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California Statewide Automated Demand Response Program

Process Evaluation

CALMAC Study ID SDG0277.01

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1. Executive Summary

This report provides the process evaluation findings for the 2012 California Statewide Automated Demand Response (Auto-DR) program. The program is offered by the three California Investor-Owned Utilities (IOUs): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). The program offers technical assistance and incentives to encourage non-residential customers to install technologies that automate participation in demand response (DR) events. The goal of the program is to provide reliable load shed during DR program events by automating customers' participation. The findings and recommendations provided in this report are based upon a review of program materials and databases, participant surveys, and interviews with program stakeholders including program staff, account representatives, vendors, and program verification engineers. Please note that review of impact estimates, and program cost effectiveness are outside of the scope of this evaluation.¹

This process evaluation was designed to address multiple research questions, including:

- How is the program managed at each IOU? (Section 3.1)
- What is the program reach, and what are participant characteristics? (Section 3.2)
- How have customers and vendors experienced the program? (Section 3.3)
- How do customers use the Auto-DR technology? (Section 3.4)
- How do customers respond to DR program events? (Section 3.5)
- Why are customers not meeting load shed test estimates? (Section 3.6)
- How can the program change to improve the customer and vendor experience? (Section 3.7)

The body of the report provides detailed answers to the respective questions shown above. Below we present overarching findings and recommendations.

1.1 Key Findings and Recommendations

Evaluation findings indicate that the Auto-DR program enhances participants' ability to participate in DR program events. According to participants surveyed for this study, the program also increases enrollment in other IOU DR programs, improves customer operational efficiency, reduces operational costs to customers (depending on the enrolled program, by avoiding non-performance penalties, avoiding higher energy costs, or by qualifying for incentive payments) and increases satisfaction.

Program theory suggests that by installing enabling technologies on existing equipment, event participation will become more reliable and "easier" for DR program participants. The majority of participants (68%) in the evaluation survey noted that the technology made it easier for them to participate in DR program events. Further, according to program database records, 73% of Auto-DR program participants responded to all events called for by their DR program(s), while 10% responded to some events, and 17% did not respond to any events. In addition, survey respondents reported taking additional load shed actions beyond their automated response during events (18, or 40% of

¹ According to the 2009 impact evaluation report, the Auto-DR program provided load impacts during events that were significantly below their load shed test values (i.e., estimated load shed). Additionally, incremental load impacts were lower than total load impacts, and in some cases were negative. Further, the report indicated that the Auto-DR programs were not cost effective, as a result of lower than expected load impacts. Source: Christensen Associates Energy Consulting, 2009 Load Impact Evaluation and Cost Effectiveness Tests of California Statewide Automated Demand Response Programs, September 2010. The latest impact evaluation report is forthcoming.

respondents). Seventeen (38%) indicated that they also turned off lights, 16 (36%) performed pre-cooling, and 10 (22%) adjusted the automated set points on the thermostat.

The Evaluation Team also identified five key areas for program enhancement: (1) improving DR program enrollment via program outreach, (2) streamlining program application processes, (3) assuring quality installation of technologies, (4) continuing communication with participants, and (5) program design changes to enable event participation. Notably, we present findings and recommendations at a statewide level, thus some recommendations may not be relevant for a particular IOU. We outline the key evaluation findings regarding program value and offer suggestions for improvement below.

Improving DR Program Enrollment and Outreach Processes

In 2012, there were 224 unique enrolled customers, totaling 1,119 sites. A site represents technology installed at one customer site at one point in time defined by their service account identifier. Notably, customers can have multiple service accounts, with more than one project at different times. The largest share of participants comes from SCE (113 customers, 634 sites) and the smallest share comes from SDG&E (18 customers, 115 sites) (see Table 1). Just over one-third of these participants (36%) participate in multiple DR programs. The majority of participants are enrolled in the Demand Bidding or Capacity Bidding Programs, followed by aggregator-managed programs. The remaining enrolled Auto-DR participants are also enrolled in the Critical Peak Pricing, Real-Time Pricing, and Base Interruptible Programs.

Table 1. Summary of 2012 Auto-DR Program Participants

IOU	Participants	Sites ^a
PG&E	93	370
SCE	113	634
SDG&E	18	115
Statewide	224	1,119
^a Sites reflect unique service account identifiers.		

The Auto-DR program requires new participants to enroll in DR programs to receive Auto-DR technology incentives. As such, the Auto-DR program acts as a recruiting agent for new DR program enrollees. A little over half of Auto-DR survey respondents enrolled in a DR program after installing the Auto-DR program technologies and most of them indicated that they would not have enrolled in the DR program without the Auto-DR technology incentives.

Interviews with account representatives and vendors indicate that providing account representatives with additional training to increase their knowledge of the Auto-DR program would enable them to better identify customers best suited for participation and support account representatives with their customer outreach. To help with customer outreach, the evaluation team recommends the following:

- **Provide enhanced training to vendors and account representatives regarding the program.** Survey results indicate the majority of participants first hear about the Auto-DR program from their account representative (55%). Even though nine of 10 account representatives report receiving training on the program, we found variation within and across the IOUs related to training offered (ranging from project-specific kick-offs to educational seminars). Account representatives suggested a variety of materials that would help support their role in the program. We understand that the IOUs vary in terms of the training offered for the programs, and in some cases already provide the following recommended enhancements. Enhanced efforts could include:

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- A list of IOU contacts for customer questions (based on the nature of the question) for account representatives and vendors so they can refer customers to the correct person
 - Brief one-page descriptions of the program's mechanics and technical information for account representatives to have on-hand
 - Sector-specific case studies (similar to those on the SCE Auto-DR website) with examples to help vendors sell the program to customers, emphasizing how the Auto-DR incentive improve customers' operations and reduces costs on non-event days
 - Industry-specific marketing collateral to help vendors sell the program
- **Conduct project-specific meetings with key stakeholders to provide an opportunity to better explain the program and clarify concerns.** In addition to providing additional collateral and FAQs regarding program design, conducting project-specific meetings with customers can help to answer core questions and concerns. Account representatives suggested providing customers with these face-to-face meetings with program staff to answer questions and help explain the program's value and processes.

Streamlining Program Application Processes

While participants are generally satisfied with the program, they gave relatively low satisfaction ratings for the length of time required to process and fill out the application.² According to program staff, the duration of projects can vary based on the program staff and the number of applications (and their complexities) submitted at any given time. One project can have up to 25 individual service accounts (site locations). Additionally, delays may occur from waiting to receive information from the customer or vendor. Interviews with account representatives and vendors support this finding. Account representatives indicated that the review process for applications is too long and too complex for customers. Further, roughly half of interviewed vendors mentioned that the application process was confusing for them and their customers, and almost all of the interviewed vendors mentioned that the application process took too long.

- **Monitor application process timing and identify opportunities to streamline the process.** This program requires many steps and incorporates multiple stakeholders, which can result in longer processing times. We suggest that the utilities review the aspects of the process that take the most time and identify any areas for streamlining processes. In addition, we suggest that the IOUs prioritize the amount of information needed from customers during the application stage to support program oversight and evaluation, and streamline application forms based on this review. In order to facilitate this effort, we recommend that program staff develop an application process map and identify areas for improvement (i.e., the amount of time it takes to input and process information, identify unnecessary steps, etc.) and make revisions based on this review.

Our review of program processes indicates that the most important difference in the process across the IOUs occurs at the application stage. During this stage, the vendor typically performs an audit, assessment, or review of the customer's facility and proposes technologies to install. The utility then approves the project and uses the vendor's estimates to calculate the incentive reservation for the project. However, PG&E and SCE also incorporate an initial engineering review, which may adjust

² Respondents gave a mean score of 6.5 and 6.7 respectively on a 7-point scale, where 1 was dissatisfied and 7 was very satisfied.

vendor estimates. This step is critical, as both program staff and vendors acknowledge that there is a disparity between vendors' load shed estimates (used to reserve the incentive) and verified load shed estimates performed by program verification engineers (used to determine the final incentive amount). According to program staff, the engineering review is typically the most accurate estimate of load shed, likely because vendors may utilize incorrect baselines. Due to this difference, customers may become dissatisfied with adjustments or expect a higher incentive amount than they ultimately receive.

- **SDG&E should consider incorporating additional engineering review of vendor-estimated load shed** prior to reserving the incentive and installation of the technology. Approaches could extend to leveraging existing project verification engineers to review incentive requests prior to installing the technology, or contracting with third-party engineers to support this review.

Assuring Quality Installation of Technologies

Participants tend to install technologies that control multiple equipment types, predominantly HVAC systems. The vendor works with the customer to recommend the technologies to install within the site. The program only requires that technologies enable demand response,, meaning that any technology can be installed and incentives are based upon load shed estimates. Notably, the program collects information on technologies installed and controlled, but an electronic database of these records was not available for this evaluation. Over half (52%) of survey respondents' installed technologies control more than one type of equipment. The predominance of enabled HVAC equipment is an important finding, given that HVAC load impacts can be more variable in terms of potential load shed. Load reduction from HVAC equipment can vary greatly, especially compared to lighting equipment, which creates challenges when estimating reliable load reduction during events, as well as cost-effectiveness for the program.

Survey results indicate that one of the primary barriers to event participation was that the Auto-DR technology was not operational or did not operate as planned. To address this issue, we recommend the following:

- **Enhance vendor quality control activities to ensure the operability of technology.** Vendor QA/QC efforts should focus on (1) the quality of installation, (2) ensuring the technology is working properly and (3) the installation experience from the customer's perspective (such as professionalism, timeliness, and courtesy of the vendor). While the findings from this study indicate that some QA/QC would help resolve customer issues and increase customer satisfaction with the program, we recognize that the any vendor can participate in the program. We also understand that performing QA/QC on every vendor would be challenging given that the IOUs are not allowed to make vendor recommendations or critiques. However, there may be some ways that the IOUs can add requirements to technologies and/or vendors that could mitigate some customer concerns. For example, requiring (as PG&E does) that installed technologies come with a default 3-year warranty.
- **Conduct follow-up calls with account managers and program participants at three months and six months post-installation to ensure that the technology is operational.**

Vendors also expressed difficulties with the load-shed testing stage. Vendors indicated that they had difficulty understanding how baselines are calculated, and why engineering load-shed test estimates did not always correspond to vendor-estimated load-shed. We found that SCE provides customers and vendors with a memo that summarizes the results of the load-shed test in non-technical language, and presents the final incentive amount. Considering the challenges mentioned in the program application stage, this step can be valuable in helping customers understand why vendor and utility load reduction estimates (and resulting incentives) may differ. We understand that program staff at SCE provide introductory workshops as well as conference calls and first quarter review of program

design changes, while PG&E provides vendor training on calculating load shed and baselines. To increase satisfaction and clarify this stage of the process, we recommend the following:

- **Continue to increase the transparency of baseline calculations** by providing this information to vendors as they participate in the program, and provide materials that explain the process in non-technical terms, and that compares vendor estimates against utility calculated estimates.
- **Conduct introductory workshops** for new vendors to provide educational materials regarding the program process and other supplemental collateral and FAQs related to baseline calculations.

Continuing Communication with Participating Customers

When asked for ways to improve the program, participants suggested improving communication with the IOUs. Participants requested additional information about the program and events, including better communication around timing and duration of events. Based on interviews with Auto-DR and DR program staff, Auto-DR program staff are not responsible for communicating events with DR program participants, rather each Demand Response program has their own notification process (for some programs, there is no notification by design) and each is responsible for communicating with the participant. However, there may be potential avenues to provide additional communication with participants and to streamline the participation process. Therefore, the Evaluation Team recommends the following:

- **Provide status updates to stakeholders and participants throughout the participation process.** We recommend that the IOUs consider creating a customer web-portal to provide project-specific information to vendors, account representatives, engineers, IOU staff, and customers. This portal could contain all project documentation, including applications, load-shed estimates, technology installed, and project status. In addition, the portal could provide links to additional information regarding program processes and other relevant material, as well as event notifications for upcoming DR program events. We understand that these customers may already have access to general energy management tools offered online, which could potentially be leveraged to provide this information to customers. The IOUs should seek to balance cost and privacy concerns with increased access to program information when considering this recommendation. At a minimum, the IOUs could consider a portal that provides project status information or utilizing existing Customer Relationship Management (CRM) technology, to automatically send email updates when the project status changes.

Program Design Changes to Enable Event Participation

Prior impact evaluation results indicate that the Auto-DR programs have lower than expected load impacts. As a result, the IOUs initiated program design changes in the 2012-2014 program cycle to support increasing reliability of event participation (and therefore increased load shed) for customers through three primary mechanisms.

- Requiring participants to enroll in a DR program for at least three years.
- Moving from a 100% incentive paid out after the technology is installed, to paying 60% of the incentive after the technology is installed, with the remaining 40% paid contingent on the customer participating in their demand response program for one full season (60-40% model). This mechanism went into effect in 2013. This program design change provides an incentive for customers to participate in program events after the installation of the Auto-DR technology (thereby increasing program benefits). Additionally, the new incentive mechanism decreases vendor incentive to overestimate load reduction estimates.

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- Ensuring that all new technology projects use the most up-to-date communication standard, or Open ADR 2.0 capabilities, to facilitate Demand Response Automation Server (DRAS)³ communication with the Auto-DR systems.

Given that many of these design changes are new in 2013, this evaluation was limited in its ability to explore their program effects.

- **Track effects of program design changes.** Tracking should include: (1) number of newly enrolled customers, (2) the number of participating vendors, and (3) the proportion of participants that participate in events in a given year. Tracking the trends year-over-year will help the program assess the impact of these design changes on program participation. Additionally, a survey of non-participants may provide additional feedback regarding likelihood to participate in the Auto-DR program with the 60-40% incentive and impacts on future program participation.

1.2 Future Research

We recommend that DRMEC consider conducting additional evaluations to gain greater insights regarding program value, particularly regarding lower than expected load shed during program events and program cost-effectiveness. In particular, future efforts should jointly review the process evaluation in the context of impact findings. These efforts would include one or more of the following:

- **Identify participant characteristics that provide consistent and reliable load-shed, and target future enrollment based on these characteristics through database review and non-participant survey:** The Evaluation Team was unable to provide a full participant characterization by key criteria due to limited tracking data and unreliable contact information that reduced the total number of survey completes. Steps are already underway to enhance program tracking. These efforts may:
 - Help provide additional insights into the type of participants who provide consistent and reliable load-shed (by segment, size, DR program, or technology type). Notably, the IOUs do not consistently track technology installed or controlled. By tracking this information, future research could cross-reference technology by event performance. This could serve to identify technologies that support load impacts, and disqualify any technologies that are poor performers.
 - Help balance load shed impacts with cost of technologies. This review could help to prioritize technologies that provide greater impacts at lower installation costs.
 - Help target future recruitment efforts for newly enrolled DR participants by exploring whether participants who enrolled in a DR program after installing the Auto-DR technologies participate similarly to those who were already enrolled in a DR program, as well as profile enrollment across various types of DR programs. Results from this exploratory research could provide findings that support targeting customers with more reliable event participation and provide guidance around the best DR program fit for their businesses.

³ The DRAS sends a web-based signal to the system, which then travels directly to the EMS that automatically implements the pre-programmed load reduction plan.

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- **Identify any incremental impacts resulting from participation in the Auto-DR program.** A non-participant survey and database review would help to identify differences between Auto-DR and non-Auto-DR participants (such as enabling technology installed within the facility) and serve as a benchmark for identifying any incremental benefits from the Auto-DR technology. (If not already occurring, consider flagging Auto-DR participants in DR program databases to enable benchmarking).

We provide detailed findings organized by research objective in Chapter 3: Integrated Findings, following a description of our evaluation methods in Chapter 1. In addition, we provide a summary of findings organized by each of the research questions in Appendix F. Notably, some questions were not fully answered due to limitations with the program database. We provide opportunities for enhancement to the tracking database in Section 4.1.

2. Methods

Opinion Dynamics conducted a process evaluation of the Auto-DR program to answer the following overarching research objectives:

- How is the program managed at each IOU?
- What is the program reach, and what are participant characteristics?
- How have customers and vendors experienced the program?
- How do customers use the Auto-DR technology?
- How do customers respond to DR program events?
- Why are customers not meeting load shed test estimates?
- How can the program change to improve the customer and vendor experience?

Table 2 outlines the evaluation tasks conducted for the Auto-DR program.

Table 2. Auto-DR Process Evaluation Tasks

Evaluation Task	Description
Program Materials and Database Review	Analyzed the Auto-DR and other DR program databases to fully characterize and understand the participant population
Program Staff Interviews	Conducted telephone or in-person interviews with program staff from each of the three IOUs
Program Stakeholder Interviews	Conducted telephone interviews with 25 program stakeholders across the three IOUs. These stakeholders include key account representatives, vendors, program verification engineers and DR program staff
2012 Participant Survey	Fielded telephone survey to 179 program participants with contact information, resulting in 49 completes
2013 Participant Interviews	Conducted telephone interviews with six 2013 participants across the three IOUs

We summarize each of these tasks in detail below.

2.1 Evaluation Tasks

2.1.1 Program Materials and Database Review

The evaluation team reviewed program materials—such as program implementation plans, business plans, and program marketing and outreach materials—as well as the IOU program databases. Upon receiving the program database and other program information, we analyzed the Auto-DR program databases in an effort to fully characterize and understand the participant population. In particular, we explored:

- How long participants have been enrolled in the program and the incentives they have received
- The types of industries that participate
- The types of customers that become inactive, and when they become inactive

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As part of this task, we also developed our sampling approach for the participant survey, as well as designed the survey using participant database variables.

2.1.2 Program Staff Interviews

The evaluation team conducted interviews with Auto-DR program staff for each of the three IOUs. We conducted these interviews over the telephone or in-person where feasible. The goal of the interviews was to learn more about the program design and implementation activities during the evaluated period, as well as to explore key successes and challenges experienced by program staff to focus additional data collection activities. The program staff interviews focused on documenting the program goals, performance expectations, and marketing efforts, as well as validating program database information. We also discussed what the program staff would like to gain from the process evaluation's data collection with stakeholders and participants, and solicited program staff's perspective on customer experience thus far and potential areas of improvement. We conducted these interviews in July 2013.

2.1.3 Program Stakeholder Interviews

The evaluation team conducted telephone interviews with key program stakeholders, including implementation staff, key account representatives, program verification engineers, and DR program managers.

The key account representative interviews focused on their role with respect to the Auto-DR program, their feedback on their experience with participants, and any suggested areas of improvement from their perspective. Interviews with vendors focused on vendor and customer experiences with the program, as well as sought to gain insights from their perspective on areas for improvement. Interviews with engineering staff explored how the engineering calculations are conducted during load-shed tests, and solicited their input into potential reasons for why a customer might underperform compared to load shed test estimates. Interviews with DR program managers elicited feedback regarding coordination efforts between Auto-DR program staff and DR program staff, as well as identified any opportunities for improvement. Interviews were conducted in August through October 2013. Table 3 below provides a summary of stakeholder interviews.

Table 3. Program Stakeholder Interviews

Stakeholder Type	PG&E	SCE	SDG&E	Total
Program Staff				
Population	1	1	1	3
Completes	1	1	1	3
Vendors				
Population	4	7	3	14
Completes	2	5	2	9
Account Representatives				
Population	11	12	3	26
Completes	4	5	1	10
DR Program Managers				
Population	3	3	2	8
Completes	2	2	1	5

Stakeholder Type	PG&E	SCE	SDG&E	Total
<i>Capacity Bidding Program/Aggregator Managed Portfolio</i>	0	1	0	1
<i>Critical Peak Pricing / Peak Day Pricing</i>	1	1	1	3
<i>Demand Bidding Program /Base Interruptible Program</i>	1	0	0	1
Engineers				
Population	2		1*	3
Completes	2		1*	3
Total Interviews Completed:				28
*Conducted interview for SCE and SDG&E together.				

2.1.4 2012 Participant Survey

We conducted participant surveys with the goal of exploring motivations for participating, program value/benefits so far, actions taken and barriers to taking consistent action, program experience feedback, vendor interactions and feedback, and participant characteristics. The survey explores the following research topics:

- How customers are responding to the marketing and outreach efforts and areas for enhancement
- Whether customers are satisfied with the program processes, technology, and vendors, as well as the program overall
- Actions taken by participants during events (i.e., whether they participate in events), and actions taken as a result of their participation
- Key motivators, drivers, challenges, and barriers to participation

The evaluation team fielded a telephone survey to a census of 178 program participants with contact information in October 2013. During survey fielding, we found that 25 customers had either disconnected or incorrect phone numbers. Of the 153 customers with valid contact information, 49 participants completed the survey, for a response rate of 32%.⁴ We present a full disposition in Appendix D.

