



# Energy Upgrade California – Home Upgrade Program Process Evaluation 2014-2015

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FINAL  
REPORT



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## Acronyms

**AQMD:** Air Quality Management District  
**ARRA:** American Recovery and Reinvestment Act  
**BIG:** Build it Green (Pacific Gas and Electric Company implementer)  
**BPI:** Building Performance Institute  
**CATI:** Computer-Assisted Telephone Interviewing  
**CPUC:** California Public Utilities Commission  
**CSE:** Center for Sustainable Energy  
**CSLB:** California State Licensing Board  
**EFLIC:** Energy Financing Line Item Charge  
**GHG:** Greenhouse Gas  
**HERO:** Home Energy Renovation Opportunity  
**HERS:** Home Energy Rating System  
**ICF:** ICF International (Southern California Edison implementer)  
**IOU:** Investor-Owned Utility  
**ME&O:** Marketing, Education, and Outreach  
**NPS:** Net Promoter Score  
**PACE:** Property Assessed Clean Energy  
**PG&E:** Pacific Gas & Electric Company  
**QA/QC:** Quality Assurance / Quality Control  
**QI:** Quality Installation  
**REEL:** Residential Energy Efficiency Loan Assistance Program  
**REN:** Regional Energy Network  
**RHA:** Richard Heath and Associates, Inc. (Southern California Edison and Southern California Gas Company implementer)  
**SCE:** Southern California Edison  
**SCG:** Southern California Gas Company  
**SDG&E:** San Diego Gas & Electric  
**SMT:** Strategic Market Transformation  
**SMUD:** Sacramento Municipal Utility District

## Glossary

**Building Performance Institute (BPI) certification:** Home performance contracting certification

**CSLB Class “B” License:** General Building Contractor

**CSLB Class “C” License:** Specialty Contractor

**Energy Financing Line Item Charge (EFLIC):** On-bill financing for PG&E service area customers

**Home Energy Rating System (HERS):** A method for assessing home energy performance. Assessments are conducted by HERS raters, who conduct tests to produce a rating of a home’s energy efficiency relative to a reference home built to just meet the Title 24 Building Energy Efficiency Standards' prescriptive requirements

**Implementer:** Organization contracted by an IOU to support program administration. Implementers for the Home Upgrade program include: BIG (PG&E), RHA (SCE/SCG), and ICF (SCE/SCG)

**Near-participant/lead:** IOU customers who contacted an implementer about the Home Upgrade program between January 2014 and December 2015, but did not participate in the program

**Net Promoter Score (NPS):** A customer loyalty metric. Customers are categorized as “Promoters,” “Detractors,” or “Passives” based on responses to a key survey question. The score represents the percentage of customers identified as Promoters (customers who respond with a 9 or 10 on a 1-10 scale about their self-reported likelihood to recommend the program to a colleague) minus the percentage of customers identified as Detractors (customers who respond with a 1 through 6 on the same scale). NPS was first defined in the Harvard Business Review by Frederick F. Reichheld in December 2003 in an article titled "One Number You Need to Grow".

**Participant:** IOU customers who received an incentive or were awaiting an incentive for a Home Upgrade project between January 2014 and December 2015

**Regional Energy Efficiency Loan Assistance Program (REEL):** California statewide residential financing pilot program

# Executive Summary

The Energy Upgrade California – Home Upgrade program (Home Upgrade program) is a single-family residential energy efficiency program operated by PG&E, SCE, SCG, and SDG&E. This report provides the results of the process evaluation of the Home Upgrade Program conducted by EMI Consulting and Tetra Tech, an independent team of evaluators. This evaluation focuses on the programs run by PG&E, SCG, SCE, and SDG&E. SCE and SCG implement their programs together in the areas where their service territories overlap; PG&E and SCG also implement their programs together in areas where their service territories overlap. SCG also independently implements a program elsewhere in its service territory. The IOUs coordinate to ensure key processes are consistent across the state.

## Program Overview

The Home Upgrade Program is a residential retrofit program targeted at improving the energy efficiency of existing, single-family homes. The program offers incentives to residential customers to encourage comprehensive energy efficiency upgrades at the whole house level. Program participation is primarily contractor-driven; contractors conduct the majority of the marketing activities on behalf of the program. Homeowners have two options for participation: Home Upgrade and Advanced Home Upgrade.

The **Home Upgrade** pathway, previously referred to as the “Basic” pathway, provides incentives for multi-measure, whole-home projects that are typically smaller in scale than Advanced pathway projects. The Home Upgrade pathway allocates points for specific measures and combinations of measures. The minimum point threshold for qualifying for the Home Upgrade pathway is 100 points, and the incentive ranges from \$1,000 for a 100-point project to \$3,000 for a 300-point project. The **Advanced Home Upgrade** pathway, or “Advanced” pathway, is a custom approach that requires a “test-in” and “test-out” assessment and energy savings model. This approach requires at least a 10% expected improvement in performance and a minimum of three measures. An expanded group of measures is available compared to the Home Upgrade pathway.

## Research Questions

The process evaluation of the Home Upgrade program sought to understand how the program has evolved since the last evaluation and identify potential areas of improvement as the program moves forward and continues to scale. Based on input from program staff and IOU staff, the evaluation team developed detailed research questions, specifically around program operations, contractor engagement, and marketing messages.

The following overarching questions guided research efforts for this evaluation:

- What opportunities exist for streamlining the operational aspects of the program?
- What components are most successful at engaging contractors with the program?
- What marketing messages are most effective at engaging potential participants?
- What aspects of the current training and mentoring opportunities are most effective in terms of increasing participation and improving the quality of installation?

- What is the effectiveness of recent program changes (e.g., increased incentives, increased focus on contractor mentoring)?

To address these objectives, the evaluation team collected information on the experiences of various stakeholders involved with the program. This included program staff, contractors, and residential home-owners. To collect this information, the evaluation team completed nine main research activities. The EMI Consulting and Tetra Tech process evaluation of the Home Upgrade program began in January 2015 and concluded mid-year 2016. This evaluation focuses on the 2014-2015 program years. The process evaluation findings are drawn from analyses of several data sources, with data obtained using a variety of methods. Table ES-1 provides an overview of the methods and data sources used in the evaluation.

**Table ES-1: Evaluation Data Collection Methods and Sources**

Data Collection Method	Data Source
Telephone Survey	265 Program Participants 135 Program Near-participants
Telephone In-depth Interviews	20 Participating California Contractors 7 Non-Participating California Contractors 7 Program Staff 5 Quality Installation Experts
Literature Review	Studies of Quality Installation (QI) Programs Previous Evaluation Reports
In-Person "Ride-Alongs"	5 Home Upgrade QA/QC Inspectors

## Limitations

There are several key limitations to the scope of this research that are important to understand given the history and context of the Home Upgrade program. First, the Home Upgrade program is considered a market transformation program and as such, is part of on-going research and development of a market transformation framework (i.e., the 2015 Comprehensive Strategic Market Transformation (SMT) Plan developed by Navigant Consulting). This framework was finalized after the launch of this process evaluation and as such, was not included in our scope. However, the EMI Consulting evaluation team has included a limited assessment of the progress towards the objectives laid out in the SMT plan as we are able as an additional research objective.

Second, based on the results of past impact evaluations, the program is currently not cost-effective. This is primarily due to inaccurate building models and higher than expected free-ridership. While the EMI Consulting evaluation team explored ways to improve program targeting to mitigate free-ridership and maximize participant energy savings as part of our key findings and recommendations, we did not recalculate cost-effectiveness based on the result of this process evaluation.

Finally, the recent CPUC ruling regarding implementing statewide programs under a single program administrator framework may render moot several of our recommendations. Given that

these rulings are relatively recent, we have left our recommendations as part of this report for documentation purposes as they may be relevant for future program administrators.

## Key Findings

1. **Across IOUs, participants are very satisfied with the Home Upgrade program.** Average participating customer satisfaction ratings were at least 8.0 for all program components on a scale from 0-10. In addition, a majority of participating contractors reported that they were satisfied with the program, and nearly every participating contractor interviewed indicated that the program had provided at least some benefit to his/her business.

However, program staff noted that based on the results of past impact evaluations, the program is currently not cost-effective. Similarly, the Home Upgrade program is currently a statewide program with a “market transformation oriented” designation. The Strategic Market Transformation (SMT) Plan will be instrumental for guiding the long-term direction of the program, including establishing revised cost-effectiveness criteria.

2. **The program has improved on many of the issues identified in previous evaluations.** Contractors, in particular, were generally pleased with changes to the program, particularly the increased incentive limits and simplified Home Upgrade pathway point system. In addition, efforts to streamline program paperwork appear to be working for participating customers. Finally, most contractors reported minimal difficulties completing and submitting program paperwork, and noted recent changes.
3. **Saving money and improving comfort continue to be the primary motivations for completing Home Upgrade projects. High project costs were the primary barriers among near-participants, particularly among lower income brackets.** When asked to rate the importance of factors that motivated their participation in the program on a scale from 1 to 5, participating customers provided an average rating of 4.7 for “saving money on [my] energy bill” and an average rating of 4.6 for “improving the comfort of [my] home.” In addition, when asked, 53% of near-participants with incomes under \$50,000 reported that the cost of equipment was a barrier to their participation in the program, while only 28% of near-participants with incomes above \$250,000 reported the cost of equipment as barrier. The high first cost barrier may continue to present attribution-related cost-effectiveness concerns as participants with higher incomes that can afford expensive whole-home retrofits continue to participate in the program without the need for financial incentives

Note that this evaluation does not include a quantification of free-ridership or spillover. Instead, we reference findings from previous evaluation research.

