since we found the description of the opt-out process as being sketchy in some program literature and total absent from other materials.

In the post-survey we asked the participants two questions that tested their awareness of and knowledge of the opt-out process:

1. “Before now, were you aware that you can ask PG&E not to [activate your air conditioner control switch/remotely raise your thermostat settings] before an upcoming control event?”
2. “If you wanted to tell PG&E not to [activate your air conditioner control switch/remotely raise your thermostat settings] settings during an upcoming cycling event, how would you do this? “

Table 9 contains the responses to these questions. It shows that only about a quarter of the participants were aware that they could opt out of upcoming control events. A telephone call to PG&E or the SmartAC Program was, by far, their most likely means of communicating such an opt-out request. The awareness levels of this opt-out option varied somewhat with the demographic characteristics of the respondents. Respondents with some college education were more likely (30%) to be aware of the opt-out option than those with no college education (16%). Male respondents were more likely (33%) to be aware of this option than female respondents (18%).

The post-survey also asked the participants whether there were any penalties if they told PG&E that they wanted to opt out of an upcoming control event. Sixty-nine percent said there was no penalty, six percent said there was a penalty, and the remaining 24 percent did not know. Of the few who thought there were penalties for opting out, 44 percent thought that these involved losing all or some of one’s program participation incentive and 40 percent simply did not know what the penalties were. Finally the post-survey also asked the participants how likely they were to use the opt-out option in the future and what

might be their reasons for doing so. Their responses to these questions are discussed in the chapter that focuses on Control Events.

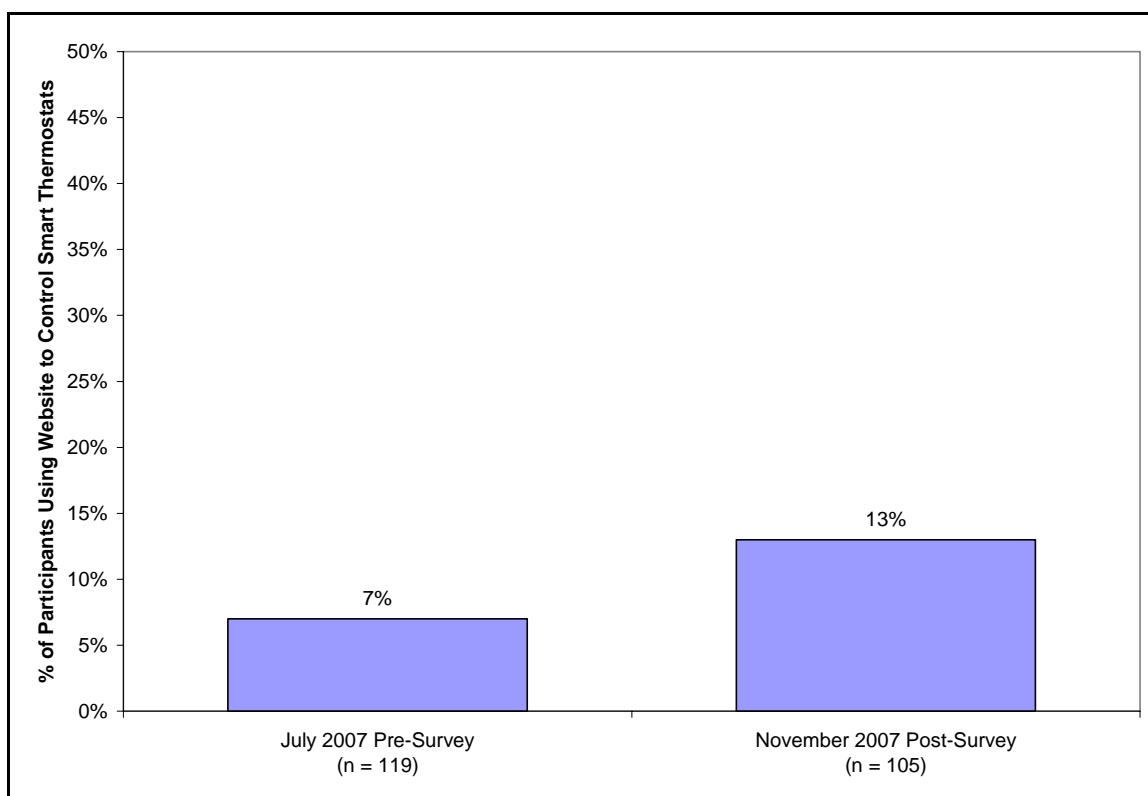
Table 9
Participant Awareness of, Likely Communication Method for
Opting Out of Upcoming Control Events

Aware can opt-out of upcoming control events?	% of Respondents (n = 222)
Yes	26%
No	73%
Don't know/Refused	1%
How participant would tell PG&E he/she wanted to opt out of upcoming control event?	% of Respondents (n = 222)
Call PG&E/SmartAC Program	73%
Email PG&E/SmartAC Program	5%
Log on to PG&E/SmartAC Program website	3%
Other	2%
Don't know/Refused	23%

Note: Source is November/December 2007 post-survey.

The SmartAC program materials promote the ability of participants with smart thermostats to use the SmartAC Program website to operate their thermostats remotely. In the Interim Memorandum we found that only seven percent of participants who received the smart thermostats have actually used the SmartAC program website to operate these thermostats. Figure 4 shows that four months later the percentage of participants who have used the website for thermostat control almost doubled, although it still represents a small minority.

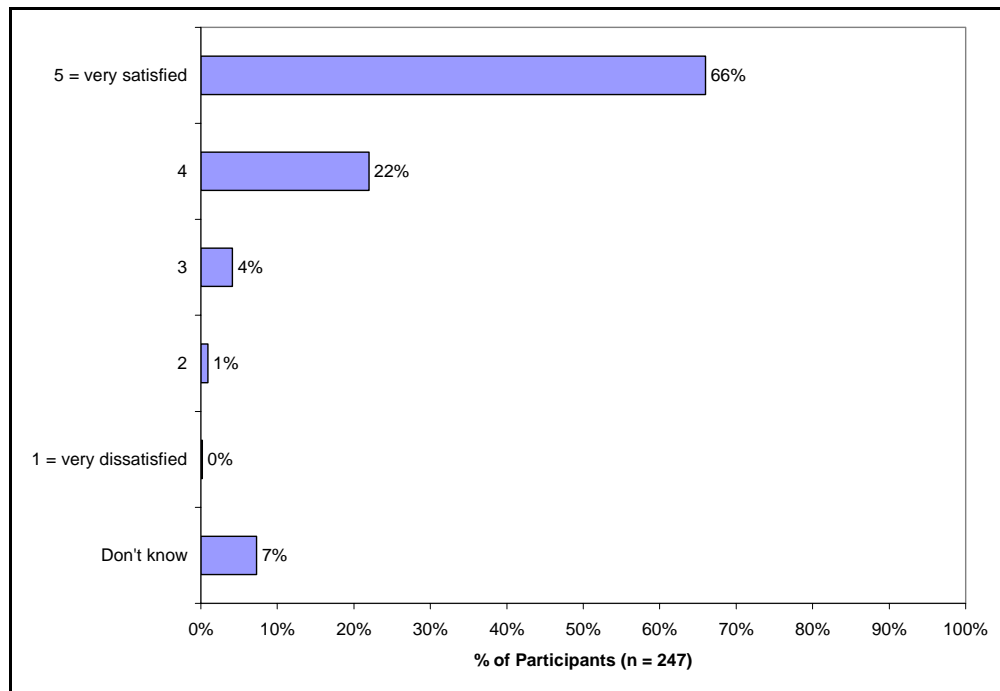
Figure 4
Use of SmartAC Website to Remotely Control Thermostat



The pre-survey also asked the participants to rate how satisfied they were with the information provided to them to explain how the SmartAC program works. We asked them to use a five-point scale where 5 equaled “very satisfied” and 1 equaled “very dissatisfied.” Figure 5 shows that the vast majority of the participants were satisfied (4 or 5 satisfaction rating) with the program information and nearly two thirds were “very satisfied.”

We asked the participants who were dissatisfied with the program information what information about how the program works was missing from the program materials. They gave responses very similar to those in Table 8 – e.g., how the whole program works (29%), when and how the cycling works (22%), and how the switch works (8%).

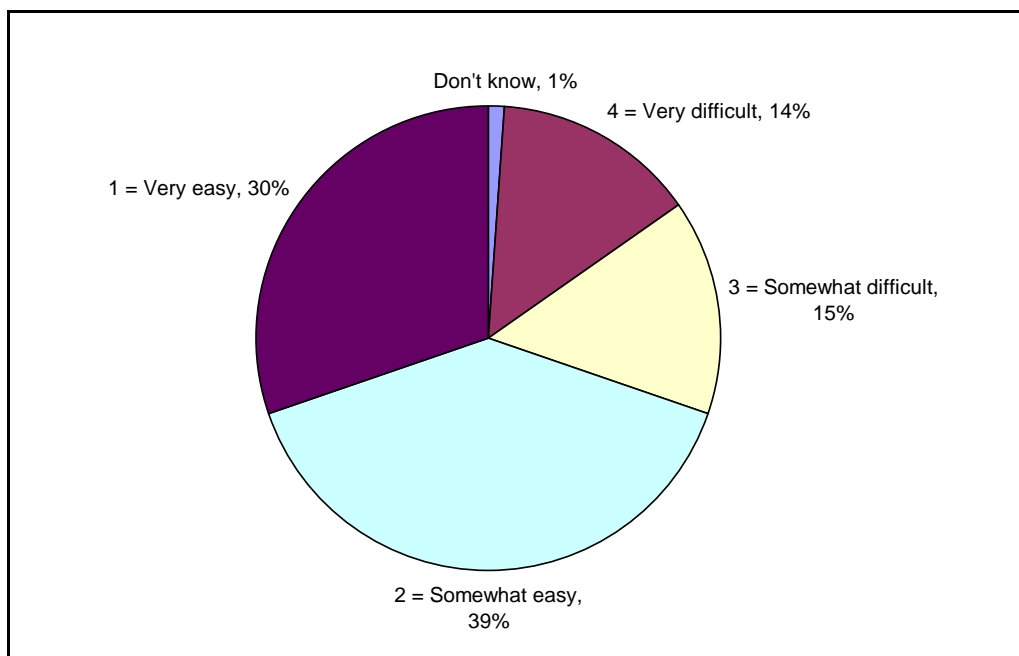
Figure 5
Satisfaction with the Program Information



Note: Source is July 2007 Pre-Survey.

The pre-survey also asked those who had smart thermostats whether they received instructions from the program on how to operate these thermostats. Eighty-six percent of them (n = 119) said that they had received them and 71 percent of those who had received the instruction said that they had read them. We then asked the 75 participants who had both received the instructions and read them whether it was very easy, somewhat easy, somewhat difficult, or very difficult to operate their smart thermostat after reading these instructions. Figure 6 shows that almost a third of these participants still found it difficult to operate their smart thermostats after reading the instructions provided by the program.

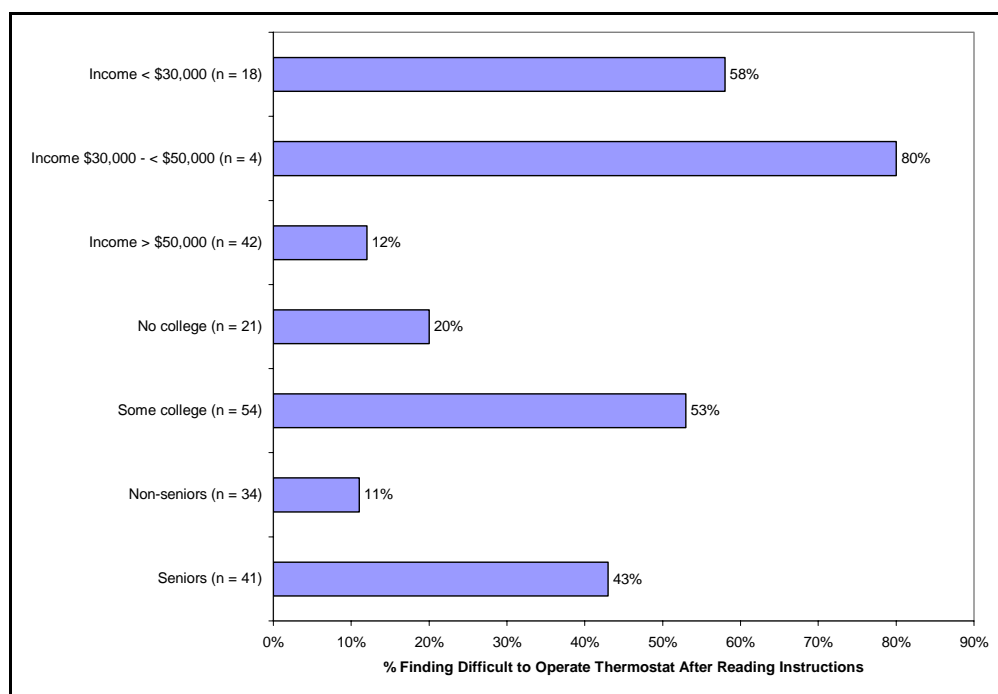
Figure 6
Ease of Operating Smart Thermostat After Reading Instructions Provided by the Program (n=75)



Note: Source is July 2007 Pre-Survey.

Whether a person found it difficult to operate a smart thermostat after reading the instructions was greatly influenced by their age, education, and income. Figure 7 shows that participants who were seniors, had no college education, and had household incomes of less than \$50,000 had much more difficulty operating the smart thermostat after reading the instructions than their counterparts. This suggests that the SmartAC program contractors that install these thermostats may need to provide more user-friendly instructions, conduct some additional customer training or even program the thermostats on the customers' behalf -- when they encounter senior customers, for example.

Figure 7
Percent of Participants Finding Operating Smart Thermostat Difficult After Reading Instructions



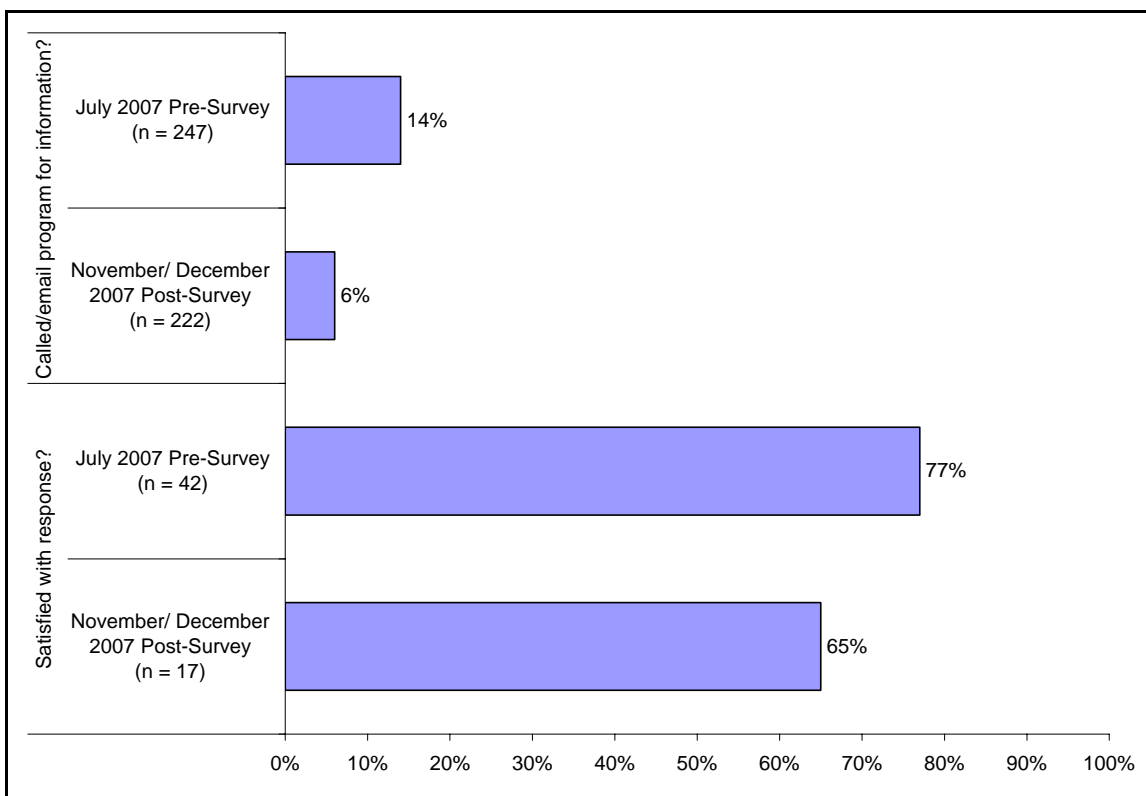
Note: Source is July 2007 Pre-Survey, n = 75.

While less than a third of the participants with smart thermostats had difficulty operating them after reading the instructions, only seven percent of them have actually used the SmartAC program website to operate their smart thermostat. Of the few participants that did use the website to operate their thermostat, the vast majority (86 percent) found it pretty easy to do so. Yet the fact that so few of the participants are using the “smart” features of the thermostats suggests that the SmartAC program needs to do some more customer education in this area.

Both the pre-survey and the post-survey asked the participants if they had called or emailed PG&E to find out more about the SmartAC program and whether they were satisfied with the response of the PG&E representative to their questions.³ Figure 8 shows their responses to these questions. The share of customers seeking such information declined between the two time periods as did their satisfaction with the responses they were receiving. For the participants who were dissatisfied with this process, the most-cited complaint was PG&E’s inability to answer or address their questions or concerns. However, it is important to point out that even though the questions asked them about calls/emails to PG&E, some of the respondents who said that they called PG&E might actually have called the SmartAC program hotline, which goes to the GoodCents call center.

³ The question in the post-survey was worded slightly differently than in the pre-survey in order to find out about program information inquiries that occurred since the pre-survey. The pre-survey question was: “Did you ever call or email PG&E to find out more about the SmartAC Program?.” The post-survey question was: “In the past few months have you ever called or emailed PG&E to find out more about the SmartAC Program?”

**Figure 8
Inquiries for SmartAC Program Information**



3.3.3.4 Preferred Ways To Receive Program Information

To help the SmartAC program improve its marketing and participant education efforts, the pre-survey asked the participants what would be the best way to provide them with more program information. Nearly three quarters of them said that a utility direct mail piece was their preferred way of receiving program information, while less than a quarter of them named another way (Table 10). However, these preferences varied somewhat by age, education and income. Non-senior participants were more likely (23%) to name email as a preferred information source than seniors (13%). Participants with at least some college education were also more likely (23%) to prefer email than those with no college education (7%). Conversely participants with no college education were more likely (85%) than participants with at least some college education (68%) to prefer the utility direct mail piece. Those with households earning less than \$30,000 per year – which may be highly correlated with those with no college education – also were more likely (90%) to prefer the utility direct mail piece compared to those in other income groups (68-72%).

Table 10
Preferred Ways to Receive Program Information

Preferred Source of Program Information	# of Participants (n = 247)
Utility direct mail piece	74%
Utility bill insert	24%
Phone call	19%
Email	18%
Other sources*	11%
Don't know	1%

Note: Source is July 2007 Pre-Survey.

Total exceeds 100% because respondents were allowed multiple responses.

**These included television ads, newspaper ads, PG&E website, visit from PG&E representative, and other information sources.*

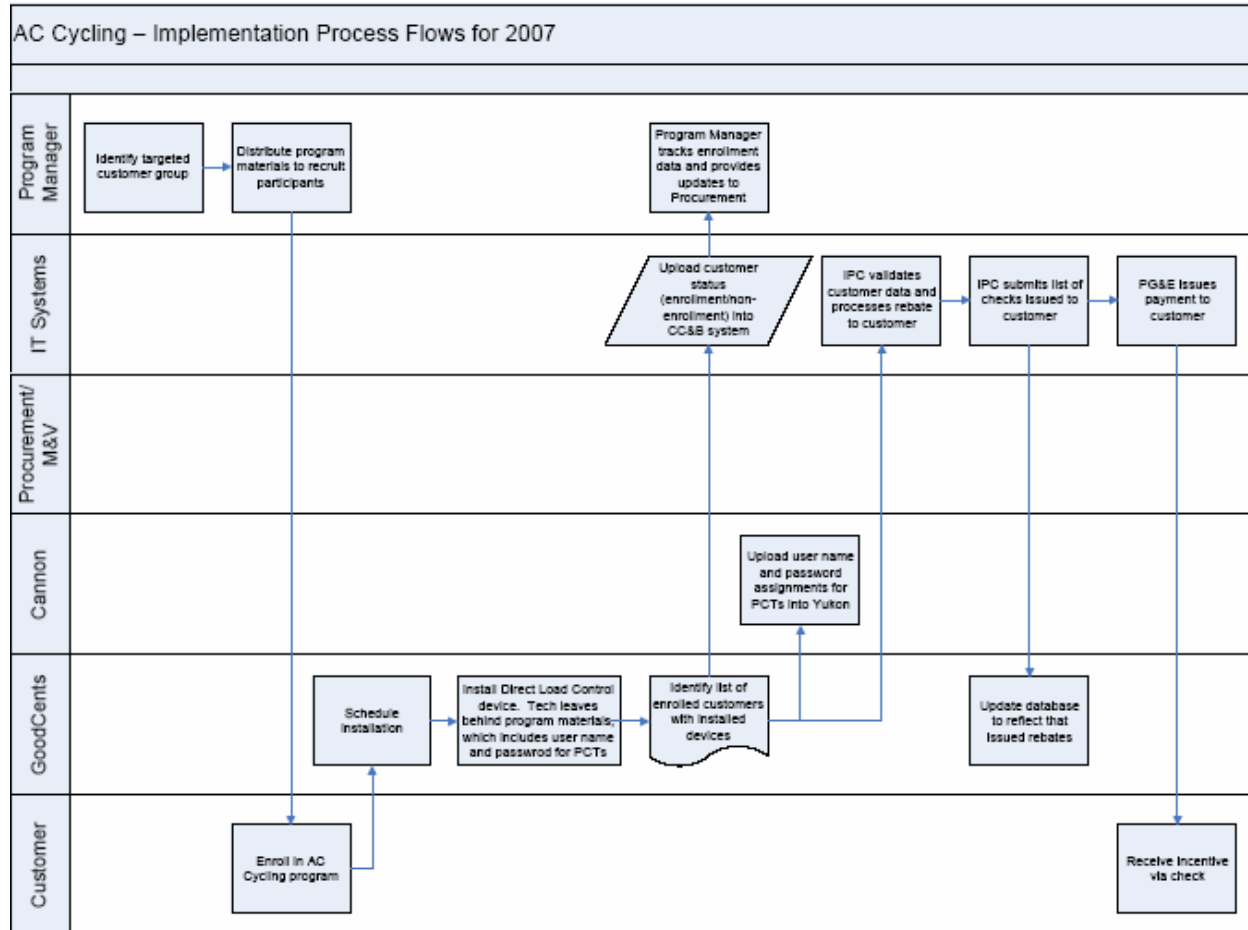
4. Program Enrollment and Control Device Installation/Operation

4.1 Summary of Program Activities

While PG&E took over the SmartAC program marketing duties, GoodCents continued to be responsible for enrolling participants and installing their control devices. Figure 9 shows the data flows involved in the enrollment and installation processes. PG&E customers can enroll in the program in three different ways: 1) they can call a toll-free number, 2) they can mail in a sign-up card; or 3) they can enroll via the Internet. GoodCents receives and processes all these enrollment requests. GoodCents also handles any necessary scheduling.

The installation of smart thermostats requires scheduling home visits while installing control switches does not. If a control switch is installed when the customer is not home, GoodCents will leave a door hanger to indicate that the installation has been completed. GoodCents uses its own field staff to install most of the control devices, although, as discussed in the next section, it has recently hired a sub-contractor to help out in response to a surge in new participants.