2.1.5 2013 Participant Interviews

As a late addition to the evaluation, we were asked by study team members to conduct some interviews with 2013 participants to date to explore the impact of the new 60-40% incentive split. We were able to conduct six interviews out of a potential pool of 33 customers. Respondents varied across those who had just decided to participate in the program, those who were still in the application process, and those who had already installed technologies. The interviews focused on motivations and program

⁴ American Association for Public Opinion Research (AAPOR) Response Rate 4.

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benefits; challenges in the application process, with emphasis on the changed incentive structure; participants' contractual arrangements with vendors to cover installation costs; their satisfaction with the program and program stakeholders; and program marketing to the extent possible, depending on where they were in the participation process.

Table 4. 2013 Participant Survey Sample Frame

Sample Type	SDG&E	SCE	PG&E	Total
Population	3	5	25	33
Interviews Completed	1	1	4	6

We created a participant sample from a list of 33 participants provided by the IOUs who had participated through Q2 of 2013. We conducted these interviews in September 2013. Due to the small number of interviews we were able to complete with this group and the varying participant status of each customer, we were not able to aggregate these results or draw any conclusions from them collectively other than to say that none of these participants were affected by the 60-40% incentive structure. Some were unaware of it, while others said that the vendor was receiving the incentive and assuming all the risk associated with the 60-40% incentive. As such, we treat the results from these interviews as unique case studies and provide these results in Appendix C.

2.2 Sample Characteristics

Below we document the total number of participants and survey completes by key characteristics such as IOU, event participation, DR program, and sector. We provide this information to illustrate how representative our 2012 participant survey respondents were to the population of participants. Overall, we found that survey respondents were generally representative of statewide enrollment, activity, sectors and load-shed. However, given the limited number of completes by IOU (completed 49 participant surveys), we present participant survey findings at a Statewide level. Notably, in most cases, given the lower number of respondents by IOU, we were unable to determine significant differences across IOU.⁵ In general, survey respondents:

- Represent 22% of total statewide enrolled participants, and by IOU, represent 11% of PG&E participants, 30% of SCE participants, and 28% of SDG&E participants (Table 5)⁶
- Represent a mix of active⁷ (82%), partial⁸ (6%), and inactive⁹ (12%) participants (Table 6)
- Represent a mix of six DR programs, including both capacity and pricing programs, as well as aggregator-managed programs (Table 7)

⁵ The evaluation team conduct non-parametric tests for statistical significance at a 90% confidence level. Where findings are significant we note them in the report.

⁶ Represents 32% of statewide enrolled participants *with valid contact information*; by IOU, represents 25% of PG&E participants, 35% of SCE participants, and 45% of SDG&E participants.

⁷ We define active customers as having participated in all demand response program events called in 2012.

⁸ We define partial customers as having participated in fewer than all of the demand response program events called in 2012.

⁹ We define inactive customers as not participating in any demand response program event in 2012.

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- Represent a range of sectors, including manufacturing, agriculture, building operators, and hospitality (Table 8)
- Represent 65% of participants with a single site and 35% of participants with multiple sites (Table 9)
- Represent 23% of realized load-shed for PG&E customers and 20% of realized load-shed for SCE customers (Table 10)

The tables below provide details on respondents and the population of participants.

Table 5. Participant Population and Respondents, by IOU

IOU	Number of Survey Respondents	Number of Participants with Valid Contact	Number of Participants Enrolled
PG&E	10	45	93
SCE	34	97	113
SDG&E	5	11	18
Total	49	153	224

The survey aimed to reach both active and inactive customers to see where potential improvements could be made. Overall, 82% of the survey respondents were active¹⁰ participants, 6% were partially active¹¹, and 12% were inactive.¹²

Table 6. Population and Respondents, by Event Participation

Event Participation	Number of Survey Respondents	Number of Participants with Valid Contact	Number of Participants Enrolled
Active	40	116	163
Partial	3	12	22
Inactive	6	25	39
Total	49	153	224

Table 7. Population and Respondents by Program Type, Multiple Programs

Program Type (by Customer with Multiple Programs)	Number of Survey Respondents	Number of Participants with Valid Contact	Number of Participants Enrolled
Capacity Bidding Program (CBP)	17	57	74
Critical Peak Pricing (CPP, PDP or SAI)	12	29	38
Demand Bidding Program (DBP)	18	57	91
Real-Time Pricing (RTP)	1	6	7
Aggregator-Managed Portfolio (AMP)	17	42	54

¹⁰ We define active customers as having participated in all demand response program events called in 2012.

¹¹ We define partial customers as having participated in fewer than all of the demand response program events called in 2012.

¹² We define inactive customers as not participating in any demand response program event called in 2012.

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Program Type (by Customer with Multiple Programs)	Number of Survey Respondents	Number of Participants with Valid Contact	Number of Participants Enrolled
Base Interruptible Program (BIP)*	1	0	0

*Note that respondents indicated different participation in programs than was tracked in the program database (i.e., BIP). This could be due to inaccuracies in the program-tracking databases or self-report error.

Table 8 below provides an overview of the program participants by sector. Notably, this table provides sectors as reported in the program-tracking database, as well as sectors as noted by survey respondents. Sectors with the most participants (according to the program-tracking database) include manufacturing, agriculture, retail, and building operators. Notably, some respondents indicated different sectors than were tracked in the program database. This could be due to inaccuracies in the program-tracking databases.

Table 8. Population and Respondents by Sector

Sector	Number of Survey Respondents	Number of Participants with Valid Contact Information	Number of Participants Enrolled
Agriculture	10	42	53
Manufacturing	10	40	52
Building Operators	6	11	13
Other	4	6	10
Retail Stores	3	20	32
Wholesale, Transport, & Other Utilities	3	5	12
Warehousing and Storage	3	8	11
Hospitality	2	3	3
School	2	2	3
Medical Facility / Lab	2	2	4
Milling	2	4	5
Office Building	1	5	9
Physical Fitness Facility	1	2	4
Government and Government Support	0	2	7
Real Estate	0	1	2
Unknown	0	0	4
Total	49	153	224
NOTE: Respondents indicated different sectors than were tracked in the program database. This could be due to inaccuracies in the program-tracking databases.			

Table 9 provides an overview of the program participants by whether a customer has a single site or multiple company sites enrolled in the program. The survey aimed to reach both single- and multiple-site customers. Overall, 65% of the survey respondents have a single site and 35% have multiple sites,

Methods

similar to the population of 55% customers with a single site, 37% of customers with multiple sites, and 8% with unknown data based on what was available in the databases.

Table 9. Population and Respondents by Number of Sites

Number of Sites	Number of Survey Respondents	Number of Participants with Valid Contact Information	Number of Participants Enrolled
Single Site	32	82	124
Multiple Sites	17	50	82
Unknown	0	21	18
Total	49	153	224

Table 10 below provides an overview of the average load impacts for the population of participants and survey respondents. Using the database average test kW and the data received from the impact evaluation team, Christensen Associates Energy Consulting, on the preliminary impacts, SCE’s population of participants achieved an average of 23% load impacts during events. Comparing the population of participants to SCE survey respondents, we see that the survey respondents have larger usage (1,123 kW compared to the population of participants whose average usage is 451 kW) but tended to achieve less load impacts (10% of respondents compared to 23% of participants). PG&E’s population of participants saved an achieved an average of 24% of load impacts during events. Comparing the population of PG&E participants to survey respondents, we see that the survey respondents have lower average usage (409 kW compared to 552 kW for the population of participants) but tended to achieve about the same load impact (24% of respondents compared to 24% of participants). Overall, the survey respondents generally represented the population of participants in terms of usage and load reduction. Overall, the survey respondents generally represented the population of participants in terms of usage and load reduction. Load impact findings are provided in greater detail in Christensen Associates Energy Consulting’s 2011-12 Load Impact Evaluation of California Statewide Automated Demand Response (Auto-DR) Programs.

Table 10. Auto-DR Participant and Respondent Load Shed ^a

Load Impact Metrics	PG&E		SCE		SDG&E
	Participants with Load Data (N=93)	Respondents with Load and Impact Data (n=8)	Participants with Load Data (N=113)	Respondents with Load and Impact Data (n=24)	
Average Reference Load	552	409	451	1,123	No data
Average Load Impact	133	418	105	114	
Average Test kW	290	98	199	562	
Average % Load Impacts	24%	24%	23%	10%	
Average Realization Rate from load shed test	46%	23%	53%	20%	

^a Results were provided by Christensen Associates Energy Consulting as part of their 2011-12 Load Impact Evaluation of California Statewide Automated Demand Response (Auto-DR) Programs.

NOTE: In some cases, we were unable to cross-reference load impact results with participant program database IDs. For SCE, of the 34 survey respondents, we were able to match 24. For PG&E, of the 10 respondents, we were able to match eight.

NOTE: No impact data were available for SDG&E at the time of the evaluation.

3. Integrated Findings

This report provides the process evaluation findings for the California Statewide Automated Demand Response (Auto-DR) program. The program is offered by the three California Investor-Owned Utilities (IOUs): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

The goal of the program is to provide reliable load shed during demand response program events by automating customers' participation. This is done by providing incentives to install enabling technologies. In 2012, there were 224 unique enrolled customers, totaling 1,119 sites.¹³

This study focuses on both active and inactive enrolled 2012 program participants in the Auto-DR program. "Active" participants are customers who have enrolled in the program, either in or prior to 2012, and participated in at least one 2012 demand response event. "Inactive" participants are customers who have enrolled in the program, either in or prior to 2012, but did not participate in a 2012 demand response event.

Below we provide findings from the process evaluation effort. Results are structured by the following overarching research objectives (synthesizing detailed research questions within each):

- How is the program managed at each IOU?
- What is the program reach, and what are participant characteristics?
- How have customers and vendors experienced the program?
- How do customers use the Auto-DR technology?
- How do customers respond to DR program events?
- Why are customers not meeting load shed test estimates?
- How can the program change to improve the customer and vendor experience?

While there are similarities in the three IOUs' Auto-DR programs, there are also some key differences. For this project, we designed our methods, and the survey instruments, to leverage similarities in the Auto-DR programs across the utilities while still recognizing the differences of each utility and program. We also designed our analysis approach and reporting structure to look for best practices and lessons learned across the utilities, while still being able to report on each of the utility programs where feasible. Notably, given smaller sample sizes for the participant survey, we provide statewide results for responses to the participant survey.

After providing findings related to these detailed research questions, we provide a summary of results from the evaluation as well as future research areas. We outline our findings by each overarching objective below.

¹³ A site represents technology installed at one customer site at one point in time defined by their service account identifier. Notably, customers can have multiple service accounts, with more than one project at different times.

3.1 How Is the Program Managed at Each IOU?

This section provides a summary of how the program is implemented at each IOU. Across the IOUs, there are three primary stakeholders engaged with the Auto-DR program, including IOU program staff (including program staff and account representatives), project verification engineers, and vendors.

The IOUs administer the program similarly statewide, with some differences related to program design and implementation. These differences are as follows:

- Range of incentive levels for technology installed (ranging from \$125/kW to \$400/kW)
- Level of prescreening that occurs prior to conducting an assessment and applying for the incentives
- Level of engineering oversight prior to installation of technology (none to third-party review)

Each IOU has varied eligibility requirements for the program, as shown in Table 11 below. All participants are required to be non-residential customers, meet minimum kW registered demand requirements, and be enrolled (or enroll) in at least one DR program for three years.

Table 11. 2012 Eligibility Requirements

IOU	Minimum kW Requirements	Eligible Demand Response Programs
PG&E	200 kW	<ul style="list-style-type: none"> • Aggregator-Managed Portfolio (AMP) • Capacity Bidding Program (CBP) • Demand Bidding Program (DBP) • Peak Day Pricing (PDP)
SCE	Varies by DR program	<ul style="list-style-type: none"> • Capacity Bidding Program (CBP) • Demand Bidding Program (DBP) • Demand Response Contracts (DRC) • Real-Time Pricing (RTP) • Summer Advantage Incentive (SAI)
SDG&E	20 kW	<ul style="list-style-type: none"> • Capacity Bidding Program (CBP) • Critical Peak Pricing (CPP)

Incentive levels also vary by IOU, and are presented in Table 12 below. Key differences include:

- PG&E offers several different incentive levels:
 - Semi-Auto DR incentives are provided to customers who respond to signals from PG&E by initiating a pre-programmed load shed strategy
 - Advanced Technology incentives are also offered for the installation of eligible advanced or emerging HVAC and lighting technologies
- As of September 2012, SCE offers a pre-determined package of measure options to smaller customers (“Express” incentives), as opposed to the customized options offered to larger customers. The “Express” incentive level is no different from the “Customized” incentive.
- SDG&E offers an on-bill financing option for technology improvements made through the program

Integrated Findings

In all cases, incentives cannot exceed 100% of the total project cost.

Table 12. Auto-DR Incentives Offered

IOU	Incentive	Description
PG&E	Semi-Auto DR	Up to \$125/kW of verified load reduction
	Auto-DR	Up to \$200/kW of verified load reduction
	Advanced Technology HVAC	Up to \$350/kW of verified load reduction
	Advanced Technology Lighting	Up to \$400/kW of verified load reduction
SCE	Auto-DR Express TI ¹	Up to \$300/kW of verified load reduction
	Auto-DR Customized TI	Up to \$300/kW of verified load reduction
SDG&E	Auto-DR	Up to \$300/kW of verified load reduction

¹ SCE began offering this option mid-program year (September 2012).

Below we present the implementation process according to four implementation stages by IOU. These stages include outreach, application, installation and verification, and program and event participation.

Outreach Processes:

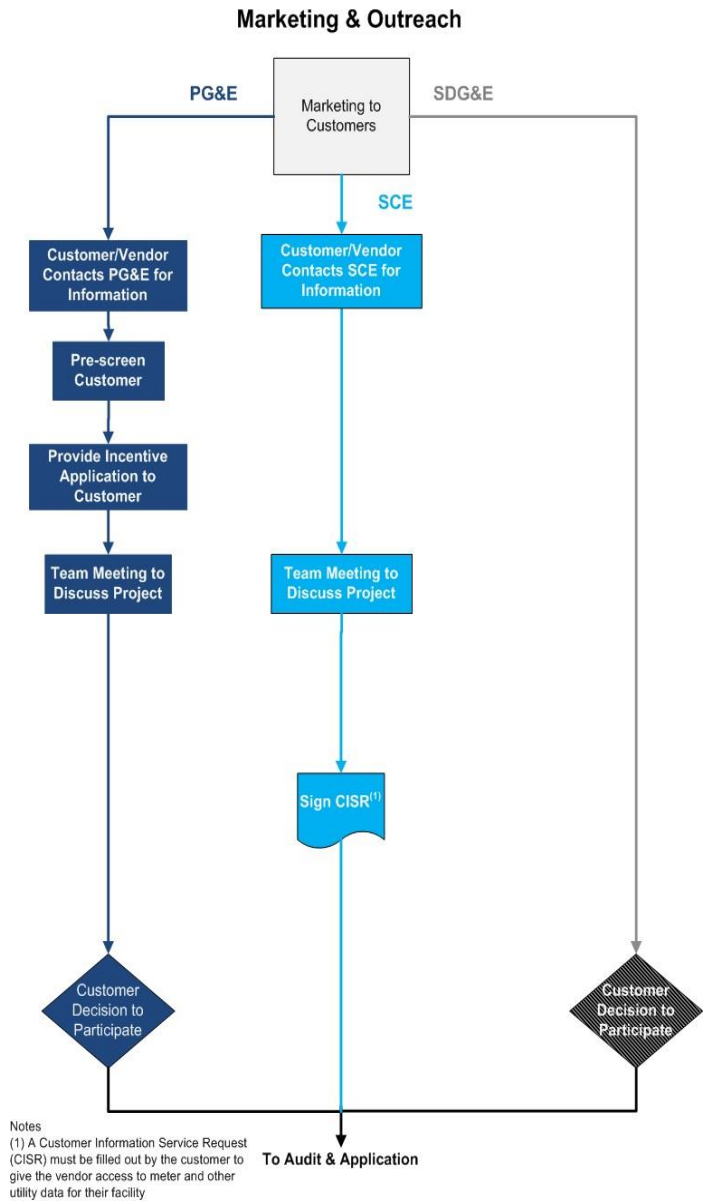
The program is marketed to customers primarily through vendors and account representatives. Program staff may also conduct outreach at conferences and other events.

PG&E's program includes two key differences at this stage compared to SCE's and SDG&E's programs:

- PG&E staff often hold a team meeting with vendors, customers, and account representatives to discuss the potential project. This meeting provides customers with an opportunity to ask questions about the project. Topics discussed may include the benefits of installing the technology, the nature of the automation that occurs, the application process, and demand response event requirements. Currently, SCE and SDG&E do not include this as a formal step, though consultation with the customer does occur on an ad-hoc basis. SCE Program Management utilizes conference calls and in-person meetings as needed utilizing the BCD Account Manager (single point of contact) as the meeting lead.

PG&E confirms customer eligibility and the load-shed capacity of their facility prior to asking customers and vendors to initiate the application process. This may be helpful in setting expectations for load reduction potential. Vendors mentioned that their customers were most frequently concerned with the following: (1) to what extent the utility will have control over their facility; (2) what would be required of them during demand response events; and (3) whether or not the technology is a worthwhile investment.

Figure 1. Outreach Processes. by IOU

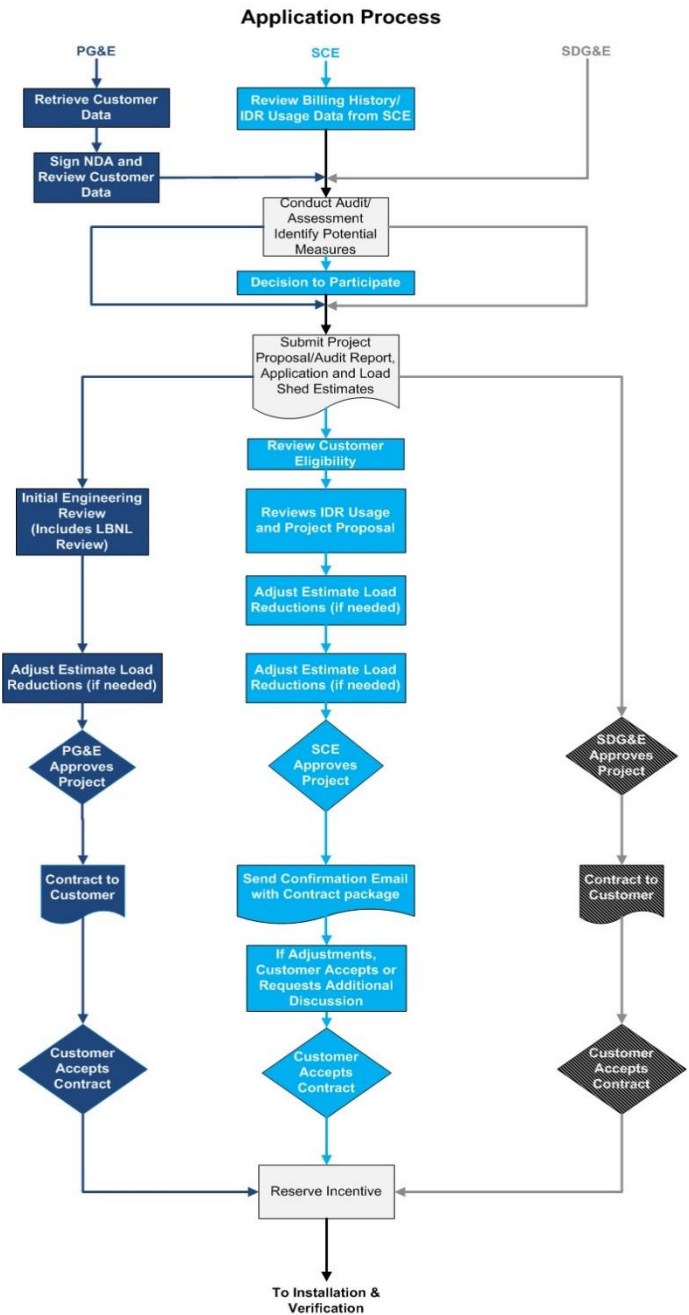


Application Process:

The most important differences across the IOUs occur within the application stage. During this stage, the vendor performs an audit, assessment, or other type of review of the customer’s facility and proposes technologies to install. The utility then approves the project and uses the vendor’s estimates to calculate the incentive reservation for the project. However, PG&E and SCE also incorporate an initial engineering review, which may adjust vendor estimates. Specifically:

- SCE program verification engineers conduct an initial review of the proposed project, and SCE presents any adjustments to the vendor and the customer. Once the adjustments are accepted, the incentive reservation occurs.
- PG&E conducts a similar review of proposed projects, but also brings in Lawrence Berkeley National Laboratories (LBNL) as a third-party reviewer.
- SDG&E does not include a pre-installation review of proposed projects prior to incentive reservation.