4. **Opportunities exist to improve statewide coordination.** A small number of contractors reported frustrations with shifting or inconsistent requirements for incentive forms and other program paperwork. This issue was most widely reported by contractors in Orange County and the surrounding area, as several contractors interviewed in this region were required to navigate requirements of multiple program implementers.
5. **Opportunities exist to improve the support offered to contractors, particularly in terms of marketing and mentorship.** Most contractors reported that they did not use marketing

materials provided by the statewide program, IOUs, or program implementers. When asked why they did not use these materials, most contractors said that they felt that the marketing materials were too complex and technical for homeowners. In addition, inspectors recommended that program staff look for ways to expand opportunities for inspectors to provide education and mentorship to contractors, reporting that “collaborative” inspections were effective mentorship opportunities.

6. **Non-participating contractors do not see energy efficiency as cost-effective and misunderstand program participation requirements.** Key barriers reported by non-participating contractors included limited awareness of program requirements, difficulty making time for required trainings, and the perception that their customers are primarily motivated to minimize up-front equipment costs rather than long-term energy savings. Additionally, non-participating contractors generally had less favorable attitudes toward the benefits and importance of energy efficiency. Finally, most non-participating contractors also assumed that they needed to be able to conduct sophisticated whole-home modeling in order to participate, indicating a lack of awareness of Home Upgrade pathway requirements.
7. **Contractors are an effective method for driving program participation and energy efficiency improvements.** Contractors are increasingly proactive in engaging customers. 46% of participants reported that they became aware of the program through contractors. In addition, nearly all (97%) of those respondents who had a home energy upgrade followed-through on either all (41%) or some (57%) of the recommendations they received.
8. **More participants are relying on financing options to complete Home Upgrade projects.** The prevalence of projects paid with cash was much lower in the current study (37%) than in previous evaluations (74% in 2011 and 77% in 2012). In addition, participants are requesting more financing options and lower interest rates. However, these participants with both high, middle, and low income levels are accessing the financing options available to them at relatively equal rates. Therefore, while some participants are using financing to mitigate first cost barriers, others are using financing as it may be a favorable or more convenient option than using cash-on-hand.

In addition, the frequency of participating high income households has not changed significantly since the 2011 process evaluation; in 2011, 54% of participating households reported household incomes higher than \$100,000 while in 2015, 50% of participating households are in the same bracket.

## Summary and Recommendations

The evaluation team has provided 12 recommendations based on our conclusions from this evaluation that will improve the overall effectiveness of the program. These recommendations are documented below and are grouped into three main categories: (1) Overall Program Design, (2) Customer and Contractor Experience, (3) Program Marketing.

## Overall Program Design Recommendations

Recommendation #1: Continue to improve statewide coordination efforts.

Program staff should continue their efforts to maximize consistency across implementers and program regions. While the evaluation team did not identify any major inconsistency in program implementation across service territories, several contractors operating across multiple IOU service territories reported difficulty navigating different program requirements between implementers. However, the evaluation team acknowledges the considerable recent efforts to improve statewide coordination and that some of these perceptions may be the result of participation in the early “ramp-up” program. As such, we recommend the IOUs review application standards across service territories for consistency. In addition, in order to mitigate contractor misconceptions, the IOUs should include education for contractors on key administrative similarities and unavoidable differences as part of contractor outreach activities.

As the Home Upgrade Working Group continues these efforts as a statewide team, increasing consistency will likely reduce marginal costs of scaling program operations, improve contractor satisfaction with the program, and reduce administrative burden on program implementers. Improving consistency in these materials may be especially beneficial for programs operated by SDG&E, SCE, and SCG, as contractors may operate across several IOU territories. In addition, these efforts will be critical as the program administrators engage national manufacturers and distributors. Consistent statewide implementation will lower barriers to their participation in the program efforts.

Recommendation #2: Include additional energy efficiency financing options to encourage greater participation among non-free-riders.

More participants are taking advantage of existing financing options than in previous studies, suggesting an opportunity to leverage financing to mitigate first cost barriers and expand program participation. The Home Upgrade Working Group should coordinate on how to best incorporate these options into the program. Importantly, by comprehensively incorporating financing options into the program, households with lower incomes and limited access to capital will have fewer barriers to participation. Based on the results from past impact evaluations, by encouraging program participation among households with lower incomes, the program may lower the percentage of partial free-riders participating in the program and increase overall cost-effectiveness.

## Customer and Contractor Experience Recommendations

Recommendation #3: Provide opportunities to HVAC, Home Performance, and Whole House contractors to differentiate themselves from non-participating contractors.

Currently, the program provides significant training and marketing support to contractors. This support has largely been successful at achieving a “push” program participation model; contractors are frequently the source of program awareness for homeowners, and customers require their support in order to participate. However, contractors find that their participation in the program provides market differentiation and improves their ability to sell whole house projects. Additional support may provide greater market differentiation from non-participating

contractors for these trade allies and increase their ability to sell home upgrade projects, likely increasing engagement among non-participating contractors as they work to adapt to a competitive marketplace. Examples of this support could include a tiered contractor rating system or co-branding materials. Note that increasing the pool of participating contractors would also require increased efforts from program staff to monitor contractor performance, “trimming” poor performing contractors from the program that do not meet participation standards.

This support aligns with program goals to broaden participation among contractors and capture more non-participating contractors. It also expands existing efforts to train and mentor contractors on whole house retrofits. Finally, it aligns with the SMT framework to engage market actors as part of the program. This engagement and support from contractors is necessary to fully scale the program to meet market demand in California.

Recommendation #4: Develop simplified and streamlined contractor marketing materials to supplement detailed brochures.

Contractors continue to be the primary method for program awareness with 46% of participants reporting that their contractors told them about the Home Upgrade program. However, participating contractors frequently requested additional materials to help them market whole home retrofits (and by association, the Home Upgrade program) to potential customers. While these materials currently exist, contractors frequently reported that they were too long, complex, or technical for most homeowners. They requested materials that were more straightforward, used less technical language, provided additional information regarding non-energy benefits, and clearly explained the program process.

Specifically, several contractors cited the Home Digest<sup>1</sup> provided by SCE and SCG as a good example for the type of content needed to speak with homeowners about the program. In addition, other contractors requested something similar to the Home Digest but shorter (one to two pages) and with greater emphasis on non-energy benefits. These requests are not mutually-exclusive; likely, both types of materials can be used by contractors to target business development depending on the motivations of potential customers.

Recommendation #5: Continue to refine program documentation for contractors.

Contractors across all four IOU service territories requested comprehensive documentation that provides more detailed instructions on completing project incentive request forms and meeting installation requirements. While this documentation already exists and program staff continue to improve this documentation based on contractor feedback, many contractors reported that they needed to contact program implementers to request clarification about program requirements. In contrast to contractors’ requests for simplified marketing materials, these contractors requested more detailed instructions for participating in the program.

Recommendation #6: Provide contractors with training on energy efficiency financing and other program options available to Home Upgrade participants.

Program participants are increasingly turning to financing options to fund the capital cost associated with whole home retrofits. Increased usage of financing mitigates the first cost barrier

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<sup>1</sup> <https://www.socalenergyupgradecontractors.com/sites/default/files/public/HomeEnergyDigest2014.pdf>

associated with whole home retrofits and increases the influence of the program on the purchase decision (thus reducing free-ridership). In addition, many near-participants (those that approached the program but did not eventually participated) reported income levels that would qualify them for additional program options such as the Energy Savings Assistance Program. The evaluation team recommends that the program staff include training for participating contractors on the available energy efficiency and income-qualified options for homeowners. With increased awareness and understanding of the benefits of these options, contractors will be better equipped to include financing options as part of the business development efforts.

**Recommendation #7:** Continue to promote collaborative or “witness” inspections.

To supplement program training and streamline installation and inspection processes, project inspectors recommended that program staff expand opportunities for inspectors to provide education and mentorship to participating contractors. Inspectors felt that the existing collaborative or “witness” inspections, in which contractors accompany inspectors during inspections of their projects, were effective mentorship opportunities, although they expressed concern that few contractors take advantage of these opportunities.

To encourage contractors to participate in these inspections, the evaluation team recommends that the Home Upgrade Working Group coordinate on possible incentives and requirements that are consistent at the statewide level. Options could include financial rewards (e.g., a \$200 gift card for completing two inspections) or incorporating the inspections into a tiered contractor recognition program. However, the evaluation team does not recommend mandating these inspections as that would likely increase the perception that program participation is overly burdensome and complicated by non-participating contractors. By encouraging inspections through incentives, the quality of work completed by contractors would likely improve resulting in more satisfied homeowners and lower overall administration costs. In addition, the impact of this recommendation should be weighed by the additional cost of expanding these opportunities.

**Recommendation #8:** Coordinate with Quality Installation/Quality Maintenance efforts in California to improve the operationalization of QI standards and awareness of QI benefits within the Home Upgrade program.

The Home Upgrade program should continue to coordinate marketing messages with statewide Quality Installation/Quality Maintenance programs (e.g., the AC Quality Care program) to raise awareness of the benefits of Quality Installation as part of whole home retrofits. Given that Home Upgrade program and QI/QM programs share objectives (installing energy efficient HVAC systems as part of high-performing homes), continued coordination to drive awareness among homeowners will increase demand for QI services from participating contractors.

**Recommendation #9:** Clearly communicate program time commitments to both new contractors and potential participants during the application process.

While most participants were generally very satisfied with their participation in the Home Upgrade program, one suggestion for improvement that was frequently mentioned was to better communicate the time commitment associated with program participation. The evaluation team recommends that these requirements be clearly stated as part of the program application process, focusing on flexibility of program inspectors’ schedules to minimize household disruption.

## Program Marketing Recommendations

Recommendation #10: Continue to focus on pre-1978 homes in outreach materials.

Based on past evaluation research, homes built prior to 1978 likely provide a greater opportunity for energy savings than homes built after 1978 due to the adoption of California's Building Energy Efficiency Standards. The program is currently focused on this population with 65% of survey respondents reporting that their homes were built before 1978 (compared to 50% of overall population of residential homes). To increase participation among this group, the evaluation team recommends that customer-facing outreach materials include messages about the benefits to retrofitting older homes. These materials could include images of older vintage homes and copy targeting "classic" or "traditional" style dwellings. In addition, program administrators should harness data-mining techniques to target pre-1978 homes in any IOU-led marketing campaigns. This could include incorporating publically available data (e.g., Census block data, property tax records) and data collected as part of other IOU programs into customer-tracking databases.