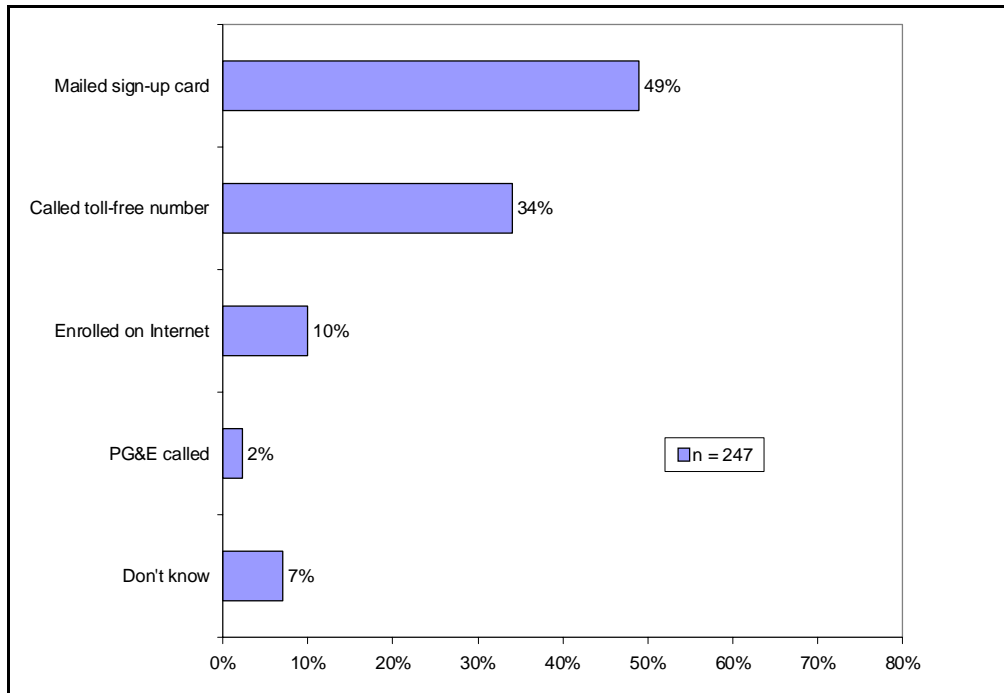
**Figure 9
PG&E SmartAC Program
Implementation Process Flows**



Note: The original flow diagram was created by PRTM management consultants for PG&E. KEMA altered it to reflect the shifting of marketing responsibilities from GoodCents to PG&E.

The pre-surveys asked the participant which method they used to enroll in the program. Figure 10 shows that nearly half of the participants used the sign-up card and about a third used the toll-free number. Age and income played some role in the method of enrollment used. Participating seniors were much less likely (3%) to use the Internet to enroll than non-seniors (18%). Participants with household incomes greater than \$50,000 were more likely (17%) than those with household incomes of less than \$30,000 (6%) to use the Internet for enrollment.

Figure 10
Participant Methods for Program Enrollment



Note: Source is July 2007 Pre-Survey.

The post-survey asked the same question of 16 participants who had not been reached in the pre-survey and the distribution of responses was similar (44% sign-up card, 28% toll-free number, and 11% Internet).

4.2 Findings from Program Implementer Interviews

This section discusses the findings from the program implementer interviews concerning control device installation, data reporting, and device operation.

4.2.1 Control Device Installation and Data Reporting

As mentioned in Chapter 3, the recent success of the SmartAC Program's marketing efforts have led to a surge in customer interest in the program that GoodCents' control-device installers have had difficulty keeping up with. Representatives of PG&E and GoodCents disagree as to whether GoodCents could have been better prepared for this increase in program participants. However there is general agreement that two factors have made it more difficult for GoodCents to keep up with demand for installations:

1. *PG&E's IBEW requirements:* PG&E has a collective bargaining agreement with the International Brotherhood of Electrical Workers (IBEW) that control devices must be installed by members of the IBEW union. When large DLC implementation companies like GoodCents need to meet a tight installation deadline or a surge in installation requests, they usually rely on a "SWAT team" of installers that are flown into the crisis area from their DLC programs in other parts of the country. However, PG&E's IBEW's requirement made this SWAT-team strategy infeasible because most of their technicians in other parts of the country are not IBEW members. "We're unable to just bring a SWAT team at a moment's notice because of the union issues," said one

GoodCents representative. “It’s not a long-term problem, it’s just when you need that short-term shot in the arm.” Therefore GoodCents has had to resort to training IBEW technicians to install the devices, which takes longer.

2. *Increased demand for programmable thermostats:* As discussed in Chapter 5, recent marketing efforts have increased the ratio of programmable thermostats demanded by new participants. GoodCents representatives claim that while early in the Program implementation the ratio of switches to thermostats was about 70:30, in recent months that trend has flipped with customers demanding thermostats over switches at an 80:20 ratio. Thermostats require scheduling an appointment with the customer and take longer to install than switches. “Now we’re only getting 6-7 installations per day per technician instead of 10,” one GoodCents representative said. “It’s almost a 33% reduction in productivity.”

A PG&E staffperson indicated that the surge in program recruitment was intentional. Considering that customers are less responsive to direct mail during the holidays, PG&E signed-up as many customers as possible during the fall, so that GoodCents could continue to install devices during the winter season and PG&E could meet its enrollment goals by the end of the year. This person also noted that during program planning, PG&E had forecasted that 60 percent of all participants would opt for a thermostat, and that this was included in the request for proposals and used to calculate the contract values signed with its vendors.

Another factor that has slowed the ability of GoodCents to increase its field staff has been difficulty finding HVAC technicians who could pass drug or background checks. “We’ve had a lot of good HVAC guys with a lot of experience come through and be interviewed, but to find out later that they have a criminal background and/or a drug issue,” said one GoodCents representative. “We obviously don’t want those people in PG&E customer’s homes.”

Despite these challenges, GoodCents eventually did significantly increase its field staff to meet the surge of new participants. From September 2007 to November 2007 GoodCents increased its permanent field staff from 10 field technicians to 25. It also was able to bring in one subcontractor SWAT team with five technicians who will install only switches. “We’ll definitely do our best to meet that [end of 2007] 25,000 [installed participant] goal,” said one GoodCents representative. In March 2008 GoodCents reported that its field staff had increased to 39 technicians with another 5 technicians in training. GoodCents also said that it had recently established agreements with the IBEW that would support its ability to recruit technicians from a much larger pool of qualified applicants that was “more than sufficient to meet the Program’s highest installation goals.” GoodCents also indicated that the IBEW had become a proactive part of the recruiting process.

PG&E SmartAC Program staff also expressed concerns about GoodCents’ field data collection and compilation processes, which rely heavily on manual processes. They note that field technicians hand deliver their work orders and the data entry people then enter these by hand. These processes are more labor intensive and cause delays in reporting installation data to PG&E. PG&E staff are also concerned how effective these manual processes will be when the program scales up. “My sense is that GoodCents does a lot of things manually that I think could be more problematic when you really ramp up to a big, high-scale program like we’re planning to do in 2008,” said one PG&E staffperson. In March 2008 GoodCents indicated that in early 2008 it initiated a project to upgrade its corporate solution footprint to introduce automation in a number of areas including the processing of work orders.

Although the large and somewhat unexpected demand for programmable thermostats posed a major challenge for the Program installation efforts, the process of insuring that there were adequate quantities

of thermostats available for installation went much more smoothly. Interviews with representatives of Cannon Technologies, which supplies the devices for the program, indicated that this was due to two factors. First, there were good communications between PG&E and Cannon that allowed Cannon to “to see that [shift toward thermostat demand] in advance and adjust the production schedule.” Second, Cannon had adequate manufacturing capacity. “We’ve got plenty of capacity so these swings don’t stress us out,” said a Cannon representative.

4.2.2 Control Device Operation

The lowest participant satisfaction rates for an aspect of the SmartAC program – 74-76% -- were for the smart thermostats. As subsection 4.3.4 shows, the two most common participant complaints were that the thermostats were too complicated to use and that they had concerns about the quality of these devices.

4.2.2.1 Operating the Smart Thermostats

The interviews with program implementers echoed many of these program participant concerns about the difficulty of operating thermostats, especially for senior participants. “That’s the big complaint we get, especially from the elderly,... because it’s not the most friendly of thermostats for those people,” said one GoodCents representative. “The numbers are small, the buttons are small, and there’s no back light.” “Elderly people may have a hard time pushing the buttons,” said another GoodCents representative who is very familiar with the Program call center activities. “It may seem too complicated trying to schedule four different timeframes if they want different temperatures ... they just want a simple on/off kind of thing.”

Both PG&E and Cannon representatives indicated that the choice of thermostat was largely based on short lead time availability at the time that the program was starting. In 2008 the SmartAC Program is planning to introduce a new, more user-friendly smart thermostat. This thermostat will have a much larger touch screen, backlighting, and enhanced communication capabilities that will allow PG&E to convey more information to participants before and during control events.

Most of the interviewees were looking forward to the new thermostats. Yet some of the problems with the current thermostats have made the Program cautious about introducing this new model too soon. “It hasn’t been tested yet in the field,” one PG&E staffperson observed. “So do I want to put 10,000 of those out there and have 10,000 go blank all about the same time? Maybe they won’t. But maybe they will.” Cannon has indicated that the new thermostats will be introduced, at the earliest, in the second quarter of 2008.

4.2.2.2 Smart Thermostat Quality Concerns

The interviews with program implementers also brought to light problems with thermostats malfunctioning. “I’m probably averaging about 60-70 service calls a month due to thermostats: thermostats going blank, heat not working, AC not working, just an array of things not working,” said one GoodCents representative. “And really the only thing that we can do is go out on a service call and troubleshoot it the best that we can, but we end up swapping out the thermostats.” Another GoodCents representative roughly estimated that GoodCents has had to send back about 400-500 thermostats compared to the 8,000-9,000 thermostats that they had installed by that point in time, about a 5-6 percent failure rate. “They’re still a small percent of what we’ve installed, so that’s obviously not going to raise anybody’s eyebrows,” he said, “but we see it as a major inconvenience for the customer.”

In March 2008, PG&E noted that: (a) a 5-6 percent failure rate exceeds the historical performance standards of the manufacturer as well as the maximum failure rate specified in the contract with the equipment vendor, and (b) at the onset of the Program, there were more failures than expected and that these were subsequently corrected by installing an additional component (a shunt) with every thermostat. PG&E also noted that this matter needs to be investigated further and that it would follow up with the equipment vendor.

In March 2008, Cannon representatives also said that they were aware of the thermostat failures and were working with Honeywell and GoodCents to clarify the extent of the problem and to determine appropriate courses of action.

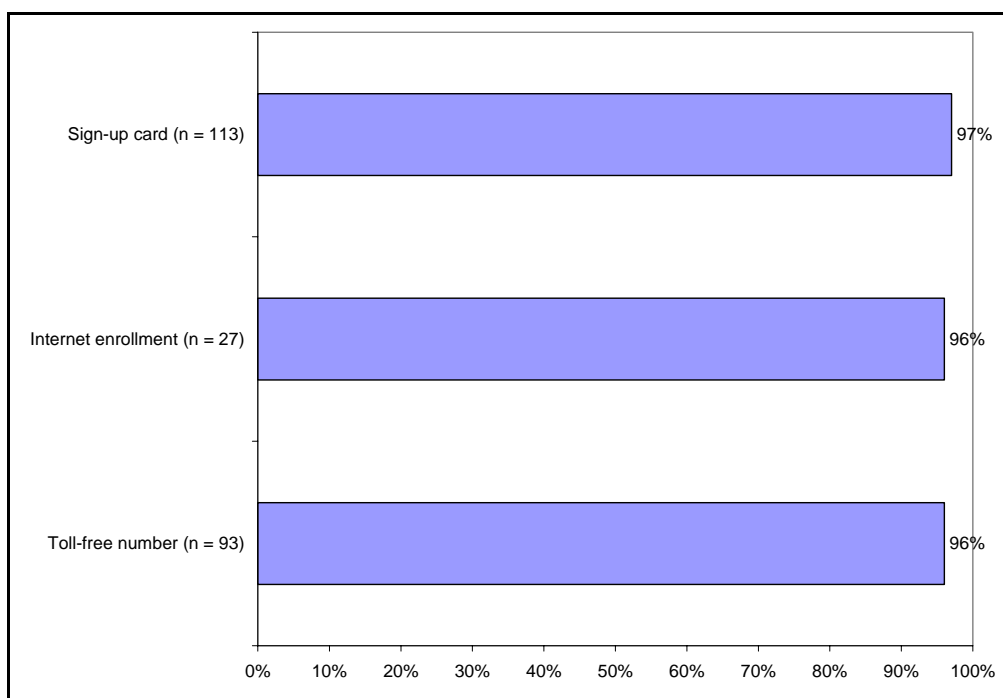
4.3 Findings from Pre-and Post-Surveys

This section summarizes the findings from the pre- and post-surveys that concern program enrollment and control device installation/operation. These findings address customer satisfaction with program enrollment, reasons for choosing the control device, satisfaction with the scheduling and installation process, and satisfaction with the control devices.

4.3.1 Enrollment

The pre-survey asked the participants to rate their satisfaction with the enrollment process using a scale where 5 equaled “very satisfied” and 1 equaled “very dissatisfied. Satisfaction (rating of 4 or 5) with all three of these enrollment methods was very high, as Figure 11 shows. In addition, a small number of participants who said that they enrolled via a phone call from PG&E said that they were satisfied with the enrollment process.

Figure 11
Satisfaction with Program Enrollment Methods



Note: Source is July 2007 Pre-Survey.

The post-survey asked the same question of 16 participants who had not been reached in the pre-survey and the level of satisfaction was similarly high (97% satisfaction with sign-up card, 100% satisfaction with toll-free number, and 100% satisfaction with Internet).

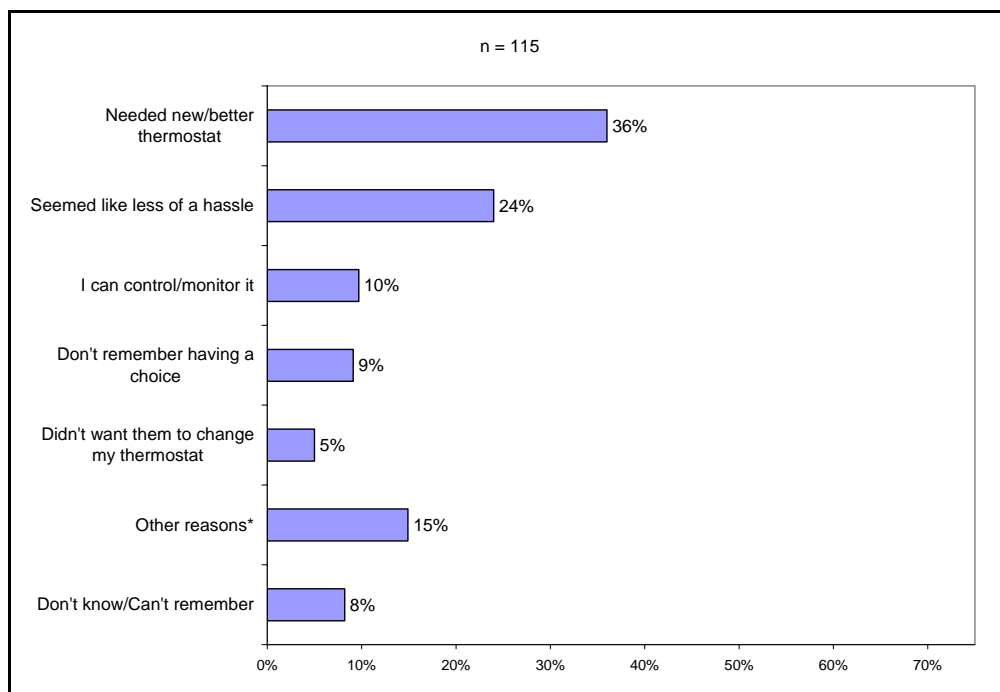
4.3.2 Choosing the Control Device

In Spring 2007 when this evaluation began, the SmartAC program staff was somewhat surprised that more participants were choosing the CAC switch than the smart thermostat and wanted to know more about their motives for doing so. Although the evaluators knew which control device the participants had received, the pre-survey asked them which control device they had chosen. Those participants who had received the smart thermostat were much more likely to correctly identify the control device that they had received. Ninety-two percent of the smart thermostat recipients (n = 119) said that they had received a smart thermostat. In contrast, only 59 percent of the CAC switch recipients (n = 128) correctly said that they had received a switch. Because GoodCents could install the switch and KEMA could install the monitoring device on the switch when the customer was not home, it is not surprising that recall of the control device received was lower for the CAC switch than the smart thermostat, although the level of recall was still lower than we expected. Over a quarter (27%) of the CAC switch recipients actually thought that they received the smart thermostat.⁴

⁴ The November 2007 post-survey also posed this question to 16 participants who had not been reached in the pre-survey. Of the smart thermostat recipients in this group, 77 percent correctly identified that they had received a thermostat, 17 percent thought that they had received a switch, and 6 percent did not know. Of the control switch recipients in this group, 62 percent correctly identified that they had received a switch, 3 percent thought that they had received a switch, and 35 percent did not know.

We then asked the participants why they had chosen one control device rather than the other. The smart thermostat participants cited a number of reasons (Figure 12) with the most-cited reason being the need/desire for a new/better thermostat. The participants who received the CAC switch also cited a variety of reasons for choosing this (Figure 13) – with “seemed like less of a hassle” being, by far, the most cited.

Figure 12
Why Participants Chose Smart Thermostats

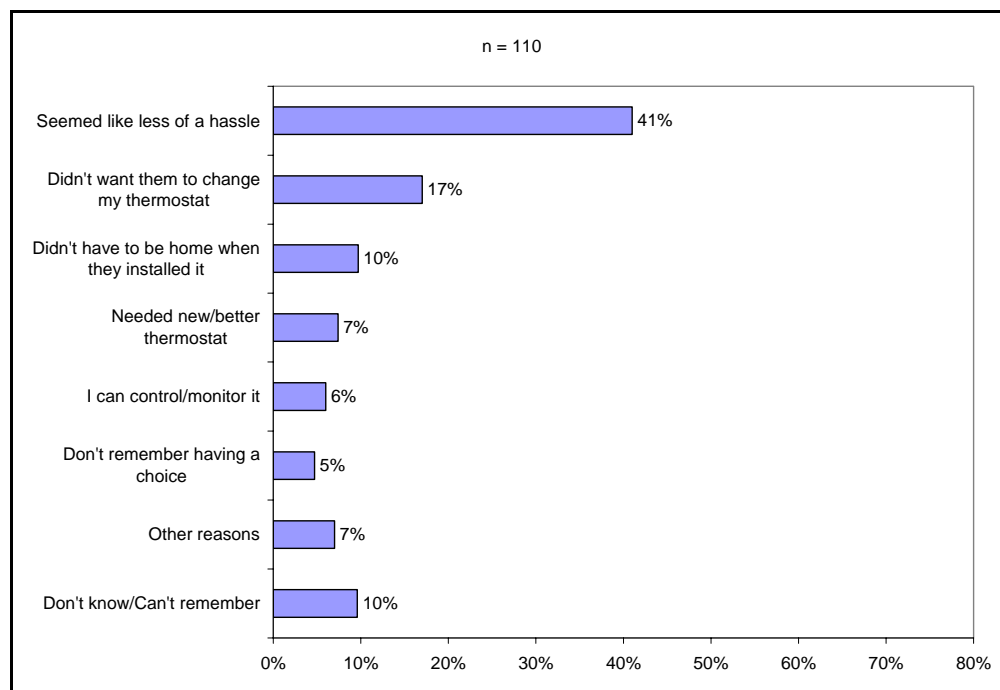


Note: Source is July 2007 Pre-Survey.

Total exceeds 100% because respondents were allowed to cite multiple reasons.

**Other reasons include don't want thermostat, technical problems prevented the switch option, program recommended it, don't want the switch, technical problems with the thermostat, didn't have to be home when they installed it, prefer the thermostat, and other reasons. Some of the seemingly inappropriate responses – e.g., “didn't want them to change my thermostat” or “don't want thermostat” -- are likely from the few smart thermostat participants who thought they had received a switch (they were classified based on what control device they actually received, not what they thought that they had received).*

Figure 13
Why Participants Chose CAC Switches



Note: Source is July 2007 Pre-Survey. Total exceeds 100% because respondents were allowed to cite multiple reasons.

**Other reasons include don't want thermostat, prefer thermostat, program recommended it, and don't want switch. Some of the seemingly inappropriate responses – e.g., “I can control/monitor it” or “prefer thermostat” -- are likely from the CAC switch participants who thought they had received a smart thermostat (they were classified based on what control device they actually received, not what they thought that they had received).*

4.3.3 Device Installation

The pre-survey also asked participants who recalled a contractor coming to their house to install a thermostat or switch to rate their satisfaction with this installation process, including the scheduling of the installation. Once again participants were asked to use a scale where 5 equaled “very satisfied” and 1 equaled “very dissatisfied.” Ninety-three percent of the participants who recalled the scheduling and installation process (n = 234) were satisfied (4 or 5 satisfaction rating) with this process.⁵ For the few (15) participants who were dissatisfied with the enrollment process, reasons for dissatisfaction included problems with the installation of the thermostat (48%), problems with the thermostat itself (23%), no/inadequate thermostat instructions (21%), the installer not coming at the scheduled time (16%), problems with the air conditioner since the device was installed (16%), and difficulty scheduling the installation at a convenient time (14%). Senior participants were much more likely (41%) than non-senior participants (3%) to report problems with the operation of the thermostat.

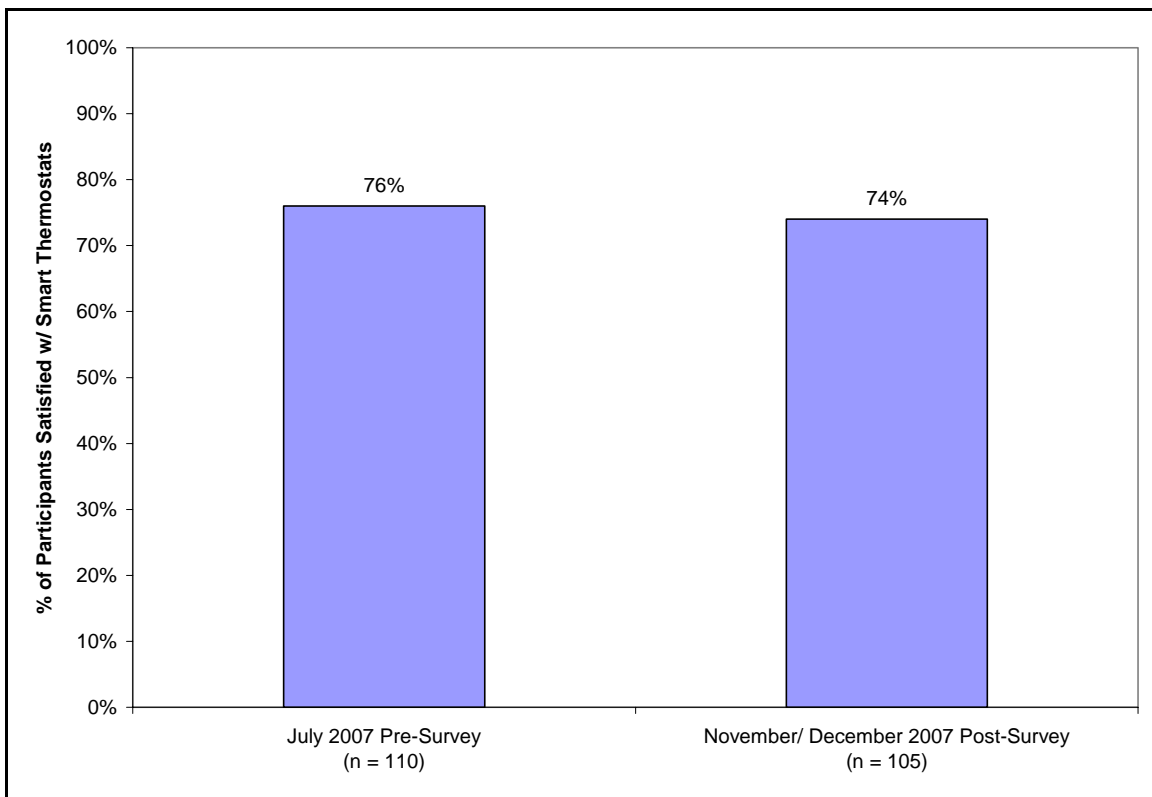
⁵ The post-survey also asked this question of 16 participants who had not been reached in the pre-survey. The level of satisfaction with the scheduling and installation process was also very high (96%) among the 14 participants who recalled these processes.