This difference is critical, as both program staff and vendors acknowledge a disparity between vendors’ load shed estimates (used to reserve the incentive) and verified load shed estimates performed by program verification engineers (used to determine the final incentive amount). According to program staff, the engineering review is typically the most accurate estimate of load-shed, likely because vendors may utilize incorrect baselines. Due to this difference, customers may become dissatisfied with or expect a higher incentive amount.

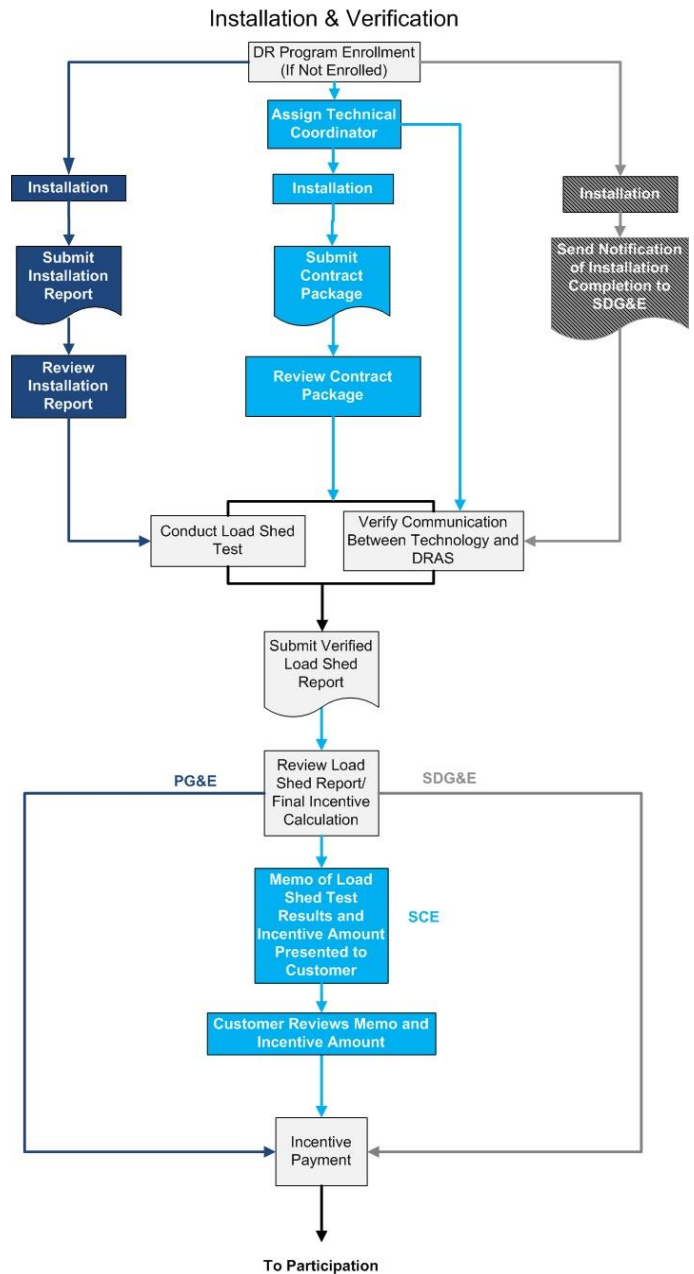


Installation and Verification:

In this stage, the vendor installs the Auto-DR enabling equipment and, if not already enrolled in a program, the customer enrolls in an eligible DR program. Program verification engineers perform an inspection of the installation and conduct a load shed test. The results of the verified load-shed test determine the final incentive amount, paid to either the customer or the vendor.

At a high level, this process stage is consistent across the three IOUs, except that SCE and PG&E assign a technical coordinator to each site who provides on-site assistance to the customer with regard to connecting their technology to the Demand Response Automation Server (DRAS). The DRAS sends a web-based signal to the system, which then travels directly to the EMS that automatically implements the pre-programmed load reduction plan. Without open communication with the DRAS, the DRAS will not be able to directly send the signal to initiate the load reduction plan, potentially affecting load reduction opportunities. For SDG&E, the program verification engineers ensure communication with the DRAS.

SCE also provides customers and vendors with a memo summarizing the results of the load-shed test in non-technical language, and presents the final incentive amount.



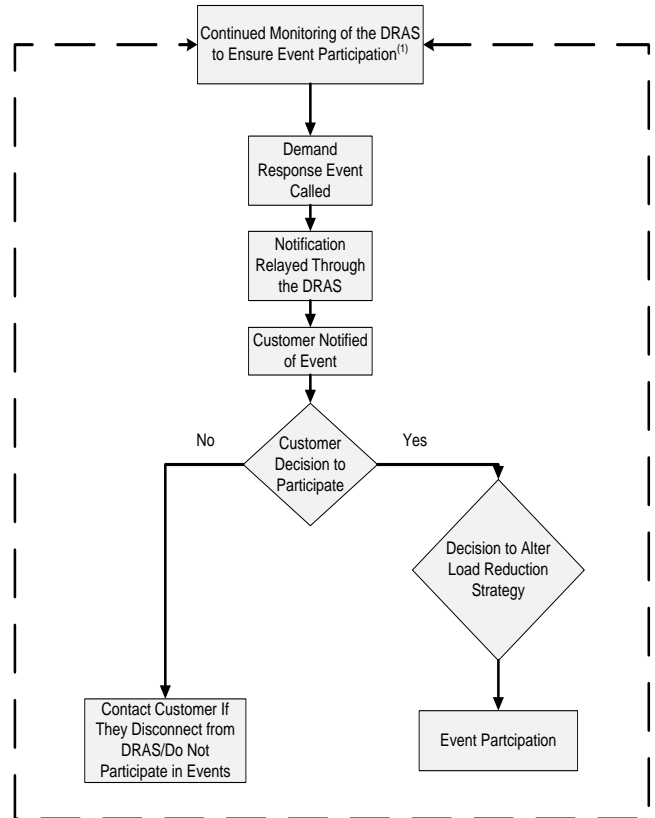
Program and Event Participation:

Enrolled Auto-DR customers must participate in demand response events as specified by the program incentive requirements. Within this stage, program staff continuously monitor the DRAS to ensure continued communication with the enabling technology. Program staff may also monitor the load reduction performance of all or specific customers during events. Demand response program staff are responsible for calling demand response events and sending event notifications to the customer. If customers do not participate in events, account managers may reach out to them to determine why they have stopped participating. When customers decide to participate in an event, they may also decide to alter their load reduction strategy executed by the technology.

One key difference in this process is performance management. PG&E and SCE conduct performance monitoring for select customers. PG&E checks participant load, conducts performance analyses, and telephones non-performing customers to provide feedback. SCE conducts performance reviews for select customers.

Another difference is the Open ADR requirements for enrolling in aggregator-managed programs. For these programs, aggregators are responsible for managing load reduction for their customers, and for sending signals (or notifications) during events. SCE and PG&E require that customers enrolled in aggregator programs be able to demonstrate the ability to receive a signal from the DRAS. SDG&E does not have this requirement, but will implement this in 2013.¹⁴ As a result, for SDG&E customers enrolling in the program in 2012 may have received incentives for installing technologies that are not compatible with the Open ADR 2.0 language.

Figure 4. Event Participation Processes, by IOU



Notes:
 (1) SCE monitors the DRAS for the purposes of ensuring customers continue to be connected to the DRAS. A separate performance review is conducted for select customers.

¹⁴ Decision 12-04-045. Decision Adopting Demand Response Activities and Budgets for 2012 through 2014. 4/30/2012.

3.1.1 What are the implications of program design changes from 2012 and 2013?

The evaluation effort focused on the 2012 program period. However, several program design changes were implemented in the 2012-2014 program cycle. The IOUs initiated these program design changes within this program cycle to support increasing reliability of event participation for participants through three primary mechanisms:

- The first mechanism was to require participants to enroll in a DR program for at least three years.
- The second was to move from a 100% incentive paid out after the technology is installed, to paying 60% of the incentive after the technology is installed, with the remaining 40% paid contingent on the customer participating in their demand program for one full demand response season (60-40% model). We understand that in 2013, all IOUs will monitor customer performance to calculate the 40% incentive payment.
- The third was to ensure that all technologies have ADR 2.0 capabilities, which facilitates DRAS communication with systems. The standard in use in 2012, Open ADR 1.0, provided one-way signal communications. In 2013, Open ADR 2.0 A and B sends a signal, received confirmation of receipt and provides telemetry data to record load impact.

Changes to program design are summarized in Table 13 below.

Table 13. Summary of Program Design Changes in 2012-2013

IOU	Changes
Statewide	<ul style="list-style-type: none"> • 60-40% incentive split implemented • Require three year enrollment in DR program
PG&E	<ul style="list-style-type: none"> • Incentives reduced from \$250 to \$200 • Changed program implementer from Global Energy Partners to Energy Solutions • Created a new central database • Customers are now required to remain enrolled in the same DR program (receive DRAS signal) for the first year then switch program if needed but must remain enrolled in ADR eligible DR program for additional two years
SCE	<ul style="list-style-type: none"> • All SCE program databases moved into a central database • DR program participation requirement increased to 36 months (from 12 months) • Require that aggregator program customers connect to the DRAS via Open ADR 2.0 standards • Updated marketing materials
SDG&E	<ul style="list-style-type: none"> • Participants required to enroll in a DR program for one year • No baseline data sent to vendors • Technical Assistance (TA) program provided DR audit; included a feasibility assessment that would identify additional energy savings opportunities • Began providing customer-specific summer baseline data to vendors • Technical Assistance program discontinued • Energy Assessment & Solutions provides free analysis on ADR measures • Implemented pre-post inspection of vendor installation • Open ADR 2.0 capability requirements for installed technologies

The evaluation team explored any perceived changes to participation in interviews conducted with program stakeholders, and conducted exploratory qualitative interviews with 2013 participants.

As noted above, one of the most important changes statewide between 2012 and 2013 was the implementation of the 60-40% split incentive model. In previous years, 100% of the incentive was paid to customers (or vendors) based on the results of the post-installation verified load-shed test. Beginning in 2013, 60% of the incentive is paid after installation, and the remaining 40% is paid contingent on the customer participating in their demand program for one full demand response season.

We explored responses to this program design change in interviews with program stakeholders and 2013 participants. Overall, six of the nine vendors interviewed say that the number of projects they have completed has reduced between 2012 and 2013 as a result of the change to 60-40%. We found that vendors identified three key areas of concern: 1) impact on customer participation, 2) impact on financing from lending institution, and 3) impact on smaller vendor participation.

Many of the vendors (five of nine) indicated that the move to 60-40% incentive would impact customer participation in 2013 because customers would now have to provide some of the upfront investment, or that customers have concerns about the risk of not getting the additional 40%. However, some of the larger vendors do not report this being a concern because they still pay for the upfront investment entirely.

Smaller vendors may be the most adversely impacted by the change to the 60-40% incentive. Specifically, vendors from two self-identified “small companies” mention that they cannot afford to wait for the additional 40% (or risk that it will not be paid in full), and that the 60% incentive does not leave room for a profit margin on the project. These vendors noted that profit margins on projects were small even with the 100% upfront incentive system.

One vendor also reported that lending institutions were less likely to finance projects.

“...we have lending institutions that understood the program well enough to say, ‘We will back you up.’ So we could get short-term construction loans on these projects that were in the hundreds of thousands of dollars. And we could afford to go after projects like that...knowing that we could borrow against a receivable if we had to. With 60-40 we can’t do that. The lending institutions are not interested in the risk associated with that 40%.”
(Vendor)

Conversely, among the six 2013 participants we interviewed, none mentioned any problems or concerns with the 60-40% incentive. However, we do note that none of the 2013 participants we interviewed was familiar with the 100% incentive structure. A better gauge of the impact of the 60-40% incentive on customer likelihood to participate may be possible through an exploration of non-participant feedback. Notably, one program verification engineer indicated that the shift from a 100% incentive allocation to a 60-40% allocation would

“So my experience with the 60-40 in 2013 has been that the incentive for customers to participate in the program was lessened because customers struggled to see the value and ROI on spending.” (Vendor)

“I mean we have customers...which are interested in...participating, but it has been a little slow for them to go sign on. And now that...40% of the money is at risk, you know people are a little scared...they don’t want to sign on.” (Vendor)

“The 60-40 doesn’t work for somebody like us that’s a small company that has put all of the money out there and then you only want to pay the 60% and wait a year to pay the 40[%].”
(Vendor)

“help regulate the realization rate on some of these customers. Especially in the industrial applications, it would seem that the 60-40% would be very beneficial.”

Further, interviewed program verification engineers noted that this shift from 100% to 60-40% incentive might help improve realization rates between load-shed estimates and event participation. Specifically, this incentive structure increases customer incentive to participate in events, and decreases vendor incentive to put in aggressive estimates.

We recommend exploring 2013 program changes by tracking the number of newly enrolled customers, the number of participating vendors, and the proportion of participants that participate in events in a given year. Tracking these trends year-over-year will help the program assess the impact of these design changes on program and event participation. Additionally, the program could also consider conducting non-participant interviews with similar customers to explore potential barriers to the 60-40% incentive.

3.2 What Is the Program Reach and What Are Participant Characteristics?

The evaluation team reviewed program databases and participant survey data to characterize participants by firmographics and other key attributes. Notably, the program databases did not provide comprehensive data across the IOUs (see Section 4.1). In addition, we cross-referenced survey responses with available firmographics. However, given the small number of survey respondents, no conclusive results could be drawn from the survey. Below we describe findings about participant characteristics from our integrated analysis.

3.2.1 Participant Characteristics

In 2012, there were 224 unique enrolled customers, totaling 1,119 sites. The largest share of participants comes from SCE (113 customers, 634 sites), with the smallest from SDG&E (18 customers, 115 sites).

Table 14. Summary of 2012 Auto-DR Program Participants

IOU	Participants	Sites
PG&E	93	370
SCE	113	634
SDG&E	18	115
Statewide	224	1,119
^a Sites reflect unique service account ID's.		

For the 224 participants enrolled from November 2008 through December 2012 with available data, the program paid out incentives of \$39,967,856.¹⁵ By IOU, PG&E paid \$8,266,609, SCE paid \$30,607,867, and SDG&E paid \$1,093,379. The process evaluation team received load impact estimates from the impact evaluation team. Christensen Associates Energy Consulting, the impact evaluation team, shared their findings from their econometric models for those survey respondents where the database tracked *ex ante* kW impacts.

¹⁵ Note that this includes incentives that were labeled as un-paid. Program staff indicates that un-paid incentives have completed M&V but the check has not been issued.

These findings indicate that the average respondent realized approximately 23%-53% (depending on the IOU) of their load impact estimate.

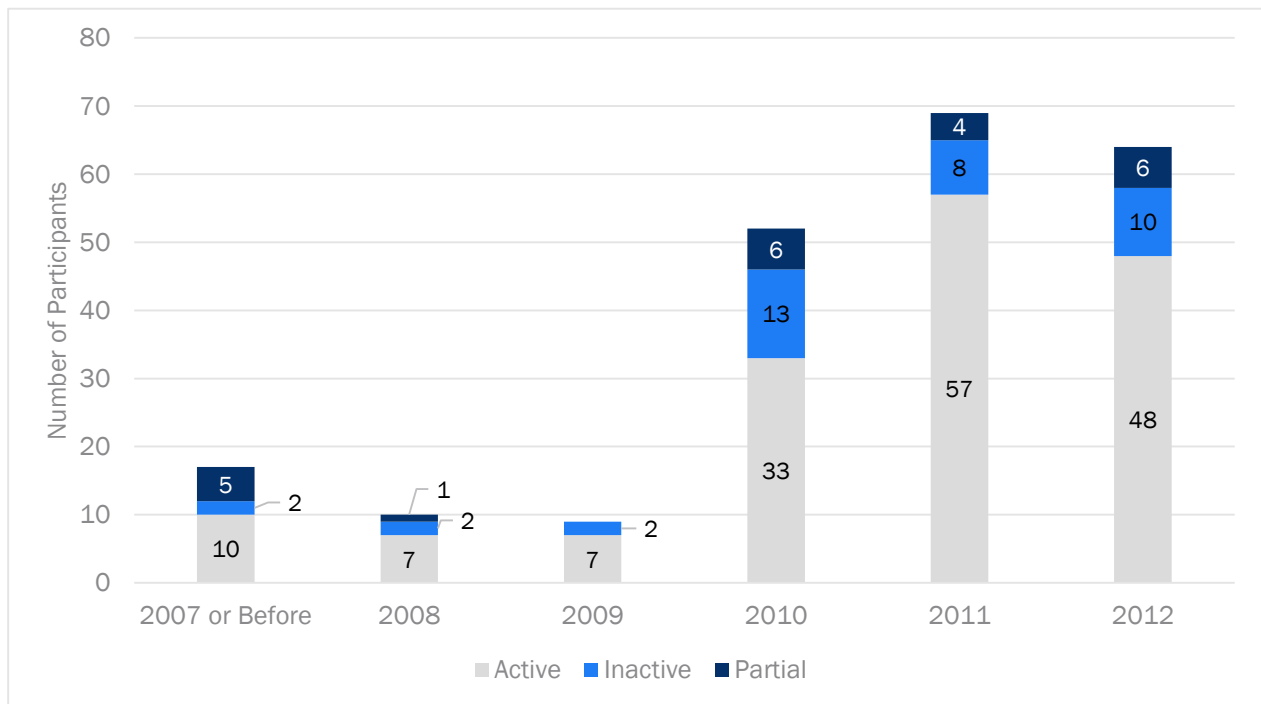
Table 15 below provides the total number of participants by event participation. According to the program database, 73% of participants are active, while 10% and 17% are partially active or inactive, respectively.

Table 15. Total Number of Participants, by Event Participation

Participation	Population	%
Active	163	73%
Partial	22	10%
Inactive	39	17%
Total	224	100%

The majority of 2012 participants (62%) were enrolled in the program in 2011 or 2012.

Figure 5. Enrollment Dates by Active/Inactive Participants (n=221)*



*Three participants have unknown enrollment dates.

Just over one-third of participants in the tracking database (36%) participate in multiple DR programs. The majority of participants are enrolled in the Demand Bidding program (DBP) or Capacity Bidding Programs (DBP and CBP) (see

Table 16 below).

Table 16. Population and Respondents by Program Type, Multiple Programs

Program Type	Number of Participants Enrolled (Program Database)	PG&E	SCE	SDG&E
Capacity Bidding Program (CBP)	74	43	20	11
Critical Peak Pricing (CPP, PDP or SAI)	38	10	22	6
Demand Bidding Program (DBP)	91	31	60	0
Real-Time Pricing (RTP)	7	0	7	0
Aggregator-Managed Portfolio (AMP)	54	16	38	0
Base Interruptible Program (BIP)*	0	0	0	0

Table 17 below provides an overview of program participants by sector. Sectors with the most participants (according to the program-tracking database) include manufacturing, agriculture, retail, and building operators.

Table 17. Auto-DR Participants, by Sector

Sector	Number of Participants Enrolled (Program Database)
Agriculture	53
Manufacturing	52
Retail Stores	32
Building Operators	13
Wholesale, Transport, & Other Utilities	12
Warehousing and Storage	11
Office Building	9
Government and Government Support	7
Milling	5
Medical Facility / Lab	4
Physical Fitness Facility	4
Hospitality	3
School	3
Real Estate	2
Other	10
Unknown	4
Total	224

NOTE: The category "other" includes customers who perform services including fire protection, software publishing, motion picture production, printing, construction, etc.

Table 18 provides a summary of load-shed realization rates by sector, where data are available. The impact evaluation team, Christensen Associates Energy Consulting, provided average realization rate of load impact compared to load shed test by sector for sites where customers responded to our participant survey. We binned these realization rates by 1-30% realization, 31-60% realization and over 60% realization and

catalogued the sectors that fell within each of these bins. The second column provides the number of sites where this data were available.

Table 18: Summary of Participant Respondent Realization Rate, by Sector

Realization Rate	Sites for which Data Are Available	Sectors
1-30%	15	Manufacturing; Hospitality; Milling; Other
31-60%	13	Agriculture; Building Operations; Wholesale, Transport & Other Utilities
>60%	4	Warehousing and Storage, School

3.3 How Have Customers and Vendors Experienced the Program?

3.3.1 How is the program marketed to customers?

We asked program participants (i.e., customers who enrolled in the program in 2012 or before) about how they first became aware of the program, what the benefits are of participating, and how well their experience matched how the program was described.

The majority of respondents first became aware of the program incentives through their utility account representative, followed by their vendor, as shown in Table 19 below. This finding is notable because program staff indicate that they consider marketing efforts for the program to be “vendor-driven.”