Recommendation #11: In addition to energy savings, continue to include non-energy benefits as part of program marketing materials.

As identified in other California evaluation research, non-energy benefits continue to be a primary driver for participation in the Home Upgrade program. Participants ranked increasing the comfort of their home as the second most important motivation for participating in the program (after saving money on their energy bill). In addition, participants reported several non-energy benefits as a result of participation. These include increased comfort, increased home value, and better air quality. While this study did not quantify the value of these benefits, evidence suggests that the benefits are real and valued by participants.

The evaluation team recommends that program staff include non-energy benefits (e.g., comfort and home value) as part of customer-focused and contractor-focused outreach activities. Combined with energy cost reductions, these benefits can make a compelling case for investing in a whole house retrofit project. These efforts should align with contractor training efforts and contractor marketing materials.

Recommendation #12: Include energy efficiency financing options in program marketing materials.

The process evaluation research indicates that Home Upgrade participants are increasingly relying on financing options to fund the whole house retrofit project and the evaluation team recommends that the program work to support this trend. A number of participants took advantage more recent energy efficiency finance options such as Property Assessed Clean Energy (PACE) financing – including the Home Energy Renovation Opportunity (HERO) and mPower programs, among others – and loans through the Sacramento Municipal Utility District (SMUD). Directing potential participants to these options could mitigate first cost barriers.

Encouraging greater use of financing as part of the Home Upgrade has two benefits. First, it mitigates first cost barriers (the most frequently stated barrier among non-participants contacted as part of this evaluation), increasing program participation. Second, it encourages households from middle income brackets to invest in whole home retrofit projects. Given the cost of the whole home projects, current participation is focused on upper income households. This has contributed to a large percentage of partial free-riders (based on past impact evaluation results),

lowering net savings. By encouraging middle-income households to participate, the program can mitigate the participation of free-riders, thus increasing the per household net savings.

# 1. INTRODUCTION

The Energy Upgrade California – Home Upgrade Program is a single-family residential energy efficiency program operated by the Pacific Gas & Electric Company (PG&E), SCE, Southern California Gas Company (SCG), and San Diego Gas & Electric (SDG&E). This report provides the results of the process evaluation of the Energy Upgrade California – Home Upgrade Program conducted by EMI Consulting and Tetra Tech, an independent team of evaluators. This program evaluation focused on the programs run by the Investor-Owned Utilities (IOUs): PG&E, SCG, Southern California Edison (SCE), and SDG&E. In areas where the SCG service territories overlap with SCE, SDG&E, or PG&E, the utilities co-implement the program. The IOUs collaborate and coordinate to ensure key processes are consistent across the state. The Regional Energy Networks (RENs) and municipalities implement Energy Upgrade California programs separately and are not included as part of this evaluation.

The Home Upgrade Program, previously known as the Whole-House Program, is part of the statewide Energy Upgrade California initiative and offers incentives (in the form of financial rebates) to residential customers for comprehensive energy efficiency upgrades at the whole building level. Eligible services include improvements to building envelope and insulation, efficient heating and cooling systems, water heaters, and windows. The Home Upgrade Program provides two options or pathways: the Home Upgrade pathway and the Advanced Home Upgrade Pathway. The Home Upgrade pathway provides a fixed “menu” of options and requires that homeowners select at least three energy efficiency measures. The Advanced Home Upgrade pathway provides incentives based on modeled energy savings for more in-depth projects, which may include hardwired lighting, cool roofs, and other custom measures.

## 1.1 Evaluation Overview

The primary objective of this evaluation was to provide information and recommendations so that the program can meet its future goals. Our evaluation provides clarity on the effectiveness of the program activities while assessing the program design across the IOUs. To understand the scope of the program, Table 1-1 below summarizes the program goals by IOU for 2013-2014 and each IOUs progress towards those goals. In general, all IOUs did not meet their 2013-2014 targets as laid out in program plans. This evaluation explores opportunities to better meet those targets in the future.

Table 1-1. 2013-2014 Program Goals

Metrics	SDG&E		SCE		SoCalGas		PG&E	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Number of homes treated in the Basic Path sub-program	2,600	348	660	95	660	95	3,100	784
Number of homes treated in the Advanced Path sub-program	650	92	1,320	632	1,320	632	6,700	4,090
Number of enrolled contracting firms participating in the sub-program	160	54	75	104	75	104	240	233

This evaluation covers the 2014 and 2015 program years and draws from retrospective analysis to inform future program developments. In the 2014 and 2015 program years, the program focused on refining and improving program processes and initiatives to allow and encourage increasing program activity. As described in the 2010–2012 process evaluation, the program experienced challenges with application processing as it worked to establish protocols and procedures and train contractors in the first years of implementation. This evaluation seeks to understand how the program has evolved since the last evaluation and identify potential areas of improvement as the program moves forward and continues to scale. Based on input from program staff and IOU staff, the evaluation team developed detailed research questions, specifically around program operations, contractor engagement, and marketing messages.

The following overarching questions guided research efforts for this evaluation:

1. What opportunities exist for streamlining the operational aspects of the program?
2. What components are most successful at engaging contractors with the program?
3. What marketing messages are most effective at engaging potential participants?
4. What aspects of the current training and mentoring opportunities are most effective in terms of increasing participation and improving the quality of installation?
5. What is the effectiveness of recent program changes (e.g., increased incentives, increased focus on contractor mentoring)?

To address these objectives, the evaluation team collected information on the experiences of various stakeholders involved with the program. This included program staff, contractors, and residential home-owners. To collect this information, the evaluation team completed nine main research activities. Table 1-2 below summarizes these data collection activities along with the associated sample size. With the exception of the surveys, all data collection activities were qualitative in nature and were not intended to achieve population-level estimates. Precision calculations for the surveys are provided in

Table 3-2.

Table 3-2.

Table 1-2: Data Collection Activities

Data Collection Activities	Sample Size
Program staff interviews	7
Quality installation expert interviews	5
Participant surveys	265
Near-participant surveys <sup>2</sup>	135
Contractor interviews	20
Non-participating contractor interviews	7
Inspector ride-alongs	5
Quality installation literature review	N/A
Review of previous evaluation reports	N/A

## 1.2 Limitations

There are several key limitations to the scope of this research that are important to understand given the history and context of the Home Upgrade program. First, the Home Upgrade program is considered a market transformation program and as such, is part of an on-going market transformation framework (i.e., the 2015 Comprehensive Strategic Market Transformation (SMT) Plan developed by Navigant Consulting). This framework was finalized after the launch of this process evaluation and as such, was not included in our scope. However, as we were able, the EMI Consulting evaluation team has included an assessment of the progress towards the objectives laid out in the SMT plan as an additional research objective.

Second, based on the results of past impact evaluations, the program is currently not cost-effective. This is primarily due to inaccurate building models and higher than expected free-ridership. While the EMI Consulting evaluation team explored ways to improve program targeting to mitigate free-ridership and maximize participant energy savings as part of our key findings and recommendations, we did not recalculate cost-effectiveness based on the results of this process evaluation.

Finally, the recent CPUC ruling regarding implementing statewide programs under a single program administrator framework may render moot several of our recommendations. Given that these rulings are relatively recent, we have left our recommendations as part of this report for documentation purposes as they may be relevant for future program administrators.

## 1.3 Organization of Report

The remainder of this report includes the following chapters:

**Chapter 2** - Program Overview

**Chapter 3** - Methodology

**Chapter 4** - Findings

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<sup>2</sup> Near-participants were defined as IOU customers who contacted program or implementer staff to inquire about the Home Upgrade program but either did not apply or did not progress beyond the application stage.

- **Key Findings**
- **Program Operations**
  - Program Satisfaction - Research questions 1, 2, 3, 4, and 5
  - Program Marketing - Research questions 2 and 3
  - Project Applications and Incentive Submissions - Research questions 1, 4, and 5
- **Participant Engagement**
  - Participant Decision-Making and Motivations - Research questions 1, 3, and 5
  - Assessment and Energy Efficiency Measures - Research questions 1, 3, and 5
  - Pre- and Post-Program Behaviors - Research questions 1, 3, and 5
  - Non-energy Impacts - Research questions 1, 3, and 5
- **Contractor Characteristics** - Research question 2
- **Contractor-Customer Interactions** - Research questions 2 and 3

## **Chapter 5 - Conclusions & Recommendations**

The report also includes copies of all data collection instruments as appendices.

## 2. PROGRAM OVERVIEW

This evaluation represents the second process evaluation of the Energy Upgrade California – Home Upgrade Program. The Home Upgrade Program, previously known as the Whole-House Program, consists of two pathways: The Home Upgrade pathway and the Advanced Pathway. In this time period, the program focused on developing contractor networks, meeting savings goals, building statewide awareness of the program among customers, and streamlining processes and making them consistent across utilities.

Program staff noted that, based on the results of past impact evaluations, the program is currently not cost-effective. Staff also described a transition point for the program since the initial process evaluation, in which the emphasis shifted from establishing the program’s processes to refining them, thereby making it easier for contractors and customers to participate. One major development was a redesign of the “Home Upgrade” pathway of the program. The programs collaborated to overhaul the incentive structure — notably the required measures — and streamlined other aspects of the process. As a result, the Home Upgrade pathway became increasingly prominent in this time period and represented the majority of projects in the SDG&E program. In addition to the changes to the Home Upgrade pathway, many small changes were made, and a summary of the major initiatives is included at the end of this chapter.