Although the satisfaction ratings with scheduling and installation process are very high, it is important to point out that all the participants who responded to both the pre-survey and post-survey had their devices installed in Spring 2007 when the flow of new participants was at a manageable level. As discussed above, the surge in new participants that began in Fall 2007 created delays in scheduling and installation for some customers. Therefore a survey of these newer participants might produce lower satisfaction levels with the scheduling and installation processes.

4.3.4 Device Operation

Both the pre-survey and the post-survey asked participants who had received smart thermostats how satisfied they were with these thermostats. Figure 14 shows that greater experience with the thermostats did not change satisfaction levels to any significant degree – with about three quarters of the participants expressing satisfaction with the devices.

Figure 14
Satisfaction with Smart Thermostats

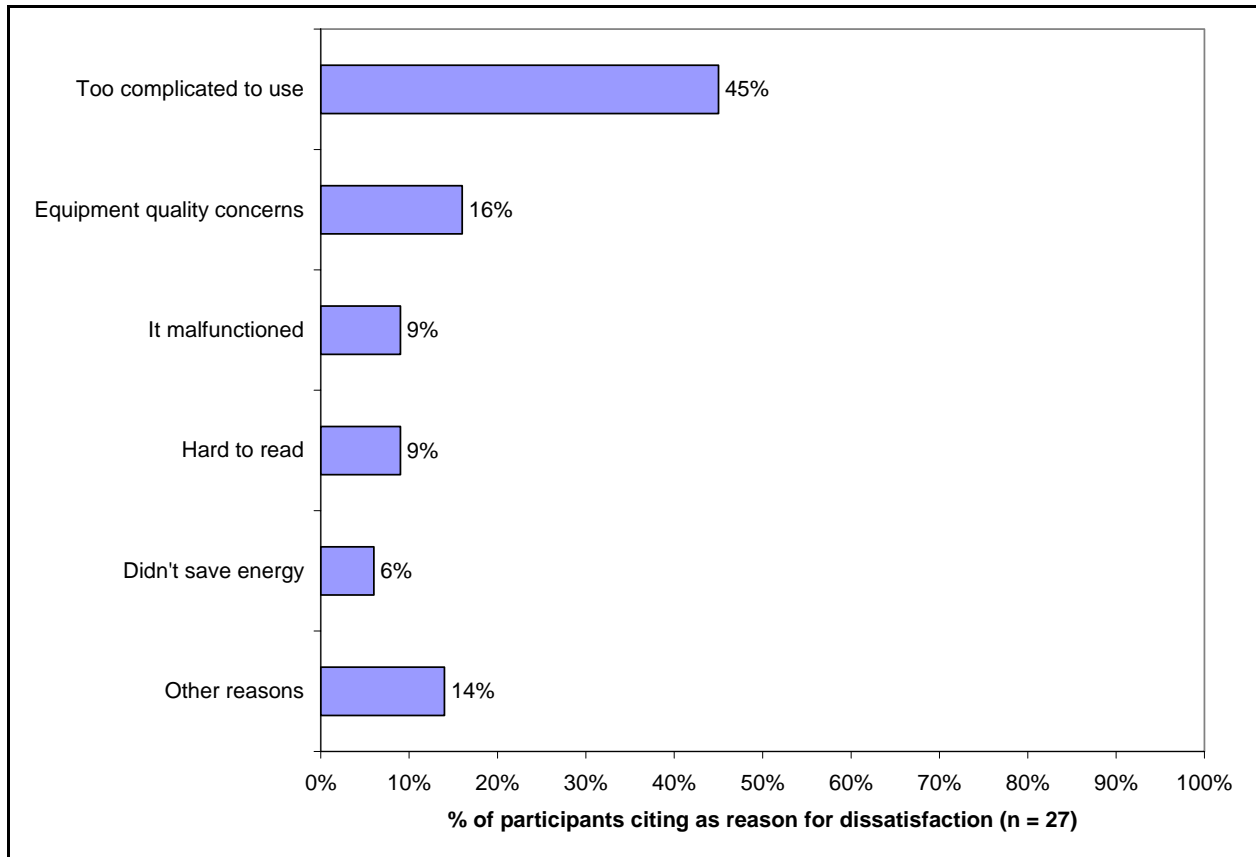


Satisfaction levels with the smart thermostats varied somewhat with demographic characteristics. The pre-survey found that participants with household incomes greater than \$50,000 were much more likely (90%) to be satisfied (4 or 5 on the five-point satisfaction scale) with the thermostats than participants in the other two income groups (54% satisfaction in the \$30,000 - < \$50,000 income group and 64% satisfaction in the < \$30,000 income group). The post-survey did not find these income effects, but it did find that people with no college education were more likely (74%) to be “very satisfied” with the

thermostats than people with college education. It is difficult to construct a theory that would explain this demographic difference in satisfaction levels.

Figure 15 shows the participants' reasons for dissatisfaction with the smart thermostats. The thermostats being too complicated to use was the most-cited reason for dissatisfaction. Similar reasons for dissatisfaction were cited in response to the pre-survey although with slightly different levels of citation.⁶

Figure 15
Reasons for Dissatisfaction with Smart Thermostat

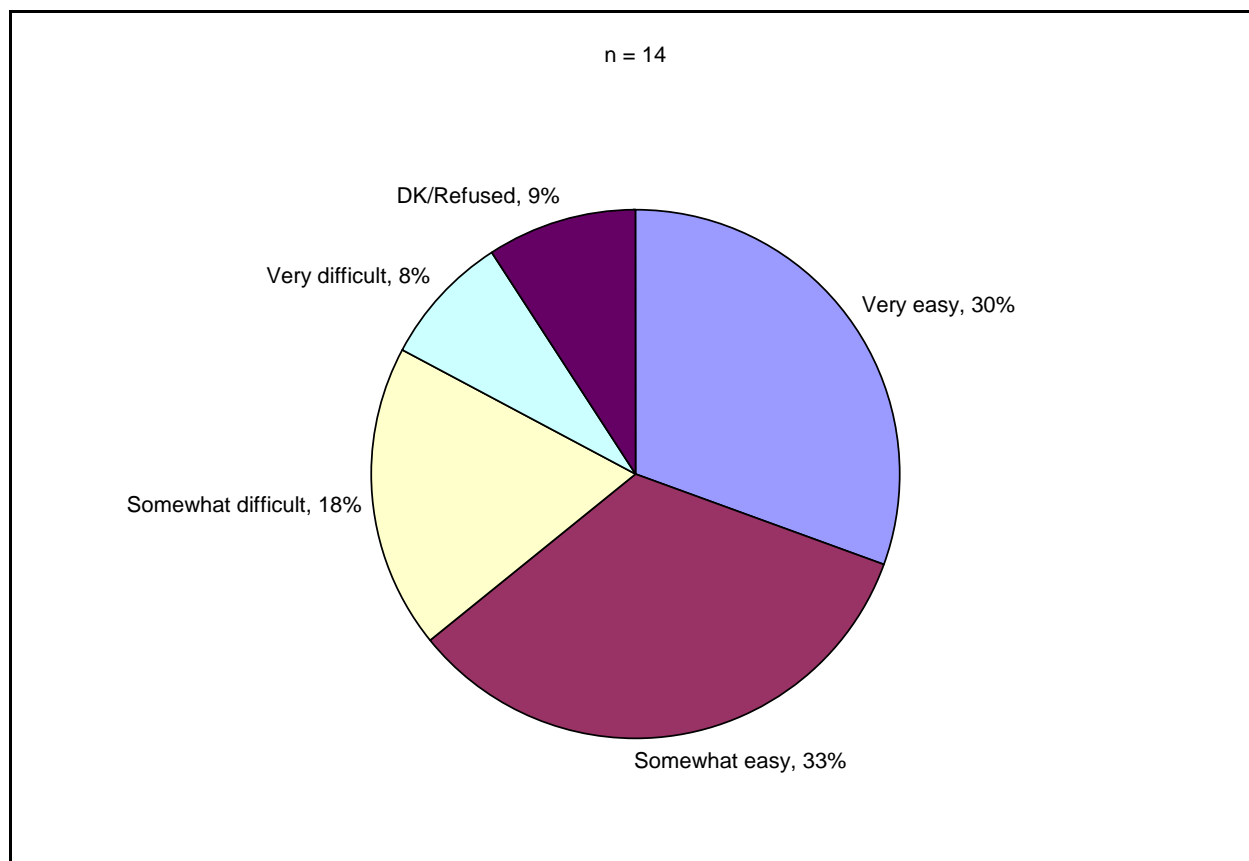


*Note: Source is November/December 2007 Post-Survey.
Respondents were allowed to cite multiple reasons.*

As noted in the previous chapter, although the SmartAC program has promoted the ability of participants to control their smart thermostats remotely through the program website, few participants have used this program feature. However, in the post-survey we did ask the 14 participants who did use this feature to rate how easy or difficult it was to use. Figure 16 shows that about a quarter of the participants who used this feature found it at least somewhat difficult to use.

⁶ For the 17 pre-survey respondents who were dissatisfied with thermostat performance, reasons for dissatisfaction included the thermostat malfunctioning (33%), being too complicated to program (31%), and the thermostat not having a lighted dial (15%), among other reasons.

Figure 16
Assessing Ease/Difficulty of Using SmartAC Program Website
to Control Smart Thermostats



Note: Source is November/December 2007 Post-Survey.

The post-survey also asked participants who had control switches whether their switch was working.⁷ Sixty-nine percent said that it was working, 15 percent said that it was not working, and 16 percent did not know. When the 20 participants who said that their switch was not working were asked why they thought this, 95 percent of them said that it was because their HVAC contractor had disconnected the switch.

In other evaluations of Direct Load Control (DLC) programs, the evaluators have found that a common problem is DLC program participants blaming the program’s control device for problems with air conditioning equipment that are not related to it. Both the pre-survey and the post-survey asked the SmartAC Program participants if they had any mechanical problems with their air conditioner since joining the program. The responses were very similar for both surveys with very few participants (6% in the pre-survey, 7% in the post-survey) reporting mechanical problems and about half of those reporting

⁷ We also asked this question in the pre-survey, although we did not expect the participants with control switches to have much basis for knowing whether their switches were working, since we surveyed the large majority of them before the first control event. Seventy-one percent of those who said that they had a CAC switch said it was working and the rest of them didn’t know whether it was working or not.

mechanical problems saying that these problems were related to their participation in the Smart AC Program. All of the participants with mechanical problems called someone to resolve the problem with the most-cited targets of their calls being either the utility (37% in the pre-survey, 41% in the post-survey) or an HVAC contractor (49% in the pre-survey, 25% in the post-survey).

5. The Implementation of Control Events

5.1 Summary of Program Activities

In 2007 PG&E initiated 15 control events that affected the 297 SmartAC Program participants that made up the special monitoring group. Table 11 summarizes these control events. Two of these control events – one in July 2007 and one in September 2007 -- affected all SmartAC Program participants. All these control events were either called by the evaluators or by PG&E. However, if California had reached a Stage 2 Emergency (the closest in 2007 was a Stage 1 Emergency), the California ISO would have called the control event.

Table 11
Control Events Involving the SmartAC Special Monitoring Group

Event	Date	Day of Week	Start Time	End Time	Duration (Hours)	Day Type (a)	Group that received the population treatment (b)	Notes	Observed Temperature (c)	
									Stockton Hi	Stockton Low
1	07/12/07	Thu	2:30 PM	6:00 PM	3.5	0	ALL	Population test called by PG&E	86	60
2	07/17/07	Tue	12 Noon	5:00 PM	5.0	1	A		87	62
3	07/23/07	Mon	12 Noon	4:00 PM	4.0	2	B		97	66
4	07/26/07	Thu	2:00 PM	6:00 PM	4.0	1	A		93	59
5	07/27/07	Fri	2:00 PM	6:00 PM	4.0	2	B		97	58
6	08/01/07	Wed	2:00 PM	6:00 PM	4.0	1	A	CPP day	98	62
7	8/9/2007	Thu	2:00 PM	6:00 PM	4.0	2	B		93	57
8	8/10/2007	Fri	2:00 PM	6:00 PM	4.0	1	A		95	60
9	8/21/2007	Tue	2:00 PM	7:00 PM	5.0	2	B	CPP day	100	65
10	8/22/2007	Wed	2:00 PM	7:00 PM	5.0	1	A	CPP day	100	69
11	8/28/2007	Tue	3:00 PM	7:00 PM	4.0	2	B	CPP day	101	66
12	8/30/2007	Thu	3:00 PM	7:00 PM	4.0	1	A	CPP day	105	73
13	8/31/2007	Fri	2:00 PM	7:00 PM	5.0	2	B	CPP day	102	76
14	9/10/2007	Mon	4:00 PM	7:00 PM	3.0	1	A		89	60
15	9/26/2007	Wed	2:00 PM	7:00 PM	5.0	0	ALL	Population test called by PG&E	90	53

Note: (a) “Day Type” applies only to thermostat participants. Day Type = 1 refers to a day when subgroup A received the population treatment.⁸ Day Type = 2 refers to a day when subgroup B received the population treatment. Last, Day Type = 0 in an event that applies to all participants of the SmartAC program, and all SmartAC participants receive the population treatment. (b) “Group that received the population treatment” indicates which of the subgroups received the setback method that was applied to the entire group of SmartAC participants in population event days. This information is redundant to that presented in the prior column. (c) Observed Temperature was obtained from weather.com. Actual weather temperature utilized in the EM&V analysis will be obtained from other sources, and thus may or may not match these temperatures.

The typical process for a control event involved the following steps:

1. The evaluators decide what day and time period should be used for the control event based on the weather forecast, and the mix of event and non-event days that were already experienced.⁹
2. If the evaluators call the control event, the evaluators alternate the two smart thermostat subgroups within the special monitoring group that received the population treatment and the alternative treatment. If the event is called by PG&E -- i.e., if the event applies to all SmartAC

⁸ During a control event affecting all smart thermostat SmartAC program participants, PG&E set back the thermostat one degree every other hour. We refer to this as the “population treatment.” Because events last a maximum of six hours, the population treatment resulted in a maximum setback of three degrees, reached at the beginning of control hour 4 (events start in control hour 0.) The alternate treatment consisted of setting back the thermostat one degree every hour for four hours. This treatment resulted in a maximum setback of four degrees, reached at the beginning of control hour 3.

We note that the population treatment that was implemented during the 2007 season differed from what was originally described in *ex-ante* program descriptions and savings estimations. In these *ex-ante* documents, the population treatment consisted of an immediate setback of four degrees.

⁹ From an impact evaluation perspective, hot days with no events are as important as hot days with events; since they provide the baseline with which to measure the program’s impact.

participants and not just those in the special monitoring group -- then the entire special monitoring group received the population treatment.

3. The day prior to the control event, the evaluators submit these instructions to the PG&E SmartAC Program staff who then relay them to Cannon Technologies which manages the Yukon system that allows the control events to be initiated.
4. Cannon Technologies writes a computer program that will implement the control instructions requested by the evaluators. Cannon tests the program. After this program was refined, it was not necessary to write a new program for each event.
5. PG&E's Transmission Operations staff receive the evaluator instructions and initiate the control events. A 900 MHz paging system is used to control the devices. The PG&E staff receive emails when the control event begins and when the control event ends.

Program participants can opt out of the control event either by calling the Program (either calling the GoodCents call center directly or being routed there from the PG&E call centers) during the control event or logging on to the SmartAC Program website and opting out there. This latter option is only available to participants with smart thermostats. In 2007 only a handful of participants opted out of the control event using these procedures. However, as subsection 5.3.3 indicates, about half of the 29 smart thermostat participants who recalled a control event said that they tried unsuccessfully to lower their thermostat settings during these events.

5.2 Findings from Program Implementer Interviews

Interviews with the PG&E Smart AC Program staff, the PG&E Transmission Operations staff, and representatives of Cannon Technologies all indicated that, in general, the control events went very well. The Cannon representatives had no problems programming the evaluator instructions and the PG&E Transmission Operations staff, after some initial training, found the process for triggering the control events to be very straightforward. "It's really simple," said a PG&E Transmission Operations staffperson, "it's a point and shoot."

The interviewees could only identify two minor glitches in the control event process. One involved the paging system for the control events. Originally Cannon was sending one page to activate the control event and a second page to terminate the control event. The problem was that if the control device did not receive the second page, it would remain in control mode. The Program discovered this when some customers called and pointed out that their air conditioners were still in cycle mode even though it was as late as 8:00 PM. Initially this problem was solved on an ad hoc basis by GoodCents sending an opt out command for that customer. However, Cannon eventually devised a more permanent solution by using just one page for both activation and termination of the control event. This way, if the device received the page it would get the termination command and if it didn't receive the page the cycling would not initiate.

A second glitch involved the training software for scheduling control events. In theory the software is designed to prevent the scheduler from setting up control periods that fall outside of permitted SmartAC Program parameters – such as a control event on a weekend or holiday. However, one of the PG&E schedulers accidentally scheduled a 10-hour long cycling event and the training software allowed this event to go through, even though it should have been prohibited by the Program rules. Since this was just training software no harm was done and the real scheduling software would have disallowed such a control period.

Cannon Technologies would also like to improve the flexibility of the system in controlling certain device subgroups. Currently if the SmartAC Program wants to control just a subgroup in its overall population of devices, it can either work with some default control areas or “leap zones” that Cannon has pre-programmed, or request Cannon to program in a new subgroup – as was the case with the evaluator’s special monitoring group. However, the SmartAC Program cannot set up its own subgroups.

Cannon is hoping to change its Yukon system so that it will allow operators to control based on “scenarios” rather than default control areas. “With scenarios rather than forcing everything into the default gears, I can give the operators the opportunity to change gears when they do the startup,” said one Cannon representative. “So [if the operators] want to control one of the groups of receivers a different way than the default and use scenarios, that would allow them to do that.” However, Cannon delayed implementation of these new scenario controls until 2008 because it did not want to interfere with the 2007 control season.

5.3 Findings from Pre-and Post-Surveys

This section summarizes the findings from the pre- and post-surveys that concern control events. These findings address home occupancy and the frequency of AC use, awareness of the control events, effects of the control events, and the likelihood of using the opt-out option in the future.

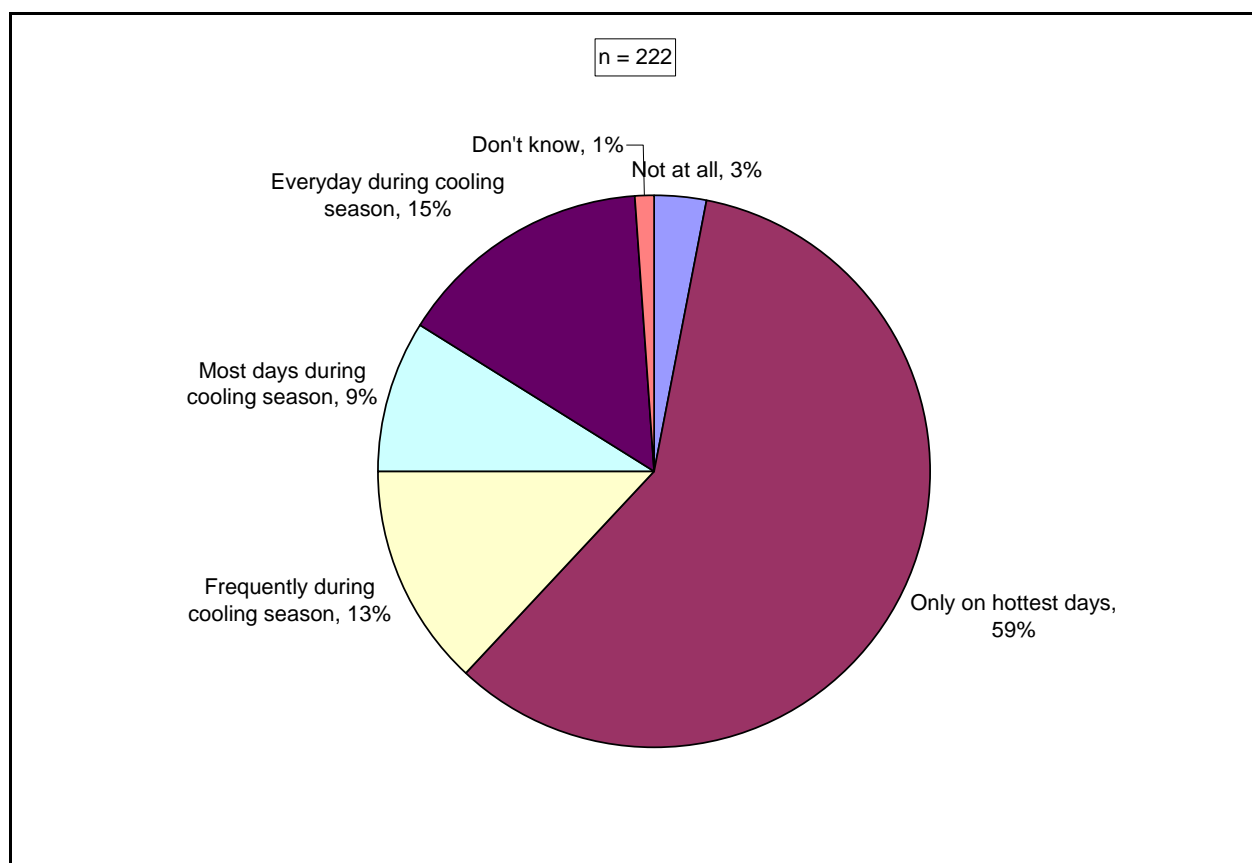
5.3.1 Home Occupancy and Frequency of AC Use

One issue of interest to managers of Direct Load Control programs such as SmartAC is how many of their participants are actually home during the weekday summer afternoons when most control events take place. We asked the SmartAC participants whether someone is usually home on weekday afternoons during the summertime.¹⁰ Eighty-two percent of the participants said that there was somebody home during this time period. Not surprisingly senior participants (94%) were more likely than non-senior participants (71%) to report someone being home. Participants with household incomes greater than \$50,000 were less likely (75%) to have somebody home on summertime weekday afternoons than those in the other two income categories (92% occupancy for the < \$30,000 income group and 94% occupancy for the \$30,000 - < \$50,000 income group).

The level of air conditioning usage among participants is also another issue of interest to the SmartAC program managers. As Figure 17 shows, over half of the program participants say that they typically only use their central air conditioners on the hottest days.

¹⁰ This question was only asked in the pre-survey.