Table 19. Channel where Customers First Learned About the Auto-DR Program (n=49)

Response	Frequency	Percent
Utility account rep/account executive/account manager	27	55%
Vendor/installer/contractor	14	29%
Utility seminar, staff, or advertisement	3	6%
Other	3	6%
(Don't know)	2	4%
Total	49	100%

As participant awareness tends to be driven through account representatives, we asked account representatives about their understanding of the program and the training they had received. We found that while nine out of 10 account representatives received some training on the program, the format of that training varied widely. Half of the account representatives attended a program-specific meeting or training session, as opposed to a general informational meeting reviewing a variety of utility programs. Account representatives who attended training specific to Auto-DR rated the helpfulness of the training with an average of 8.6 out of 10 (with 10 being “extremely helpful”), whereas those without an Auto-DR-specific kick-off meeting gave an average rating of 7.0 out of 10. Despite diverging training formats, most account representative’s report having a good understanding of the program, and only one account representative identified gaps.

Program staff indicate that they offer a variety of forms of training, for example, SCE training includes the following:

- Program staff utilize conference calls and in person meetings as needed utilizing their account manager (single point of contact) as the meeting lead
- Provides training seminars, conference calls and webinars that provide descriptions of the program
- Provide introductory workshops as well as conference calls and first quarter review of program design changes.

In addition, PG&E provides vendor training on calculating load-shed and baselines.

However, account representatives did provide specific recommendations for improving training. These include:

- Providing industry-specific case studies or examples
- Providing more information on the program process, such as fact sheets
- Providing information on typical technologies installed
- Including more face-to-face internal trainings on the program
- Providing account representatives with a list of program contacts for various customer questions and technical issues

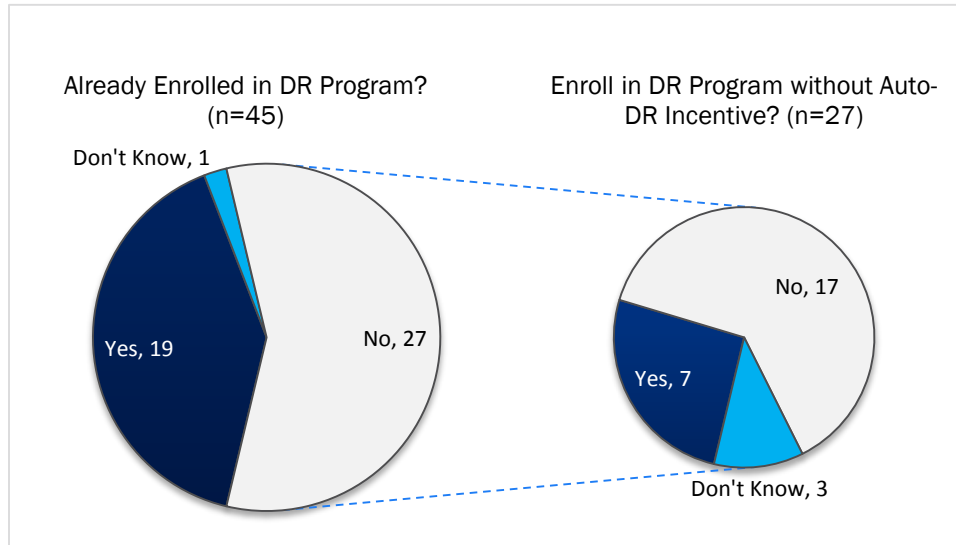
3.3.2 Did the customer experience meet expectations?

The majority (41 participants representing 82% of 2012 respondents) indicated that their experience with the program matched how it was described to them. However, the eight respondents who noted that their experience did not match how the program was described tended to mention technology that was not operational and dissatisfaction with vendor services (we describe this in greater detail under event participation). Of these eight respondents, seven first learned about the program from account representatives, IOU staff, or IOU seminars, and the other first learned about it from a vendor.

3.3.3 Why are customers participating in Auto-DR, and would they join a DR program without it?

We found that the incentives motivated customer respondents to enroll in demand response programs. As seen in Figure 6 (left side) below, a little over half of survey respondents enrolled in a DR program after installing the Auto-DR technologies. Of those who were not previously enrolled in a DR program, most indicated that they would not have enrolled in the DR program if the technology incentives were not available (see Figure 6, right side). Cost or the inability to afford the technology investment were mentioned most often as reasons for not enrolling (eight out of 17).

Figure 6. Enrollment in DR Programs, and if they would have enrolled without Auto-DR Incentives



3.3.4 What motivates customers to participate in the program?

When considering how the program was described to them, about a third of responding customers reported that reducing operational costs (i.e., saving money or lowering utility bills) was the primary selling point for the program. Secondary selling points included the incentives available and the socio-environmental benefits (e.g., saving energy, being a good corporate citizen, and avoiding rolling blackouts). Table 20 below shows the selling points for the program mentioned by respondents.

We also asked program stakeholders (vendors and account reps) about how they pitch or explain the program to participants, and assessed whether it aligned with responding program participants' selling points. Vendors, account representatives, and responding customers align in seeing the rebates available (for both Auto-DR and demand response programs) as a key selling point for the program.

Table 20. Alignment of Sales Pitch to Responding Participant Selling Points

Pitch/Selling Point	Examples	2012 Customers (n=49)*	Vendors (n=9)*	Account Representatives (n=10)*
Operational cost benefits	• Saving money	37%	1 of 9	NONE
	• Reduced operational costs			
	• Lower utility rates			
Incentives	• Program incentives	29%	7 of 9	6 of 10
	• Free technology/installation			
	• Demand response program rebates			
Social and environmental benefits	• Avoid rolling black-outs	27%	1 of 9	4 of 10
	• "Going Green"			
	• Being a good corporate citizen			
	• Saving energy			
Operational efficiency benefits	• Increased operational efficiency	14%	1 of 9	1 of 10
	• Greater facility control/monitoring			

Pitch/Selling Point	Examples	2012 Customers (n=49)*	Vendors (n=9)*	Account Representatives (n=10)*
	<ul style="list-style-type: none"> Automation 			
Event participation benefits	<ul style="list-style-type: none"> Increased load reduction 	8%	2 of 9	5 of 10
	<ul style="list-style-type: none"> Easier participation in events 			
	<ul style="list-style-type: none"> Protection from penalties 			
New technology benefits	<ul style="list-style-type: none"> Getting the “latest and greatest” technology 	NONE	4 of 9	NONE
	<ul style="list-style-type: none"> Getting a technology upgrade 			
<p>Legend: Dark blue indicates “High Importance,” light blue indicates “Some Importance,” and gray indicates “Low to No Importance.”</p> <p>*Respondents were allowed multiple responses.</p>				

While the PG&E and SDG&E websites focus on general information on the incentive available and the process for applying, SCE also includes case studies for the program. These case studies discuss specific customers’ experiences with the projects, and include information on the operational cost benefits of the program. We also note that the PG&E website includes similar case studies for their demand response programs (but not Auto-DR), organizing them based on specific types of customers or sectors. We recommend that PG&E and SDG&E explore options for developing similar case studies to those included on the SCE Auto-DR website. Furthermore, all three IOUs should consider including messaging directly on their websites regarding the key selling points responding customers identified in Table 20 above.

3.3.5 What value or benefits do customers experience?

The benefits experienced by customer respondents included reducing operational costs, reducing energy usage on non-event days, and increasing operational efficiency (see

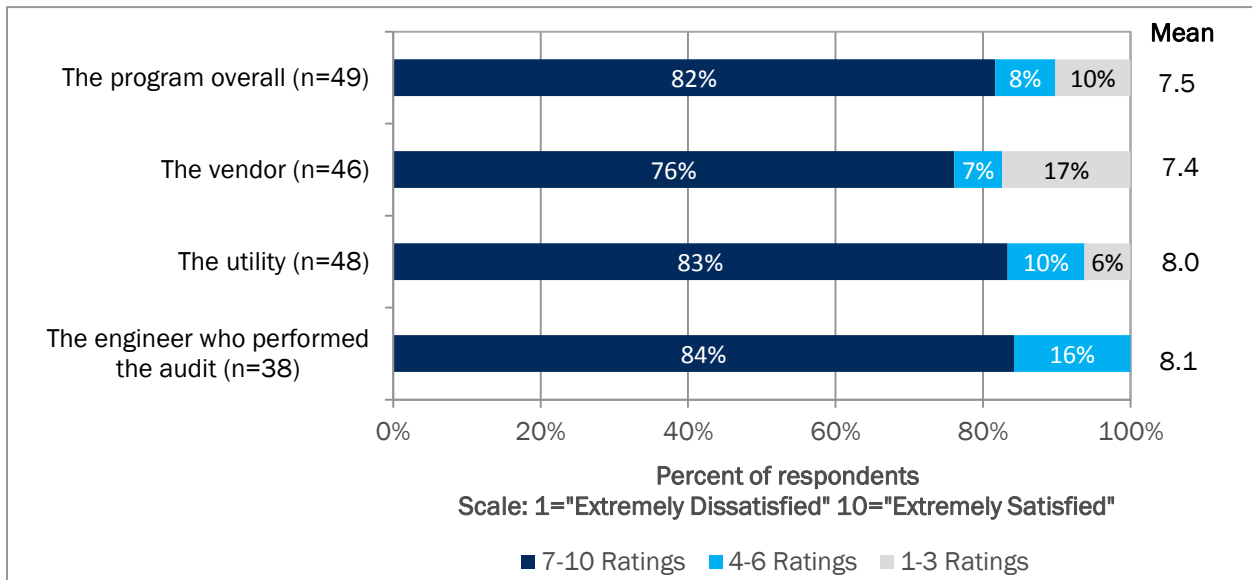
Table 21 below).

Table 21. Responding Participant Benefits of Participating in Auto-DR Program (n=49)

Finding	Illustrative Quote
The majority of respondents (61%) reported that the technology lowered their operational costs	<i>“[The technology gave us]...the ability to have greater control over the facility, control energy costs, and receive...credits for participating in [demand response] events.”</i>
About half of respondents (49%) reported that the technology reduced their energy use on non-event days	<i>“[The technology helped]...reduce energy usage and save money in the process.”</i>
Nearly half of respondents (43%) reported that the technology increased their operational efficiency	<i>“The same technology controls the entire refrigeration system with advanced capability, graphic trends, alarms, better interface.”</i>

Overall, we found that customer respondents are satisfied with the program. Over three-quarters of all responding participants give high satisfaction ratings (of 7 or higher on a 10-point scale where 1 is “extremely dissatisfied” and 10 is “extremely satisfied”) for the program overall, its vendors, the utility, and the engineer performing the initial audit (see Figure 7 below). Additionally, 86% of respondents indicated that they would recommend this program to others (n=49).

Figure 7. Responding Participant Satisfaction with the Program and Program Stakeholders



Note: Figure does not include respondents who answered with a "Don't Know" or "Not Applicable."

3.3.6 What role do incentives play in the program? What are customers' opinions on the incentive levels and payment process?

Respondents typically reported that they were unlikely to install the technology without the incentives, as shown in Figure 8 below.

Figure 8. Customer Likelihood to Install the Auto-DR Technology without the Incentive

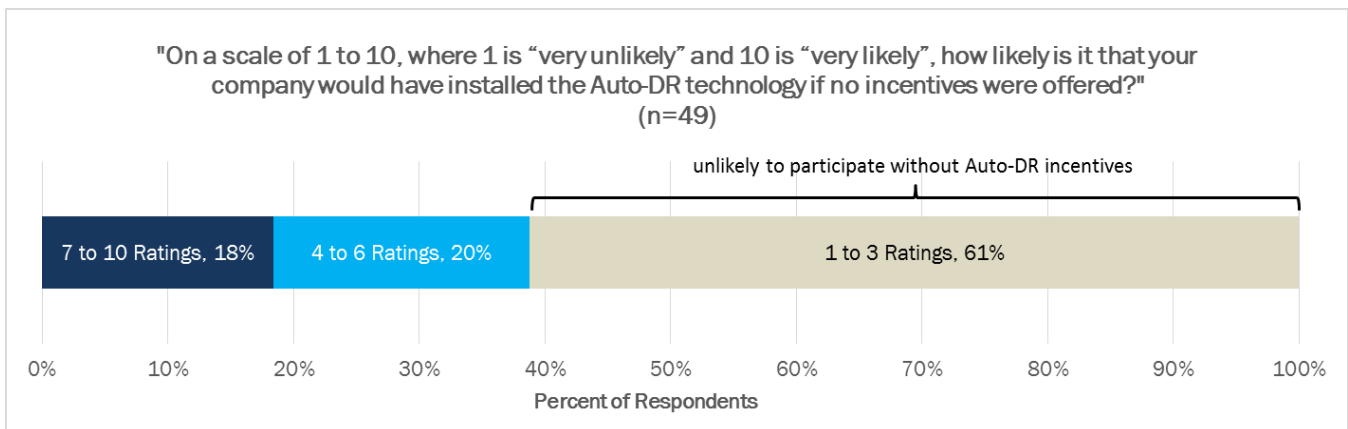
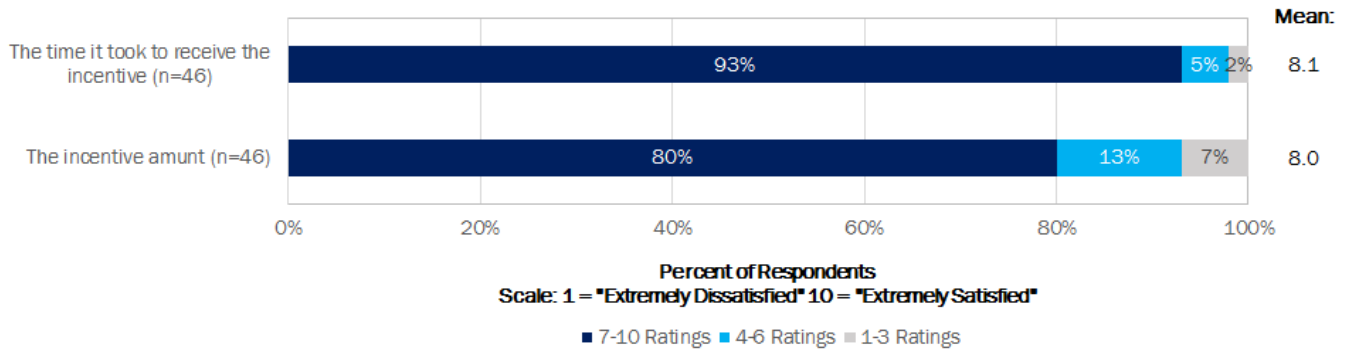


Figure 9 shows respondent satisfaction with the incentive and incentive process.¹⁶

Figure 9. Responding Participant Satisfaction with the Rebate Amount and Time to Receive Rebate



Note: Figure does not include respondents who answered with a “Don’t Know” or “Not Applicable.”

The evaluation team also spoke with program stakeholders, specifically vendors and engineers, to learn more about installation and verification efforts. Vendors indicated that it is unclear how incentives are calculated. Six of the nine interviewed vendors expressed challenges with the incentive calculation process. Vendors mentioned a lack of transparency in terms of how the incentives are calculated, or that vendors and program verification engineers use different baselines. For example, one vendor mentioned that the Customer-Specific Summer Baseline (CSSB) is too conservative. Further, two vendors suggest that this difference may be partly caused by vendors and program verification engineers performing their tests on dissimilar days (i.e., in terms of weather conditions).

“They do have information about [the incentive calculation]. [But] they don’t fully tell you what they are going to be doing about it to calculate it...We will try to compare what we think the utility is going to do, and they have something ultimately a little bit different. So, it is always a cat and mouse thing, and it is frustrating because we are trying to secure the highest kW and we ultimately find that the payments are lower than we expect. It is not always the case, but there seems to be less transparency than I would like.” (Vendor)

In contrast, engineers noted that their baselines are typically more conservative than vendor baselines (i.e., peak load rather than average load), and suggested that vendors may overestimate potential load shed. Additionally, program staff mentioned that, historically, customer satisfaction with the program has been negatively impacted in instances where customers were confused or upset that they did not get the verified load shed (and incentive) that the vendor estimated. In some cases, the program staff mentioned that the load reduction estimates submitted were far larger than peak load for the facility. Vendors also mentioned that big differences between the vendors’ estimates and verified load reduction can sometimes lead to customer dissatisfaction.

¹⁶ Non-parametric tests indicate statistically significant differences across IOUs for satisfaction with the incentive level. However, given the small number of completes, we caution against drawing conclusions at a utility level.

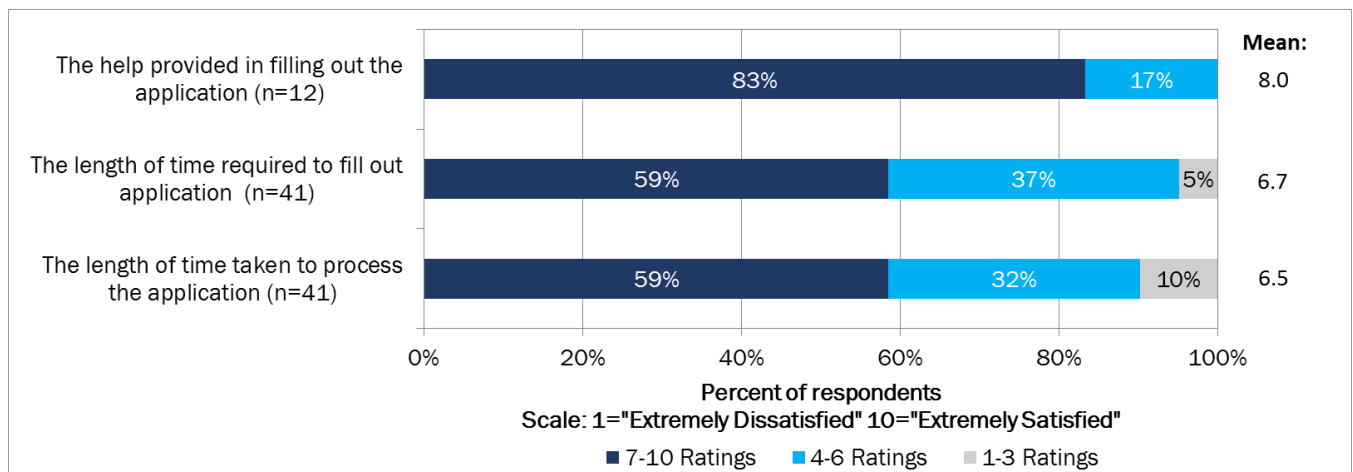
“If there is any backlash to going through the [Auto-DR program], it will probably be around the vendors and what the vendors told [the customers], what they promised them or how they approached the product [the Auto-DR technology].” (Program Staff)

Further, stakeholders identified variation across IOUs in engineering oversight prior to the incentive reservation process. We found variation across the IOUs in terms of the level of review of vendor estimates before the incentive reservation is placed. We note that some IOUs include additional reviews of the vendor estimates by the performance verification engineers prior to the incentive reservation process (see Section 3.1.), which could serve to adjust aggressive vendor baseline estimates and provide an opportunity to work with customers and vendors prior to reserving the incentive.

3.3.7 How is the application process?

Respondents are satisfied with the help provided in completing the application (mean score of 8.0). However, lower satisfaction ratings were given for the length of time required to complete and process the application (mean satisfaction scores of 6.7 and 6.5, respectively, as shown in Figure 10 below).

Figure 10. Responding Participant Satisfaction with the Application Processes



Note: Figure does not include respondents who answered with a “Don’t Know” or “Not Applicable.”

Responding participant findings regarding application processes tend to align with vendor comments. Seven of nine vendors mentioned that the application process was too long. Account representatives also indicated that there was a slow review process that takes too long and is too complex.

Four of nine interviewed vendors had challenges with the application process, noting that it was confusing for them and their customers. Vendors also noted that the application could be streamlined, particularly for submitting applications for customers with multiple sites.

“It would frequently take an enormous amount of time for an application to be processed or go through their third-party review...We had a couple opportunities that just died because that review process... we had signed up four [company] plants and the review process for the initial submittals took so long that...by the time the review process was complete... [the company] changed its mind.” (Vendor)

Vendor Comments:

“The processing time can be extremely long; it was longer than the expectation.”

“When we first signed up they thought they had the money, then they said they didn’t. I had to wait four months for them to confirm they had the money.”

“It took a long time to process the application... issues with verifying the information provided in the application.”

“Six months later, most of the applications for enrolling other sites have not progressed.”