### 2.1 Strategic Importance

The Home Upgrade Program is targeted at improving the energy efficiency of existing, single-family homes. Single-family homes account for 35% of energy used by buildings in California and 76% of residential energy use.<sup>3</sup> California has 10 million single-family homes<sup>4</sup> and an estimated 50% of existing buildings were built before California’s *Building Energy Efficiency Standards* were adopted in 1978.<sup>5</sup>

While these numbers underscore the substantial energy footprint of the single-family sector, there are many potential barriers to energy efficiency improvements. As described by the Existing Buildings Energy Efficiency Action Plan developed by the California Energy Commission (CEC), the single-family market is a “challenging arena in which to achieve deep energy savings due to the diversity in housing stock, socio-economic and demographic makeup, property owner preferences, behaviors, knowledge of energy, and differences in climate zones.” The Home Upgrade Program is designed to engage with these challenges and is a statewide effort to develop a program capable of delivering deep energy savings through the retrofit of existing inefficient single family homes.

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<sup>3</sup> California Energy Commission (2015). Existing Buildings Energy Efficiency Action Plan. [http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-05/TN206015\\_20150904T153548\\_Existing\\_Buildings\\_Energy\\_Efficiency\\_Action\\_Plan.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-05/TN206015_20150904T153548_Existing_Buildings_Energy_Efficiency_Action_Plan.pdf)

<sup>4</sup> Ibid.

<sup>5</sup> California Energy Commission (2011). Integrated Energy Policy Report. <http://www.energy.ca.gov/2011publications/CEC-100-2011-001/CEC-100-2011-001-CMF.pdf>

## 2.2 Program Process

The Home Upgrade Program offers incentives to residential customers to encourage comprehensive energy efficiency upgrades at the whole building level. Importantly, it is a contractor-driven program. Contractors generate most program activity through their own on-the-ground marketing efforts, often face-to-face with customers. The CSE coordinates marketing to build general awareness at a statewide level and additional leads are generated from utility marketing activities. These efforts support and engage the contractors and provide legitimacy to efforts by the contractors to “sell” the program. The program implementer then forwards these to contractors. Contractors complete program application paperwork and submit it to the program implementer on behalf of the customer. The program process differs depending on the pathway; the Advanced pathway requires two submittals, a pre-installation job application before starting work and a post-installation incentive request after completing the project. The Home Upgrade pathway requires only a single incentive request submittal.

In addition to having two years of work experience, contractors must be licensed by the California State Licensing Board (CSLB) and/or have staff that have achieved Home Energy Rating System (HERS) II certification or Building Performance Institute (BPI) certification. They must have proof of insurance and must also attend a Participation workshop. Contractor requirements for the two program pathways differ slightly and are detailed below.

### Home Upgrade Incentive Pathway

The Home Upgrade pathway, previously referred to as the “Basic” pathway, provides incentives for multi-measure, whole-home projects that are typically smaller in scale than Advanced pathway projects. The Home Upgrade pathway allocates points for specific measures and combinations of measures. The minimum point threshold for qualifying for the Home Upgrade pathway is 100 points, and the incentive ranges from \$1,000 for a 100-point project to \$3,000 for a 300-point project. The incentive increases by \$100 for each additional 10 points until the maximum is reached. The measures must be on a single application to qualify.

Measures qualifying for points include:

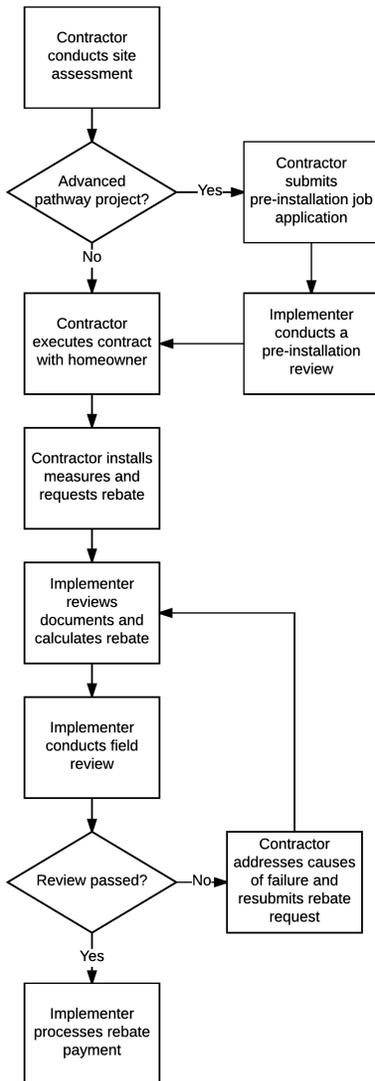
- Base measures: duct sealing, duct replacement, whole building air sealing, attic insulation and air sealing.
- Flex measures: Wall/floor/duct insulation, windows, gas central furnace or wall heater, air conditioner, gas or electric water heaters.

In addition, this pathway has specific requirements for contractors completing projects. These requirements for the Home Upgrade Pathway include:

- Two years of work experience
- CSLB issued B license (General Contractor) or C License (Specialty Contractor)
- HERS II Whole House Rater or BPI-certified professional on staff or use of BPI-accredited company for diagnostic test-in, test-out assessments and Combustion Appliance Tests
- Attendance of Program Participation Workshop and signing of Contractor Participation Agreement

The Home Upgrade pathway differs from the Advanced Home Upgrade pathway in that it requires only a single submittal to the program after the completion of work.<sup>6</sup> A high-level version of this process is depicted in Figure 2-1. Although minor variations may exist between IOUs, the overall program process involves contractors submitting incentive requests for installed measures. Once submitted, implementer staff review the application to confirm customer eligibility, that the work scope meets program requirements, and the pre- and post-improvement conditions. Inspectors from the program also conduct field verifications on a sample of projects for quality assurance. If the project and incentive are approved, then the customer is notified and the project is complete.

Figure 2-1: High-Level Program Implementation Process Flow Diagram



<sup>6</sup> Documentation of test-in, test-out of Combustion Appliance Safety (CAS) is required for the Home Upgrade track (as well as for Advanced Home Upgrade); however, these results are included in the application submittal and not required before the application.

## Advanced Home Upgrade Pathway

The Advanced Home Upgrade pathway, or “Advanced” pathway, is a custom approach that requires a “test-in” and “test-out” assessment and energy savings model. This approach requires at least a 10% expected improvement in performance and a minimum of three measures. An expanded group of measures is available compared to the Home Upgrade pathway. The incentives are awarded based on expected energy savings, ranging from \$1,000 for 10% energy savings to \$4,500 for 45% or greater energy savings. In addition to these performance incentives, customers can receive “kicker” incentives for modeled energy savings at \$2.00 per therm and \$0.75 per kWh. As SCE/SCG are dual-fuel utilities, fuel-switching measures are not eligible within the SCE/SCG program.

Eligible measures for the Advanced Home Upgrade pathway include:

- Duct sealing, duct replacement, whole building air sealing, attic insulation and air sealing
- System air flow verification
- Wall/floor/duct insulation and windows (including window film)
- Cool roofs
- Gas central furnace
- Radiant or hydronic heating
- Central air conditioner and heat pumps
- Gas or electric water heaters
- Pool pump

Contractor requirements for the Advanced Home Upgrade pathway include:

- Two years of work experience
- Insurance
- All requirements for the Home Upgrade Pathway
- Must have CSLB B license (General Contractor)
- At least one BPI-certified professional on staff
- Completion of Home Upgrade Advanced Technical Training

As previously mentioned, the Advanced Pathway requires two submittals to the program: (1) a pre-installation *job application* before work begins and (2) a post-installation *incentive request* after the completion of work (Figure 2-1). Program staff verify the job application to confirm customer and program eligibility and understand the pre-installation conditions. Program staff review the *incentive request* to understand the post-installation conditions (relative to pre-improvement conditions) and to again confirm the project meets program requirements. Inspectors from the program also conduct field verification of Advanced pathway projects, following the post-installation incentive request review.

## Marketing

Marketing to build awareness of the Home Upgrade programs has primarily been conducted at a statewide level. In 2013-2015 the Center for Sustainable Energy (CSE) led a statewide Marketing, Education, and Outreach (ME&O) program to build awareness of energy efficiency through the Energy Upgrade California brand. The campaign directs customers to a statewide Energy Upgrade California website that in turn refers customers to the appropriate IOU or REN website depending on a customer’s location. In addition to the statewide effort, the IOU programs conduct direct marketing to customers and support contractors’ marketing efforts through co-

marketing. The IOUs participate in community events, send bill inserts and direct emails, and direct customers to the website through their call centers.

The statewide ME&O program achieved six of its seven performance metrics in the 2014-2015 period, including a target of 20% aided awareness of the Energy Upgrade California brand.<sup>7</sup> Among respondents who were aware of the Energy Upgrade California brand, 48% were aware of Home Upgrade. Interestingly, only 21% of these respondents reported hearing about Home Upgrade from Energy Upgrade California,<sup>8</sup> suggesting that other marketing channels, word-of-mouth, and media are also contributing to awareness of the Home Upgrade program.

The program model relies on contractors to drive the on-the-ground marketing efforts and move customers from awareness to participation. The majority of participants are recruited through contractors, although program implementers also collect and track leads from IOU and statewide marketing efforts. Build it Green (BIG), the implementer for PG&E's program, does not actively conduct marketing on behalf of the program. Most customers who complete PG&E's program are not contacted by BIG but instead are recruited by contractors. SDG&E, SCE, and SCG all have internal marketing teams, and ICF, the program implementer for these IOUs' programs, provides marketing for contractors.

## 2.3 Program Status

In the evaluation period from 2014 to 2015, the Home Upgrade Program refined program processes, tested initiatives, and improved coordination among IOU programs. As part of the 2010-2012 residential energy efficiency portfolio, SCE and SCG offered contractor training courses starting in 2010 to prepare the workforce for the program, while SDG&E and PG&E launched a pilot version of the program, dubbed the "Whole House Retrofit Program." The program transitioned to full program status in mid-2011, at which point the IOUs each hired new implementation contractors. The past process evaluation covered this "transition period" for the IOU programs from July 2011 to February 2012.<sup>9</sup> The overall program design has not changed dramatically; the initial offering included a "Basic" (now the "Home Upgrade" pathway) and "Advanced" package (still known as "Advanced" pathway).