Figure 17
Frequency of CAC Use



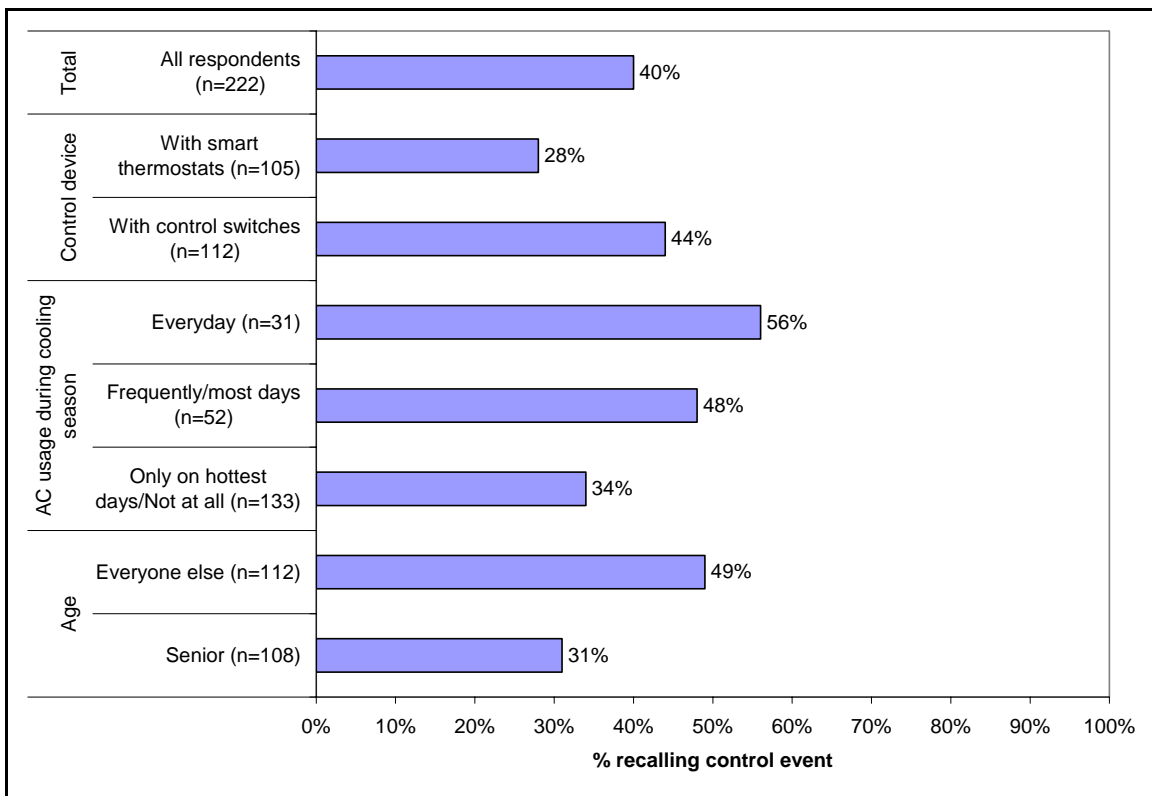
Note: Source is November/December 2007 Post-Survey.

5.3.2 Awareness of the Control Events

Although PG&E initiated 15 control events for the special monitoring group from July through September 2007, only 40 percent of those surveyed in November/December 2007 recalled these events. In addition, when participants who recalled control events were asked to estimate how many events had occurred since they joined the program, the average estimate was only three events.

The likelihood of recalling a control event did vary to a significant degree for some participant categories. Figure 18 displays some of these cases. It shows, not unexpectedly, that recall of a control event increased the more frequently a participant used his/her air conditioner. Yet the chart also displays some differences that the evaluators did not expect. It shows that participants with control switches were more likely to recall a control event than those with smart thermostats. Interestingly senior participants, who one would expect to the home more often than other participants, were less likely to be aware of the control events than these other participants.

Figure 18
Recall of Control Event



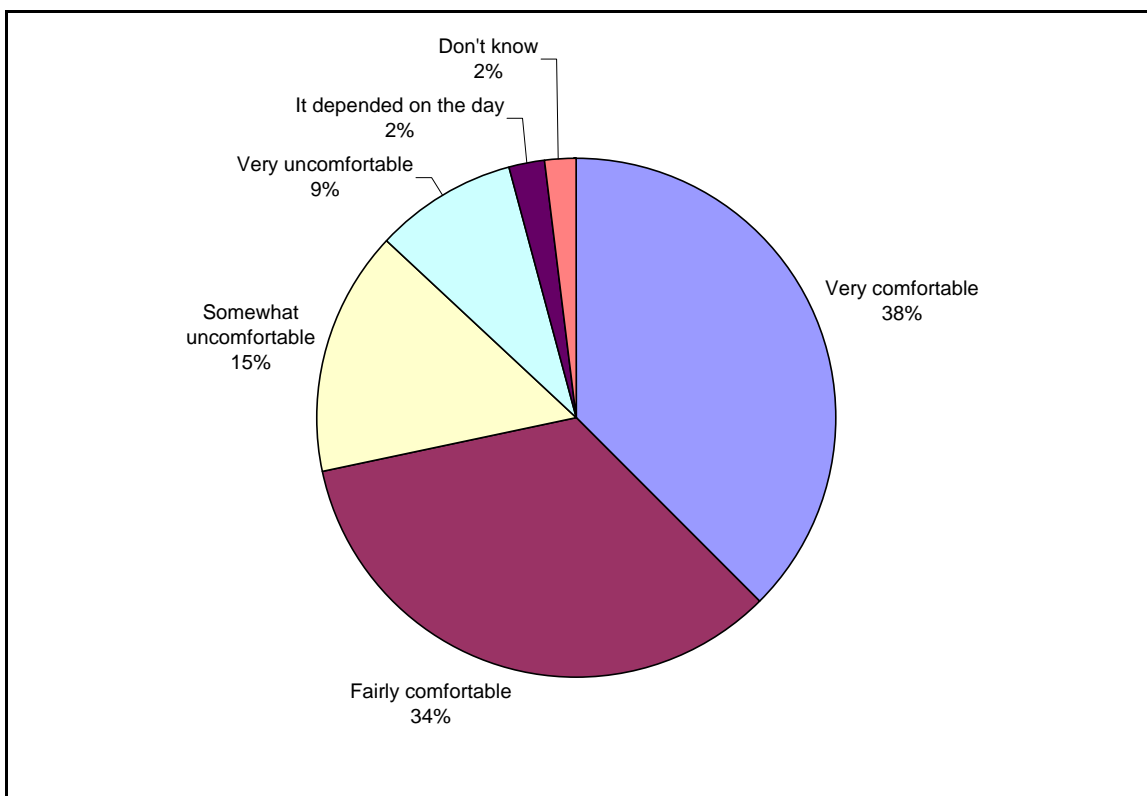
Note: Source is November/December 2007 Post-Survey.

5.3.3 Effects of the Control Event

The post-survey asked participants who recalled a control event about their comfort level during these events. Figure 19 shows that only about a quarter of the participants who recalled a control event experienced some level of discomfort. One reason for this is that 38 percent of them said that they turned on fans during the control event. Other ways to keep cool cited by participants included closing blinds/shades (9%), leaving the house (8%), and drinking something cool (7%).

The thermostat participants recalling the control events were more likely to be uncomfortable (49%) than the switch participants (20%) who recalled the events. One possible reason for this is that for the switch participants the air conditioner fan kept running during the control event. The post-survey also asked the few thermostat participants who had recalled control events (n = 29) whether they tried to lower their thermostat settings when they thought that PG&E was remotely raising them. Over half of them (52%) tried to do this and found that they were unable to change their thermostat settings. Not surprisingly, those participants who said that they used their air conditioners only on at hottest days or not at all were less likely (13%) to say they were uncomfortable during the control events than those who used their air conditioners frequently or on most days (41%).

Figure 19
Comfort Level During Control Event

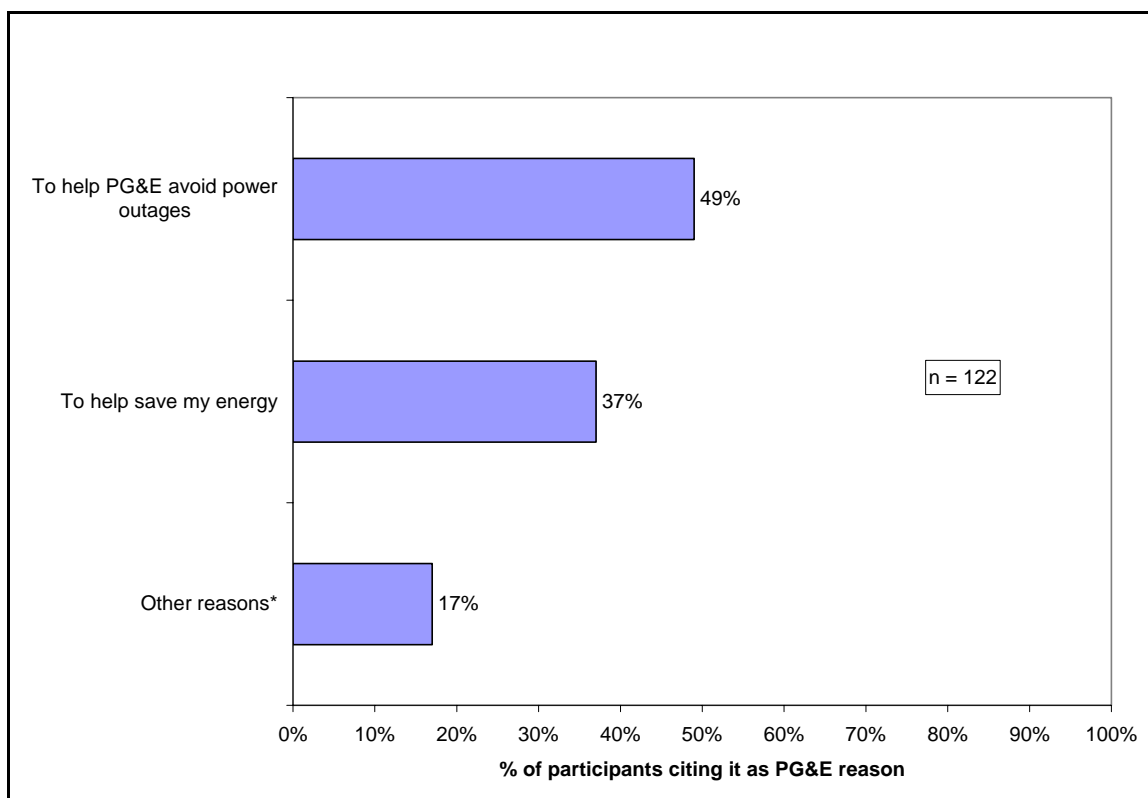


Note: Source is November/December 2007 Post-Survey.

After telling the participants that PG&E had indeed raised their thermostat settings or activated their air conditioner control switch, the post-survey then asked them if they had some idea why PG&E would do this. Over half (58%) of the respondents said that they had some idea why PG&E would do this. The most-cited ideas included PG&E wanting to avoid power outages and PG&E wanting to save the participants some energy (Figure 20). Male respondents were more likely (57%) than female respondents (39%) to cite the avoidance of power outages as being PG&E's motivation. People with no college education were more likely (56%) than people with at least some college education (33%) to say that PG&E's control events were designed to save participants some energy.

In analyzing the pre-survey data, the evaluators had noticed that many participants thought that PG&E's control events would save them energy. So in the post-survey the participants were asked if they thought that PG&E's remote raising of their thermostat settings or activation of their air conditioner control switch had reduced their monthly energy bill. Fifty-eight percent of the respondents (n=122) said that it had. Female respondents were more likely (68%) than male respondents (50%) to say that it had. Non-senior participants were more likely (30%) than senior participants (15%) to say that the control events had *not* reduced their monthly energy bills.

Figure 20
Why Participants Thought
PG&E Would Control Their Air Conditioner



Note: Source is November/December 2007 Post-Survey.

5.3.4 The Opt-Out Option

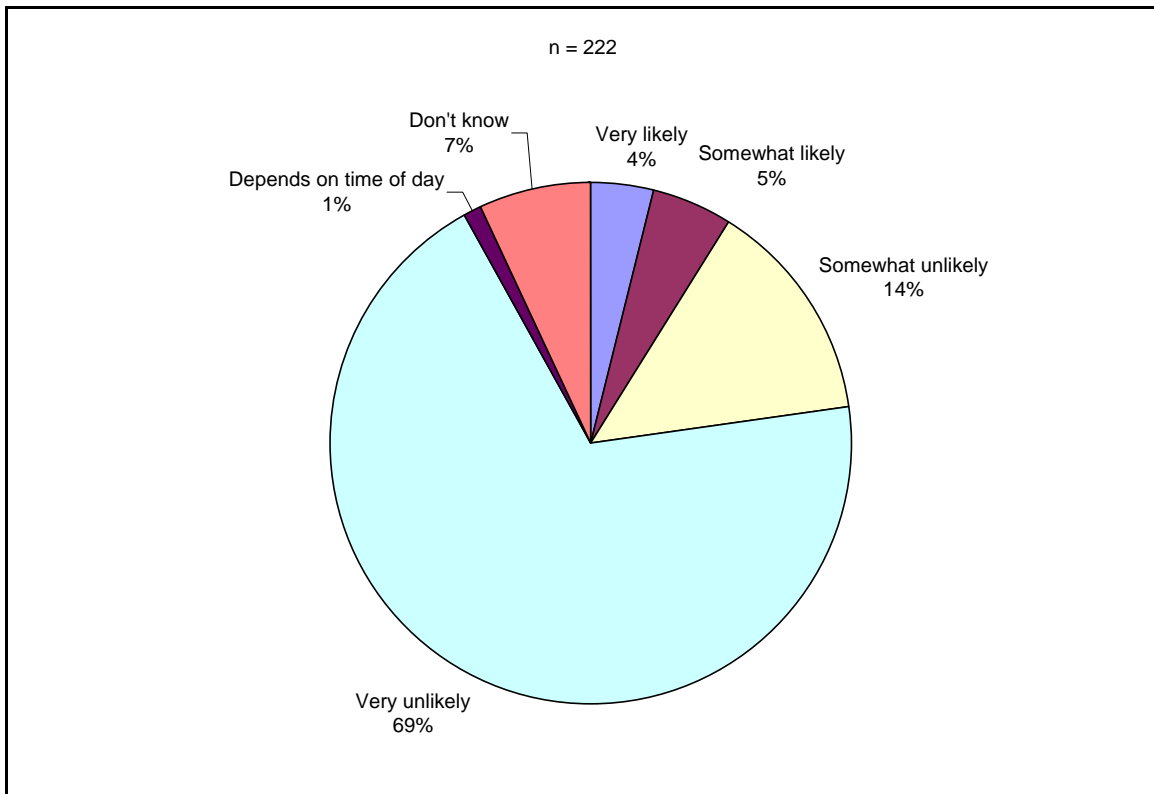
In Chapter 5 it was noted that only 26 percent of the participants who responded to the post-survey were aware that they could ask PG&E not to remotely raise their thermostat settings or activate their air conditioner control switch before an upcoming control event. Once the participants were told that they had this “opt-out option,” the post-survey asked them how likely they were to exercise this option in the future. Figure 21 shows that less than 10 percent of the respondents expressed any likelihood of using this option in the future. Of those who indicated that they might use the opt-out option (n = 75),¹¹ the most cited reasons included an occupant or visitor with heat sensitivity or health problems (18%), a party or family event (18%), and a long heat wave (12%).

One member of the PG&E SmartAC Program staff indicated that the absence of information about the opt-out option in some program literature was “intentional” due to concerns about too many participants exercising this option. However, Figure 21 suggests that these concerns may be unjustified. Experience from other direct load control programs indicates that high levels of opting out usually only occur when the means of opting out are relatively easy – e.g., lowering the thermostat settings or pushing an “override

¹¹ This included all that did not say that they were “very unlikely” to opt out.

button.” on the device, instead of remotely. The SmartAC Program’s means of opting out – either logging on to a program website that very few participants have used or calling the Program in advance of the control event – are not so “user- friendly.” It is also reasonable to ask whether the absence of information about the opt-out option in the program materials might discourage PG&E customers who value such an option from joining the program.

Figure 21
Likelihood of Using Opt-Out Option in the Future



Note: Source is November/December 2007 Post-Survey.

6. The Payment of Program Incentives

6.1 Summary of Program Activities

The SmartAC Program pays new participants a (currently) one-time “thank you” payment of \$25. The incentive payment process begins when GoodCents compiles a list of enrolled customers whose control devices have been installed and send this list to PG&E’s Integrated Processing Center (IPC). The IPC validates the customer data and then sends the list of valid participants to another PG&E department that issues the checks through SAP, the utility’s Enterprise Resource Planning (ERP). The IPC then updates its database to reflect the fact that the rebates have been issued. The SmartAC Program literature tells participants to allow six weeks after installation to receive their \$25 payment.

6.2 Findings from Program Implementer Interviews

6.2.1 The Timeliness of the Incentive Payments

PG&E SmartAC Program staff acknowledged that in its early stages the program was having trouble paying the incentive checks in a timely manner. “When we were first starting to sign up customers in April, it took more than six weeks and customers were really starting to call into the GoodCents call center saying: “where is my check?, one PG&E staffperson said. She blamed the tardiness on the overwhelming complications and challenges of getting a new program operational. “We had to do so much, so fast to get that first 5,000 [enrollments] in,” she explained. “It was kind of like assembling the plane in mid air, there was just a ton to do. So getting that system in place where the data was getting swapped and SAP was picking it up and cutting the checks, it just took some time.”

The PG&E staff indicated that they thought that these problems had been solved, but they couldn’t be absolutely sure. “Presumably we’re doing better now,” said one PG&E staffperson. “But we do need to have people monitoring that and we don’t have that in place yet – to make sure that we know what the average check time is.”

A GoodCents representative interviewed in November 2007 indicated that payment delays were still a problem. “The biggest challenge ...with some customers is sometimes a delay in getting their rebate,” he said. “You know people will tell us: ‘I’m not into it for the \$25.’ But it’s just like anything, if you tell somebody that they’re going to get something, they better get it in a timely manner. So I think that maybe that has been the biggest [customer service] thing.”

GoodCents representatives indicated that while they were supposed to be getting monthly customer data updates from PG&E, the utility has been running almost two months behind in providing these. A PG&E representative indicated that while they were providing timely customer information updates to GoodCents, GoodCents was having difficulty switching between updates. All interviewees agree that outdated information makes it difficult for GoodCents to verify enrollments and also can delay incentive payments. A GoodCents representative explained:

What will happen is we’ll enroll a customer and then by the time we send through an incentive request, there may have been a change in the customer’s [account number] for some reason. And so it gets rejected because we’re submitting with old information and [PG&E’s] system has

been updated with new information. So although the customer may not have moved out and it may be nothing other than just an account number change, we're getting a rejection. And that adds another length of time to try to find out why – what's different – how do we correct and resubmit the incentive requests.

“I think that whole incentive request area is probably one that could benefit from some tuning work,” he concluded.

In March 2008, GoodCents indicated that progress was being made on these customer data exchange problems. GoodCents reported that after several discussions, GoodCents and PG&E established accepted formats, content, scheduling and timelines for the processing of monthly updates. GoodCents said that with the January 2008 customer data exchange it had developed a process to automate the import of data and that this automatic process worked for the February data exchange without incident. GoodCents also said that it had begun other initiatives to better monitor how long it took for incentive payments to be paid. One of these was “a proactive approach to incentive check processing by monitoring the interval between installation and customers’ receipt of checks.” It also said that it had designed an exception handling process for customers that had not received their incentive checks six weeks after installation of the control device. GoodCents said that it would implement this process after further discussion with PG&E.

6.2.2 The Adequacy of the Incentive Payments

PG&E SmartAC Program staff indicated that they were studying whether to give their existing participants additional incentives to help maintain program retention levels. “We’ll probably give a thank you at the end of the year,” said a PG&E staffperson in an October 2007 interview. “[The message is:] ‘Thanks for sticking with us all year long.’” However, the Program Staff noted that they were uncertain how to reward these existing participants. Ideas they were considering included gift cards, charitable contributions, free home energy audits, certificates for free CFLs, sweepstake entries, tree plantings, and many other possible incentives.

The SmartAC Program staff is also considering similar incentives as additional inducements (besides the \$25) for new participants. One reason the SmartAC Program is looking more at non-monetary incentives for these additional inducements is a fear of upsetting existing participants. She explained:

It's like the iPhone. They were selling for \$500 and 6-8 weeks later [Apple] realized that they tipped a little bit too high, too far past what the market will bear, and they took \$100 off. The people who paid the \$500 now are mad: 'If I would have just waited, I could have gotten it for a \$100 bucks cheaper.' So if I offer \$25 today and tomorrow I say: 'Oh we're having a hard time so I'll give you \$50,' those \$25 people are going to say: 'I want \$25 more too.' So it has to be presented in such a way ... so that it doesn't look like the people who adopted it early are getting the short shrift because of that. So that they don't come back angry.

The GoodCents representatives felt strongly that additional incentives were needed for customer retention. “I think that they’re going to have to [offer retention incentives],” said one GoodCents representative. “I know of no other way of them keeping [existing participants]. ... I believe that the people that are joining right now are people that believe in the cause and it’s nice to get a little incentive. But I also believe that these people will come back a year later or even six months later and say: ‘OK, what else are you going to do for me?’”

The GoodCents representatives also felt that higher incentives would be needed for new participants. “I think that down the road when they’re trying to get larger and larger volumes, [the \$25 incentive] definitely needs to be raised,” another GoodCents representative said. “Now they have Commission approval for \$50, but they chose to see how many they could try to get with \$25.”

PG&E staffpersons noted that the \$25 incentive for new participants was selected based on its market research prior to program deployment and on vendor recommendations, and that it was sufficient to meet and exceed its first year enrollment goals. PG&E plans to re-evaluate the incentive level for future program expansion.

The GoodCents representatives also said that awareness of higher DLC program incentives elsewhere in California could cause resentment among SmartAC Program participants. “Although they’re not competing with Southern California Edison, certainly being within the State of California under the same CPUC, there’s an awareness that ...the same person that’s getting \$25 in Northern California is getting about \$100 in Southern California,” one GoodCents representative observed. In fact the SmartAC Program did lose some participants when the San Joaquin Irrigation District launched a DLC program that was similar to the PG&E program, but with a higher incentive. However, it is unclear that PG&E customers would be aware of, or influenced by, incentives available to customers in southern California.

6.3 Findings from Pre-and Post-Surveys

This section summarizes the findings from the pre- and post-surveys that concern Program incentive payments. These findings address the receipt and timeliness of the incentive payments, the adequacy of the incentive payments, and their relative interest levels in various possible alternative or additional Program incentives.

6.3.1 Receipt and Timelines of the Incentive Payment

The post-survey asked the participants whether they had received their \$25 “thank you payment” from PG&E for participating in the SmartAC Program. Surprisingly although the post-survey was administered at least seven months after they had joined the program, only 61 percent of the respondents said that they had receiving the payment, with 22 percent claiming that they had not received it and 16 percent saying that they did not know. When asked how many weeks it had taken for the \$25 thank you payment to arrive, the mean estimate was five weeks and the median estimate was four weeks. As noted, the SmartAC program literature tells participants to expect about six weeks for the arrival of the incentive payment.

6.3.2 Adequacy of the Incentive Payment

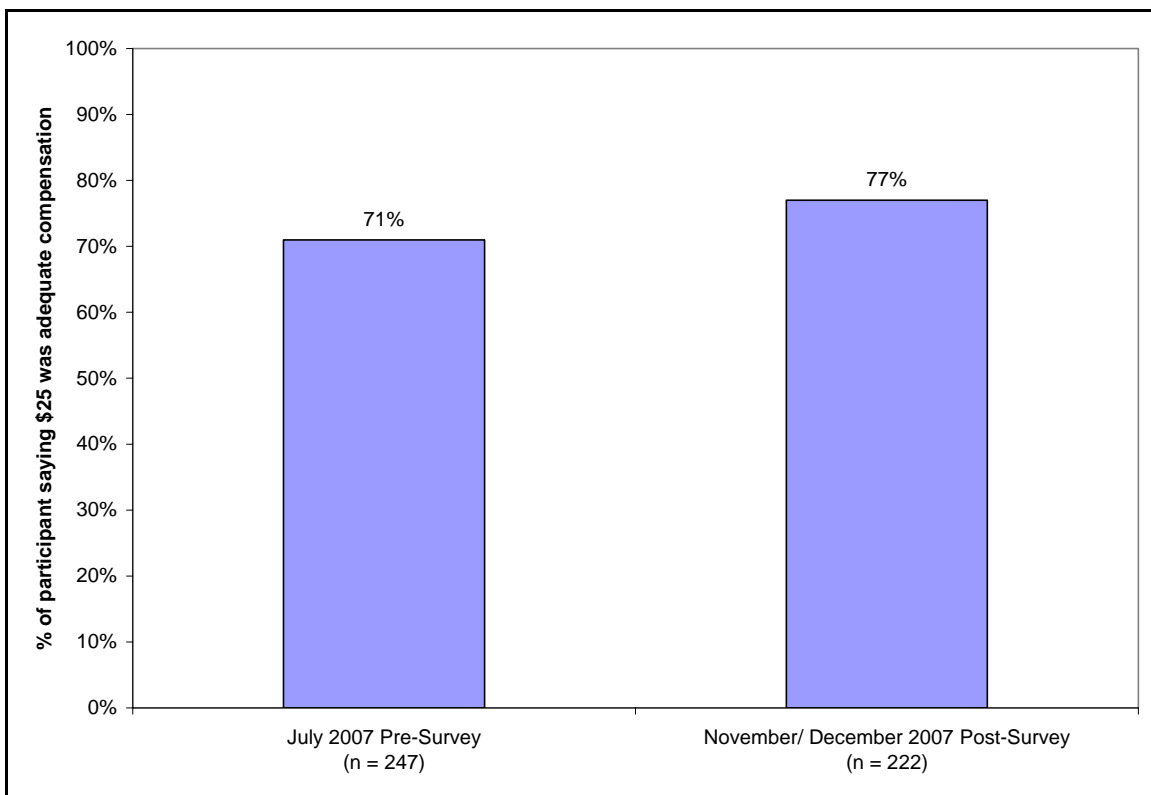
Both the pre-survey and the post-survey asked the participants whether the \$25 thank you payment was sufficient compensation for PG&E cycling their air conditioner over the summer of 2007.¹² Since most of

¹² Since the participants in the special monitoring program could receive as much as \$110 in financial incentives from PG&E in addition to the normal \$25 thank you payment, the survey question read: “Let’s suppose that you were not participating in the special monitoring program and were only receiving the \$25 Thank You Check for participating in the SmartAC Program. In this case, would this \$25 be enough compensation for PG&E cycling your air conditioner over the summer of 2007?”

the respondents to the pre-survey had not experienced a control event, the evaluators were curious whether the experience of 15 control events, with some occurring during very hot weather, would change the participants' minds as to whether \$25 was adequate compensation. Figure 22 shows that this was not the case.