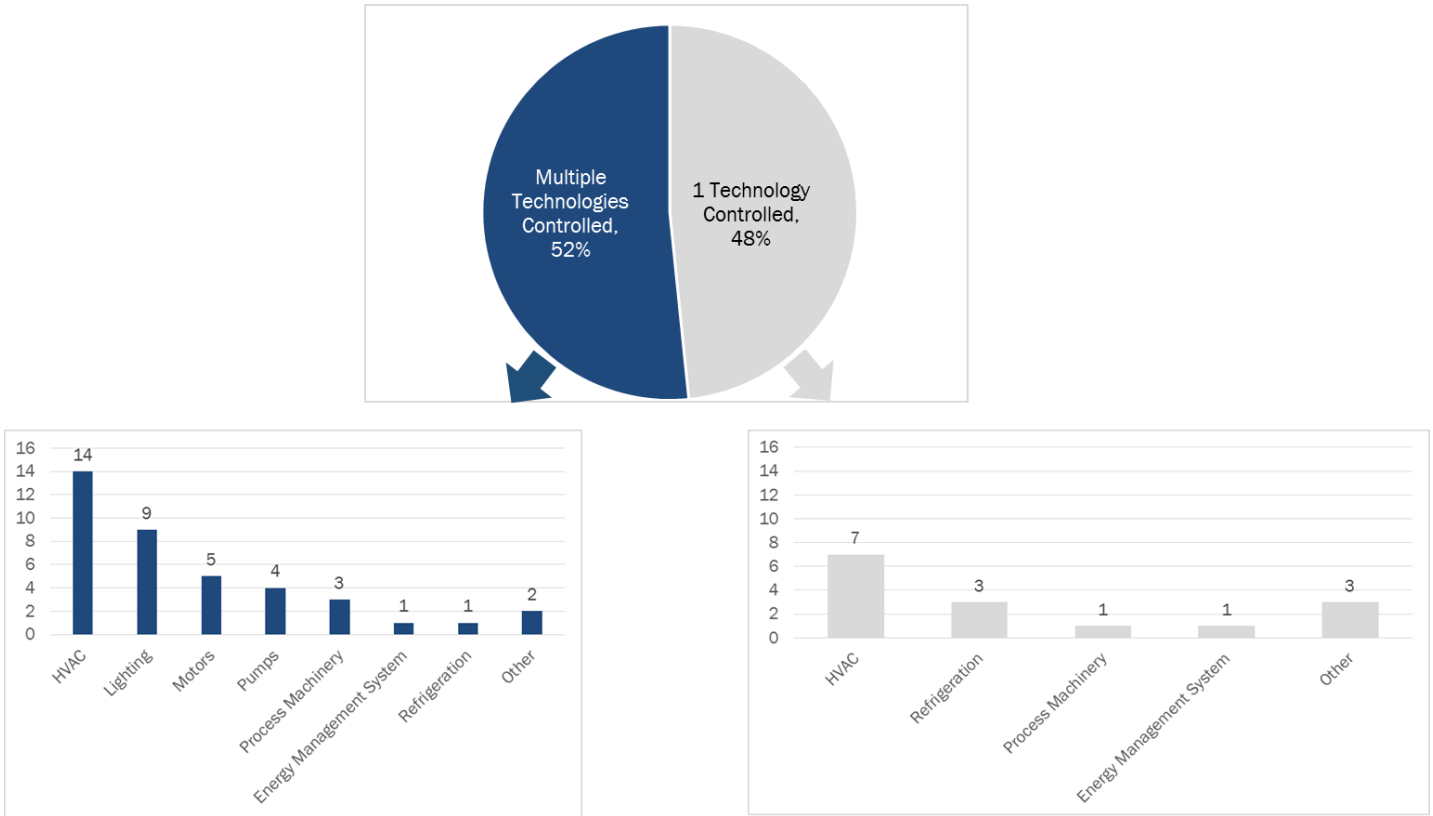
Additionally, vendors and account representatives were also unclear on project status. Vendors report that they typically do not know a project’s status, and they would like more insight into status. Account representatives indicate that they would like to know the best IOU contact to refer key questions.

3.4 How Do Customers Use the Auto-DR Technology?

3.4.1 What is the customer’s experience installing technology?

The evaluation team asked respondents a series of questions about their experience installing and using the technologies. Respondents tend to install technologies that control multiple equipment types, predominantly HVAC systems. Over half of the (52%) installed technologies control more than one type of equipment, as shown in Figure 11 below.

Figure 11. Equipment Controlled by Auto-DR Technology (Multiple Response: n=31)



NOTE: We asked this question to the 31 respondents who knew what type of technology was installed. “Other” technology controlled tended to relate to agricultural systems (wells, grading, and packaging).

The predominance of HVAC equipment being enabled is an important finding, given that HVAC load impacts can be more variable in terms of potential load-shed. Further, these findings are consistent with stakeholder interviews. Program staff mentioned that a significant portion of load controlled by the technologies is from HVAC equipment. According to the program staff, load reduction from HVAC equipment is variable, which created challenges for achieving reliable load reduction during events, as well as the cost-effectiveness of the program.

The database does not track the types of equipment controlled, and provides incomplete information on the technologies installed. The program applications currently track installed enabling technology, as well as the equipment it controls. Transferring this information to the program tracking database could facilitate tracking whether HVAC controlled technologies provide variable load-shed over time. We did not identify any trends regarding specific technologies installed or controlled.

As shown in Table 22, respondents’ installed the technologies to save money in their facilities or to cover the cost of the technology.

**Table 22. Reasons Customers Installed Auto-DR Technologies
(Multiple Response: n=49)**

Why did you decide to install the Auto-DR technology?	Frequency	Percent
Save money	27	55%
Free program or technology/Auto-DR incentive	15	31%
Increased operational efficiency	9	18%
Lower operating costs	6	12%
Lower energy use on non-event days	6	12%
Automation	3	6%
Help the environment	3	6%
Convenience/easier to shut down equipment	3	6%
Greater monitoring or control over facility/facilities	2	4%
Easy/convenient to participate	2	4%
Other	6	12%

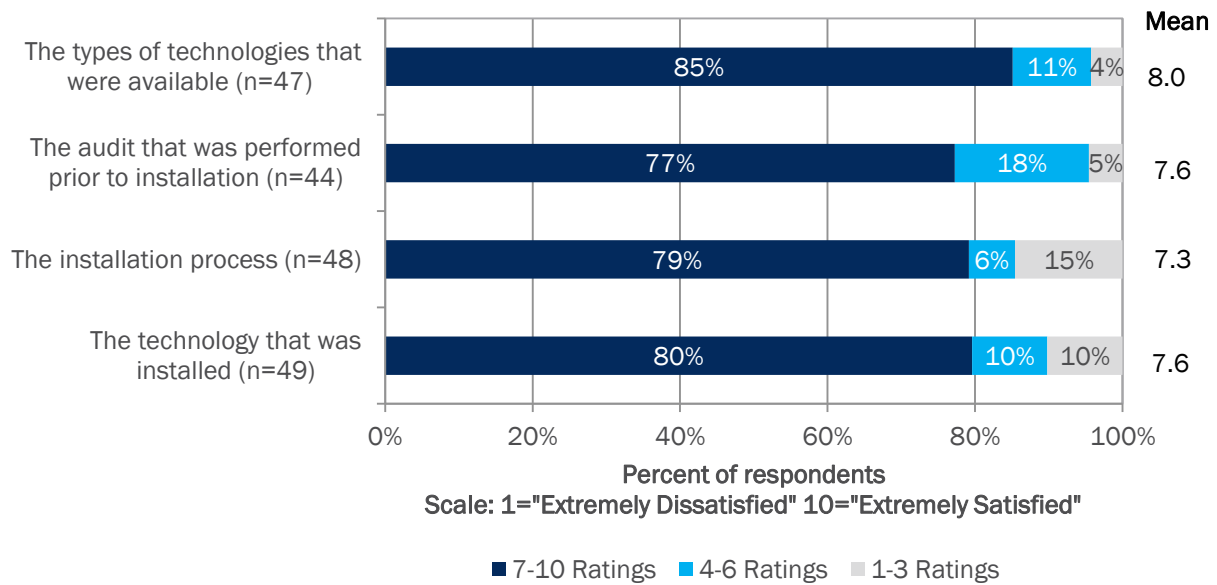
Respondents are generally satisfied with the technologies, but less satisfied with the installation process. Respondents gave the highest mean score for the types of technologies available (8.0), and gave the lowest mean satisfaction score for the installation process (7.3), where respondents referred to low installation standards and long installation times (see Figure 12 below). These findings indicate that improper installation of equipment could potentially affect customer satisfaction, as well as potentially reduce load impacts and cost-effectiveness. Respondents noted:

“When they installed the equipment they didn’t want to understand the process, they just wanted to put it in their way, and not deal with what we go through.”

“(The) initial electrician wired the device incorrectly and damaged the pump (\$20,000 worth of damages); at least two pumps are not shutting down correctly.”

“It was supposed to take a couple of months and it took over a year.”

Figure 12. Responding Participant Satisfaction with Program Technologies and Related Processes



Note: Figure does not include respondents who answered with a "Don't Know" or "Not Applicable."

Respondents are generally satisfied with the utility and engineers, but less satisfied with vendors. We found that eight respondents (16%) were dissatisfied with the vendor, giving scores between 1 and 3 on a 10-point scale. Respondents provided various reasons for their dissatisfaction, ranging from problems with the system/technology, poor time management, and poor training. Notably, we found no trends in terms of vendors who received lower satisfaction scores.

Considering this feedback, we recommend that the IOUs consider adopting a QA/QC process for vendors, focusing on the quality of installation, ensuring the technology is working properly, and understanding the installation experience from the customer's perspective (such as professionalism, timeliness, and courtesy of the vendor).

Participant Comments:

"The system is still not working."

"Their response on fixing parts, training and overall getting things done. Very poor."

"They promised things on the management side, it took them three years."

3.5 How Do Customers Respond to DR Program Events?

The majority of respondents indicate that the Auto-DR technology made participating in events easier. Of the 19 respondents who were already enrolled in a DR program prior to installing the technology, 13 respondents indicated that installation of the technology made participating in DR events easier, while three indicated that it was the same, two indicated that it was more difficult, and one respondent answered with a “Don’t know.”

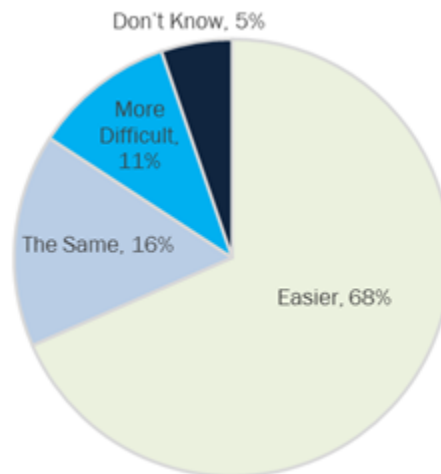
Those who noted that it did not make event participation easier cited having less control, the verification taking time, and the technology not working. We found no trends for these respondents in terms of sector, technology controlled, or vendor.

Participant Responses:

“Before we had to run around for a few hours turning everything on and off. Now the computer does all the work for us. I can even do it while traveling or when on vacation without a problem.”

“Even more precise and selective on what piece of equipment to shut down. We can take full advantage of our downtime. Also identified pieces of equipment that were not operating efficiently and needed replacement.”

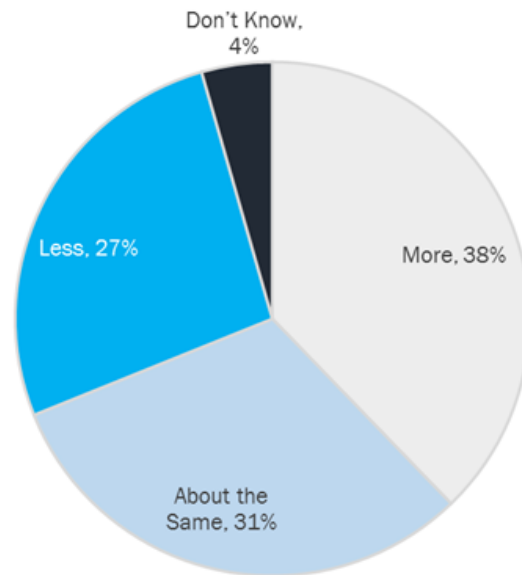
Figure 13. Respondents Indicating Whether Installation of the Technology Made Event Participation Easier, More Difficult, or the Same (n=19)



Note: We asked this question to those respondents who were already enrolled in a DR program before they installed the Auto DR technology.

Over one-third (38%) of respondents think that they reduced more energy than was estimated during events, while a little under a third indicated that they saved the same or less energy (31% and 27%, respectively), with the remaining 4% indicating they did not know if they had reduced more, the same, or less energy than estimated (see Figure 14 below). Notably, those who thought that they varied most from the estimate (either by more or less) tended to be respondents in the manufacturing, mining, and agricultural sectors. This corresponds to stakeholder findings that indicate that these sectors have more variation in terms of load-shed. We found no trends in terms of the vendors or technology controlled.

Figure 14. Respondents Indicated They Reduced More, Less, or the Same Energy than Was Estimated During Events (n=45)



Note: Four survey respondents were inactive and thus were not asked this survey question.

Respondents who indicated that they saved about the same energy as estimated indicated that sometimes the nature of their business does not allow for event participation, or that customer comfort / customer demands do not allow for energy reductions.

“The site is a school and we cannot power it down whenever we want.”

“Quality of the HVAC equipment—if it’s not running it’s not using energy so you can’t save more energy than none. A lot of equipment is shut off, leads to DR being an inconvenience—have to shut down the ones that are still running which are essential.”

Respondents who indicated that they saved less energy than estimated indicated that production schedules, technology not working, or incorrect initial estimates were some of the reasons for the lower energy savings.

“The programming of the load shed was not as successful as originally anticipated—had to tune programming.”

“The location of my facility has poor telecommunication signals. Load shed signals might not always go through.”

Notably, given the small number of survey respondents, no conclusive results can be drawn from this analysis. See Appendix G for cross tables between energy savings and firmographics (such as facility square footage, facility age, and building type).

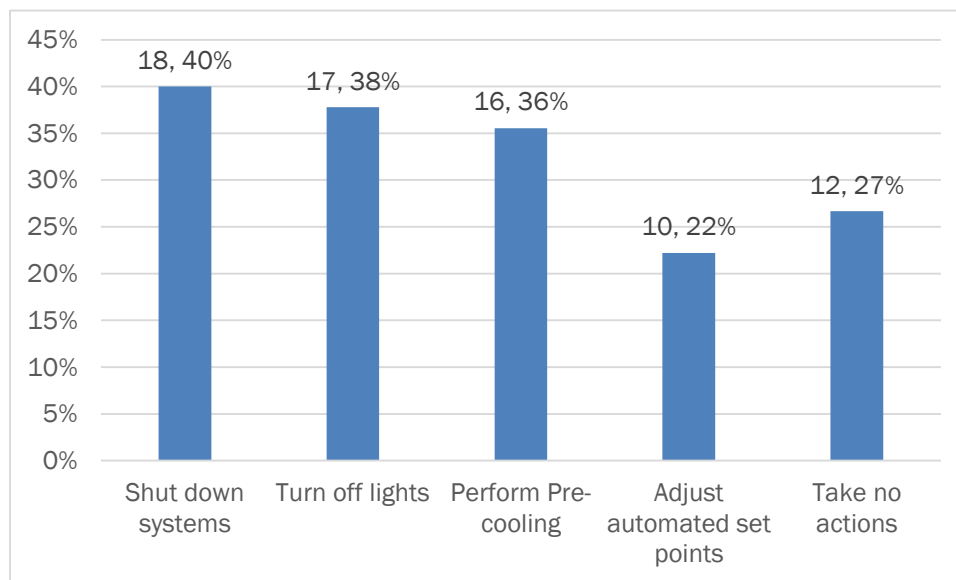
Those survey respondents who indicated that they participated in an event called in 2013 were asked whether they saw an impact on their business due to their participation. About half of the respondents (n=7) indicate that participating in their most recent demand response event had “no impact” on their business, four mention a “negative impact,” and two mention a “positive impact.” Those who indicate a positive impact stated their company saw a reduction in costs, and the event participant helps meet their savings goals. Those who

indicate a negative impact stated that the event inconvenienced them in terms of time of day their employees had to work, they were inconvenienced when the lights shut off, and the events increased production time.

3.5.1 What actions do participants take?

Eighteen of the respondents (40%) indicate that after they received an event notification in 2012, their organization shut down systems beyond what automatically shuts off during the event. Seventeen (38%) indicated that they also turn off lights, 16 (36%) perform pre-cooling, and 10 (22%) adjusted the automated set points on the thermostat.¹⁷

Figure 15. Actions Taken in Addition to What Is Automatically Shut-Off After Receiving Event Notification (Multiple Response: n=45)



Note: Four survey respondents were inactive and thus were not asked this survey question.

3.6 Why Are Customers Not Meeting Load Shed Test Estimates?

3.6.1 What are the barriers to consistent event response after installation of the technology?

As shown in Table 23 below, primary factors that prevented respondents from participating in events included that technology did not operate as planned and a concern for comfort. One respondent also noted that they had difficulty responding to events because they participated in multiple DR programs. The respondent said, “When CBP and CPP are called on the same day, there are problems with the baseline energy use. CPP events

¹⁷ Non-parametric tests indicate statistically significant differences across IOUs for actions taken during an event. However, given the small number of completes, we caution against drawing conclusions at a utility level.

eliminate ‘day of adjustment’ baseline, eliminates any possibility of meeting nomination.” Just over one-third of the 49 respondents (35%) are in multiple programs.

Table 23. Factors that Prevented Respondents from Participating in Events (Multiple Response: n=18)

Factors	Frequency	Percent
Technology did not operate as planned	6	33%
Comfort of employee and customers / Customer requirements	5	28%
Reduces production	2	11%
Timing was inconvenient	2	11%
Operational decision	2	11%
Not sure how to participate	1	6%
Installation was not complete	1	6%
Other	2	11%
Don't Know	1	6%

Note: Only those 18 respondents who were inactive or responded that they had only participated in some (not all) events were asked this survey question.

Additionally, customers who did participate in all events reported similar challenges to those mentioned above. Customers noted that the amount of time spent during and after events can be challenging. One respondent noted that event participation was often challenging due to the amount of equipment that needed to be turned off and on. “We are an agriculture customer with 20 wells, turning them all back on takes a long time.” Another customer noted “we cannot always meet the time requirement; we cannot leave the machines off that long.”

The top three barriers to enrolling in the program mentioned by customers involve the impact that the technology will have on their businesses operations—their revenue, customers, and employees (see Table 24 below).

Similar to the barriers to event participation discussed above, customers also had comfort-driven concerns prior to enrolling in the program. Further, concerns mentioned include the number of events, time needed to participate, and the difficulty of shutting down equipment; these concerns echo the convenience-based barriers that prevented some customers from participating in events.

Participant Remarks:

“It’s still not operational,” “it didn’t work,” and “after installation, [the] services were poor.”

“[The technology] never lived up to its expectations and after three years it never worked. [Vendor] changed employees every three weeks. They couldn’t keep anyone.”

The “vendor left me question marks, hardware that did not perform adequately or at all. The data wasn’t transferred from equipment to EMS equipment.”

The respondent “expected to easily participate [for their] other facilities. However, six other facilities are still awaiting smart interval meters. The project did not meet deadlines.”

Other respondents commented on event participation results. One noted that, “I found that aggregators base on what they want to nominate rather than what I tell them,” and another’s experience did not match “because I thought we’d save more money.”

Table 24. Concerns about Participating Mentioned by Customers

“What concerns, if any, did you have when deciding whether to participate in this program?” (Multiple Response: n=49)	Frequency	Percent
No concerns/no challenges	9	15%
Concerns about employee/customer satisfaction	9	15%
Comfort during events	7	11%
Impact on revenue streams	6	10%
Number of events	4	6%
Money	4	6%
Not sure if they can meet commitments/penalties	3	5%
Skeptical of Auto-DR technology	3	5%
Event notifications	2	3%
Time	2	3%
Cannot/hard to shut down certain equipment	2	3%
Skeptical of load reduction capability	1	2%
Return on Investment	1	2%
Lack of control	1	2%
Risk to product or business	1	2%
Other	7	11%

Consistent with participant responses, we found that program staff and stakeholders identified lack of control, issues of technology integration, and internal champions as potential barriers to participation.