## Past Studies

A process evaluation of the Home Upgrade Program was last conducted for PG&E, SCE, and SCG in 2011–2012. An additional Phase II process evaluation conducted for PG&E in 2012–2013 and a marketing and targeting analysis was conducted for PG&E in 2013-2014.

The 2010–2012 PG&E and SCE/SCG Whole House Retrofit Program Process Evaluation Study was the previous statewide process evaluation conducted for the Home Upgrade Program. This

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<sup>7</sup> Opinion Dynamics (2016). 2013-2015 California Statewide Marketing, Education, and Outreach Program: Verification and Integrated Effectiveness Study.

<sup>8</sup> Ibid.

<sup>9</sup> SBW Consulting. (2013). 2010-2012 PG&E Whole House Retrofit Program Phase II Process Evaluation Study - Methods and Findings - PGE0302.06. Bellevue, WA.

evaluation did not include the SDG&E program but did include the SCE/SCG partnership.<sup>10</sup> In the evaluation time period from July 2011 to February 2012, the Advanced package accounted for 97% of projects conducted in the PG&E and SCE/SCG programs. This evaluation period coincided with a period in which marketing for the program was driven by funds from the American Recovery and Reinvestment Act (ARRA). ARRA funds also supported statewide and regional marketing efforts, added to incentives for customers in some regions, and supported the program efforts of RENs.

The evaluation found that the program was experiencing challenges in its implementation process, resulting in long application processing times and dissatisfaction among contractors. Among the recommendations of this evaluation were suggestions to reduce Quality Assurance / Quality Control (QA/QC) requirements to speed up application processing times, conduct targeted marketing, support contractor marketing efforts, focus training and mentorship on top contractors, improve customer service through a single point of contact, and modify the Basic (now “Home Upgrade”) pathway. The current evaluation found that the IOUs have implemented many of the recommendations from the previous process evaluation related to program marketing, implementation, and program design. Table 2-1 below details these recommendations and our assessment of the status of that recommendation.

**Table 2-1. Status of Previous Process Evaluation Recommendations**

Recommendation	Status	Notes
Foster peer-to-peer marketing.	In Progress	While the program administrators have leveraged social media channels to advertise the program with benefits based on other participants’ experiences, the evaluation team believes additional progress can be made through the greater use of case studies to document program benefits.
Promote main program benefits.	Completed	Current program marketing materials continue to promote the program’s main benefits including: (1) home comfort, (2) lowering energy bills, (3) the financial incentives available, and (4) conserving energy for the environment.
Continue offering events and workshops.	Completed	The IOUs continue to conduct in-person events that provide greater opportunity to educate customers about the program.
Build the future target market based on characteristics of past participants.	On Going	The IOUs are currently using data analytics to target marketing materials and campaigns. However, the tools available to the IOUs to conduct advanced data analytics continue to evolve. As such, program managers should continue to update targeting efforts based on the best data available to them.

<sup>10</sup> The SDG&E Home Upgrade Program was launched on a similar time frame to the other programs, beginning in the fall of 2010.

Recommendation	Status	Notes
Move control of EUC website to the IOUs.	Rejected	Control of the Home Upgrade California website continues to be centralized at the Center for Sustainable Energy and that the IOUs do not have access to data collected through that channel.
Support contractor marketing efforts.	In Progress	While the IOUs continue to provide marketing support to contractors, there is room for improvement. Several contractors requested simpler, more straightforward materials that quickly described the program participation process and the potential benefits to use as an introduction to the program.
Reduce application-processing times and QA/QC requirements.	Completed	Across all service territories, contractors reported that processing times and administrative burden has improved since program inception.
Focus training and mentoring on the top performing contractors.	Completed	The IOUs continue to work closely with and support high performing contractors (typically home performance contractors). In addition, as recommended, the IOUs have now started to engage new contractors as part of the program or re-engage those that declined to participate during the program's launch.
Adopt common statewide job reporting.	In Progress	The IOUs have made significant progress toward increasing statewide coordination by standardizing design and incentive structures. However, some room for improvement continues to exist (see recommendations), particularly regarding contractors' perceptions of program requirements and keeping contractors apprised of changes to those requirements.
Identify financing options for customers.	In Progress	<p>The IOUs have made significant progress at better incorporating energy efficiency financing options into the program to mitigate first cost barriers, and significantly more participants are using financing options than identified previously. The prevalence of projects paid with cash was much lower in the current study (37%) than in previous evaluations (74% in 2011 and 77% in 2012).</p> <p>However, the available options continue to evolve and first costs remains a top barrier among near-participants. As such, additional opportunity remains to educate both participants and contractors on the available options.</p>

Recommendation	Status	Notes
Improve customer service to contractors and customers.	In Progress	While IOUs have established single points of contact for customers and contractors (e.g., “Home Performance Advisors”), the IOUs are continuing to implement automated contractor/customer notification systems. However, contractors report that notification timeframes have reduced (from three to four days to one day).
Modify or drop the Basic Upgrade package.	Completed	The IOUs have revised the Basic package (now the Home Upgrade track) to account for previous recommendations. It now includes a point system that allows customers to select the optimal mix of measures for their home while still achieving comprehensive savings. This change has been well-received by contractors across service territories.

Building off the process evaluation, a Marketing and Targeting Analysis study was conducted for PG&E from 2013 to 2014. This study found that the participant population was characterized by higher income households and greater levels of education compared to non-participants (trends also identified in this research). Comfort was one of the strongest benefits of participation, along with reducing energy usage and saving money on energy bills. This study found that participants that saved the most energy were more likely to have higher incomes, lower home values, live in cooler climate zones, live in homes built before 1980, and live in larger homes (greater than 1,500 square feet). In addition, the Marketing and Targeting study identified financial constraints as the largest barrier and recommended that customers be made aware of financing options. This result is echoed in our process evaluation. Note that these results supplement impact evaluation results (discussed below) which focused on potential savings based on modeling and billing analysis.

Finally, the CPUC conducted an impact evaluation of the program in 2014, assessing the gross and net energy savings associated with program delivery.<sup>11</sup> This evaluation, using billing analysis and self-reported free-ridership analysis, estimated relatively low realization rates for gross savings and identified significant levels of free-ridership associated with the Advanced program track. Combined, these results indicated that the program was not delivering the expected energy savings due to incorrect building modeling assumptions, high partial free-ridership, and lower potential electric savings.

### Program Changes

As a result of previous evaluations, the program focused on revising the Home Upgrade pathway, streamlining program processes, developing contractor networks and mentoring contractors, marketing to customers, and meeting savings goals in the 2014 to 2015 time period. The IOU programs also tried new initiatives of their own. As described by one program manager, the IOUs went “down a similar path independently.” Across utilities, program changes since 2012 include:

- Improved consistency statewide

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<sup>11</sup> DNV-GL (2014). Whole House Retrofit Impact Evaluation. Prepared for the CPUC.

- Expanded mentorship to contractors
- Revised Home Upgrade pathway
- Streamlined program processes
- Collaborations

Market transformation framework SDG&E provides required and supplemental mentoring; three mentoring sessions are required at minimum to ensure new contractors are following BPI standards and Home Upgrade requirements. SDG&E's program has four account managers for contractors. The SCE/SCG program also requires a mentoring session for new contractors and has dedicated account representatives and project coordinators for contractors, assigned by territory. All of the programs also offer training workshops for contractors on topics such as sales and marketing, home upgrade assessments, and the program process.

### Revised Home Upgrade Pathway

The Home Upgrade pathway was revised to become less restrictive and more adaptable. The major change was to allow for flexible combinations of measures, both in the “base measure” and “flex measure” categories. For example, customers can now choose between multiple types of base measures; previously, they were required to have air sealing, attic insulation, and duct sealing measures.

Program staff described the popularity of the Home Upgrade pathway in the SDG&E program as being a result of the types of market actors in SDG&E service territory. While “home performance contractors” (i.e., contractors who specialize in whole home energy retrofits) never had any issues with the Advanced pathway, they make up a very small segment of the market actors. HVAC contractors are the most prevalent group, and SDG&E staff described that these contractors had difficulty with the modeling requirements of the Advanced pathway and thus are disposed toward the Home Upgrade pathway. Additionally, program staff mentioned that contractors operating within SDG&E territory have expressed concerns about the uncertainty involved with not knowing the amount of a project incentive until the project is complete as part of the Advanced pathway. Staff at PG&E and SCE expressed similar comments regarding HVAC contractors in their territories.

However, SCE/SCG reported having an opposite experience, with more Advanced pathway projects than Home Upgrade projects. Program staff reported that this may be due to training provided to whole home contractors early in the program lifecycle.

### Streamlined Program Processes

IOU program staff described an ongoing effort to streamline program processes. As one program manager described it, “initially we were focused on quality but not on ease of participation.” The streamlining occurred by removing many requirements and steps that served as barriers to contractors and customers. Initially, it would take contractors a number of days to submit the paperwork to begin working; program staff described in 2015 that contractors could now start work within a day.

Additionally, the programs have made it easier for customers to participate. For example, PG&E now offers a single point-of-contact for customers through “Home Performance Advisors.” The Advisors follow up with customers and provide them with information and assistance to keep them engaged and confident to move forward with their project.

## Collaborations

The IOU programs have independently pursued collaborative initiatives with other utility programs, municipalities, and regional organizations. PG&E has participated in community events to market the program face-to-face and launched a community-based social marketing program, “Step Up Power Down,” in the cities of Redwood City, San Carlos, and Woodland. Although this program represents a separate initiative, the community-based social marketing program encourages energy efficiency actions such as participating in the Home Upgrade program. In addition, the SCE/SCG program collaborates with the Southern California RENs and EmPower on all community outreach events, financing efforts, and contractor training in shared territories.