One possible explanation for the high satisfaction level with the incentive amount was the low incidence of discomfort among the participants. The previous chapter showed that only 40 percent of the participants recalled a control event and only about a quarter of those who recalled such an event said that they experienced some discomfort. Another possible reason is that most participants did not cite the financial incentive as a reason for joining the program. Only 16 percent cited it as a primary reason for participation and only 15 percent cited it as a secondary reason. With most participants not caring much about the incentive to begin with, it is unlikely that they would say that the \$25 thank you payment was inadequate compensation. Finally it's possible that despite the wording of the question, some participants did factor in the additional special monitoring group incentives (up to \$110) that they expected to receive in considering whether the \$25 thank you payment was adequate.

Figure 22
Participant Assessment of Adequacy of \$25 Program Incentive



Note: Source is November/December 2007 Post-Survey.

Although most participants were satisfied with the \$25 thank you payment, there were still 16 percent of the respondents to the pre-survey and 19 percent of the respondents to the post-survey who said that \$25 was not adequate compensation. Both these surveys asked these unsatisfied participants how much

financial compensation from PG&E would be adequate. In response to the pre-survey the mean participant estimate was \$130 and the median estimate was \$110. In response to the post-survey the mean participant estimate was down to \$78 and the median estimate was \$100.

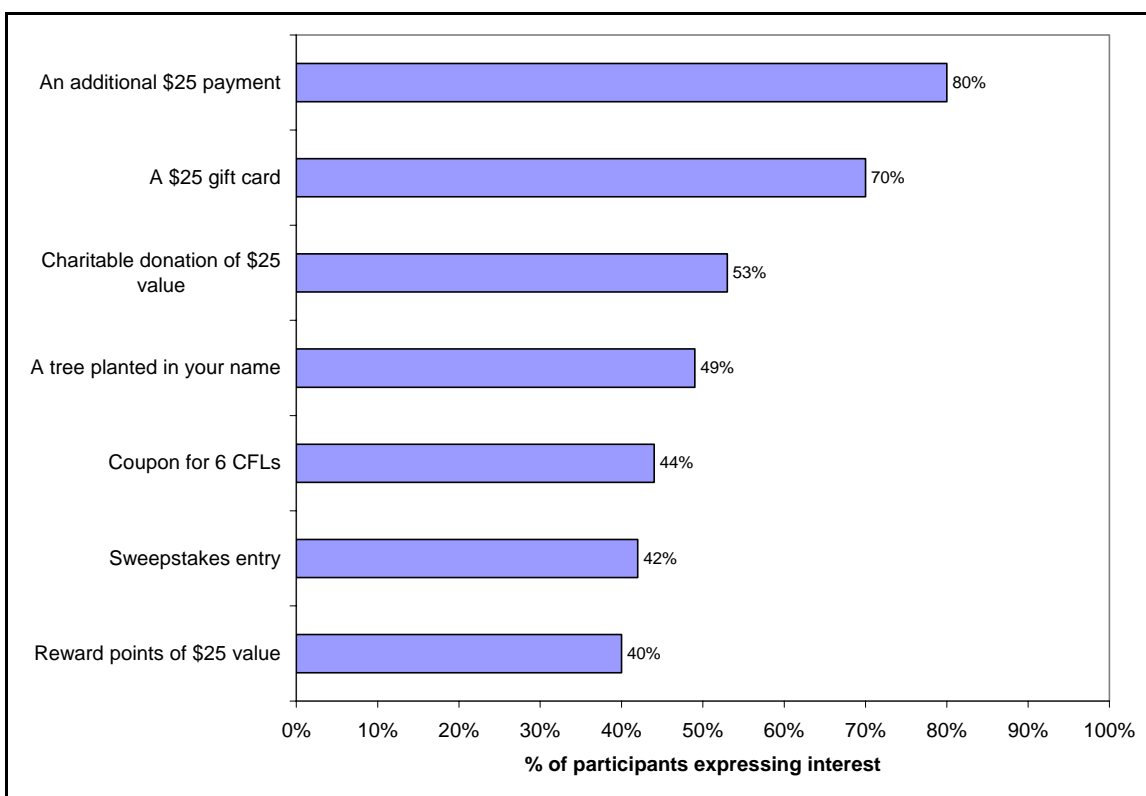
As noted in the Interim Report, these high demands for compensation suggest that it would take more than a modest increase in the program's \$25 payment to satisfy these participants. However, the fact that these participants may receive as much as \$110 in compensation due to their participation in the special monitoring group may also influence these responses in different ways.

6.3.3 Participant Interest in Other Incentives

As discussed above, the PG&E SmartAC program is considering offering other incentives or premia to program participants, either as additions or alternatives to the existing \$25 payment. The post-survey asked participants about their level of interest in a variety of alternative incentives.¹³ Figure 23 shows that the participants showed the greatest interest in an additional \$25 payment or a gift card of \$25 value.

¹³ Respondents were asked to rate their level of interest on a five-point scale in which 5 indicated "Very interested" and 1 indicated "Not interested at all." The list of possible incentives was randomized to insure that participant preferences were not influenced by the order of the choices.

Figure 23
Participant Interest in Additional/Alternative Program Incentives



Note: Source is November/December 2007 Post-Survey.

The evaluators also looked to see how these levels of interest might differ among different demographic groups. As a general rule, the lower the participant's income group, the greater that he/she was interested in these additional or alternative incentives. Significant differences in levels of interest among demographic groups included:¹⁴

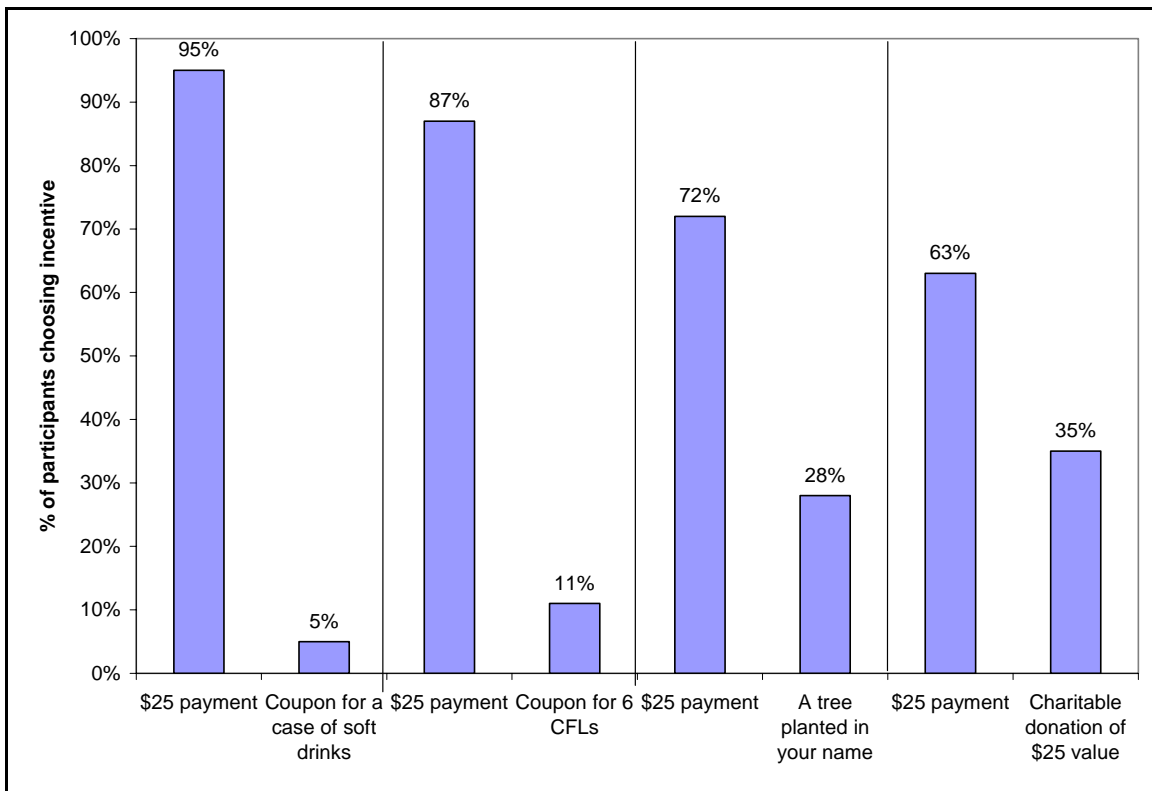
- *Coupon for six CFLs*: Participants in the highest annual income category (\$50,000 and over) had a lower level of interest in these coupons (31%) than those in the \$30,000-\$49,999 income category (53%) or in the under \$30,000 income group (64%).
- *Tree planted in your name*: Male respondents were more likely (45%) than female respondents (31%) to be *not interested* (1 or 2 on five-point interest scale) in this incentive.
- *\$25 gift card*: Those with annual incomes under \$30,000 were more interested (81%) in this incentive than those in the \$30,000-\$49,999 income category (69%) or those in the \$50,000 and over income category (65%).
- *Sweepstakes entry*: Those with annual incomes under \$30,000 were more interested (59%) in this incentive than those in the \$30,000-\$49,999 income category (37%) or those in the \$50,000 and over income category (35%).

¹⁴ Statistically significant differences at least at the 90% confidence level.

- *Additional \$25 payment:* Those with no college education were more interested in this incentive (90%) than those with at least some college education (78%).
- *Reward points of \$25 value:* Those with annual incomes under \$30,000 were more interested (60%) in this incentive than those in the \$30,000-\$49,999 income category (38%) or those in the \$50,000 and over income category (29%).
- *Charitable donation of \$25 value:* Seniors were more likely (45%) to be “very interested” in this option than non-seniors (30%). Those in the under \$30,000 annual income group (which was highly correlated with the senior group) were also more likely (51%) to be “very interested” in this option than those in the in the \$30,000-\$49,999 income category (41%) or those in the \$50,000 and over income category (29%).

Finally, in order to help the program figure out alternative incentives that might attract new participants, the participants were asked to imagine that they were joining for the program for the first time and to choose between the existing \$25 payment and a number of possible alternative incentives. As Figure 24 shows, the participants preferred the \$25 payment to any of the possible alternatives, with a charitable donation of \$25 value being the most popular of these.

Figure 24
Participant Choices Between \$25 and Possible Alternative Incentives



Note: Source is November/December 2007 Post-Survey.

7. Scaling Up the Program

Although the PG&E SmartAC Program had a goal of 25,000 control devices installed by the end of 2007, its long-term goal is to get 400,000 control devices installed by June 2011. PG&E expressed interest in knowing how current program processes will fare as the program grows much larger. The evaluators obtained feedback from the program implementers on the challenges of “scaling up” the following program processes.

7.1 Scaling Up Control Device Production

Representatives of Cannon Technologies anticipated no problems scaling up production of control devices. “Right now we are forecasted for 120,000 units for next year, it’s in our production forecast,” said one Cannon representative. “We’re fine. We have a very strong relationship with a handful of contract manufacturers so at those facilities we have plenty of “line time” – dedicated resources to meet those demands.” He noted that Cannon has uses a comprehensive production planning tool where it inputs the forecasted needs of all its demand response customers as well as other considerations. For example, the production planning tool has action plans to deal with possible constraints such as the potential lifespan for a key component of one of their control devices.

7.2 Scaling Up Scheduling, Device Installation, and Related Processes

The difficulty that GoodCents had in keeping up with SmartAC Program installations in the last third of 2007 has raised legitimate questions about their ability to handle the even higher volume of installations that will be required during the 2008-2010 period. GoodCents representatives point out that between September and November 2007 they increased their field staff from 10 technicians in September 2007 to 25 technicians in November 2007. “We’re hiring people like crazy right now,” said one GoodCents representative.

However, some PG&E SmartAC Program staffpersons expressed concern that GoodCents was not scaling up fast enough. They pointed to some forecast scenarios where GoodCents would need at least 60 technicians to keep pace with program installation goals.

Yet the GoodCents representatives also pointed to the risks of hiring technicians when there is insufficient demand for installations to keep them busy. “If I had 25 technicians ready to go [back in Summer 2007], 7 or 8 of them would have been sitting around for the last two months with nothing to do,” one GoodCents representative commented in an October 2007 interview. “So it’s all a matter of trying to stay ahead of the curve in timing. A nice smooth curve is good for everybody.”

One GoodCents representative who works closely with the Program’s data management said the company’s system for managing scheduling installation appointments will likely have to be upgraded to handle the higher volume. “Our systems work fairly well with relatively moderate scheduling,” he said, “but we’ve got work to do to be able to scale up to 100,000 installs a year.” He noted that GoodCents is hoping to introduce an online scheduling tool in 2008 that would allow customers to enroll and schedule appointments without having to contact the GoodCents call center. “So [we need] things like that,” he said, “we need systems that are going to support that kind of a volume.”

Another GoodCents representative who is familiar with the company's call centers said that the San Bernardino call center, which handles the calls from the three California DLC programs that GoodCents runs, has room for expansion. She also noted that GoodCents has a backup call center in Georgia which has staff trained to handle the SmartAC Program.

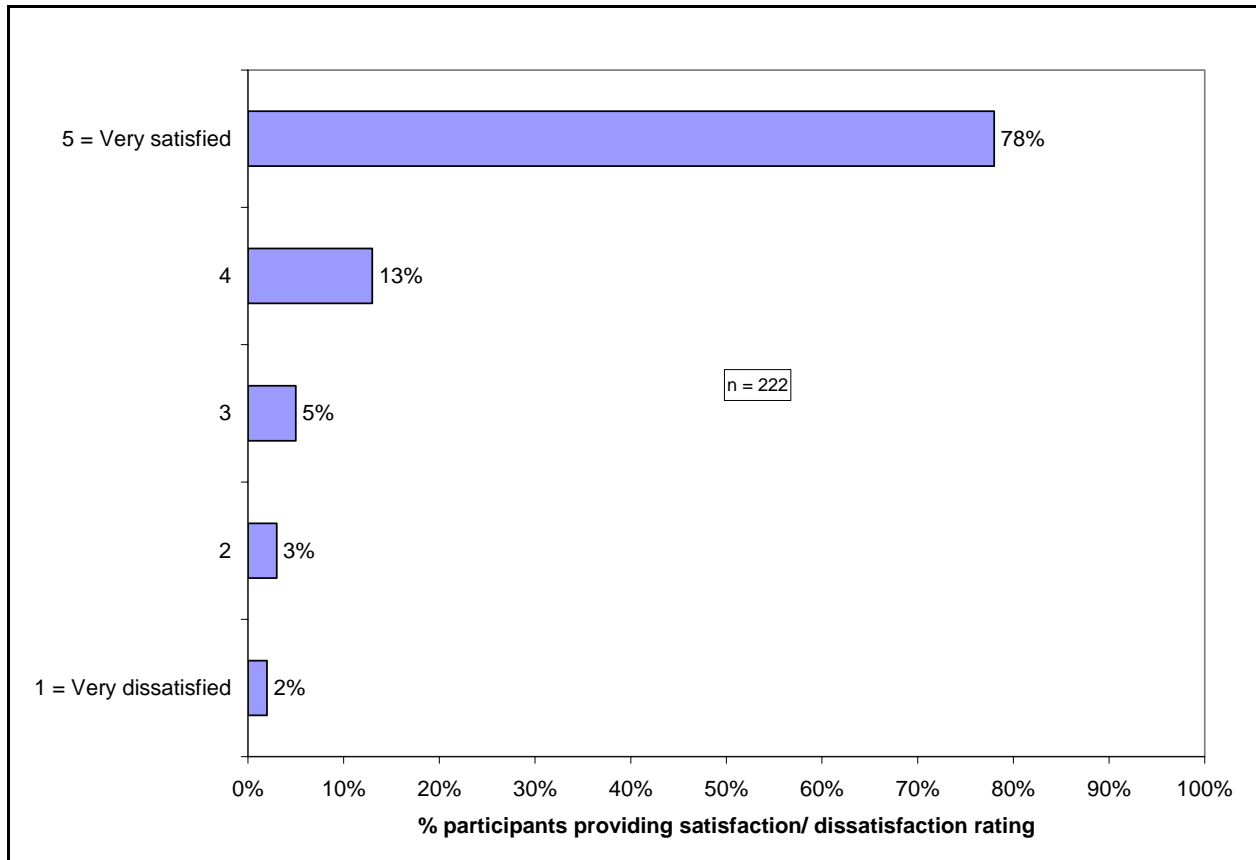
PG&E SmartAC Program staff also expressed concerns about the difficulties GoodCents will face in scaling up their current field data collection and compilation processes. "My sense is that GoodCents does a lot of things manually that I think could be more problematic when you really ramp up to a big, high-scale program like we're planning to do in 2008," said one PG&E staffperson. "I'm a little bit concerned about that. Because right now their guys drive their forms in and drops them off and then someone manually enters them. They don't even fax them in."

In response to these concerns, in March 2008 GoodCents reported that: (a) it had further increased its field staffing level to 39 with another 5 technicians in training. As discussed in subsection 4.2.1, GoodCents said that it completed a new staffing implementation plan with PG&E and reached agreements with the IBEW that should help field staff hiring efforts going forward; (b) it was in the process of upgrading its Customer Information System with expanded routing and scheduling capabilities and wireless work order processing for field technicians, and that, when fully implemented, these system upgrades would provide on-line enrollment capabilities, increased flexibility with process automation, business driven metric reports for the key processes, and improved reporting capabilities for customers; (c) in early 2008 it initiated a project to upgrade its corporate solution footprint to introduce automation in a number of areas including the processing of work orders; (d) that the call center has added staff and currently there were 18 full-time customer service representatives, that in anticipation of the project office adding more technicians, the call center would be adding five additional customer service representatives as well as a 6-hour shift on Saturdays.

8. Overall Program Satisfaction

In the post-survey participants were asked to indicate how satisfied they were with the SmartAC Program in general. Despite the fact that they had been exposed to 15 control events, participant satisfaction was very high (Figure 25) with over three quarters of the participants saying they were "very satisfied" with the program in general. Satisfaction levels (4 or 5 on the satisfaction scale) did not vary much based on the demographic categories of the participants except that senior participants gave higher average satisfaction ratings (96%) than non-senior (87%).

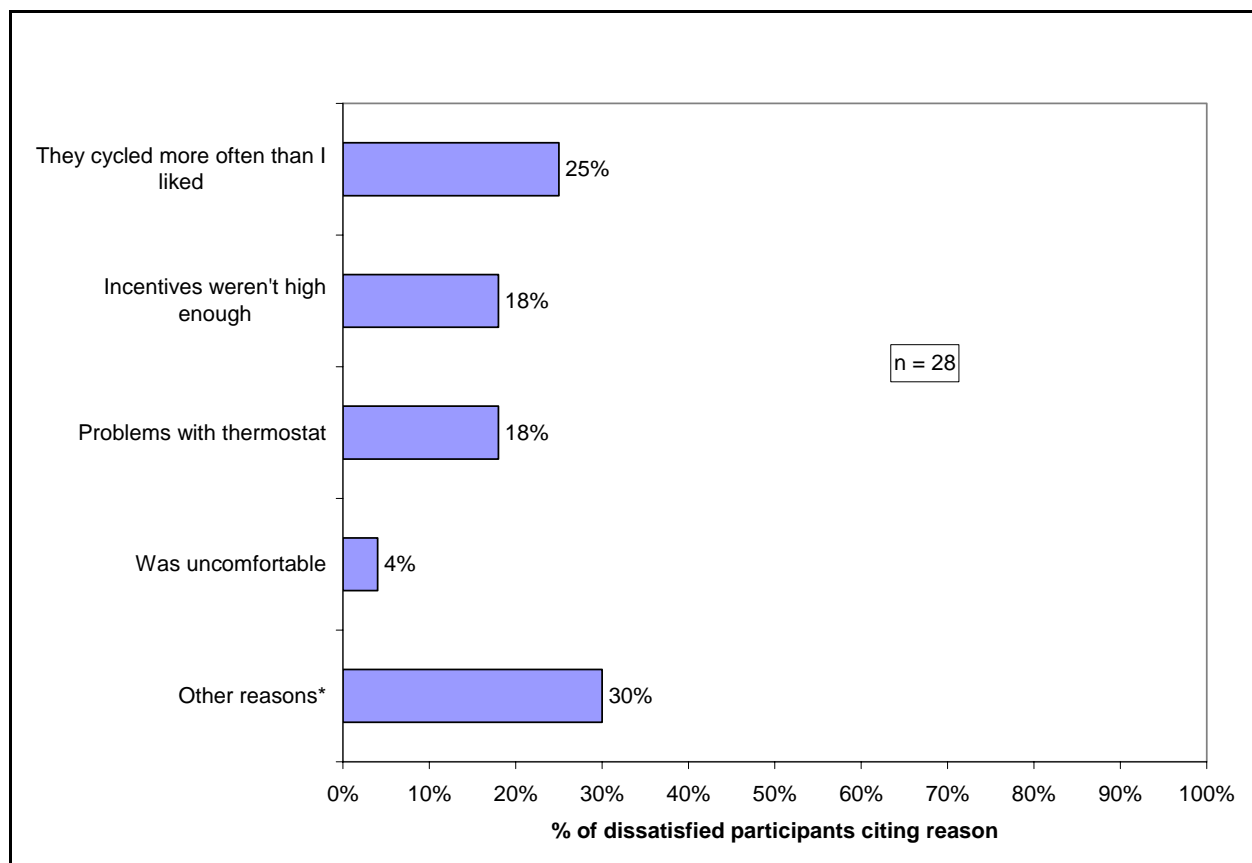
Figure 25
Participant Satisfaction with Program as a Whole



Note: Source is November/December 2007 Post-Survey.

The 28 participants who were dissatisfied with the SmartAC program expressed a variety of reasons for their dissatisfaction. The most cited reasons included too-frequent cycling, inadequate incentives, and problems with the thermostat (Figure 26).