Table 25. Perceived Customer Barriers Identified by Stakeholders

Barrier	Illustrative Quote
Fear of utility taking control	<p><i>“There was this fear that ‘you’re going to shut me off and make adjustments whenever you want; that you’re going to be able to have access to my data’...There’s this paranoia about security.” (Program Staff)</i></p> <p><i>“The word automation is a barrier. Customers thinking that automation being they had no control and any time they got a signal it was going to do a shut down for them.” (Account Rep)</i></p> <p><i>“We had to spend a fair amount of time in almost every case educating the customer that this is not automatic DR. In other words, it is not the utility shutting you down. ‘You guys get to say yes or no on an event-by-event basis. You guys get to program exactly how you participate.’” (Vendor)</i></p>
Technology integration and existing equipment might not be compatible with Auto-DR technology	<p>Older equipment may require upgrades before technology can be installed: <i>“A lot of time it’s just what kind of equipment the customer currently has. Sometimes we have to do the EE before we can do the DR simply because they don’t have the right equipment in there.” (Vendor)</i></p> <p>Technology must be integrated with various pieces of equipment within the facility: <i>“There are technological barriers where you have various types of industrial equipment [with] which we have to integrate that system and make it work.” (Vendor)</i></p>
Concern regarding fit with business model / operations	<p>Ability to participate may vary by sector (i.e., some businesses are less able to respond during events and not interrupt business operations): <i>“For some customers with continuous processes, DR is pretty much out of the question. Others have processes that can be interrupted and have the opportunity to do production at other hours.” (Account Rep)</i></p>
Lack of an internal champion within the company to support the project	<p><i>“If there is no internal champion of the Auto-DR project, if it’s not a priority for the organization, it becomes just another capital project and might not get the attention that it needs.” (Vendor)</i></p>

Nearly half of respondents reported no challenges while participating in the program. However, among those with challenges, most frequently mentioned were technology and installation challenges, DR event participation challenges, and program processes challenges. Table 26 below presents the various challenges mentioned by respondents.

**Table 26. Challenges Encountered while Participating in the Program
(Multiple Response: n=49)**

Category	“Did your company encounter any challenges when participating in the program?”	Frequency	Percent
No challenge	No challenges	22	42%
Technology and Installation Challenges	Technology didn’t work/work correctly (4) Some areas/equipment cannot be altered (2) Set-up/programming challenges (2) Staff learning to use technology (2)	12	24%

Category	“Did your company encounter any challenges when participating in the program?”	Frequency	Percent
	Technology did not meet load reduction expectations (1) Communication issues (1)		
DR Event Participation Challenges	Customer/client satisfaction (3) Load reduction required (1) Timing of event days (1) Demand response program challenges (1) Too time-intensive (1) Changing production schedule (1)	8	16%
Program Processes Challenges	Application process (2) Challenges with utility staff (1) Problems with vendor (1) Lack of coordination (1)	5	10%
Decision-Making Challenges	Too good to be true/ no money given (2) Tough to convince management that systems payback (1) Disagreement within company (1)	4	8%
Other	Other	2	4%

3.6.2 Why do some customers drop-out?

Five out of the 49 respondents indicated that they opted-out of signals during events. We did not find any trends regarding sector, technology controlled, or vendor type for those who opted-out. For those who indicated that they had opted-out, they mentioned the following:

The nature of their business does not allow them to shut down (e.g., *“the senior team made the determination that impacting the quality of air was too much of an inconvenience,”* or they *“cannot shut off the wells”*).

They decided to opt-out due to concerns regarding comfort (e.g., *“customer demand at a specific area in the building, such as the Ballroom HVAC”* or *“to a point it was an inconvenience to our customers.”*)

3.6.3 Are there characteristics of participants who are/are not realizing load shed in terms of technology type, program participation, and behavioral practices?

The evaluation team reviewed survey responses and other data collected through the evaluation effort, and was unable to find any trends in terms of participant characteristics and load shed reduction. However, this may be due to the number of survey responses rather than an absence of characteristics.

We did find that respondents in the agriculture and industrial sectors were more likely than respondents from other sectors to report that they achieved less or more than was estimated during the load-shed test. Given the small number of survey respondents, no conclusive results can be drawn from this analysis.

However, we asked program stakeholders if they have noticed any particular types of customers that are more likely to participate in the program or achieve more load reduction during events. Program stakeholders indicated that customer type may be a factor in terms of realization of load shed. For example, they expect variability by sector (e.g., industrial customers are less predictable, or office and retail have different comfort concerns). While the survey results do not show any trends across business sector, there are certain customers who are unable to respond to events due to the nature of the business (e.g., schools) or customer demands (e.g., hotels).

Most vendors interviewed (six of nine) mention that industrial customers may be the best fit for the program, because they tend to have larger loads and have flatter load profiles that they can leverage to more easily shift their production away from event hours. Conversely, some retail companies or service organizations (such as schools or hospitals) face participation barriers in terms of the flexibility of their operations. One vendor that serves commercial customers indicated that only large customers (such as big-box retailers and movie theaters) are likely to benefit from the program due to their load reduction potential. Potential barriers mentioned by account representatives interviewed included whether or not services or operations can be interrupted, or whether certain load-shed strategies (such as dimming lighting in retail settings) will negatively affect their customers' satisfaction.

Program stakeholders indicated that because DR programs provide varied penalties for non-participation (i.e., voluntary programs may have less event participation versus tariff-based programs), program type may have an impact in terms of event participation. The evaluation team analyzed the inactive participant population and survey respondents by DR program type. The data does not show any particular trends in terms of program type within which participants are inactive.

Some program stakeholders noted that vendors may over-inform customers of how to opt-out of the program events. As noted above, of the 49 survey respondents, only five indicate opting-out of the program. As such, the participant count is too small to confirm this claim.

Stakeholders also noted that participant staffing and customer education may play a role in responsiveness to events (e.g., site staff might not be educated, staff attrition, over-ride controls, etc.). In addition, load shed estimates do not account for customer behavior after the technology was installed. As noted earlier, about one-third of the survey respondents (n=17) indicate that they did take action to change their company's energy usage since installing the Auto-DR technology. Most respondents took actions relating to their lighting or HVAC systems. Only five respondents indicate making behavioral changes; these include change time of use of equipment, additional monitoring, and changing thermostat set points.

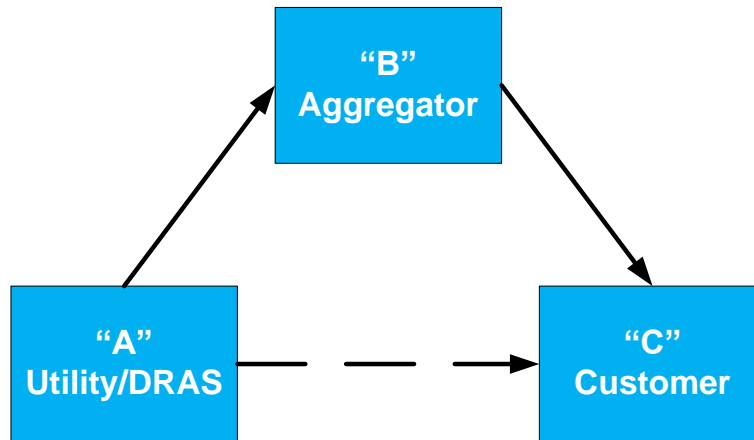
Program stakeholders also indicated that event participation and load-shed may be contingent on the technology controlled (e.g., HVAC load shed is more variable than lighting) or other issues, such as cloud-based control issues. Survey responses indicate no trends in terms of technology type.

However, we do understand that customers who enrolled in aggregator-managed programs in 2012 have varying requirements (by IOU) in terms of the technology installed. With reference to Figure 16 below, SDG&E does not require the technology installed to support communication between the DRAS and the customer (from "A" to "C"). Rather, the technology installed may or may not (depending on the aggregator and customer) support communication between the aggregator and the customers (from "B" to "C"). In cases where "B" to "C" communication does not occur, aggregators may be relaying notifications to customers for manual initiation of load reduction strategies.

This structure generates what is referred to as the "stranded assets" problem because it creates a risk that, should the customer switch to a non-aggregator-managed program (such as CPP or DBP), communication between the technology installed and the DRAS may not be possible. Furthermore, this structure allows for the possibility that the programs are incentivizing technologies that are not truly Auto-DR-capable. To address these concerns, SCE and PG&E has instituted a requirement that all incented technologies installed by

aggregators must support the Open ADR 2.0 program language (used by the DRAS). We understand that SDG&E will adopt this requirement going forward in 2013.¹⁸

Figure 16. The “Stranded Assets” Problem



In 2013, the program now ensures that all technologies have the most up-to-date communication standard, or Open ADR 2.0 capabilities, which facilitates Demand Response Automation Server (DRAS)¹⁹ communication with the Auto-DR systems. Without open communication with the DRAS, the Auto-DR system will not be able to initiate the load reduction plan, minimizing load reduction opportunities. The standard in use in 2012, Open ADR 1.0, provided one-way signal communications. In 2013, Open ADR 2.0 A and B sends a signal, received confirmation of receipt and provides telemetry data to record load impact. However, despite incorporating Open ADR 2.0 capabilities, not all IOUs can autonomously trigger events with aggregator managed participants.

3.6.4 What types of behavioral / operational changes do participants make after installing the technology?

About one-third of the respondents (n=17) indicate that they took actions to change their company’s energy usage since installing the technology. Eight took action relating to lighting and four indicate either making changes to their HVAC system, setting the thermostat, or installing dehumidifiers/economizers. Remaining respondents made changes to other equipment such as pool pumps and refrigeration, or increased the monitoring of or reorganized their equipment schedule. Given the small number of respondents, no conclusive results can be drawn from this analysis. As such, we provide these results for informational purposes only.

Nine respondents (18%) made changes to business operations or facilities that significantly increased or decreased load since the technology installation. These changes include installing additional equipment due to increased production demands, tenants moving out, modifying schedule to accommodate DR events,

¹⁸ Decision 12-04-045. Decision Adopting Demand Response Activities and Budgets for 2012 through 2014. 4/30/2012.

¹⁹ The DRAS sends a web-based signal to the system, which then travels directly to the EMS that automatically implements the pre-programmed load reduction plan.

installing solar panels, and performing retro-commissioning. Of these nine respondents, five indicate that they saved more energy and four indicate saving about the same as estimated during the events.

3.7 How Can the Program Change to Improve the Customer and Vendor Experience?

We asked responding participants to provide recommendations for program changes that improve their experience with the program. Their responses aligned with findings about primary barriers and challenges to participating in the program. Survey respondents provided recommendations for program changes to improve their experience with the program. Notably, these recommendations may be relevant to select utilities. These recommendations include:

- Supporting DR event participation: Respondents suggested offering better or more DR incentives for participating in events. Others asked for more advanced notice of events.
- Enhancing program processes: A few respondents suggested streamlining the processing time for applications, while another suggested, “improve the speed of the check, and hold vendors accountable.”
- Providing more training for account representatives and program staff: Respondents indicated that account representatives could be more familiar with the program. They also preferred working with account representatives who were more responsive to their needs and allowed for greater interaction with the IOU.
- Providing more education and training to customers: Respondents wanted knowledgeable staff to train customers to run and maintain their systems, and wanted more information about DR program options available and what programs best suit their particular needs. One respondent suggested creating better documentation on how DR events work, such as a one-pager that participants could share with senior staff in their facility. SCE has such a document but it may be prudent to ensure that all customers are aware of it.
- Providing more feedback and information: One respondent indicated that they wanted to know about their event results, and whether they were successful in terms of results. Respondents commented on issues with the DRAS, as they noted that it loses connection, and a PG&E customer indicated that this makes it difficult to bid into the website through the web-portal. Additionally, respondents wanted more information about new technologies that would be relevant for the program.

We also asked responding participants to share how the IOUs could encourage event participation in DR programs. Overwhelmingly, respondents suggested improving communication and information provided about the DR program and program events. These included providing more information about when events were coming, the number of events that would be called and receiving notification earlier. A key piece to this recommendation was making sure that the account representatives were providing this information to their clients.

In addition, respondents also provided a handful of suggestions to support better communication. These included hosting a breakfast meeting at the beginning of the event season to remind participants that events could be up-coming and providing time for a question and answer session so that respondents can learn more about their system. Another respondent indicated that existing collateral (such as flyers from the IOUs) were not “very user friendly” as they did not explain the benefits of participating very well. This respondent

Integrated Findings

suggested offering case studies. Given geographic concerns, IOUs could offer webinars to provide additional program related information to existing participants.

4. Summary of Findings and Future Research Areas

Below we provide a summary of evaluation findings by research question as well as suggested future research areas.

Evaluation findings indicate that the Auto-DR program enhances participants' ability to participate in DR program events. According to surveyed participants, the program also increases enrollment in other IOU DR programs, improves customer operational efficiency, reduces operational costs to customers (depending on the enrolled program, by avoiding non-performance penalties, avoiding higher energy costs, or by qualifying for incentive payments) and increases satisfaction.

The Evaluation Team also identified five key areas for program enhancement: (1) improving DR program enrollment via program outreach, (2) streamlining program application processes, (3) assuring quality installation of technologies, (4) continuing communication with participants, and (5) program design changes to enable event participation. Notably, we present findings and recommendations at a statewide level, thus some recommendations may not be relevant for a particular IOU. We outline the key evaluation findings regarding program value and offer suggestions for improvement below.

Improving DR Program Enrollment via Marketing & Outreach Efforts

The Auto-DR program requires new participants to enroll in DR programs to receive Auto-DR technology incentives. As such, the Auto-DR program acts as a recruiting agent for new DR program enrollees. While the program serves to increase enrollment in these DR programs, there are additional opportunities to further increase and target enrollment.

The evaluation team recommends the following:

- **Provide enhanced training to account representatives regarding the program.** Despite the fact that nine of 10 account representatives report receiving training on the program, we found variation within and across the IOUs in terms of the training offered (ranging from project-specific kick-offs to educational seminars).
- **Conduct project-specific meetings with key stakeholders to provide an opportunity to better explain the program and clarify concerns.** In addition, providing additional collateral and FAQs regarding program design, conducting project-specific meetings with customers can help to answer core questions and concerns. Account representatives suggested providing customers with these face-to-face meetings with program staff to answer questions and help explain the program's value and processes.

Streamlining Program Application Processes

While participants are generally satisfied with the program, they gave relatively low satisfaction ratings for the length of time required to process and fill out the application.²⁰ According to program staff, the duration of projects can vary based on the program staff and the number of applications (and their complexities) submitted at any given time. One project can have up to 25 individual service accounts

²⁰ Respondents gave a mean score of 6.5 and 6.7 respectively on a 7-point scale, where 1 was dissatisfied and 7 was very satisfied.

(site locations). Additionally, delays may occur from waiting to receive information from the customer or vendor.

The most important differences across the IOUs occur during the application stage, where PG&E and SCE incorporate an initial engineering review, while SDG&E does not. This difference is critical, as both program staff and vendors acknowledge a disparity between vendors' load shed estimates and verified load shed estimates performed by program verification engineers.

The evaluation team recommends the following:

- **Monitor application process timing and identify opportunities to streamline the process.** This program requires many steps and incorporates multiple stakeholders, which can result in longer processing times. We suggest that the utilities review the aspects of the process that take the most time and identify any areas that can be streamlined. In addition, we suggest that the IOUs determine the appropriate amount of information to collect from customers who apply to the program to support program oversight and evaluation, and streamline application forms based on this review. In order to facilitate this effort, we recommend that program staff develop an application process map and identify areas for improvement (i.e., the amount of time it takes to input and process information, identify unnecessary steps, etc.) and make revisions based on this review.
- **SDG&E should consider incorporating additional engineering review of vendor-estimated load shed** prior to reserving the incentive and installation of the technology. SCE and PG&E are already incorporating this practice into their program design, and we recommend that SDG&E develop a similar approach to increase engineering review. Approaches could extend to leveraging existing project verification engineers to review incentive requests prior to installing the technology, or contract with third-party engineers to support this review.

Assuring Quality Installation of Technologies

Survey results indicate that one of the primary barriers to event participation was that the Auto-DR technology was not operational or did not operate as planned. Additionally, customers' program dissatisfaction tended to focus on issues with the technology installation and operability.

Vendors also expressed difficulties with the load-shed testing stage. Vendors indicated that they had difficulty understanding how baselines are calculated, and why engineering load-shed test estimates did not always correspond to vendor-estimated load shed.

We recommend the following:

- **Enhance vendor quality control activities to ensure operability of technology.** Vendor QA/QC efforts should focus on the quality of installation, ensuring the technology is working properly and the installation experience from the customer's perspective (such as professionalism, timeliness, and courtesy of the vendor).
- **Conduct follow-up calls with account managers and program participants at three months and six months post-installation to ensure that the technology is operational.**
- **Continue to increase the transparency of baseline calculations** by providing this information to vendors as they participate in the program, and providing materials that explain the process in non-engineering terms. Further, the IOUs could consider conducting introductory workshops for new vendors to provide educational materials regarding the program process and other supplemental collateral and FAQs related to baseline calculations.

- **Conduct introductory workshops** for new vendors to provide educational materials regarding the program process and other supplemental collateral and FAQs related to baseline calculations.

Continuing Communication with Participating Customers

Survey respondents overwhelmingly suggested improving the program through enhancing communication and information provided about the program and events. We acknowledge that the nature of this program will likely always require multiple participation steps and multiple parties. In addition, Auto-DR program staff are not responsible for communicating events with DR program participants.

Therefore, the evaluation team recommends the following:

- **Provide status updates to stakeholders and participants throughout the participation process.** We recommend that the IOUs consider creating a customer web-portal to provide project-specific information to vendors, account representatives, engineers, IOU staff, and customers. This portal could contain all project documentation, including applications, load estimates, technology installed, and project status. In addition, the portal could provide links to additional information regarding program processes and other relevant material, as well as event notifications for upcoming DR program events. The IOUs should seek to balance cost and privacy concerns with increased access to program information.

Program Design Changes to Enable Event Participation

Prior impact evaluation results indicate that the Auto-DR programs achieved lower than expected load impacts. As a result, the IOUs initiated program design changes in the 2012-2014 program cycle to support increasing reliability of event participation (and therefore increased load shed) for customers through three primary mechanisms. These include requiring participants to enroll in a DR program for at least three years, transitioning from a 100% incentive to a 60/40% incentive, and requiring all technologies to move to the most up-to-date communication standard (Open ADR 2.0 capabilities).

We recommend the following:

- **Track effects of program design changes.** Tracking should include: (1) number of newly enrolled customers, (2) the number of participating vendors, and (3) the proportion of participants that participate in events in a given year. Tracking the trends year-over-year will help the program assess the impact of these design changes on program participation. Additionally, a survey of non-participants may provide additional feedback regarding likelihood to participate in the Auto-DR program with the 60-40% incentive and impacts on future program participation.

4.1 Opportunities to Improve Program Tracking

Some research questions were not fully answered due to program database tracking issues. We found that there were limitations in terms of program data tracking across the IOUs. As a result, there were difficulties determining (1) which customers received the incentive; (2) DR program enrollment; (3) whether customers were actively participating in events; and (4) how to contact participants, since many did not have contact information. Therefore, there is room for improvement regarding data tracking for this program.

We provide the following recommendations related to program tracking and database structure. Overall, the evaluation team found that limitations in terms of program data tracking are similar across the IOUs. While analyzing the program databases, the evaluation team found several inconsistencies or several variables with missing data. To improve the database and help track customer progress, we recommend improving the following data variables:

- **Unique Identifier:** Given the nature of the Auto-DR program, a customer could have several projects at several sites, which makes tracking unique customers both important and difficult. This is currently the Service Account ID (SAID) variable. However, we found issues when leveraging this variable. Some customers have the same address and same kW savings/incentives, which could be indicative of the same project recorded twice. Additionally, there were also instances where customers had several different premise IDs for the same address. Thus, to account for the different projects for the same customers, we recommend that each IOU ensure that the SA_ID variable is a unique identifier for each project.
- **Event Activity Flags:** The primary outcome of the program is to have an impact on demand savings through participation in DR program events. However, the current databases do not consistently track event participation for all participants. As such, we recommend consistently tracking event status for customers. Additionally, a helpful addition would be a date when the customer began participating in program events; we found that this was difficult for some program staff to locate when pulling data 2012 participants for the evaluation effort.
- **DR Program Participation Flag:** Besides participating in different events, customers are also able to enroll in several different DR programs offered by the IOUs. Thus, similar to the flags for event participation, the IOUs should record these for each program that a site is enrolled in. Currently, the databases have incomplete information for several sites. As a result of providing data for this evaluation effort, PG&E developed a process to flag active Auto-DR customers across the various DR program event database, to enable oversight of Auto-DR customer enrollment and activity.
- **Track Load-Shed Test Data:** We found that load-shed test estimates were not consistently entered for customers in the program-tracking database. We recommend tracking this information consistently within the program database to allow program staff to monitor realization of load shed by customers.
- **Track Technology Installed:** One of the main components of the program is the technology installed at customer sites. However, this information is not tracked, which makes it difficult to identify which technologies are well received by customers, or profile event participation by technology type. We understand that this information is currently tracked in program application records.
- **Company Information:** One of the company characteristics currently tracked in the databases is the NAICS/SIC code. To support profiling customers over time to enhance program tracking and oversight, we recommend comprehensively tracking company characteristics.
- **Update Contact Information:** During the course of this evaluation, we attempted to contact all customers for the purpose of completing a participant survey. However, (1) we were not able to obtain contact information for all customers; (2) several of the phone numbers were incorrect, invalid, or disconnected; (3) several of the primary contacts were not the correct point person or were no longer with the company; and (4) many email addresses were invalid. As such, several of the customers could not be reached and feedback could not be obtained from them for the purpose of helping to improve the program.