The Home Upgrade programs encourage additional home improvements through “enhanced options,” covering other energy end uses, renewables, and water efficiency; however, these options are not formally a part of the Home Upgrade Program. The SCE/SCG program has collaborated with SCE’s lighting and plugload programs to allow for a “one-stop shop” experience with the energy efficiency programs. SCG initiated this approach before SCE by including the SCG Plugload and Appliance measures on their program applications. The SCE/SCG promotion provided additional incentives for lighting and plugload measures if a home achieved energy savings through the Home Upgrade program. The SCE/SCG program has also partnered with the Air Quality Management District (AQMD) in the Coachella Valley to focus on Greenhouse Gas (GHG) emissions reductions. This partnership provided additional incentives, allowing customers to install additional energy efficiency measures.

## Market Transformation Framework

The CPUC has been directing an effort to develop a market transformation framework and plan for the Energy Upgrade program. The effort began with a CPUC order in 2012, and the market transformation consultant began work in 2014. The Home Upgrade program is currently a statewide program with a “market transformation oriented” designation. The Strategic Market Transformation (SMT) Plan will be instrumental for guiding the long-term direction of the program, including establishing revised cost-effectiveness criteria. Market transformation and resource acquisition programs both ultimately attempt to drive energy efficiency adoption, but differ in approach, intermediate goals, and measurement of savings. For example, a resource acquisition program aims to maximize energy savings per participant and the energy savings for the program are calculated as the sum of energy savings for known participants. A market transformation program aims to drive widespread adoption of a technology, behavior, or service and savings are calculated across the market, including non-participant adopters.

The Comprehensive SMT Plan<sup>12</sup> defines the product for the Home Upgrade program as two or more home building shell measures or three or more home upgrade measures (including at least one building shell). The target market is defined as three market segments: (1) home renovation market, (2) HVAC replacement market, and (3) whole house retrofit market. Market actors include homeowners, contractors, lenders, real estate professionals, manufacturers, and suppliers.

As described in the 2015 report, adopting an SMT framework will require many actions on the part of both the Home Upgrade program administrators and program stakeholders. The report makes seven general recommendations regarding adopting a SMT framework for the Home

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<sup>12</sup> Navigant Consulting (2015). A Comprehensive Strategic Market Transformation (SMT) Plan for a Home Upgrade Program SMT Initiative. Prepared for SDG&E and the Home Upgrade Working Group.

Upgrade program. As discussed earlier, evaluating progress towards market transformation was not an objective for this process evaluation. However, as our research overlapped with several of the SMT recommendations, we have provided comments based on our observations and analysis in Table 2-2 below.

**Table 2-2. SMT Framework General Recommendations**

<b>Navigant Report Recommendation</b>	<b>Process Evaluation Comment</b>
The Working Group should continue to develop the needed components of SMT initiative for the Home Upgrade Program.	Interviews with program staff indicate that these efforts continue. Specific examples includes statewide coordination and increased engagement with market actors.
The Working Group should explore creative collaboration approaches that go beyond the traditional regulatory framework.	<i>No comment. The process evaluation research did not assess regulatory engagement.</i>
The Working Group should continue to deepen its current practice of building flexibility and innovation into its development and implementation processes for a potential Home Upgrade SMT initiative.	Interviews with program staff and contractors indicate that the program administrators continue to innovate program design. This includes testing new methods for engaging contractors.
The Working Group should deepen its focus on consumer messaging needs and drivers in order to increase the demand for a home upgrade.	While efforts exist to raise awareness among potential participants, there is opportunity for increased efforts here. Contractors report that additional marketing efforts from the program would raise awareness of program benefits and increase demand from homeowners.
The Working Group should pursue and develop statewide public/private handshake partnerships.	<i>No comment. The scope of the process evaluation did not include interviews with national manufacturers or distributors.</i>
The Working Group should seek to expand the public partnership as part of developing the Initiative Implementation Plan (as possible and advisable).	<i>No comment. The scope of the process evaluation did not include public agencies.</i>
The Working Group should pursue continuation of this effort to establish the parameters and discussion points for future CPUC rulemaking R.13-11-005 Phase III deliberations.	<i>No comment. The scope of the process evaluation did not include Working Group meetings or planned activities.</i>

## Program Participation

As the 2014 and 2015 program years served as the basis for the customer surveys in this evaluation, analysis of program participation also focused on this time period. Since the data request was submitted in October 2015, data cover January 2014 to September 2015.

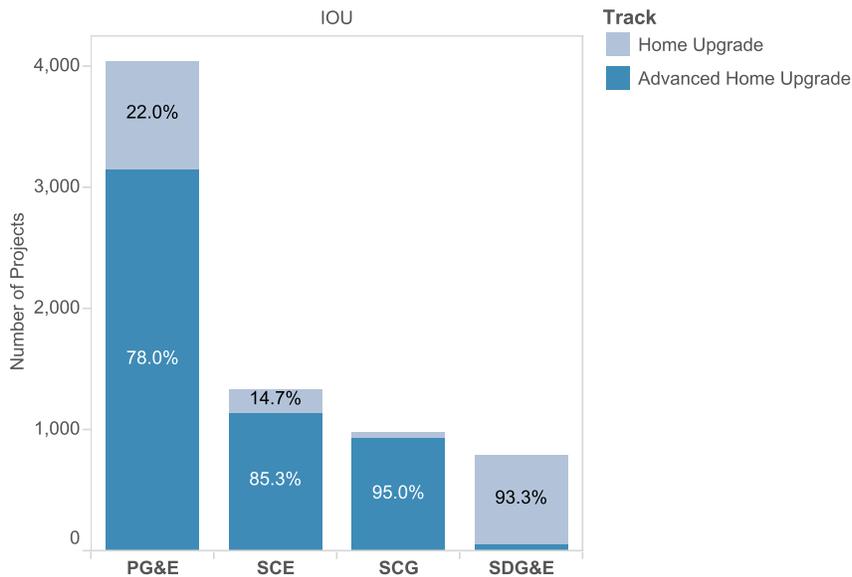
In this time period, the IOU programs completed 7,141 projects, 5,270 (74%) in the Advanced pathway and 1,871 (26%) in the Home Upgrade pathway. In both years, the IOU programs completed more than 3,400 projects.

While the Advanced pathway was much more common for PG&E, SCE, and SCG, the Home Upgrade pathway accounted for the majority of SDG&E projects. As depicted in Figure 2-2, the Home Upgrade pathway accounted for only 22% of PG&E projects, 15% of SCE projects, and 5% of SCG projects compared to 93% of SDG&E projects. When looking at energy savings, the Home

Upgrade pathway accounted for a smaller percentage for each IOU, as the Home Upgrade projects are typically smaller than the Advanced pathway projects.

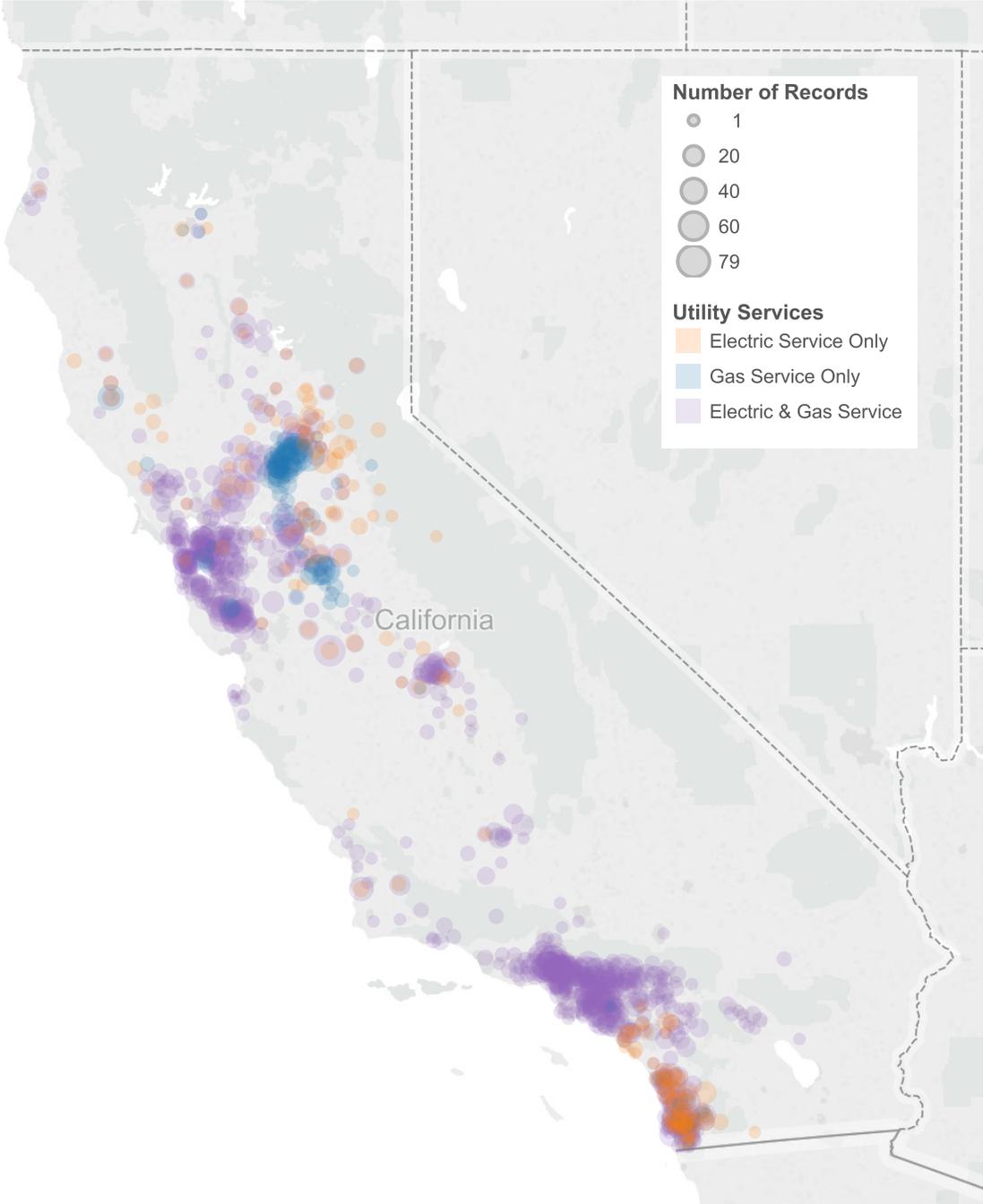
The program worked with hundreds of different contractors in 2014 and 2015, with a total of 539 contractors completing projects in this time period.