Figure 26
Reasons for Participant Dissatisfaction



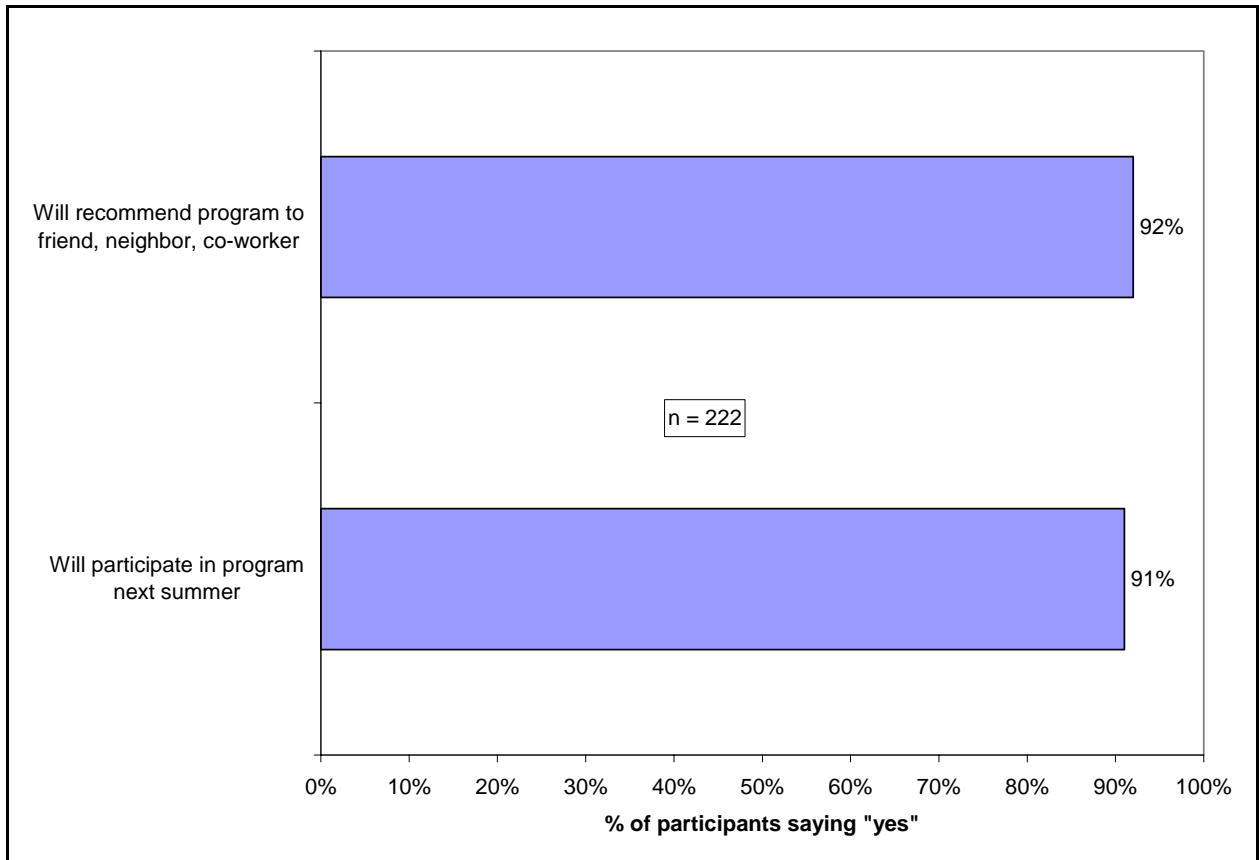
Note: Source is November/December 2007 Post-Survey.

Respondents were allowed to cite multiple reasons.

**Other reasons include no longer having control over thermostat, furnace problems, not saving enough energy/money, call center people unable to explain how to program thermostat, failure to see the benefits of the program, and surveys were inconvenient.*

The post-survey also asked the participants whether they would participate in the SmartAC program next summer and if they would recommend the SmartAC program to a friend, neighbor, or co-worker. Figure 27 shows that over 90 percent of participants said yes to both of these questions. When those who said “no” were asked why, they cited reasons similar to those in Figure 26.

Figure 27
Future Participation, Recommendations to Friends



Note: Source is November/December 2007 Post-Survey.

9. Recommendations

The evaluators have the following recommendations for program improvements:

9.1 Marketing and Program Information Recommendations

- *Do more marketing to commercial customers:* Compared to other similar California DLC programs such as the SDG&E Summer Saver Program, the PG&E SmartAC Program has done almost no marketing to commercial customers. Marketing to commercial customers requires a different delivery mechanism – e.g., face-to-face meetings instead of direct mail. Because it is a different delivery mechanism, it will be useful for PG&E to gain experience with it sooner rather than later. The program will also need to do some data mining of PG&E’s CIS system to identify those commercial customers that are likely to have businesses types and air conditioning equipment best suited for the Program.
- *Do more marketing to multifamily customers:* The PG&E SmartAC Program staff has done little marketing to multifamily customers. Some DLC programs have found that effective multifamily participation strategies can provide cost-effective load relief. In addition, in many parts of PG&E’s service territory, multifamily residences represent a large proportion of the residential sector. The PG&E SmartAC Program staff has some good ideas for marketing to these customers such as providing “bounties” to landlords who recruit tenants or seeking CPUC approval for “opt out” tenant participation rules. The Program should begin implementing some of these ideas.
- *Do targeted mailings to high-potential residential customers:* Two groups of residential customers that have great potential for joining the program include those who have participated in other PG&E energy efficiency programs and those who have moved into a house that already has a control device installed (but which has been deactivated). The PG&E SmartAC Program staff has contemplated marketing campaigns for these residential subgroups and should move forward on these efforts, including conducting the data mining needed to identify customers in the former group.
- *Improve instructions for thermostat operation:* Evidence from participant surveys indicate that the SmartAC Program installers need to provide more user-friendly instructions, conduct additional customer training or even program the thermostats on the customers’ behalf -- when they encounter senior customers, for example. There is also some survey evidence that Program call center staff need better training in how to instruct participants to operate their thermostats. Additionally only a small minority of participants who received the smart thermostats have actually used the Program website to operate these thermostats. This suggests that the Program needs to do more customer education in this area – possibly by providing a brief case study of a participant who finds this feature useful.
- *Use the customer interaction during the thermostat installation process to market other PG&E energy programs:* One advantage of the recent increase in popularity of the smart thermostat is that the Program has more interaction with PG&E customers. The low level of awareness of other PG&E energy programs among SmartAC Program participants, indicates that the SmartAC Program is missing an opportunity to promote these other energy programs.
- *Feature the opt-out option more prominently in Program materials:* Only a quarter of the surveyed participants were aware of the Program’s opt-out option. This is not surprising since some Program materials have included no mention of this option and other materials have given it little prominence.

Interviews with Program staff suggested that this de-emphasis was intentional due to concerns about high opt out rates. However, the participant surveys indicated that these concerns were unfounded. When informed of this option, few of the participants said that they were likely to use it. Only a handful of participants opted out of the control events that were conducted in 2007. However, we also note that a few of the EM&V sample participants that were subject to frequent control events decided to drop out of the SmartAC program entirely. Experience from other direct load control programs indicates that high levels of opting out usually occur when the means of opting out are relatively easy – e.g., lowering the thermostat settings or pushing an “override button” on the device. The SmartAC Program’s means of opting out – either logging on to a program website that very few participants have used or calling the Program in advance of the control event – are not so “user- friendly.” It is also possible that the absence of information about the opt-out option in the program materials might discourage PG&E customers who value such an option from joining the program.

9.2 Program Enrollment and Control Device Installation/Operation Recommendations

- *Require a long-term plan for field technician staffing levels:* Although GoodCents recently increased its field staff from 11 to 25 field technicians, the number of required installations will increase from 25,000 in 2007 to over 100,000 in 2008. According to some PG&E forecasts, as many as 60 field technicians will be needed to keep up with this higher volume. The union hiring requirements in the PG&E service territory also make it more difficult for GoodCents to find qualified technicians. For these reasons it is crucial that GoodCents present PG&E with a long-term plan for field staffing levels that is based on forecasts of the expected number of new participants. Because of the inherent uncertainty of the success of Program marketing efforts this plan should be used as a guideline rather than a mandate and should be adjusted periodically based on new information.

In March 2008, GoodCents said that in January 2008 it completed, with the PG&E staff, a new implementation plan for the SmartAC program for 2008 and beyond. GoodCents said that this new plan “includes all pertinent information required to closely monitor the Program’s marketing, enrollment, field manpower, and installation goals” along with weekly status call-in meetings. GoodCents also said that it had recently established agreements with the IBEW that would support its ability to recruit technicians from a much larger pool of qualified applicants that was “more than sufficient to meet the Program’s highest installation goals.” Finally GoodCents indicated that the IBEW had become a proactive part of the recruiting process.

- *Reduce reliance on manual data collection process:* GoodCents’ current field data collection and compilation processes rely heavily on manual processes such as field technicians hand delivering their work orders and the data entry people then entering these by hand. These processes are more labor intensive and cause delays in reporting installation data to PG&E. PG&E staff are also concerned how effective these manual processes will be when the program scales up. GoodCents should consider using more in-field data reporting devices.
- *Facilitate the introduction of the new smart thermostat:* Both GoodCents representatives and surveyed participants reported problems with the current smart thermostat model including difficulty of operation and equipment malfunctions. The Program is planning to introduce a new smart thermostat model in 2008 that will have a much larger touch screen, backlighting, and enhanced communication capabilities. Due to the experiences with the current thermostat model, the program is cautious about

introducing this new model without adequate testing. For this and other reasons, the new thermostat models are not expected to be introduced until the second quarter of 2008 at the earliest. We recommend that the Program do what it can to accelerate this product testing and phase-in process. The new thermostat is likely to not only reduce participant complaints but also be an attractive marketing feature.

- *Explore ways to limit the potential of device tampering:* Of the 16 percent of participants who said that their control switches were not working, 95 percent of them said that this was because their HVAC contractor had disconnected the switch. This information suggests that the PG&E SmartAC Program staff needs to do more education and outreach to the HVAC community. Educating the HVAC community about SmartAC could reduce device tampering. Other ways could include educating the customer about mentioning the device to HVAC technicians, or applying labels to the devices or their surroundings.

9.3 Control Event Recommendations

- *Consider initiating control events for the whole Program population more often:* Although PG&E initiated 15 control events for the special monitoring group from July through September 2007, only 40 percent of those surveyed recalled those events and only about a quarter of those recalling the events experienced some level of discomfort. In 2007 the SmartAC Program only exposed its entire participant population to two control events, but the evidence from the special monitoring group indicates that they could initiate more control events than this without causing too much discomfort.
- *Increase the flexibility of the control system:* We support the efforts of Cannon Technologies to change its Yukon system so that it will allow operators to control based on “scenarios” rather than default control areas.
- *Allow same day EM&V control events:* As the PG&E SmartAC program expands, measurement and evaluation will continue to be important for measuring program success. Currently PG&E does not allow evaluators to have a control event occur on the same day it is requested, although this is allowed for non-EM&V control events. Evaluators should have this same flexibility.

9.4 Recommendations Concerning the Payment of Program Incentives

- *Consider increasing the Program incentive amount for both current and prospective customers:* Advocates for keeping SmartAC Program incentives at the current \$25 level point to survey evidence that shows that few participants cite the incentive as their reason for joining the program. The problem with this argument is that the fact that current participants do not value the incentive does not mean that customers who have not joined the program also do not value the incentive. In fact, the reasons why these customers have not joined the program may be because they do not view a \$25 payment as adequate compensation for the inconvenience of their air conditioner being cycled. It is well known in the program evaluation literature that there are adoption curves for new technologies or programs and usually the customers that are “early adopters” are different than those who adopt the technologies or programs later. It is likely that the participants who joined the SmartAC Program in 2007 were “early adopters” who are different than the customers that the Program is trying to recruit in 2008. Furthermore the PG&E SmartAC Program incentives are much lower than those for other DLC programs in California. With the exception of a few customers lost to the San Joaquin Irrigation District DLC program, this incentive disparity has not impacted the PG&E program directly. However, growing awareness of higher DLC

program incentives elsewhere in California could cause resentment among SmartAC Program participants.

- *Perform an analysis of the timeliness of incentive payment and develop a late check monitoring capability:* If it has not already done so, PG&E should conduct an analysis of the average amount of time that passes between the date that a Program device is installed and the date that the incentive check is sent out to the participant to see if a problem exists. It also should develop the capability to get a warning when an incentive payment is taking longer than expected so that it can troubleshoot the problem.

Increase the frequency of customer data updates: PG&E and GoodCents disagree on the reasons behind the delays in updating the customer data that is available to GoodCents. They all agree, however, that this makes it difficult for GoodCents to verify enrollments and also can delay incentive payment if GoodCents submits an incentive request using old customer information, which leads to the rejection of the request.

In March 2008, GoodCents indicated that progress was being made on these customer data exchange problems. GoodCents reported that after several discussions, GoodCents and PG&E established accepted formats, content, scheduling and timelines for the processing of monthly updates. GoodCents said that with the January 2008 customer data exchange it had developed a process to automate the import of data and that this automatic process worked for the February data exchange without incident. GoodCents also said that it had begun other initiatives to better monitor how long it took for incentive payments to be paid. One of these was “a proactive approach to incentive check processing by monitoring the interval between installation and customers’ receipt of checks.” It also said that it had designed an exception handling process for customers that had not received their incentive checks six weeks after installation of the control device. GoodCents said that it would implement this process after further discussion with PG&E.

10. Appendices

10.1 Appendix A: Methodology

10.1.1 Overview

The findings in this report are based on following sources of information.

- *Interviews with program implementation staff:* The evaluators conducted in-depth interviews, and in some cases multiple in-depth interviews, with 14 persons who are significantly involved in the implementation of the SmartAC Program. These people work for PG&E and the SmartAC Program's two primary implementation contractors: GoodCents and Cannon Technologies. Most of these interviews were conducted in the October-November 2007 period.
- *Two surveys of EM&V special monitoring group participants:* In a July 2007 "pre-survey" and a November/December 2007 "post-survey" the evaluators asked 263 participants in the SmartAC Program's EM&V special monitoring group a wide variety of questions on their experience with and assessment of the SmartAC program processes. Participants in the EM&V special monitoring group agreed to have a meter connected to their air conditioner so that the evaluators could measure their air conditioner operating behavior during Program control events. They also were also subject to 15 control events -- compared to only two control events for other SmartAC participants. As compensation, members of the special monitoring group could receive up to \$110 depending on how many surveys they completed and how long they allowed their air conditioners to be metered.
- *Program materials and websites:* The evaluators reviewed SmartAC Program materials such as marketing collateral, program information, marketing analyses, and process flow diagrams. They also reviewed program websites.

We attempted to survey all 297 special monitoring group participants for both the pre-survey and the post-survey. We were able to complete pre-surveys with 247 monitoring group participants and post-surveys with 222 monitoring group participants. Since 16 of the post-survey respondents had not responded to the pre-survey, a total of 263 of the monitoring group participants responded to at least one of two surveys. Table 12 shows the sample design for the EM&V special monitoring group. Table 13 shows the pre-survey and post-survey dispositions by strata for this group.

Table 12
Sample Design for EM&V Special Monitoring Group

Stratum	Type Of Device	Total Tons From All Units	Multiple AC units on site (1=Yes)	Program Participants as of 06/11/2007	Design Sample Size	Design Number of Loggers	Final Sample Size	Final Number of Loggers
1	PCT	<4	0	483	93	93	88	90
2	PCT	<4	1	6	3	6	2	4
3	PCT	>=4	0	148	37	37	39	39
4	PCT	>=4	1	34	17	34	17	37
5	Switch	<4	0	1,404	77	77	72	73
6	Switch	<4	1	21	5	10	5	10
7	Switch	>=4	0	637	54	54	53	53
8	Switch	>=4	1	123	17	34	21	46
Total				2,856	303	345	297	352

Table 13
Survey Disposition for EM&V Special Monitoring Group

Stratum	Final Sample Size	Number of Respondents to Pre-Survey	Number of Respondents to Post-Survey
1	88	69	61
2	2	2	2
3	39	33	30
4	17	15	12
5	72	59	57
6	5	4	4
7	53	45	42
8	21	20	14
Total	297	247	222

10.1.2 Topics Covered by the Survey Instruments

10.1.2.1 Topics Covered by The Pre-Survey

The pre-survey questions covered the following topics:

- *Participation drivers, assessing the program marketing and information:*
 - Why they joined the Program;

- Whether the Program is something that they would expect PG&E to offer;
- Where they had heard about the Program;
- What marketing messages they recalled;
- Their satisfaction level with the Program information including thermostat operation instructions;
- What Program information was unclear or missing;
- Their satisfaction level with phone/email inquiries seeking Program information; and
- What other PG&E energy programs that they had heard of.
- *Cycling experience/expectations and air conditioning use:*
 - Whether they thought the Program had already cycled their air conditioner;
 - How many times they expected the Program to cycle their air conditioner;
 - Whether they expected to be uncomfortable during the control events;
 - How frequently they use their air conditioner;
 - Whether someone was usually home during the weekday afternoon periods when control events normally occur; and
 - If they thought the Program had already cycled their air conditioner, whether they were comfortable when this happened and whether they turned on any fans or room air conditioners during the event.
- *Satisfaction with incentive payment:*
 - Whether they had received their \$25 incentive payment yet;
 - How long it took for the incentive payment to arrive;
 - Whether \$25 was enough compensation for the Program cycling their air conditioner;
 - If \$25 was not sufficient compensation, what amount would be; and
 - If \$25 was sufficient compensation, how many times could the Program cycle their air conditioner when this \$25 payment would no longer be sufficient compensation.
- *Choosing the control devices and satisfaction with them:*
 - What control device they chose;
 - Why they chose that control devices;
 - Their satisfaction with the smart thermostat;
 - Whether the switch was working; and
 - Whether they've had an air conditioner problems since joining the Program and whether they thought that these were attributable to the Program.
- *Satisfaction with enrollment, scheduling and installation:*
 - What method they used to enroll in the program;
 - Their satisfaction with the enrollment process; and
 - Their satisfaction with the scheduling and installation process;
- *Housing/demographic questions:*
 - Whether they own/rent their homes;
 - Years of residence;
 - Type of home;
 - Age of home;
 - Number of occupants and their ages;
 - Age and gender of respondent;
 - Education level of respondent; and
 - Income level of respondent's household.

10.1.2.2 Topics Covered by The Post-Survey

The post-survey questions covered the following topics:

- *Control event experiences and reactions:*
 - Whether they thought the Program had already cycled their air conditioner, and if so, how often and when was the last control event;
 - Their level of comfort during control events;
 - Whether they turned on fan and did other things to keep cool during control events;
 - Whether they tried to lower their thermostat settings when they thought that the Program was remotely raising them and what happened when they tried to lower these settings;
 - Why they thought that PG&E would initiate control events; and
 - Whether they thought that control events would save them energy.
- *Opting out of control events:*
 - Whether they knew that they could opt out of control events;
 - How they would opt out if they wanted to;
 - Whether they thought there were penalties for opting out;
 - How likely they were to opt out in the future;
- *Satisfaction with incentive payment:*
 - Whether they had received their \$25 incentive payment yet;
 - How long it took for the incentive payment to arrive;
 - Whether \$25 was enough compensation for the Program cycling their air conditioner;
 - If \$25 was not sufficient compensation, what amount would be;
 - Their level of interest in alternative/additional Program incentives including CFLs, tree plantings, gift cards, sweepstake entries, additional payments, reward points, and charitable contributions; and
 - Whether they would prefer some of these alternative incentives to the current \$25 payment.
- *Satisfaction with Program processes and control devices:*
 - Their satisfaction level with phone/email inquiries seeking Program information;
 - (If they hadn't responded to the pre-survey) their satisfaction levels with the enrollment, scheduling, and installation processes;
 - Whether they had tried to operate their thermostat via the Program website and if so, how satisfied they were with this feature;
 - Their satisfaction with the smart thermostat;
 - Whether the switch was working; and
 - Whether they've had an air conditioner problems since joining the Program and whether they thought that these were attributable to the Program.
- *Overall program satisfaction:*
 - Their level of satisfaction with the Program as a whole;
 - Whether they planned to participate in the Program in the future; and
 - Whether they would recommend the Program to their friends, neighbors, or co-workers.

The full pre-survey and post-survey instruments appear in Appendix B.

10.2 Appendix B: Survey Instruments

This appendix contains the pre-survey and post-survey instruments.

10.2.1 Pre-Event Survey for PG&E Smart AC Program Participants

Introduction and Screener

[IF CONTACT NAME IS AVAILABLE, READ: “MAY I PLEASE SPEAK WITH <CONTACT NAME>?” AND THEN GO TO I0]

[IF CONTACT NAME IS NOT AVAILABLE, GO TO I0.]

I0.

Hello, my name is _____, and I’m calling on behalf of Pacific Gas and Electric (PG&E). Recently you agreed to participate in the PG&E SmartAC Program. This program allows PG&E to control your air conditioner when there is a critical need for electricity in the region. [IF REFUSED, SAY “DO YOU REALIZE THAT YOU MUST COMPLETE THIS SURVEY AS ONE OF THE CONDITIONS OF RECEIVING AN \$80 INCENTIVE FROM PG&E?”]

I1.

Are you aware of your participation in this program?

[Yes]..... 1

[IF RESPONDENT IS DIFFERENT THAN <CONTACT NAME> RECORD NAME AND GO TO I2, ELSE GO TO I2]

[No] 2

[READ: “THEN MAY I PLEASE SPEAK TO THE PERSON WHO WOULD BE MOST FAMILIAR WITH YOUR PARTICIPATION IN THIS PROGRAM?” IF PERSON FAMILIAR WITH SMART AC PROGRAM IS AVAILABLE, RECORD NAME AND CONTINUE SURVEY. IF FAMILIAR PERSON IS UNAVAILABLE, RECORD NAME, FIND OUT CONVENIENT TIME TO RECONTACT THEM AND THEN BEGIN SURVEY FROM TOP WITH NEW CONTACT.]

Refused-98 [ASK I2]

I2.

According to our records you also agreed to become part of a special monitoring group that will allow PG&E to measure how much energy this program is saving. PG&E will pay you \$110 for participating in this special monitoring group. Are you aware that you joined this monitoring group? [IF NEEDED, SAY: “YOU SHOULD HAVE RECENTLY RECEIVED A THANK YOU LETTER FROM PG&E’S CONTRACTOR, KEMA FOR PARTICIPATING IN THIS SPECIAL MONITORING GROUP.”]

[Yes]..... 1 [SKIP TO I3]

[No]..... 2 [GO TO I2a]

I2A.

“Then may I please speak to the person who would be most familiar with your participation in this special monitoring group? [IF PERSON FAMILIAR WITH SPECIAL MONITORING GROUP IS AVAILABLE, RECORD NAME AND CONTINUE SURVEY. IF FAMILIAR PERSON IS UNAVAILABLE, RECORD NAME, FIND OUT CONVENIENT TIME TO RECONTACT THEM, AND THEN BEGIN SURVEY FROM TOP WITH NEW CONTACT.]

I3.

Before you can receive \$80 from PG&E you must complete three surveys. This is the first of these surveys.

[IF THEY ASK WHEN OTHER SURVEYS WILL BE, READ: “THE SECOND SURVEY WILL BE DONE SOMETIME LATER IN THE SUMMER AND THE LAST SURVEY WILL BE IN THE FALL.”]

[IF THEY ASK HOW LONG THIS SURVEY WILL TAKE, READ: “IT WILL TAKE LESS THAN 15 MINUTES.”]

[IF NEEDED, SAY: “I’M CALLING FROM _____, AN INDEPENDENT RESEARCH FIRM, WHO HAS BEEN CONTRACTED TO CONDUCT THE STUDY.” IF VERIFICATION IS NEEDED, TELL THEM THEY CAN CALL THE PG&E SMART AC PROGRAM AT 1-866-908-4916].

Participation Drivers, Recall/Satisfaction with Program/Marketing Information

P1.

What, if any, PG&E programs or services have you heard of that help customers save energy? Any others? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES]

[Rebates program/rebates]	1
[Rebates for light bulbs].....	1
[Rebates for insulation].....	1
[Rebates for appliances].....	1
[Home energy audits].....	2
[Recycling used refrigerator, freezers, or room air conditioners]	3
[Energy Assistance/LIHEAP/weatherization]	4
[Renewable energy/green power]	5
[New construction program]	6
[Other] (RECORD)	7
[Don't know/Not sure/Can't remember/Not aware]	-97
[Refused].....	-98

P2.