4.2 Future Research Areas

The evaluation team provides findings related to enhancing program design and implementation throughout the body of this report. However, given the timing of the evaluation effort and limitations in terms of data tracking and sample sizes, we were unable to provide results for all research objectives. As such, we provide the following future research areas to consider going forward:

- **Explore effects of program design changes.** As noted Section 3.1.1, we recommend exploring 2012-2014 program cycle changes by tracking the number of newly enrolled customers, the number of participating vendors, and the proportion of participants that participate in events in a given year. Tracking these trends year-over-year will help the program assess the impact of these design changes on program and event participation. Additionally, the program could also consider conducting non-participant interviews with similar customers to explore potential barriers to the 60-40% incentive.

We recommend that DRMEC consider conducting additional evaluations to gain greater insights regarding program value, particularly regarding lower than expected load shed during program events and program cost-effectiveness. In particular, future efforts should jointly review the process evaluation in the context of impact findings. These efforts would include one or more of the following:

- **Identify participant characteristics that provide consistent and reliable load-shed, and target future enrollment based on these characteristics through database review and non-participant survey:** The Evaluation Team was unable to provide a full participant characterization by key criteria due to limited tracking data and unreliable contact information that reduced the total number of survey completes. Steps are already underway to enhance program tracking. These efforts may:
 - Help provide additional insights into the type of participants who provide consistent and reliable load-shed (by segment, size, DR program, or technology type). Notably, the IOUs do not consistently track technology installed or controlled. By tracking this information, future research could cross-reference technology by event performance. This could serve to identify technologies that support load impacts, and disqualify any technologies that are poor performers.
 - Help balance load shed impacts with cost of technologies. This review could help to prioritize technologies that provide greater impacts at lower installation costs.
 - Help target future recruitment efforts for newly enrolled DR participants by exploring whether participants who enrolled in a DR program after installing the Auto-DR technologies participate similarly to those who were already enrolled in a DR program, as well as profile enrollment across various types of DR programs. Results from this exploratory research could provide findings that support targeting customers with more reliable event participation and provide guidance around the best DR program fit for their businesses.
- **Identify any incremental impacts resulting from participation in the Auto-DR program.** A non-participant survey and database review would help to identify differences between Auto-DR and non-Auto-DR participants (such as enabling technology installed within the facility) and serve as a benchmark for identifying any incremental benefits from the Auto-DR technology. (If not already occurring, consider flagging Auto-DR participants in DR program databases to enable benchmarking).

Appendix A. Program Implementation Processes

Below we provide implementation flow charts that characterize program implementation across each IOU.

Figure 17: PG&E Implementation Flow Chart

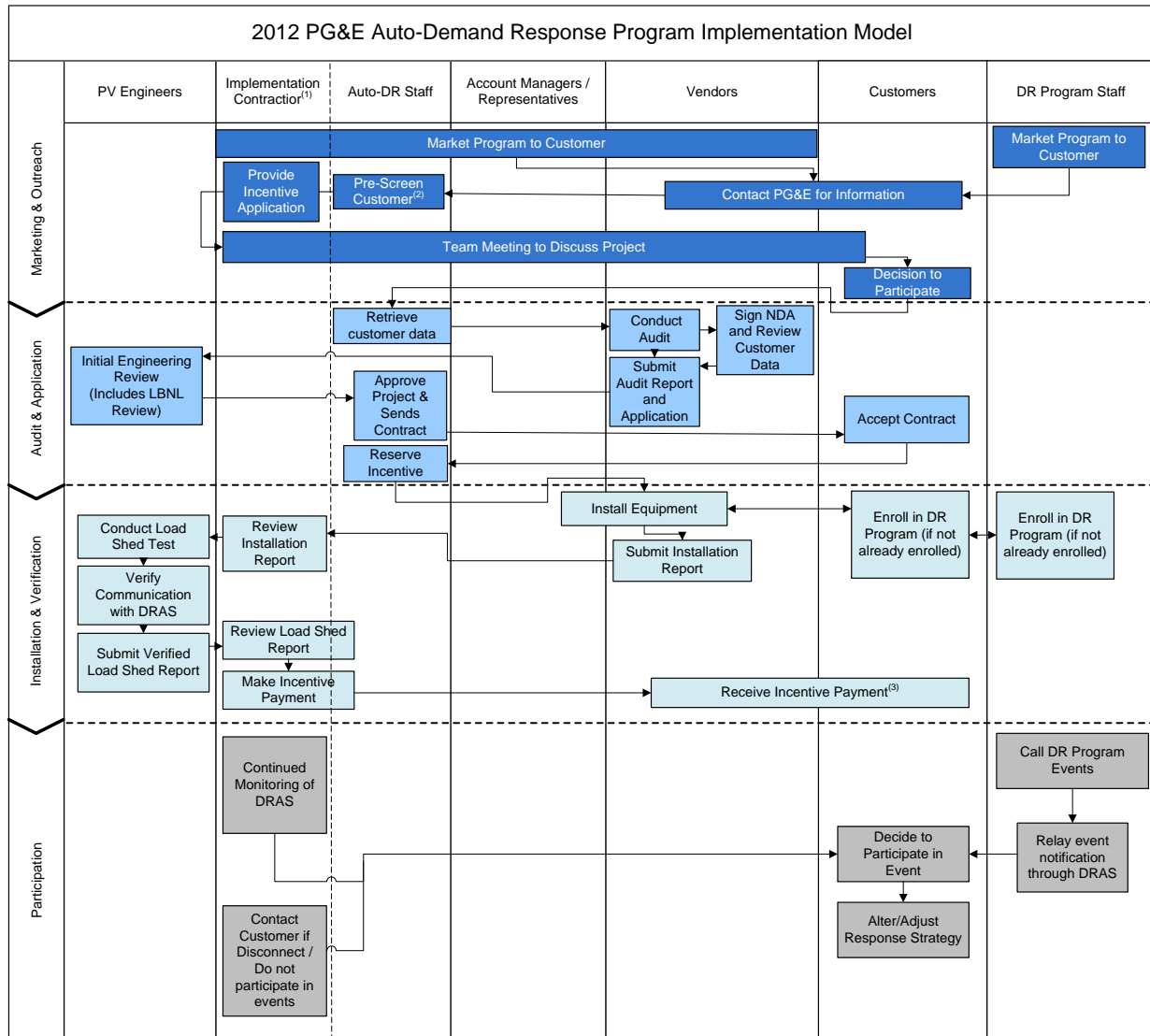
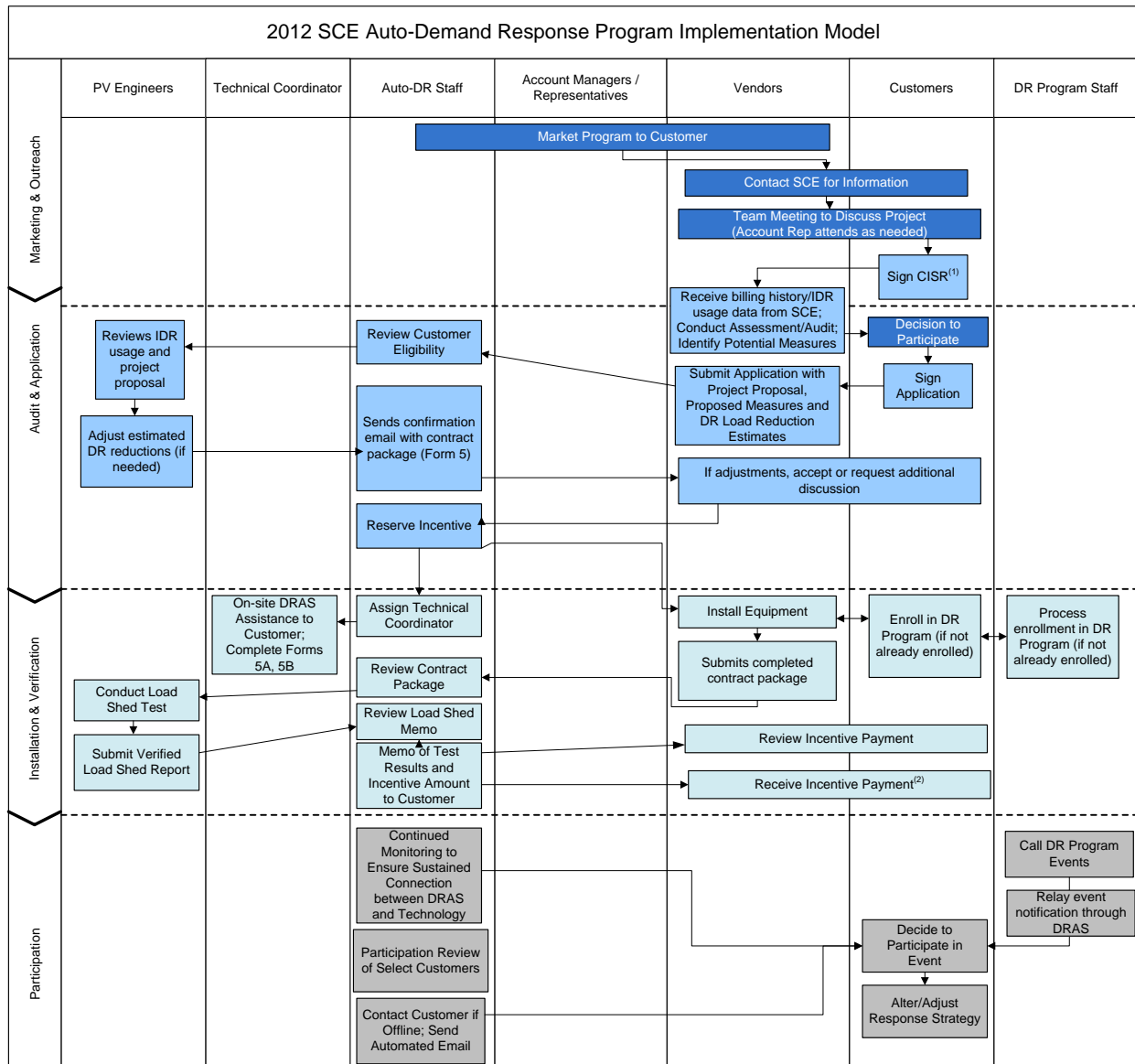


Table Notes:

- (1) PG&E changed implementation contractors in mid-2012 from Global Energy Partners to Energy Solutions. However, the role of these implementers remained the same
- (2) Pre-screening includes review to determine customer eligibility and that the facility has enough load to qualify for an Auto-DR incentive
- (3) In 2012, 100% of the incentive was paid up-front. Beginning in 2013, 60% of the incentive was paid at this point and the remaining 40% was paid after participation in one full DR event season.

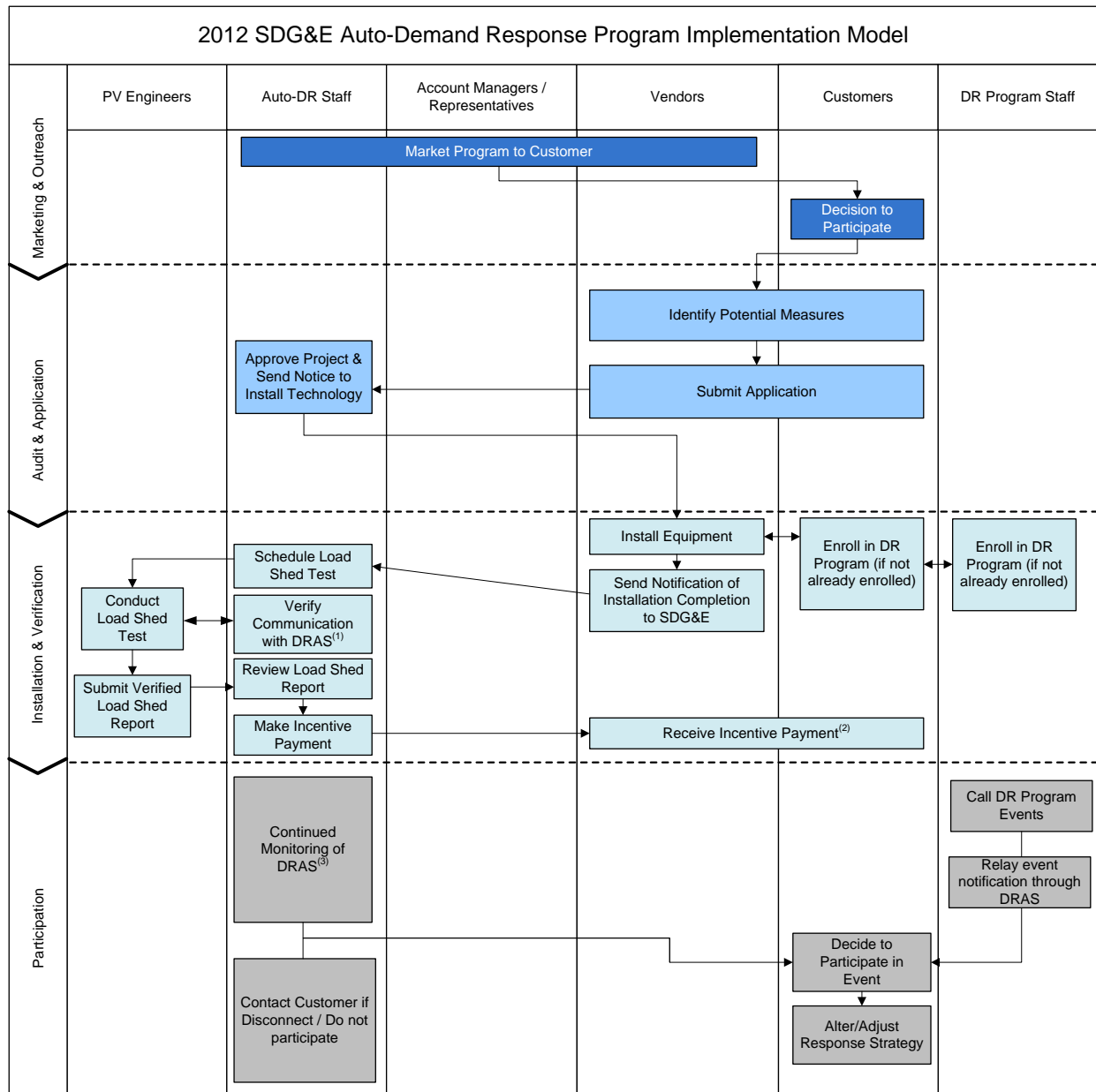
Figure 18. SCE Implementation Flow Chart



Notes:

- (1) A Customer Information Service Request (CISR) must be filled out by the customer to give the vendor access to meter and other utility data for their facility
- (2) In 2012, 100% of the incentive was paid up-front. Beginning in 2013, 60% of the incentive was paid at this point and the remaining 40% was paid after participation in one full DR event season

Figure 19. SDG&E Implementation Flow Chart



Notes:

(1) In 2012, SDG&E's DRAS provider ensured connection between the Auto-DR technology and the DRAS; in 2013, this step is now completed by Auto-DR support staff

(2) In 2012, 100% of the incentive was paid up-front. Beginning in 2013, 60% of the incentive was paid at this point and the remaining 40% was paid after participation in one full DR event season

(3) Customers who enroll in an aggregator program (CBP) are not required to be connected to the DRAS; in these cases, aggregators manage event notification

Appendix B. Summary of Sales Pitch by Vendors and Account Representatives

Table 27. Sales Pitches Mentioned by Vendors (n=9)

Vendor	Sales Pitch Components	Sales Pitch Quote
V1	<ul style="list-style-type: none"> • Technology (first) • Technology that supports better energy management • Free technology • Incentive payments for very little effort • Voluntary DR event participation 	<p>“... You’re going to get a control system that is going to allow you to have greater visibility on your energy usage and it’s going to be paid for entirely by the incentives...the only thing you have to do is to enroll in the program...and participate when you can, and if you can’t, you don’t participate.... You’re only going to have to do something 12 times a year and you’re going to get [thousands of dollars] for almost doing nothing”</p>
V2	<ul style="list-style-type: none"> • Auto-DR program (first) • “Turnkey program” that includes a feasibility assessment and technology upgrade 	<p>“So we would market Auto-DR as a turnkey program that started with site assessment [of] feasibility all the way through... so from concept to commissioning is how we would pitch the program.”</p>
V3	<ul style="list-style-type: none"> • Technology (first) • Economics • “Green” benefits • Community/grid benefits 	<p>“I start with the economics and then I follow with the Green and then I follow with the community/grid and city level impact... I start from the pebble in the water with the customer and his meter and [then go] outward.”</p>
V4	<ul style="list-style-type: none"> • Technology (first) • Program process • Incentives • How technology helps DR participation 	<p>“From [the customer’s] perspective they have to sign up for a qualified DR program and they know that there are incentives that are paid...and that our system is fully automated and it will take control of those DR events...”</p>
V5	<ul style="list-style-type: none"> • Auto-DR program (first) • Program benefits • Incentives from DR participation • Free technology upgrade 	<p>“We’re telling them all the benefits of the program, how much money they stand to make during the DR event. How much you know they’ll not have to pay anything out of pocket for the entire project.”</p>
V6	<ul style="list-style-type: none"> • DR program (first) • DR program and incentives for automating participation 	<p>“...we lead with selling the aggregate DR program. Here is the program and here is the dollars that can become available to you to automate your system to be able to participate in DR programs.”</p>
V7	<ul style="list-style-type: none"> • DR program (first) • Making money from DR participation • Saving money on technology upgrade through Auto-DR 	<p>“...DR is definitely a big thing that we’re trying to sell... you [the customer] just get incentive money to pay for the technology, but you don’t really get any extra money. It is money that you’re saving, but with the DR you actually get more money.”</p>

Summary of Sales Pitch by Vendors and Account Representatives

Vendor	Sales Pitch Components	Sales Pitch Quote
V8	<ul style="list-style-type: none"> Auto-DR and DR incentives (first) Increases the convenience of DR program participation 	<p>"Well we just explain to them that the [Auto-DR] program doesn't require any additional resources on their behalf. It is something that is more streamlined and effective...A lot of them have dealt with the old DR programs where basically they are running up and down hallways switching off lights and adjusting thermostats."</p>
V9	<ul style="list-style-type: none"> Incentives pay for most/all of the technology upgrade 	<p>"The fairly generous incentive...is a huge selling factor. Everybody wants to know... how much is it going to cost to change the equipment that they have so that they can become Auto-DR enabled; and a major portion of that is covered under the incentives and that's the selling point."</p>

Table 28. Sales Pitches Mentioned by Account Representatives (n=10)

Account Rep	Sales Pitch Components	Sales Pitch Quote
AR2	<ul style="list-style-type: none"> Highlight environmental gains: being Green Highlight reputational gains: prevent black-outs Provide customer with marketing materials 	<p>"I sell it also from the basis of kind of going Green and being Green and participating in the environment and preventing all of our other smaller customers from perhaps being involved in rolling black-outs...I give them some items for...advertising, we have these big banners that can be put up in a store [saying] for example...'We're participating in demand response and our lights are dimmer or it's a little warmer in here' ...and we're doing our part."</p>
AR1	<ul style="list-style-type: none"> Explain available programs Give technical advice on program benefits How ADR fits into energy efficiency portfolio and additionally Highlights social and environmental gains 	<p>"I say a big part of my job is to market our EE and DR programs to our customers. This comes in a lot of different shapes and forms. Whether it be to tell them initially about the programs that are available or as they work on EE projects, tell them how ADR might fit into their EE portfolio...the form of education and/or technical advice on the benefits of the program. We are basically a third-party and rate energy advisors for our customers. So they trust our opinion if they are looking for additional opportunities because with the customers I deal with they have been participating in our programs for probably the last 20 years. Other than new technologies there is really no low-hanging fruit for those guys to become more EE, they have to reach higher and higher up the chain. So I present ADR as an additional opportunity for them, especially with the control systems they have in place now. Actually, I look at ADR as another piece of low-hanging fruit. Most of them don't have the control...And then by knowing your customers too you look at ...how ADR can actually fit into their social awareness and their sustainability plans."</p>
AR5	<ul style="list-style-type: none"> Highlight convenience: labor savings 	<p>"I talk to them about how much easier it would be ... for them to have their shutdown process automated. That is what gets me started talking...I get them excited about not having to rely on a person to have another job of having things shut down when there is an event."</p>
AR6	<ul style="list-style-type: none"> Explain opportunities of ADR: how load drop can be expanded Highlight monetary incentives Highlight convenience & flexibility 	<p>"I kind of try and look and see are you doing something already? Can we expand upon it?...How do you go about dropping that load? What's the process and can we make that better for you, because I have this awesome, groovy program that will pay up to 100% of your project costs to automate that for you and make it so that you can go on vacation and it will be taken care of, and you can opt-out and those types of things. So that's pretty much my approach to look who's got actual opportunity and how can we expand upon there."</p>
AR8	<ul style="list-style-type: none"> Explain benefits of upgrade Highlight reputational gains: examples of comparable participants Highlight leadership of early adaptors 	<p>"I would say that I usually do my homework first and see how many accounts they have that already participate in the DRC program, whether or not it would a benefit to them if they're planning on upgrading ... equipment that we have incentives that can pay for that if they're willing to do Auto-DR, which working with the third-parties they make it really quite simple. Some of them inquire.... And I'm like yeah, I've seen several water districts in the past be able to take advantage of the incentives and they're kind of like leaders in the industry and then everybody else kind of follows suit."</p>