**Figure 2-2: Projects by IOU and Pathway (2013–2014)**



Participation is generally concentrated in urban areas. As shown in Figure 2-3, Home Upgrade participants in the IOU programs from 2013 to 2014 were located in 853 of the 1,913 ZIP codes served by California IOUs (45%).

Figure 2-3: Energy Upgrade California - Home Upgrade Projects by ZIP Code, Fuel Type (color), and Number (size of circles)



### 3. METHODOLOGY

The EMI Consulting and Tetra Tech process evaluation of the Home Upgrade program began in January 2015 and concluded mid-year 2016. This evaluation focuses on the 2014-2015 program years. Tetra Tech led the survey development and data collection tasks, while EMI Consulting led efforts to collect data, conduct analyses, and report findings for all other tasks.

The process evaluation findings are drawn from analyses of several data sources, with data obtained using a variety of methods. Table 3-1 provides an overview of the methods and data sources used in the evaluation.

**Table 3-1: Evaluation Data Collection Methods and Sources**

Data Collection Method	Data Source
Telephone Survey	Program Participants Program Near-participants
Telephone In-depth Interviews	Participating California Contractors Non-Participating California Contractors Program Staff Quality Installation Experts
Literature Review	Studies of Quality Installation (QI) Programs Previous Evaluation Reports
In-Person “Ride-Alongs”	Home Upgrade QA/QC Inspectors

Details for each of these data collection methods are provided in the sections below, along with data analysis procedures and any limitations associated with these methods.

#### 3.1 Program Staff Interviews

EMI Consulting conducted 20-30 minute qualitative in-depth interviews with Home Upgrade staff including program managers, implementation staff, and portfolio supervisors between May 8, 2015 and May 15, 2015. These interviews were intended to achieve the following objectives:

- Expand the evaluation team’s understanding of the roles and responsibilities for key program staff
- Identify major program activities and goals
- Document recent changes to program activities and goals
- Solicit key topics of interest for the evaluation

EMI Consulting developed the telephone interview instrument, scheduled interviews via email, and conducted interviews via telephone at a convenient time for the interviewees. Interviews were summarized and informally analyzed during bi-weekly stakeholder check-in calls and through a series of internal meetings with the EMI Consulting team. The evaluation team conducted a total of 7 interviews with various program stakeholders across all IOUs. See Appendix E for the full Program Staff Interview Instrument.

## 3.2 Participant Survey

The evaluation team conducted 400 Computer-Assisted Telephone Interviewing (CATI) telephone surveys of program participants and near-participants between February 15 and March 11, 2016. On average, these interviews lasted 20 minutes and were designed to achieve the following objectives:

- Identify how program participants and near-participants became aware of the program
- Identify program participants' motivations for participating
- Assess participants' satisfaction with the program
- Examine participants' perceptions of the program's energy and non-energy benefits
- Identify near-participants' barriers to participating in the program
- Solicit suggestions for improving the program

Developed by the evaluation team, the survey instrument incorporated suggestions from the CPUC and key program stakeholders within the IOUs. The evaluation team then programmed the final survey instrument using CATI software, after which interviewers employed by Tetra Tech's in-house survey laboratory conducted data collection. Surveys were analyzed using SPSS, a statistical analysis software package. See Appendix A for the full survey instrument.

The evaluation team developed the survey sample from program records obtained from each California IOU in October, 2015. Sample sizes were designed to achieve a minimum of 90/10 confidence/precision levels for the Participant and Near-Participant populations. Response rates were generally good, although survey fielders were only able to complete 21 surveys with near-participants from SDG&E territory. The populations, samples, number of completed surveys, and the associated response rates for each sample strata are provided in Table 3-2.

**Table 3-2: Participant and Near-participant Survey Samples**

Respondent Type	Pathway	IOU <sup>13</sup>	Population	Sample	Complete	Response Rate	Precision <sup>14</sup>
Participants	Home Upgrade	PG&E	884	175	40	23%	13%
		SDG&E	407	175	45	26%	12%
		SCE	188	175	44	25%	11%
		SCG	44	44	11	25%	22%
	Advanced	PG&E	2,925	175	36	21%	14%
		SDG&E	30	30	5	17%	34%
		SCE	1,093	175	43	25%	12%
		SCG	900	175	41	23%	13%
<b>Participant Subtotal</b>			<b>6,471</b>	<b>1,124</b>	<b>265</b>	<b>24%</b>	<b>5%</b>
Near-participants	All Pathways	PG&E	779	200	43	22%	12%
		SDG&E	253	253	21	8%	17%
		SCE	3,929	350	66	19%	10%
		SCG	40	40	5	13%	35%
<b>Near-participant Subtotal</b>			<b>5,001</b>	<b>843</b>	<b>135</b>	<b>16%</b>	<b>7%</b>

<sup>13</sup> Numbers associated with SCG participants and near-participants are for the SCG-only program, not the combined SCG/SCE program.

<sup>14</sup> At 90% confidence level and 50% expected response distribution

<b>Grand Total</b>	<b>11,472</b>	<b>1,967</b>	<b>400</b>	<b>20%</b>	<b>4%</b>
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The evaluation team developed the survey sample from data provided by the IOUs. First, the evaluation team stratified the population of eligible records into participant and near-participant groups. Participants were defined as IOU customers who received at least one incentive through the Home Upgrade program between January 1, 2014 and September 30, 2015. Near-participants were defined as IOU customers who contacted program or implementer staff to inquire about the Home Upgrade program but either did not apply or did not progress beyond the application stage.

The evaluation team further stratified the sub-population of program participants according to the program pathway in which they participated (i.e., Home Upgrade or Advanced pathway). None of the customer records indicated participation in both pathways. Each sub-population of program participant pathways were further stratified by the IOU program in which they participated.

After identifying eligible near-participant records, the evaluation team further stratified this sub-population by the IOU program in which they participated. Near-participant records were not consistently associated with their program pathway of interest and were not stratified by program pathway.

Finally, the evaluation team randomly selected participants and near-participants within each sample stratum. For strata with a small number of records, the strata sample comprised the entire sub-population of records that met the strata's eligibility requirements. Survey response rates are based on complete surveys only. Partially completed surveys were excluded from analyses.

### 3.3 Contractor Interviews

EMI Consulting conducted 27 qualitative in-depth telephone interviews with participating and non-participating California contractors between November 10, 2015 and February 29, 2016. The interviews took approximately 30-40 minutes each, and were intended achieve the following objectives:

- Identify key drivers for contractor participation
- Identify key barriers to increased contractor participation
- Assess the program's administrative burden on contractors
- Assess the effectiveness of contractor training and mentorship offerings on installation quality

EMI Consulting developed the telephone survey instrument and incorporated suggestions from the CPUC and key program stakeholders within the IOUs. The evaluation team scheduled interviews via email and conducted them on the telephone at a convenient time for the interviewees. Interviews were analyzed for key themes using NVivo, a qualitative data analysis software package. See Appendix C for the full Contractor Interview instrument.

The sample of contractors who participated in the program was drawn from the California Contractor Panel. Contractors on this panel were recruited by Evergreen Economics and are paid a financial incentive to be available for research requests. In addition, contractors who completed interviews were provided with a \$50 Visa gift card for their participation. The populations and number of completed interviews for each IOU program are provided in Table 3-3.

Table 3-3: Participant and Non-Participant Contractor Interview Samples

Interviewee Type	IOU Service Territory	Complete
Participating Contractors	PG&E	8
	SDG&E	6
	SCE/SCG	6
<b>Participant Subtotal</b>		<b>20</b>
Non-Participating Contractors	PG&E	3
	SDG&E	2
	SCE/SCG	2
<b>Non-Participant Subtotal</b>		<b>7</b>
<b>Grand Total</b>		<b>27</b>

### 3.4 Literature Review

EMI Consulting conducted a literature review of QI standards within the HVAC industry. This review included previous research in California and New York. The literature review and interviews were intended to achieve the following objectives:

- Identify best practices for high quality equipment installation
- Examine market actors' awareness and use of QI standards
- Assess the desirability of incorporating aspects of QI practices into the Home Upgrade program.

The evaluation team also interviewed five program managers and technical advisors from the following programs and organizations related to residential QI:

- Environmental Protection Agency's ENERGY STAR Program
- Midwestern Energy Efficiency Alliance (MEEA) HVAC SAVE Program
- Southern California Edison Quality Installation Program
- Western HVAC Performance Alliance (WHPA)
- Energize Connecticut (Energize CT) Quality Installation and Verification (QIV)

### 3.5 Inspector Ride-Alongs

EMI Consulting conducted five in-person ride-alongs in October 2015 with inspectors from each IOU program. For each ride-along, an EMI Consulting analyst accompanied an inspector on a half-day post-installation inspection of a participating customer's home. The ride-alongs were intended to achieve the following objectives:

- Identify existing QI practices
- Assess the measurability of proposed QI practices
- Identify any existing barriers to QI implementation
- Collect general feedback about program processes

EMI Consulting developed the inspector ride-along instrument. The final version of the instrument incorporated suggestions from the CPUC and key program stakeholders within the California IOUs. EMI Consulting scheduled ride-alongs via emails with inspectors and program managers.