Were you involved in the decision to join PG&E's SmartAC program?

[Yes].....	1	
[No].....	2	[SKIP TO P4]
[Don't know/Not sure/Can't remember]	-97	[SKIP TO P4]
[Refused].....	-98	[SKIP TO P4]

P3.

What was the main reason why you joined the program? [DO NOT PROMPT. ALLOW ONLY ONE RESPONSE]

[Getting a \$25 rebate/incentive from PG&E]	1
[Getting a new/better/programmable thermostat]	2
[Helping PG&E avoid power shortages/outages]	3
[Helping fight global warming/climate change]	4
[Helping the environment]	5
[Saving my energy].....	6
[Saving Stockton's energy].....	7
[Helping PG&E avoid building more power plants].....	8
[Don't use air conditioner that much]	9
[Other reasons] [SPECIFY]	10
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

P3A.

What were your other reasons for joining this program? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES]

[No other reasons].....	1
[Getting a \$25 rebate/incentive from PG&E]	2
[Getting a new/better/programmable thermostat]	3

[Helping PG&E avoid power shortages/outages]4
 [Helping fight global warming/climate change]5
 [Helping the environment]6
 [Saving my energy]7
 [Saving Stockton’s energy]8
 [Helping PG&E avoid building more power plants].....9
 [Don’t use air conditioner that much] 10
 [Other reasons] [SPECIFY] _____ 11
 [Don’t know/Not sure/Can’t remember] -97
 [Refused]..... -98

P4.

Is the SmartAC program something you would expect to be offered by a company like PG&E?

[Yes].....1
 [No].....2
 [Don’t know/Not sure/Can’t remember] -97 [SKIP TO P4B]
 [Refused]..... -98 [SKIP TO P4B]

P4A.

Why do you say that?

[RECORD RESPONSE] _____
 [Don’t know/Not sure/Can’t remember] -97
 [Refused]..... -98

P4B

From where did you *first* hear about PG&E’s SmartAC Program? [ONLY ALLOW ONE RESPONSE]

[PG&E/utility bill insert/stuffer] 1
 [PG&E/utility letter]2
 [PG&E/utility post card]3
 [PG&E/utility website]4
 [Word-of-mouth (friend/neighbor/landlord)].....5
 [Other] (RECORD) _____6
 [Don’t know/Not sure/Can’t remember] -97
 [Refused]..... -98

P5.

What are some other ways that you heard about the SmartAC Program? [ALLOW MULTIPLE RESPONSES]

[No other ways].....1
 [From a PG&E/utility bill insert/stuffer]2
 [From a PG&E/utility letter]3
 [From a PG&E/utility post card]4
 [From the PG&E/utility website]5
 [Word-of-mouth (friend/neighbor/landlord)].....6
 [Other] (RECORD) _____7
 [Don’t know/Not sure/Can’t remember] -97
 [Refused]..... -98

P6.

In the information you received from PG&E about this program, do you recall why the utility said you should join the SmartAC program?

- [Yes].....1
- [No].....2 [SKIP TO P7A]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO P7A]
- [Refused]..... -98 [SKIP TO P7A]

P7.

What were some reasons why PG&E said that you should join the SmartAC Program? [ALLOW MULTIPLE RESPONSES]

- [Getting a \$25 rebate/incentive from PG&E]1
- [Getting a new/better/programmable thermostat]2
- [Helping PG&E avoid power shortages/outages]3
- [Helping fight global warming/climate change]4
- [Helping the environment]5
- [Saving my energy].....6
- [Saving Stockton's energy].....7
- [Helping PG&E avoid building more power plants].....8
- [Other reasons] (RECORD) _____9
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

P7A.

Was anything unclear to you about how the program would work?

- [Yes].....1
- [No].....2 [SKIP TO P8]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO P8]
- [Refused]..... -98 [SKIP TO P8]

P7B.

What was unclear to you?

- [RECORD RESPONSE] _____
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

P8.

PG&E sent you information on how the program works. Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with this information in helping you to understand how the program works?

- Very Dissatisfied.....1
- 22
- 33
- 44 [SKIP TO P9]
- Very Satisfied.....5 [SKIP TO P9]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO P9]
- [Refused]..... -98 [SKIP TO P9]

P8A.

What information about how the program works was missing from the SmartAC program materials?

- [RECORD RESPONSE] _____ 1?
- [None]2
- [Don't know/Not sure/Can't remember] -97 [SKIP TO P9]
- [Refused] -98 [SKIP TO P9]

P9.

Did you ever call or email PG&E to find out more about the SmartAC Program?

- [Yes]1
- [No]2 [SKIP TO P11A]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO P11A]
- [Refused] -98 [SKIP TO P11A]

P10.

Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with how the PG&E representative responded to your questions?

- Very Dissatisfied1
- 22
- 33
- 44 [SKIP TO P11A]
- Very Satisfied5 [SKIP TO P11A]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO P11A]
- [Refused] -98 [SKIP TO P11A]

P10A.

Why were you less than satisfied with the PG&E representative you talked to? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES]

- [Didn't respond to my questions/ concerns]1
- [Unable to answer/address my questions/concerns]2
- [Not professional/courteous]3
- [Other] (RECORD) _____ 4
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

P11A. [IF <DEVICE> = PROGRAMMABLE THERMOSTAT, ELSE SKIP TO P12]

Did the program provide you with instructions on how to operate your programmable thermostat

- [Yes]1
- [No]2 [SKIP TO P12]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO P12]
- [Refused] -98 [SKIP TO P12]

P11B.

Have you read these instructions?

- [Yes]1
- [No]2 [SKIP TO P11D]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO P11D]
- [Refused] -98 [SKIP TO P11D]

P11C.

After reading these instructions, would you say it very easy, somewhat easy, somewhat difficult, or very difficult to operate your programmable thermostat?

[Very easy].....	1
[Somewhat easy].....	2
[Somewhat difficult]	3
[Very difficult].....	4
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

P11D.

Have you used the SmartAC Program website to operate your programmable thermostat?

[Yes].....	1	
[No].....	2	[SKIP TO P12]
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO P12]
[Refused].....	-98	[SKIP TO P12]

P11E.

Would you say it very easy, somewhat easy, somewhat difficult, or very difficult to operate your programmable thermostat using the SmartAC Program website

[Very easy].....	1
[Somewhat easy].....	2
[Somewhat difficult]	3
[Very difficult].....	4
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

P12.

If PG&E wanted to give you more information about the SmartAC Program, or any of their programs, what would be the best way to do this? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES.]

[Utility bill insert/stuffer].....	1
[Direct mail piece from the utility]	2
[PG&E website]	3
[Email]	4
[Newspaper article/ ad]	5
[Radio ad]	6
[TV ad].....	7
[A dealer/retailer].....	8
[Word-of-mouth (friend/neighbor/landlord)].....	9
[I'm not interested in such information]	10
[Other] (RECORD).....	11
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

Cycling Experience, Expectations

C1.

About how many days do you think PG&E will cycle your air conditioner during the summer of 2007?

- [RECORD AMOUNT]..... 1
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C1A.

When cycling events happen, they usually occur on summertime weekdays during the afternoon. Is someone usually home on weekday afternoons during the summertime?

- [Yes]..... 1
- [No]..... 2
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C2.

When PG&E cycles your air conditioner in the future, do you expect to be very uncomfortable, somewhat uncomfortable, fairly comfortable, or very comfortable?

- [Very uncomfortable]..... 1
- [Somewhat uncomfortable]..... 2
- [Fairly comfortable] 3
- [Very comfortable]..... 4
- [It depends on how often they cycle] 5
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C3.

Do you think PG&E has cycled your air conditioner since you joined the program?

- [Yes]..... 1
- [No]..... 2 [SKIP TO NEXT SECTION]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO NEXT SECTION]
- [Refused]..... -98 [SKIP TO NEXT SECTION]

C4.

What month did PG&E cycle your air conditioner?

- [March] 3
- [April] 4
- [May] 5
- [June] 6
- [July] 7
- [Other Month][SPECIFY] 8
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C5.

When PG&E was cycling your air conditioner, do you or any other members of your household typically turn on any fans to keep cool?

[Yes].....	1
[No].....	2
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

C6.

When PG&E was cycling your air conditioner, do you or any other members of your household typically turn on any room air conditioners to keep cool?

[Yes].....	1
[No].....	2
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

C7.

At times when you have noticed that PG&E has been cycling your air conditioner, have you and members of your household been comfortable?

[Yes].....	1
[No].....	2
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

Satisfaction with the Incentive Payment

IN1.

Before now, were you aware that PG&E is going to Thank You with a \$25 check for participating in the SmartAC Program and then another \$110 if you fully participate in the special monitoring program?

- [Yes]..... 1
- [No]..... 2
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

IN2.

Have you received your \$25 Thank You payment from PG&E yet?

- [Yes]..... 1
- [No]..... 2 [SKIP TO IN4]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO IN4]
- [Refused]..... -98 [SKIP TO IN4]

IN3.

About how many weeks after you enrolled in the program did you get your \$25 Thank You Check?

- [RECORD # OF WEEKS]
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

IN4.

Let's suppose that you were not participating in the special monitoring program and were only receiving the \$25 Thank You Check for participating in the SmartAC Program. In this case, would this \$25 be enough compensation for PG&E cycling your air conditioner over the summer of 2007?

- [Yes]..... 1 [SKIP TO IN6]
- [No]..... 2
- [Don't know/Not sure/Can't remember] -97 [SKIP TO NEXT SECTION]
- [Refused]..... -98 [SKIP TO NEXT SECTION]

IN5.

What would be an adequate level of compensation for PG&E cycling your air conditioner over the summer of 2007?

- [RECORD AMOUNT IN DOLLARS]..... 1
-[SKIP TO NEXT SECTION]
- It depends on how much they cycle my air conditioner..... 2
-[SKIP TO NEXT SECTION]
- [Don't know/Not sure/Can't remember] -97
-[SKIP TO NEXT SECTION]
- [Refused]..... -98
-[SKIP TO NEXT SECTION]

IN6.

You said that if you were not participating in the special monitoring program and were only participating in the PG&E Smart AC program that \$25 would be enough compensation for PG&E cycling your air conditioner over the summer of 2007. But suppose PG&E cycles your air conditioner many times over the

course of the summer? How many times could PG&E cycle your air conditioner before you would think that \$25 would not be enough compensation?

[RECORD # OF CYCLING EVENTS].....	1
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

Satisfaction with Enrollment and Installation, Reasons for Choosing Devices

You're enrolled in both the PG&E SmartAC program and a special monitoring group. I'm going to ask you about your experience enrolling in the SmartAC program, which would have happened first.

S1.

When you were enrolling in the SmartAC program, you had to choose between having your air conditioner controlled by either a programmable thermostat or by a switch. Which one did you choose?

[Programmable thermostat]	1	
[Switch].....	2	
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO S3]
[Refused].....	-98	[SKIP TO S3]

S2.

Why did you choose the [THERMOSTAT/SWITCH] instead of the [THERMOSTAT/SWITCH]? [ALLOW MULTIPLE RESPONSES]

[Needed a new/better/programmable thermostat].....	1
[Didn't want them to change my thermostat]	2
[Didn't have to be home when they installed it].....	3
[Seemed like less of a hassle]	4
[Worried it might hurt the performance of my air conditioner].....	5
[Other reasons] [RECORD RESPONSE[S]	6
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

S3.

There are three ways to join the PG&E SmartAC program: calling a toll-free number, filling out a sign-up card, or enrolling on the Internet. Which of these did you try using to join the program? [ALLOW MULTIPLE RESPONSES]

[Called toll-free number]	1	
[Mailed sign-up card].....	2	
[Enrolled on Internet].....	3	
[Other] [PLEASE SPECIFY] _____.....	4	
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO S5]
[Refused].....	-98	[SKIP TO S5]

S4.

Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with the process of enrolling in the program [BY TELEPHONE/BY MAIL-IN CARD/ BY INTERNET] ? [NOTE: REPEAT QUESTION IF RESPONDENT GIVES MULTIPLE RESPONSES OF 1, 2, 3, OR 4 TO QUESTION S3.]

Very Dissatisfied.....	1	
2	2	
3	3	
4	4	[SKIP TO S5]
Very Satisfied.....	5	[SKIP TO S5]
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO S5]

[Refused]..... -98 [SKIP TO S5]

S4A.

Why were you dissatisfied with this enrollment process?

[RECORD RESPONSE] _____

[Don't know/Not sure/Can't remember]..... -97

[Refused]..... -98

S5.

Soon after you decided to join the program, a contractor working for PG&E would have come to your house to install your [PROGRAMMABLE THERMOSTAT/SWITCH]. Do you recall a contractor doing this?

[Yes]..... 1

[No]..... 2 [SKIP TO NEXT SECTION]

[Don't know/Not sure/Can't remember]..... -97 [SKIP TO NEXT SECTION]

[Refused]..... -98 [SKIP TO NEXT SECTION]

S6.

Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with the whole process of scheduling and installing your [PROGRAMMABLE THERMOSTAT/SWITCH]?

Very Dissatisfied..... 1

2 2

3 3

4 4 [SKIP TO NEXT SECTION]

Very Satisfied..... 5 [SKIP TO NEXT SECTION]

[Don't know/Not sure/Can't remember]..... -97 [SKIP TO NEXT SECTION]

[Refused]..... -98 [SKIP TO NEXT SECTION]

S7A.

Why were you less than satisfied with this scheduling and installation process? [ALLOW MULTIPLE RESPONSES]

[Installer was not professional/ courteous] 1

[Installer was messy/disruptive]..... 2

[People handling scheduling were not professional/ courteous]..... 3

[Couldn't schedule installation at convenient *time*]..... 4

[Couldn't schedule installation on convenient *day*]..... 5

[Difficulty *rescheduling* the installation]..... 6

[Had problems with programmable thermostat] 7

[Had problems with switch]..... 8

[Had problems with air conditioner since device was installed]..... 9

[Other] (RECORD) _____ 10

[Don't know/Not sure/Can't remember]..... -97

[Refused]..... -98

Satisfaction With Control Device

CD1. [IF AC CONTROL DEVICE WAS THERMOSTAT ELSE SKIP TO CD2]

Using a scale of 1 to 5 where 5 indicates “Very Satisfied” and 1 indicates “Very Dissatisfied”, how satisfied are you with the performance of your new programmable thermostat?

- Very Dissatisfied..... 1
- 2 2
- 3 3
- 4 4 [SKIP TO CD3]
- Very Satisfied..... 5 [SKIP TO CD3]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO CD3]
- [Refused]..... -98 [SKIP TO CD3]

CD1A.

Why are you less than satisfied with the performance of your new programmable thermostat?

[ALLOW MULTIPLE RESPONSES]

- [It broke down/ malfunctioned] 1
- [It did not save energy] 2
- [The quality of the equipment was not up to our standards] 3
- [The quality of the installation was not up to our standards] 4
- [It was too complicated/difficult to program] 5
- [Other] [SPECIFY] _____ 6
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

CD2. [IF AC CONTROL DEVICE WAS SWITCH ELSE SKIP TO CD3]

Is the SmartAC device attached to your air conditioner working?

- [Yes]..... 1
- [No]..... 2
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

CD2A.

Why do you think that the switch that the SmartAC device attached to your air conditioner is not working? [DO NOT PROMPT. ACCEPT MULTIPLE RESPONSES.]

- [My air conditioner is not working]..... 1
- [My air conditioner was not cycling on/off] 2
- [My air conditioning contractor told me that the switch was not working] 3
- [My air conditioning contractor disconnected the control switch] 4
- [Other] (RECORD) _____ 5
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

CD3.

Have you had any mechanical problems with your air conditioner since you have been involved with the SmartAC Program?

- [Yes]..... 1
- [No]..... 2 [SKIP TO NEXT SECTION]

[Don't know/Not sure/Can't remember] -97 [SKIP TO NEXT SECTION]
[Refused] -98 [SKIP TO NEXT SECTION]

CD4.

Do you think these mechanical problems might have been related to your participation in the SmartAC Program?

[Yes] 1
[No] 2
[Don't know/Not sure/Can't remember] -97
[Refused] -98

CD5.

Have you called anyone to try to resolve these problems?

[Yes] 1
[No] 2 [SKIP TO NEXT SECTION]
[Don't know/Not sure/Can't remember] -97 [SKIP TO NEXT SECTION]
[Refused] -98 [SKIP TO NEXT SECTION]

CD6.

Who did you call? [DO NOT PROMPT. ACCEPT MULTIPLE RESPONSES.]

[Air conditioning contractor] 1
[Utility] 2
[Electrician] 3
[Other] (RECORD) _____ 4
[Don't know/Not sure/Can't remember] -97
[Refused] -98

Air Conditioning Practices

AC1.

How often do you use your central air conditioner? Would you say you use it ... [READ EACH UNBRACKETED OPTION UNTIL RESPONDENT CHOOSES ONE]

Not at all.....	1
Only on the hottest days.....	2
Frequently during the cooling season	3
Most days during the cooling season	4
Everyday during the cooling season	5
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

AC2.

Is the air conditioner typically used to keep someone at home comfortable on weekday afternoons before 5 P.M.?

[Yes].....	1 [SKIP TO D3]
[No].....	2
[Don't know/ Not sure/Can't remember]	-97 [SKIP TO D3]
[Refused].....	-98 [SKIP TO D3]

AC3.

Is the air conditioner typically used to keep someone at home comfortable on weekdays before 7 P.M.?

[Yes].....	1
[No].....	2
[Don't know/ Not sure/Can't remember]	-97
[Refused].....	-98

AC4.

Before now, did you realize that PG&E has already cycled your air conditioner this summer?

[Yes].....	1
[No].....	2
[Don't know/ Not sure/Can't remember]	-97
[Refused].....	-98

Section D – Demographics – FOR HOUSEHOLDS ONLY

Now I would like to ask you a few questions about your household.

D3.

Do you own or rent your home?

Own.....	1
Rent.....	2
Other	3
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

D4.

For how many years have you lived at this address? [Record number of years, put 0 if less than one year.]

_____ # of years at this address	
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

D5.

Which of the following best describes the type of home you live in? [READ LIST]

Single family, detached (e.g., freestanding house)	1
Single family attached such as town house or row house.....	2
Apartment in multi-unit structure of 2–4 units	3
Apartment in multi-unit structure of 5 or more units.....	4
Mobile home	5
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

D7.

Approximately what year was your home built?

1995 or later.....	1
1990 to 1994	2
1980 to 1989	3
1978 to 1979	4
1970 to 1977	5
1960 to 1969	6
1950 to 1959	7
Before 1950.....	8
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

D10.

Including yourself and children, how many people live in your home at least six months of the year?

[Record number people living in home]	_____
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

D10A.

How many people in your household are over 65 years of age?

- [Record number of people over 65] _____
 - [Don't know/Not sure/Can't remember] -97
 - [Refused] -98
- [IF D10=D10A, SKIP TO D15]

D11.

How many people in your household are 18 to 65 years of age?

- [Record number of people 18 to 65 years old] _____
 - [Don't know/Not sure/Can't remember] -97
 - [Refused] -98
- [IF D10=D10A + D11, SKIP TO D15]

D12.

How many in your household are 5 to 17 years of age?

- [Record number of people between 5 and 17] _____
 - [Don't know/Not sure/Can't remember] -97
 - [Refused] -98
- [IF D10=D10A + D11+D12, SKIP TO D15]

D13.

How many people in your household are under 5 years of age?

- [Record number of people under 5] _____
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

[CHECK THAT D10A THROUGH D13=D10. IF NOT REPEAT D10A THROUGH D13]

D15.

What is *your* age?

- [Record age of respondent] _____
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

D16.

Which of the following is the highest level of education you completed?

- 8th grade 1
- High school 2
- Associates degree, vocational or technical school, or some college 3
- Four year college degree 4
- Graduate or professional degree 5
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

D17.

Next, I'd like to know your household's total 2004 annual income before taxes. Please stop me when I reach the category that best describes your household's income. [IF NECESSARY, SAY: THIS INFORMATION IS CONFIDENTIAL AND WILL ONLY BE USED FOR CHARACTERIZING RESPONDENTS TO THIS STUDY.]"

Less than \$15,000	1
\$15,000 to less than \$20,000.....	2
\$20,000 to less than \$30,000.....	3
\$30,000 to less than \$40,000.....	4
\$40,000 to less than \$50,000.....	5
\$50,000 to less than \$75,000.....	6
\$75,000 to less than \$100,000.....	7
\$100,000 to less than \$125,000.....	8
\$125,000 to less than \$175,000.....	9
\$175,000 or more	10
[Don't know/Not sure]	-97
[Refused].....	-98

D18.

[RECORD GENDER OF RESPONDENT]

[Male].....	1
[Female]	2
[Missing]	3

D19.

[RECORD NAME OF RESPONDENT]

[THANK RESPONDENT AND TERMINATE SURVEY]

10.2.2 Post-Event Survey for PG&E Smart AC Program Participants

Introduction and Screener

[TRY TO REACH <SURVEYED CONTACT>. IF <SURVEYED CONTACT> IS AVAILABLE, READ: “MAY I PLEASE SPEAK WITH < SURVEYED CONTACT>?” AND THEN GO TO I0]

[IF <SURVEYED CONTACT> IS NOT AVAILABLE, GO TO I0]

I0.

Hello, my name is _____, and I’m calling on behalf of Pacific Gas and Electric (PG&E). Over the past few months you have been participating in the PG&E SmartAC Program. This program allows PG&E to control your air conditioner when there is a critical need for electricity in the region. [IF REFUSED, SAY “DO YOU REALIZE THAT YOU MUST COMPLETE THIS SURVEY AS ONE OF THE CONDITIONS OF RECEIVING A STUDY PARTICIPATION INCENTIVE FROM PG&E?”]

I1.

Are you aware of your participation in this program?

[Yes]..... 1

[IF RESPONDENT IS DIFFERENT THAN <SURVEYED CONTACT> RECORD NAME AND GO TO I2, ELSE GO TO I2]

[No] 2

[READ: “THEN MAY I PLEASE SPEAK TO THE PERSON WHO WOULD BE MOST FAMILIAR WITH YOUR PARTICIPATION IN THIS PROGRAM?” IF PERSON FAMILIAR WITH SMART AC PROGRAM IS AVAILABLE, RECORD NAME AND CONTINUE SURVEY. IF FAMILIAR PERSON IS UNAVAILABLE, RECORD NAME, FIND OUT CONVENIENT TIME TO RECONTACT THEM AND THEN BEGIN SURVEY FROM TOP WITH NEW CONTACT.]

Refused-98 [ASK I2]

I2.

According to our records you also agreed to become part of a special monitoring group that will allow PG&E to measure how much energy this program is saving. PG&E will pay you financial incentive for participating in this special monitoring group. Are you aware that you joined this monitoring group?

[Yes]..... 1 [SKIP TO I3]

[No]..... 2 [GO TO I2a]

I2A.

“Then may I please speak to the person who would be most familiar with your participation in this special monitoring group? [IF PERSON FAMILIAR WITH SPECIAL MONITORING GROUP IS AVAILABLE, RECORD NAME AND CONTINUE SURVEY. IF FAMILIAR PERSON IS UNAVAILABLE, RECORD NAME, FIND OUT CONVENIENT TIME TO RECONTACT THEM, AND THEN BEGIN SURVEY FROM TOP WITH NEW CONTACT]

I3.

This is the last of the surveys that you need to complete this year in order to receive your financial incentive from PG&E.

[IF THEY ASK HOW LONG THIS SURVEY WILL TAKE, READ: “IT WILL TAKE LESS THAN 15 MINUTES”]

[IF NEEDED, SAY: “I’M CALLING FROM _____, AN INDEPENDENT RESEARCH FIRM, WHO HAS BEEN CONTRACTED TO CONDUCT THE STUDY.” IF VERIFICATION IS NEEDED, TELL THEM THEY CAN CALL THE PG&E SMART AC PROGRAM AT 1-866-908-4916.]