Summary of Sales Pitch by Vendors and Account Representatives

Account Rep	Sales Pitch Components	Sales Pitch Quote
AR9	<ul style="list-style-type: none"> Explain differences between traditional programs and ADR Highlight convenience & flexibility: customer can virtually participate 	<p>"...face-to-face and tell them that the DR market is evolving... Traditional programs were interruptible and are slowly phasing out and being replaced by price response programs that allow to marginally participate at any given event." "They can virtually participate rather than have to be all in with either of our interruptible programs."</p>
AR3	<ul style="list-style-type: none"> No formal role in marketing Highlight monetary incentives Highlight energy savings 	<p>"I would (play a role in marketing) if I had more customers that are eligible for it. The refineries and the large tins ... are not interested in an ADR program." "In general, customers that are candidates for this program love the energy savings...90% it is the money. Then the environment, but it is 90% the money...if there wasn't a big incentive, they would not be participating because the cost to clear and recover from this is way too high."</p>
AR4	<ul style="list-style-type: none"> Highlight program opportunities and fit for the business Highlight the compensation 	<p>"I don't really think of it as ADR more than the DR program. That is the way I look at it because the difference ... especially with ADR, is how often it is called, what opportunities are available for the customer as far as good fit. And then obviously the compensation the customer would receive for participating in the program." "I look at who the customer is and try to find the best fit for them knowing what kind of business they operate and what kind of limitations they have."</p>
AR7	<ul style="list-style-type: none"> Highlight monetary incentives Highlight opportunities of curtailment 	<p>"The incentive for participating in a DR program is quite attractive to them, ADR making it a little simplified. And it offers an incentive...We fleshed out where the curtailed opportunities are."</p>
AR10	<ul style="list-style-type: none"> Explain opportunities of curtailment Highlight convenience & flexibility Highlight incentive 	<p>"When I do a face-to-face meeting I am talking about our option for DR. We just went out and did the education for all our customers. So it is obviously a time we talked about options of shedding load and other programs. It makes their lives easier...Did we get anymore load shed out of it? I don't think so. We are shedding the exact same amount of load, but we automated it for the customer...And it is almost like we paid you an incentive to automate it."</p>

Appendix C. Data Collection Instruments

Below we provide participant survey and stakeholder interview guides for account representatives, vendors, engineers, and DR program staff.



2012 Participant
Survey



Account
Representative Inter



Vendor Interview
Guide



Engineer Interview
Guide



DR Program
Manager Interview (



2013 Participant
Interview

Appendix D. Participant Survey Disposition

Table 29 below shows the sample frame along with the disposition for the participant survey fielded in October 2013.

Table 29. Participant Survey Disposition

Participant Survey	PG&E	SDG&E	SCE	Total
Complete	10	5	34	49
Eligible, Non-Interview (Category 2)	33	5	57	95
Refusal	9	0	14	23
Household-level refusal	0	0	0	0
Known-respondent refusal	0	0	0	0
Break off	0	0	0	0
No answer	0	0	0	0
Busy	0	0	0	0
Respondent never available (call backs not completed)	20	3	27	50
Telephone answering device (confirming HH)	4	2	16	22
Other, non-refusals	0	0	0	0
Deceased respondent	0	0	0	0
Physically or mentally unable/incompetent	0	0	0	0
Language problem	0	0	0	0
Miscellaneous	0	0	0	0
Unknown Eligibility, Non-Interview (Category 3)	2	1	6	9
Unknown if housing unit	0	0	0	0
Not attempted or worked	0	1	0	1
Always busy	0	0	2	2
No answer	1	0	4	5
Answering machine—don't know if household	0	0	0	0
Call blocking	1	0	0	1
Technical phone problems	0	0	0	0
Housing unit, unknown if eligible respondent	0	0	0	0
No screener completed	0	0	0	0
Other	0	0	0	0
Total Customers with Valid Contact Information	45	11	97	153
Not Eligible (Category 4)	5	6	14	25
Duplicate Number	0	0	1	1
Fax/data line	2	0	2	4
Non-working/disconnect	2	2	2	6

Participant Survey Disposition

Participant Survey	PG&E	SDG&E	SCE	Total
Wrong number	1	3	6	10
Temporarily out of service	0	0	0	0
Special technological circumstances	0	0	0	0
Number changed	0	0	0	0
Cell phone	0	0	0	0
Call forwarding	0	0	0	0
Pager	0	0	0	0
Non residence	0	0	0	0
Business, government office, other organizations	0	0	1	1
Institution	0	0	0	0
Group quarters	0	0	0	0
No eligible respondent	0	1	2	3
Quota filled	0	0	0	0
Other	0	0	0	0
Total Customers with Contact Information	50	17	111	178
Customers without Contact Information	43	1	2	46
Total Customers	93	18	113	224

Appendix E. Survey Response and Firmographics

Table 30 below shows the cross tab between what customers thought they saved (more, less, or about the same as estimated) with participant firmographics.

Table 30. Cross Table of Respondents Indicating They Reduced More, Less, or the Same Energy than Was Estimated during Events with Firmographics (n=45)

n=45	More than Estimated	About the Same as Estimated	Less than Estimated	Don't Know
Overall Responses	17	14	12	2
%	38%	31%	27%	4%
What percent of your overall operating costs comes from electricity costs?				
0-20%	13%	13%	13%	4%
21-40%	16%	11%	0%	0%
41-60%	4%	0%	0%	0%
61-80%	0%	0%	7%	0%
81-100%	0%	0%	2%	0%
Don't know	4%	7%	4%	0%
What systems or equipment use the largest amount of energy at your facility?				
Motors	11%	4%	4%	2%
Air conditioning	9%	18%	9%	0%
Industrial equipment	4%	2%	4%	0%
Lighting	2%	0%	0%	0%
Other	11%	4%	7%	2%
Don't Know	0%	0%	2%	0%
Refused	0%	2%	0%	0%
This facility is...				
My company's only location	0%	2%	7%	2%
One of several locations owned by my company	31%	27%	20%	2%
The headquarters location of a company with several locations	7%	2%	0%	0%
What business sector does your firm belong to?				
Manufacturing	16%	2%	9%	2%
Agricultural/Mining	7%	4%	9%	2%
Real Estate	2%	4%	4%	0%
Media/Entertainment	2%	0%	0%	0%
Retail or wholesale	0%	2%	0%	0%
Medical	0%	0%	2%	0%

Survey Response and Firmographics

n=45	More than Estimated	About the Same as Estimated	Less than Estimated	Don't Know
School	0%	2%	0%	0%
Other	11%	13%	2%	0%
Don't know	0%	2%	0%	0%
How would you categorize your building type?				
(Industrial process/manufacturing/assembly)	13%	0%	9%	0%
(Warehouse)	9%	9%	0%	0%
(Multiple office, office building)	4%	4%	7%	2%
(Agriculture)	4%	4%	4%	2%
(Retail (non-food))	2%	2%	0%	0%
(College/University)	0%	2%	0%	0%
(Hotel/Motel)	0%	4%	0%	0%
(Other—please specify in the box below)	4%	4%	7%	0%
Do you lease or own your facility?				
Lease	9%	9%	7%	0%
Own	27%	22%	16%	4%
(Don't know)	2%	0%	4%	0%
Approximately, what is the total square footage of your facility?				
10,000 - 24,999 sq ft	0%	0%	2%	0%
25,000 - 49,999 sq ft	0%	4%	2%	2%
50,000 - 74,999 sq ft	2%	4%	0%	0%
75,000 - 99,999 sq ft	7%	4%	0%	0%
Over 100,000 sq ft	22%	16%	16%	2%
(Don't know)	7%	2%	7%	0%
How many employees, full- plus part-time, are employed at this facility?				
(Less than 10)	2%	0%	2%	2%
(10-49)	7%	4%	2%	0%
(50-99)	2%	0%	4%	2%
(100-249)	18%	11%	4%	0%
(250-499)	4%	7%	7%	0%
(500 or more)	2%	9%	2%	0%
(Don't know)	2%	0%	2%	0%
(Refused)	0%	0%	2%	0%
How old is this facility?				
5-10 years	4%	9%	2%	2%

Survey Response and Firmographics

n=45	More than Estimated	About the Same as Estimated	Less than Estimated	Don't Know
10-20 years	9%	7%	4%	0%
20-30 years	4%	4%	7%	0%
30 or more years	16%	11%	13%	2%
(Don't know)	4%	0%	0%	0%

Appendix F. Findings by Research Question

This process evaluation was designed to address multiple research questions. Table 31 below summarizes the answers to each research question and identifies the section in the report where more detailed information related to a specific research question can be found.

Table 31. Summary of Findings by Research Question

Document Section	Research Question	Findings
4.1 How Is the Program Managed at Each IOU?	Who is involved?	There are three primary stakeholders engaged with the Auto-DR program, including IOU program staff (PG&E also has a contractor to assist with implementation), project verification engineers, and vendors.
	How is the program managed?	The IOUs administer the program similarly statewide, with some differences related to program design and implementation. These differences are as follows: <ul style="list-style-type: none"> • Offers a range of incentive levels for technology installed (ranging from \$125/kW to \$400/kW) • Diverse eligibility requirements (minimum kW ranges from 20 kW to 200 kW) and enrollment period requirements (none to three years) • Level of prescreening that occurs prior to conducting an assessment and applying for incentives • Level of engineering oversight prior to installation of technology (none to third-party review) • Open ADR requirements for enrolling in aggregator-managed programs
	What are the implications of program design changes from 2012 and 2013?	The IOUs initiated program design changes in 2013 to support increasing reliability of event participation for participants through three primary mechanisms. The first mechanism was to revise the length of time participants were required to be enrolled in a DR program. The second was to move from a 100% incentive paid out after the technology is installed, to paying 60% of the incentive after the technology is installed, with the remaining 40% paid contingent on the customer participating in their demand program for one full demand response season (60-40% model). The third was to ensure that all technologies had Open ADR 2.0 capabilities, which facilitates DRAS communication with systems.
4.2 What Is the Program Reach Thus Far and What Are the Participant Characteristics?	Program Reach	The program installed enabling technology for 224 unique customers, totaling 1,119 sites. The largest share of participants comes from SCE (113 customers, 634 projects), with the smallest from SDG&E (18 customers, 115 projects).
	Participant Characteristics	Just over one-third of participants in the tracking database participate in multiple DR programs. Participants primarily enrolled in the Demand Bidding Program, the Capacity Bidding Program, and the Aggregator-Managed Portfolio and Demand Response Contracts programs. Predominant sectors include agriculture, manufacturing, and retail stores.
4.3 How Have Customers and Vendors Experienced the Program and Why?	Why are customers participating in the Auto-DR program, and would they join a demand response program without it?	The incentives motivated respondents to enroll in a demand response program. A little over half of respondents enrolled in DR programs after installing the Auto-DR technologies. Of these, most indicated that they would not have enrolled in the DR program if the Auto-DR technology incentives were not available. Cost or the inability to afford the technology were mentioned most often for why they would not have enrolled (eight out of 17).
	What are customer motivations for participation?	About a third of respondents said that reducing operation costs (i.e., saving money or lowering utility bills) was the primary selling point for the program. Secondary selling points included the incentives available and the socio-environmental benefits (e.g., saving energy, being a good corporate citizen, and avoiding rolling blackouts).

Findings by Research Question

Document Section	Research Question	Findings
	What value or benefits do customers experience?	Value and benefits include reduction in operational costs, incentives, and socio-environmental benefits, in addition to increased operational efficiency.
	Does the Auto-DR technology increase operational efficiency for the customer, lower the customer's operational costs, and lower their energy use on non-event days?	The majority of respondents (61%) reported that the technology lowered their operational costs. About half of respondents (49%) reported that the technology reduced their energy use on non-event days. Nearly half (43%) of respondents reported that the technology increased their operational efficiency.
	What role do incentives play in the program?	The program provided more than \$39 million in incentives to existing participants in PY2012. Survey respondents indicated that they installed the technologies to save money in their facilities or to cover the cost of the technology.
	What are customers' opinions on the incentive levels and payment process?	Respondents were satisfied with the incentive amount and the time it took to receive the incentive (7.9 and 8.1 mean scores on a 1-to-10 scale, respectively).
	How is the application process (length and complexity)?	Respondents tend to be less satisfied with the application process (mean score of 6.5 and 6.7 on a 1-to-10 scale on the length of time to process and fill out the application, respectively). Four of nine vendors had challenges with the application process, noting that it was confusing for them and their customers, while seven of nine vendors noted that the application process took too long. Additionally, three vendors noted that they lost customers because of the long wait. Additionally, account representatives indicated that the review process takes too long and is too complex.
	If customers heard about the program from a vendor, how did the vendor describe the program, and did their program experience match the vendor's description?	The majority of respondents first became aware of the Auto-DR incentives through their utility account representative (55%), followed by their vendor (29%). This finding is notable because program staff indicate that they consider marketing efforts for the program to be "vendor-driven." Account representatives indicated varied training, and requested additional information about the program to provide to customers.
	Did the program experience meet the customer's expectations? If not, why not and what would they like to see changed?	The majority (82%) of respondents indicated that their experience with the program matched how it was described to them. All but one of the respondents who learned about the program through a vendor indicated that the program matched how it was described to them. However, the eight respondents who noted that their experience did not match how the program was described tended to center around technology that was not operational and vendor services.
	Does the customer experience vary by industry type, technology, or other factors?	We did not find any trends in terms of customer experience by industry type, technology, or other factors. However, this could be due to a relatively small number of completed surveys.
4.4 How Have Customers Used and Responded to Auto-DR Technology?	What is their experience installing technology?	Respondents are less satisfied with the installation process, giving a mean satisfaction score for the installation process of 7.3 (on a 1-to-10 scale), remarking on low installation standards and long installation times. These findings indicate that improper installation of equipment could potentially affect customer satisfaction, as well as potentially reduce load impacts and cost-effectiveness. Eight respondents were dissatisfied with the vendor, particularly regarding problems with the system/technology, poor time management, and poor training.
	How do the technology and customer respond to events?	According to the program database, 73% of responding participants are active, while 10% and 17% are partially active or inactive, respectively. The majority of respondents indicate that Auto-DR technology made participating in events easier. Those who noted that it did not make event participation easier cited having less control, the verification taking time, and the technology not working.

Findings by Research Question

Document Section	Research Question	Findings
	Are there specific groups of customers who participate because of a specific technology?	The database does not track the types of technologies installed. However, survey respondents installed technologies that controlled multiple equipment types, predominantly HVAC systems. We were unable to identify any trends regarding specific technologies installed or controlled.
	Does the type of Auto-DR technology relate to the customer's level of DR engagement?	The program database does not track the technologies installed, so we were unable to identify any trends related to technology and customer engagement. We reviewed survey data to compare installed technology with self-reported engagement and found no trends.
4.5 Why Are Customers Not Performing as Expected Compared to the Program's Load Shed Testing?	What actions do participants take?	Eighteen respondents (40%) indicate that after they received an event notification in 2012, their organization shut down systems beyond what was automatically shut off during the event. Seventeen (38%) indicated that they also turned off lights, 16 (36%) perform pre-cooling, and 10 (22%) adjusted the automated set points on the thermostat.
	What are barriers to consistent response after installation?	<p>Respondents indicated a variety of barriers to consistent response after installation:</p> <ul style="list-style-type: none"> • Non-operational technology, installation incomplete (most frequently cited) • Comfort of employees or customers / customer demands do not allow for energy reductions • The nature of their business does not allow for event participation / reduces production schedules • Inconvenient timing • Operational decisions <p>Respondents also noted that they had difficulty responding to events because they participated in multiple DR programs. About one-third of respondents participate in multiple programs. Respondents also mentioned the difficulty of participating in consecutive-day events, suggesting revising penalties on the second day.</p>
	Why do some customers drop-out?	Five out of the 49 respondents indicated that they opted-out of signals during events. We did not find any trends regarding sector, technology controlled, or vendor type for those who opted-out. For those who indicated that they had opted-out, they mentioned the following: the nature of their business does not allow them to shut down (e.g., "the senior team made the determination that impacting the quality of air was too much of an inconvenience" or they "cannot shut off the wells.") Or, they opted-out due to concerns regarding comfort (e.g., "customer demand at a specific area in the building, such as the Ballroom HVAC" or "to a point it was an inconvenience to our customers").
	Are there particular characteristics of participants who are/are not realizing load shed in terms of technology type, program participation, and behavioral practices?	<p>We were unable to identify any particular characteristics of participants related to realizing load shed. However, we did find that respondents in agriculture and industrial sectors were more likely than respondents from other sectors to report that they achieved less or more than was estimated during the load shed test. Given the small number of survey respondents, no conclusive results can be drawn from this analysis.</p> <ul style="list-style-type: none"> • Most vendors interviewed (six of nine) mention that industrial customers are most likely to take advantage of or benefit from the Auto-DR incentives, for example because they tend to have larger loads and typically have flatter load profiles that they can leverage to more easily shift their production away from event hours • Conversely, some retail companies or service organizations (such as schools or hospitals) face participation barriers in terms of the flexibility of their operations. Potential barriers mentioned by account representatives interviewed included whether or not services or operations can be interrupted (one mentioned), or whether certain load reduction strategies (such as dimming lighting in retail settings) will negatively affect their customers' satisfaction.
	What types of behavioral changes / operational changes do participants make after installing the technology?	About one-third of the respondents (n=17) indicate that they took actions to change their company's energy usage since installing the technology. Eight took action relating to lighting, and four indicate making changes to their HVAC system, setting the thermostat, or installing dehumidifiers/economizers. Remaining respondents made

Findings by Research Question

Document Section	Research Question	Findings
		<p>changes to other equipment such as pool pumps and refrigeration, or increased monitoring of / reorganized their equipment schedule. Given the small number of respondents, no conclusive results can be drawn from this analysis. As such, we provide these results for informational purposes only.</p> <p>Nine respondents (18%) made changes to business operations or facilities that significantly increased or decreased load since the technology installation. These changes include installing additional equipment due to increased production demands, tenant moved out, modifying schedule to accommodate DR events, installing solar panels, and performing retro-commissioning. Of these nine respondents, five indicate that they saved more energy and four indicate saving about the same as estimated during the events.</p>
<p>4.6 How Can the Program Change to Improve the Customer and Vendor Experience?</p>	<p>How can the program change to improve the customer and vendor experience?</p>	<p>Respondents provided recommendations for program changes to improve their experience with the program, including:</p> <ul style="list-style-type: none"> • Supporting DR event participation (n=9): Respondents suggested offering better or more incentives for participating in events. Others asked for more advanced notice of events. • Enhancing program processes (n=4): Respondents suggested streamlining the processing time for applications. • Providing more training for account representatives and program staff (n=4): Respondents indicated that account representatives could be more familiar with the program. They also preferred working with account representatives who were more responsive to their needs and allowed for greater interaction with the IOU. • Providing more education and training to customers (n=3): Respondents wanted knowledgeable staff to train customers to run and maintain their systems, and wanted more information about DR program options available and what programs best suit their particular needs. One respondent suggested creating better documentation on how DR events work, such as a one-pager that participants could share with senior staff in their facility. • Providing more feedback and information (n=3): One respondent indicated that they wanted to know about event results and how successful they were during events. Respondents commented on issues with the DRAS, as they noted that it loses connection and it makes it difficult to bid into the website through the web-portal. Additionally, respondents wanted more information about new technologies that would be relevant for the program.
	<p>Are there program improvements the utilities could make to better encourage customers to respond during events?</p>	<p>Respondents overwhelmingly suggested improving communication and information provided about the DR program and program events, including providing more information about when events were coming, the number of events that would be called, and receiving notifications earlier. A key piece to this recommendation was making sure that the account representatives were providing this information to their clients.</p>

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