Participation Drivers, Recall/Satisfaction with Program/Marketing Information

P9.

In the past few months have you ever called or emailed PG&E to find out more about the SmartAC Program?

- [Yes].....1
- [No].....2 [SKIP TO P11D]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO P11D]
- [Refused]..... -98 [SKIP TO P11D]

P10.

Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with how the PG&E representative responded to your questions?

- Very Dissatisfied.....1
- 22
- 33
- 44 [SKIP TO P11D]
- Very Satisfied.....5 [SKIP TO P11D]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO P11D]
- [Refused]..... -98 [SKIP TO P11D]

P10A.

Why were you less than satisfied with the PG&E representative you talked to? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES]

- [Didn't respond to my questions/ concerns]1
- [Unable to answer/address my questions/concerns]2
- [Not professional/courteous].....3
- [Other] (RECORD)4
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

P11D. [IF DEVICE = "Programmable thermostat" ELSE SKIP TO NEXT SECTION]

Have you used the SmartAC Program website to operate your programmable thermostat?

- [Yes].....1
- [No].....2 [SKIP TO NEXT SECTION]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO NEXT SECTION]
- [Refused]..... -98 [SKIP TO NEXT SECTION]

P11E.

Would you say it very easy, somewhat easy, somewhat difficult, or very difficult to operate your programmable thermostat using the SmartAC Program website

- [Very easy].....1
- [Somewhat easy].....2
- [Somewhat difficult]3
- [Very difficult]4
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

Cycling Experience, Expectations

[NOTE: IF DEVICE = “Air Conditioner Switch” THEN <CONTROL ACTION> = “activated your air conditioner control switch”]

[NOTE: IF DEVICE = “Programmable thermostat” THEN <CONTROL ACTION> = “remotely raised your thermostat settings”]

[NOTE: IF DEVICE = “Air Conditioner Switch” THEN <CONTROL ACTION2> = “activate your air conditioner control switch”]

[NOTE: IF DEVICE = “Programmable thermostat” THEN <CONTROL ACTION2> = “remotely raise your thermostat settings”]

C1.

Has PG&E <CONTROL ACTION> since you joined the program? [IF THEY ASK “What does activate my air conditioner control switch mean?” SAY: “PG&E has the ability to activate a switch on your air conditioner that will reduce how long it runs.”]

- [Yes].....1
- [No].....2 [SKIP TO C3D]
- [Don’t know/Not sure/Can’t remember] -97 [SKIP TO C3D]
- [Refused]..... -98 [SKIP TO C3D]

C1B.

About how many times has PG&E <CONTROL ACTION> since you joined the program?

[RECORD QUANTITY]

- [Don’t know/Not sure/Can’t remember] -97
- [Refused]..... -98

C1C.

What month was the last time you recall that PG&E <CONTROL ACTION>?

- [March]3
- [April]4
- [May]5
- [June]6
- [July]7
- [August]8
- [September].....9
- [October]10
- [November]11
- [Other Month][SPECIFY]12
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C1D.

Now I would like to ask you about your comfort level when PG&E <CONTROL ACTION>. When PG&E did this, were you very uncomfortable, somewhat uncomfortable, fairly comfortable, or very comfortable? [ONLY ALLOW ONE RESPONSE]

- [Very uncomfortable].....1
- [Somewhat uncomfortable].....2
- [Fairly comfortable]3
- [Very comfortable].....4
- [It depends on what day they activated my SmartAC control]5
- [It depends on what time of day they activated my SmartAC control].6
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C2.

When PG&E <CONTROL ACTION>, did you or any other members of your household turn on any fans to keep cool?

- [Yes].....1
- [No].....2
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C3.

What else did you or other members of your household do to keep cool? [ALLOW MULTIPLE RESPONSES]

- [Continued normal activities/ Didn't do anything different]1
- [Lowered the thermostat settings].....2
- [Turned on fans].....3
- [Turned on room/window air conditioners]4
- [Cooled the house ahead of time]5
- [Closed blinds/shades]6
- [Moved to a cooler part of the house]7
- [Left the house and went somewhere cool]8
- [Wore less clothing].....9
- [Drank more water/cool drinks].....10
- [Other] (RECORD)11
- Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C3A.

[IF DEVICE = "Programmable thermostat" and C1 =1 ELSE SKIP TO C3D]

When you thought that PG&E was remotely raising your thermostat settings, did you ever try to lower your thermostat settings in response?

- [Yes].....1
- [No].....2 [SKIP TO C3D]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO C3D]
- [Refused]..... -98 [SKIP TO C3D]

C3B.

What happened when you tried to do that? [ALLOW MULTIPLE RESPONSES]

- [I wasn't able to change the thermostat settings] 1
- [The thermostat had a message saying "LMT"] 2
- [Other] [RECORD RESPONSE] _____ 3
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

C3D.

For your information PG&E <CONTROL ACTION> 15 times this year.

C4. [IF <SURVEYED> = 1 AND <PRE-CYCLE> = 1 AND C1 = 1 ELSE SKIP TO C5]

When we first surveyed you, PG&E had not <CONTROL ACTION>. Now that it has <CONTROL ACTION> 15 times, have the experiences been worse than you expected, better than you expected, or about what you expected?

- [Worst than I expected] 1
- [Better than I expected] 2
- [About what I expected] 3
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

C5.

Do you have some idea as to why PG&E <CONTROL ACTION>?

- [Yes] 1
- [No] 2 [SKIP TO C7]
- [Don't know/Not sure/Can't remember] -97 [SKIP TO C7]
- [Refused] -98 [SKIP TO C7]

C6.

Why do you think that PG&E would do this?

- [To help PG&E avoid power shortages/outages] 1
- [To help fight global warming/climate change] 2
- [To help the environment] 3
- [To help save my energy] 4
- [To help save Stockton's energy] 5
- [To help PG&E avoid building more power plants] 6
- [Other reasons] [SPECIFY] _____ 7
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

C6B.

Do you think that when PG&E <CONTROL ACTION> it reduced your monthly energy bill?

- [Yes] 1
- [No] 2
- [Don't know/Not sure/Can't remember] -97
- [Refused] -98

C7.

Before now, were you aware that you can ask PG&E not to <CONTROL ACTION2> before an upcoming control event?

- [Yes].....1
- [No].....2
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

C8.

If you wanted to tell PG&E not to <CONTROL ACTION2> during an upcoming cycling event, how would you do this? [ALLOW MULTIPLE RESPONSES]

- [Log on to SmartAC website]1
- [Call PG&E/Smart AC Program].....2
- [Email PG&E/Smart AC Program].....3
- [Other] [RECORD].....4
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C9.

In the future, how likely are you to tell PG&E not to <CONTROL ACTION2> during an upcoming cycling event? Would you say it was very likely, somewhat likely, somewhat unlikely, or very unlikely? [ONLY ACCEPT 5 OR 6 AS MULTIPLES]

- [Very likely].....1
- [Somewhat likely].....2
- [Somewhat unlikely].....3
- [Very unlikely].....4 [SKIP TO C11]
- [It depends on what day they activate my SmartAC control]5
- [It depends on what time of day they activate my SmartAC control]...6
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C10.

What are some reasons why you might tell PG&E not to <CONTROL ACTION2> during an upcoming cycling event? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES.]

- [Party/family event]1
- [Occupant/visitor with heat sensitivity/health problems]2
- [Long heat wave]3
- [Air conditioner having problems].....4
- [Other] [RECORD] _____5
- [Don't know/Not sure/Can't remember] -97
- [Refused]..... -98

C11.

Do you think there are any penalties if you tell PG&E not to <CONTROL ACTION2> during an upcoming control event?

- [Yes].....1
- [No].....2 [SKIP TO IN2]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO IN2]
- [Refused]..... -98 [SKIP TO IN2]

C12.

What do you think these penalties are?

[Lose all your financial incentive]	1
[Lose part of your financial incentive].....	2
[Removed from the program]	3
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

Incentives

IN2.

New participants in the SmartAC program receive a \$25 thank you payment from PG&E. Have you received your \$25 Thank You payment yet?

- [Yes]..... 1
- [No]..... 2 [SKIP TO IN4]
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO IN4]
- [Refused]..... -98 [SKIP TO IN4]

IN3.

About how many weeks after you enrolled in the program did you get your \$25 Thank You Check?

- [RECORD # OF WEEKS]
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

IN4.

Let's suppose that you were not participating in the special monitoring program and were only receiving the \$25 Thank You Check for participating in the SmartAC Program. In this case, would this \$25 be enough compensation for PG&E cycling your air conditioner over the summer of 2007?

- [Yes]..... 1 [SKIP TO IN6]
- [No]..... 2
- [Don't know/Not sure/Can't remember]..... -97 [SKIP TO IN6]
- [Refused]..... -98 [SKIP TO IN6]

IN5.

What would be an adequate level of compensation for PG&E cycling your air conditioner over the summer of 2007?

- [RECORD AMOUNT IN DOLLARS]_____ 1
- [SKIP TO IN6]
- It depends on how much they cycle my air conditioner..... 2
- [SKIP TO IN6]
- [Don't know/Not sure/Can't remember]..... -97
- [SKIP TO IN6]
- [Refused]..... -98
- [SKIP TO IN6]

IN6.

If PG&E were to send you an additional thank-you reward for staying with the program through next year's cooling season, which of the following rewards would you be most interested in? For each possible reward that I mention, please state your level of interest using a scale of one to five where five equals "Very interested" and one equals "Not interested at all." [RANDOMLY ROTATE OPTIONS]

- A. A coupon for six free compact fluorescent light bulbs? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

- B. How interested would you be in a tree planted in your name? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98
- C. How interested would you be in a \$25 gift card? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98
- D. How interested would you be in an entry into a sweepstakes where the prize would be energy-efficient appliances? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98
- E. How interested would you be in an additional \$25 thank you payment? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98
- F. How interested would you be in reward points that would be redeemable for prizes of at least \$25 value? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98
- G. How interested would you be in a donation to your favorite charity of at least \$25 value? [RECORD INTEREST RATING. REMIND RESPONDENT OF SCALE, IF NECESSARY.] _____
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98

IN7.

When you joined this program, PG&E gave you a \$25 thank you payment. But PG&E is considering other incentives to give new participants in the program and it would like your opinion on which incentives will work best to recruit new participants. If you were joining the program for the first time would you ... [REPEAT "If you were joining for the first time would you ...?" EACH TIME]

- A. Prefer to receive \$25 or a coupon for six compact fluorescent lamps?
1. [\$25]
 2. [Six compact fluorescent lamps.]
 3. [Don't know/Not sure/Can't remember] -97
 4. [Refused] -98
- B. Prefer to receive \$25 or a coupon for a case of soft drinks?
1. [\$25]
 2. [Coupon for a case of soft drinks.]
 3. [Don't know/Not sure/Can't remember] -97
 4. [Refused] -98
- C. Prefer to receive \$25 or a tree planted in your name?
1. [\$25]
 2. [Planting a tree in their name.]
 3. [Don't know/Not sure/Can't remember] -97
 4. [Refused] -98

-
- D. Prefer to receive \$25 or a donation to your favorite charity of at least \$25 value?
1. [\$25]
 2. [Charitable donation.]
 3. [Don't know/Not sure/Can't remember] -97
 4. [Refused] -98

Program Satisfaction with Enrollment and Installation, Reasons for Choosing Devices, Program in General

S1. [IF <SURVEYED> = 1, SKIP TO S8] You’re enrolled in both the PG&E SmartAC program and a special monitoring group. I’m going to ask you about your experience enrolling in the SmartAC program, which would have happened first. When you were enrolling in the SmartAC program, you had to choose between having your air conditioner controlled by either a programmable thermostat or by a switch. Which one did you choose?

- [Programmable thermostat] 1
- [Switch]..... 2
- [Don’t know/Not sure/Can’t remember]..... -97 [SKIP TO S3]
- [Refused]..... -98 [SKIP TO S3]

S2.

Why did you choose the [THERMOSTAT/SWITCH] instead of the [THERMOSTAT/SWITCH]? [ALLOW MULTIPLE RESPONSES]

- [Needed a new/better/programmable thermostat]..... 1
- [Didn’t want them to change my thermostat] 2
- [Didn’t have to be home when they installed it] 3
- [Seemed like less of a hassle] 4
- [Worried it might hurt the performance of my air conditioner]..... 5
- [Other reasons] [RECORD RESPONSE[S]] 6
- [Don’t know/Not sure/Can’t remember]..... -97
- [Refused]..... -98

S3.

There are three ways to join the PG&E SmartAC program: calling a toll-free number, filling out a sign-up card, or enrolling on the Internet. Which of these did you try using to join the program? [ALLOW MULTIPLE RESPONSES]

- [Called toll-free number] 1
- [Mailed sign-up card]..... 2
- [Enrolled on Internet]..... 3
- [Other] [PLEASE SPECIFY] _____..... 4
- [Don’t know/Not sure/Can’t remember]..... -97 [SKIP TO S5]
- [Refused]..... -98 [SKIP TO S5]

S4.

Using a scale of 1 to 5 where 5 indicates “Very Satisfied” and 1 indicates “Very Dissatisfied”, how satisfied were you with the process of enrolling in the program [BY TELEPHONE/BY MAIL-IN CARD/ BY INTERNET] ? [NOTE: REPEAT QUESTION IF RESPONDENT GIVES MULTIPLE RESPONSES OF 1, 2, 3, OR 4 TO QUESTION S3.]

- Very Dissatisfied..... 1
- 2 2
- 3 3
- 4 4 [SKIP TO S5]
- Very Satisfied..... 5 [SKIP TO S5]
- [Don’t know/Not sure/Can’t remember]..... -97 [SKIP TO S5]

[Refused]..... -98 [SKIP TO S5]

S4A.

Why were you dissatisfied with this enrollment process?

[RECORD RESPONSE] _____

[Don't know/Not sure/Can't remember]..... -97

[Refused]..... -98

S5.

Soon after you decided to join the program, a contractor working for PG&E would have come to your house to install your [PROGRAMMABLE THERMOSTAT/SWITCH]. Do you recall a contractor doing this?

[Yes]..... 1

[No]..... 2 [SKIP TO S8]

[Don't know/Not sure/Can't remember]..... -97 [SKIP TO S8]

[Refused]..... -98 [SKIP TO S8]

S6.

Using a scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied", how satisfied were you with the whole process of scheduling and installing your [PROGRAMMABLE THERMOSTAT/SWITCH]?

Very Dissatisfied..... 1

2 2

3 3

4 4 [SKIP TO S8]

Very Satisfied..... 5 [SKIP TO S8]

[Don't know/Not sure/Can't remember]..... -97 [SKIP TO S8]

[Refused]..... -98 [SKIP TO S8]

S7A.

Why were you less than satisfied with this scheduling and installation process? [ALLOW MULTIPLE RESPONSES]

[Installer was not professional/ courteous] 1

[Installer was messy/disruptive]..... 2

[People handling scheduling were not professional/ courteous]..... 3

[Couldn't schedule installation at convenient *time*]..... 4

[Couldn't schedule installation on convenient *day*]..... 5

[Difficulty *rescheduling* the installation]..... 6

[Had problems with programmable thermostat] 7

[Had problems with switch]..... 8

[Had problems with air conditioner since device was installed]..... 9

[Other] (RECORD) _____ 10

[Don't know/Not sure/Can't remember]..... -97

[Refused]..... -98

S8.

Now that you've been participating in the SmartAC program for a few months, how satisfied have you been with the program in general? Please use a satisfaction scale of 1 to 5 where 5 indicates "Very Satisfied" and 1 indicates "Very Dissatisfied".

Very Dissatisfied.....	1	
2	2	
3	3	
4	4	[SKIP TO S10]
Very Satisfied.....	5	[SKIP TO S10]
[Don't know/Not sure/Can't remember]	-97	[SKIP TO S10]
[Refused].....	-98	[SKIP TO S10]

S9.

Why were you less than satisfied with the PG&E program? [DO NOT PROMPT. ALLOW MULTIPLE RESPONSES]

[They remotely re-set my thermostat/cycled my air conditioner more often than I liked]	1	
[The payments/incentives were not large enough].....	2	
[I don't like the thermostat they gave me]	3	
[Other reasons] [RECORD].....	4	
[Don't know/Not sure/Can't remember]	-97	
[Refused].....	-98	

S10.

Will you participate in the program next summer?

[Yes].....	1	[SKIP TO S11]
[No].....	2	
[Don't know/Not sure/Can't remember]	-97	[SKIP TO S11]
[Refused].....	-98	[SKIP TO S11]

S10A.

Why won't you participate in the program next summer?

[RECORD RESPONSE] _____	
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

S11.

Would you recommend this program to a friend, neighbor, or co-worker?

[Yes].....	1	[SKIP TO NEXT SECTION]
[No].....	2	
[Don't know/Not sure/Can't remember]	-97	[SKIP TO NEXT SECTION]
[Refused].....	-98	[SKIP TO NEXT SECTION]

S11A.

Why wouldn't you recommend the program to a friend, neighbor, or co-worker?

[RECORD RESPONSE] _____	
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

Satisfaction With Control Device

CD1. [IF DEVICE = “Programmable thermostat” ELSE SKIP TO CD2]

Using a scale of 1 to 5 where 5 indicates “Very Satisfied” and 1 indicates “Very Dissatisfied”, how satisfied are you with the performance of your new programmable thermostat?

Very Dissatisfied.....	1	
2	2	
3	3	
4	4	[SKIP TO CD3]
Very Satisfied.....	5	[SKIP TO CD3]
[Don't know/Not sure/Can't remember]	-97	[SKIP TO CD3]
[Refused].....	-98	[SKIP TO CD3]

CD1A.

Why are you less than satisfied with the performance of your new programmable thermostat?

[ALLOW MULTIPLE RESPONSES]

[It broke down/ malfunctioned]	1
[It did not save energy]	2
[The quality of the equipment was not up to our standards]	3
[The quality of the installation was not up to our standards]	4
[It was too complicated/difficult to program]	5
[Other] [SPECIFY] _____	6
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

CD2. [IF DEVICE = “Air Conditioner Switch” ELSE SKIP TO CD3]

Is the SmartAC device attached to your air conditioner working?

[Yes].....	1
[No].....	2
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

CD2A.

Why do you think that the switch that the SmartAC device attached to your air conditioner is not working? [DO NOT PROMPT. ACCEPT MULTIPLE RESPONSES.]

[My air conditioner is not working].....	1
[My air conditioner was not cycling on/off]	2
[My air conditioning contractor told me that the switch was not working]	3
[My air conditioning contractor disconnected the control switch]	4
[Other] (RECORD) _____	5
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

CD3.

Have you had any mechanical problems with your air conditioner since you have been involved with the SmartAC Program?

[Yes].....	1
------------	---

[No].....	2	[SKIP TO NEXT SECTION]
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO NEXT SECTION]
[Refused].....	-98	[SKIP TO NEXT SECTION]

CD4.

Do you think these mechanical problems might have been related to your participation in the SmartAC Program?

[Yes].....	1
[No].....	2
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

CD5.

Have you called anyone to try to resolve these problems?

[Yes].....	1	
[No].....	2	[SKIP TO NEXT SECTION]
[Don't know/Not sure/Can't remember].....	-97	[SKIP TO NEXT SECTION]
[Refused].....	-98	[SKIP TO NEXT SECTION]

CD6.

Who did you call? [DO NOT PROMPT. ACCEPT MULTIPLE RESPONSES.]

[Air conditioning contractor]	1
[Utility]	2
[Electrician].....	3
[Other] (RECORD) _____	4
[Don't know/Not sure/Can't remember].....	-97
[Refused].....	-98

Air Conditioning Practices

AC1.

How often do you use your central air conditioner? Would you say you use it ... [READ EACH UNBRACKETED OPTION UNTIL RESPONDENT CHOOSES ONE]

Not at all.....	1
Only on the hottest days.....	2
Frequently during the cooling season	3
Most days during the cooling season	4
Everyday during the cooling season	5
[Don't know/Not sure/Can't remember]	-97
[Refused].....	-98

AC2.

Is the air conditioner typically used to keep someone at home comfortable on weekday afternoons before 5 P.M.?

[Yes].....	1 [SKIP TO D3]
[No].....	2
[Don't know/ Not sure/Can't remember]	-97 [SKIP TO D3]
[Refused].....	-98 [SKIP TO D3]

AC3.

Is the air conditioner typically used to keep someone at home comfortable on weekdays before 7 P.M.?

[Yes].....	1
[No].....	2
[Don't know/ Not sure/Can't remember]	-97
[Refused].....	-98

Section D – Demographics – FOR HOUSEHOLDS ONLY

[IF <SURVEYED> = 1, THANK AND TERMINATE]

Now I would like to ask you a few questions about your household.

D3.

Do you own or rent your home?

- Own.....1
- Rent.....2
- Other3
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

D4.

For how many years have you lived at this address? [RECORD NUMBER OF YEARS, PUT 0 IF LESS THAN ONE YEAR]

- _____ # of years at this address
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

D5.

Which of the following best describes the type of home you live in? [READ LIST]

- Single family, detached (e.g., freestanding house)1
- Single family attached such as town house or row house2
- Apartment in multi-unit structure of 2–4 units3
- Apartment in multi-unit structure of 5 or more units4
- Mobile home5
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

D7.

Approximately what year was your home built?

- 1995 or later1
- 1990 to 19942
- 1980 to 19893
- 1978 to 19794
- 1970 to 19775
- 1960 to 19696
- 1950 to 19597
- Before 1950.....8
- [Don't know/Not sure/Can't remember]..... -97
- [Refused]..... -98

D10.

Including yourself and children, how many people live in your home at least six months of the year?

[Record number people living in home] _____

[Don't know/Not sure/Can't remember]-97
 [Refused].....-98

D10A.

How many people in your household are over 65 years of age?
 [Record number of people over 65] _____
 [Don't know/Not sure/Can't remember]-97
 [Refused].....-98
 [IF D10=D10A, SKIP TO D15]

D11.

How many people in your household are 18 to 65 years of age?
 [Record number of people 18 to 65 years old]..... _____
 [Don't know/Not sure/Can't remember]-97
 [Refused].....-98
 [IF D10=D10A + D11, SKIP TO D15]

D12.

How many in your household are 5 to 17 years of age?
 [Record number of people between 5 and 17] _____
 [Don't know/Not sure/Can't remember]-97
 [Refused].....-98
 [IF D10=D10A + D11+D12, SKIP TO D15]

D13.

How many people in your household are under 5 years of age?
 [Record number of people under 5] _____
 [Don't know/Not sure/Can't remember]-97
 [Refused].....-98

[CHECK THAT D10A THROUGH D13=D10. IF NOT REPEAT D10A THROUGH D13]

D15.

What is *your* age?
 [Record age of respondent] _____
 [Don't know/Not sure/Can't remember]-97
 [Refused].....-98

D16.

Which of the following is the highest level of education you completed?
 8th grade..... 1
 High school 2
 Associates degree, vocational or technical school, or some college.. 3
 Four year college degree 4
 Graduate or professional degree 5
 [Don't know/Not sure/Can't remember] -97
 [Refused]..... -98

D17.

Next, I'd like to know your household's total 2004 annual income before taxes. Please stop me when I reach the category that best describes your household's income. [IF NECESSARY, SAY: THIS INFORMATION IS CONFIDENTIAL AND WILL ONLY BE USED FOR CHARACTERIZING RESPONDENTS TO THIS STUDY.]

Less than \$15,000	1
\$15,000 to less than \$20,000.....	2
\$20,000 to less than \$30,000.....	3
\$30,000 to less than \$40,000.....	4
\$40,000 to less than \$50,000.....	5
\$50,000 to less than \$75,000.....	6
\$75,000 to less than \$100,000.....	7
\$100,000 to less than \$125,000.....	8
\$125,000 to less than \$175,000.....	9
\$175,000 or more	10
[Don't know/Not sure]	-97
[Refused].....	-98

D18.

[RECORD GENDER OF RESPONDENT]

[Male].....	1
[Female]	2
[Missing]	3

D19.

[RECORD NAME OF RESPONDENT]

[THANK RESPONDENT AND TERMINATE SURVEY]