EMI Consulting analysts accompanied each participating inspector on a half-day post-installation inspection of a participating customer's home. See Appendix D for the full Inspector Ride-Along Instrument. EMI Consulting conducted inspector ride-alongs with inspectors from the following service territories:

- PG&E: 2 inspections
- SDG&E: 1 inspection
- SCG: 1 inspection
- SCE/SCG: 1 inspection

## 4. FINDINGS

This section of the report describes the results of the process evaluation. These findings focus on program operations, customers' experiences throughout their interactions with the program, and program efforts to engage contractors. Specifically, these findings examine program operations, contractor engagement, participant engagement, quality installation, and recent program changes. We also have identified several emergent findings that are discussed at the conclusion of this section.

### 4.1 Key Findings

1. **Across IOUs, participants are very satisfied with the Home Upgrade program.** Average participating customer satisfaction ratings were at least 8.0 for all program components on a scale from 0-10. Average participant satisfaction ratings for the overall quality of the program ranged from 8.3 (SCG) to 8.9 (PG&E). In addition, the customer participant Net Promoter Score (NPS) values were high across utilities: 70.0 for SDG&E, 63.3 for PG&E, 47.1 for SCE, and 38.6 for SCG.<sup>15</sup> Finally, a majority of participating contractors reported that they were satisfied with the program, and nearly every participating contractor interviewed indicated that the program had provided at least some benefit to their business.
2. **The program has improved on many of the issues identified in previous evaluations.** Contractors, in particular, were generally pleased with changes to the program, particularly the increased incentive limits and simplified Home Upgrade pathway point system. In addition, efforts to streamline program paperwork appear to be working for participating customers. On a scale from 0 (Not at all difficult) to 10 (Very difficult), participating customers reported an average difficulty level of 2.0 for completing incentive forms. Average difficulty ratings varied little between PG&E ( $M=1.8$ ), SCE ( $M=2.0$ ), SCG ( $M=2.2$ ), and SDG&E ( $M=1.9$ ). Finally, most contractors reported minimal difficulties completing and submitting program paperwork, and noted recent changes. As one program contractor stated, "It's so much better than it used to be."
3. **Saving money and improving comfort continue to be the primary motivations for completing Home Upgrade projects. High project costs were the primary barriers among near-participants, particularly among lower income brackets.** When asked to rate the importance of factors that motivated their participation in the program on a scale from 1 to 5, participating customers provided an average rating of 4.7 for "saving money on [my] energy bill" and an average rating of 4.6 for "improving the comfort of [my] home." In addition, when asked, 53% of near-participants with incomes under \$50,000 reported that the cost of equipment was a barrier to their participation in the program, while only 28% of near-participants with incomes above \$250,000 reported the cost of equipment as barrier.

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<sup>15</sup> A customer loyalty metric. Customers are categorized as "Promoters," "Detractors," or "Passives" based on responses to a key survey question. The score represents the percentage of customers identified as Promoters (customers who respond with a 9 or 10 on a 1-10 scale about their self-reported likelihood to recommend the program to a colleague) minus the percentage of customers identified as Detractors (customers who respond with a 1 through 6 on the same scale).

4. **Opportunities exist to improve statewide coordination.** A small number of contractors reported frustrations with shifting or inconsistent requirements for incentive forms and other program paperwork. This issue was most widely reported by contractors in Orange County and the surrounding area, as several contractors interviewed in this region were required to navigate requirements of multiple program implementers.
5. **Opportunities exist to improve the support offered to contractors, particularly in terms of marketing and mentorship.** Most contractors reported that they did not use marketing materials provided by the statewide program, IOUs, or program implementers. When asked why they did not use these materials, most contractors said that they felt that the marketing materials were too complex and technical for homeowners. In addition, to supplement program training and streamline installation and inspection processes, inspectors recommended that program decision-makers look for ways to expand opportunities for inspectors to provide education and mentorship to contractors. Inspectors felt that “collaborative” inspections, in which contractors accompany inspectors during inspections of their projects, were effective mentorship opportunities, although they expressed concern that few contractors take advantage of these opportunities.
6. **Non-participating contractors do not see energy efficiency as cost-effective and misunderstand program participation requirements.** Key barriers reported by non-participating contractors included limited awareness of program requirements, difficulty making time for required trainings, and the perception that their customers are primarily motivated to minimize up-front equipment costs rather than long-term energy savings. Additionally, non-participating contractors generally had less favorable attitudes toward the benefits and importance of energy efficiency. Finally, most non-participating contractors also assumed that they needed to be able to conduct sophisticated whole-home modeling in order to participate, indicating a lack of awareness of Home Upgrade pathway requirements.
7. **Contractors are an effective method for driving program participation and energy efficiency improvements.** Contractors are increasingly proactive in engaging customers. 46% of participants reported that they became aware of the program through contractors. In addition, nearly all (97%) of those respondents who had a home energy upgrade followed-through on either all (41%) or some (57%) of the recommendations they received.
8. **More participants are relying on financing options to complete Home Upgrade projects.** The prevalence of projects paid with cash was much lower in the current study (37%) than in previous evaluations (74% in 2011 and 77% in 2012). In addition, participants are requesting more financing options and lower interest rates. In addition, the frequency of participating high income households has not changed significantly since the 2011 process evaluation; in 2011, 54% of participating households reported household incomes higher than \$100,000 while in 2015, 50% of participating households are in the same bracket. However, participants with both high, middle, and low income levels are accessing the financing options available to them at relatively equal rates. Therefore, while some participants are using financing to mitigate first cost barriers, others are using financing as it may be a more favorable or more convenient option than using cash-on-hand.

## 4.2 Program Operations

Overall, from a process perspective, the Home Upgrade program is running smoothly across all IOUs. Program participants were extremely satisfied with program elements and the program overall and contractors report high satisfaction with their involvement with the program. The following sections present the findings regarding participant and contractor satisfaction with the program.

### Program Satisfaction

Both program participants and contractors were in general satisfied with the program. The following subsections present the satisfaction results for program participants and involved contractors.

#### Participants

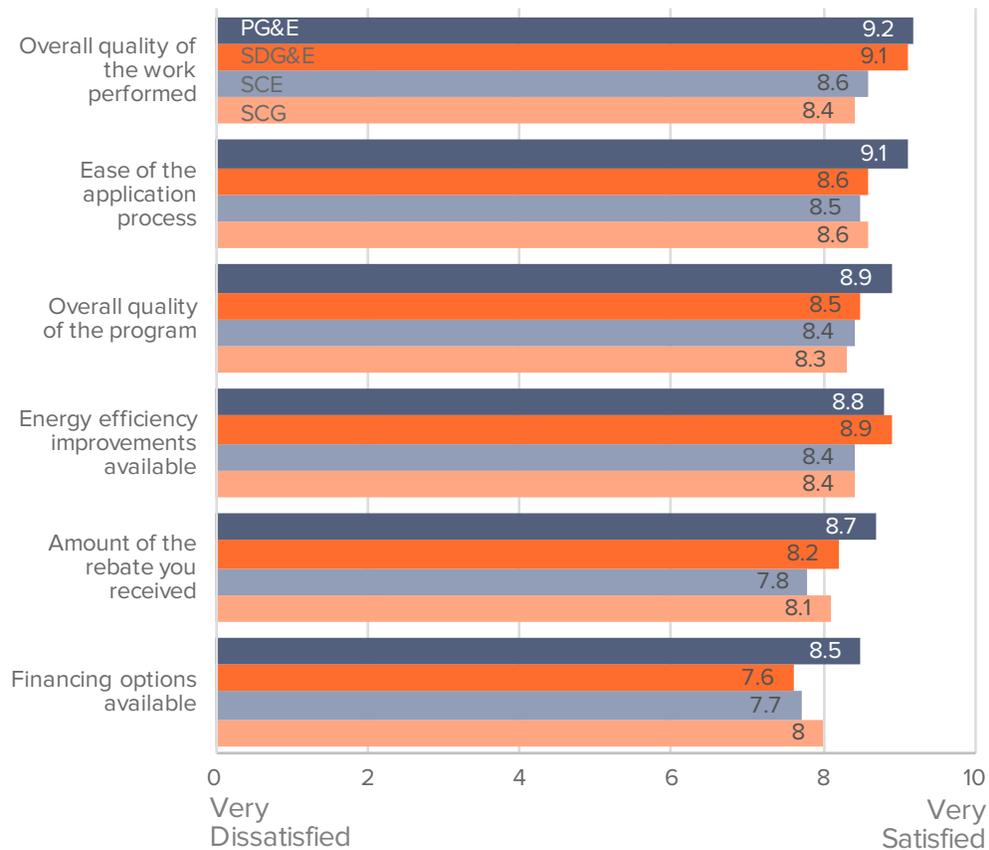
By all measures, program participants are satisfied with the program operations. First, respondents were asked to rate their satisfaction with the program as a whole, and a number of individual program aspects on a 0 (very dissatisfied) to 10 (very satisfied) scale. Across utilities, no satisfaction rating was below an 8.0 on the 11-point scale. These results support previous evaluations which also reported very high satisfaction with the program overall (9.0 total; 9.3 for PG&E; and 7.8 for SCE/SCG).<sup>16</sup> None of the differences between these scores and the current evaluation's scores were found to be statistically significant.

The highest satisfaction ratings were given to the overall quality of the work performed ( $M=8.8$ ) and the ease of the application process ( $M=8.7$ ). Respondents were least satisfied, but still highly satisfied, with the financing options available ( $M=8.0$ ). Differences between service territories in terms of satisfaction with program elements and the program as a whole were not significant. Figure 4-1 below provides complete results by IOU and program element.

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<sup>16</sup> In this 2010-2012 process evaluation of the PG&E and SCE programs, satisfaction was measured on a 1-5 scale. The current evaluation used a 0-10 scale to allow for more variation in responses. For comparison sake, we have adjusted the 2010-2012 scores.

**Figure 4-1: Average Participant Satisfaction Scores**



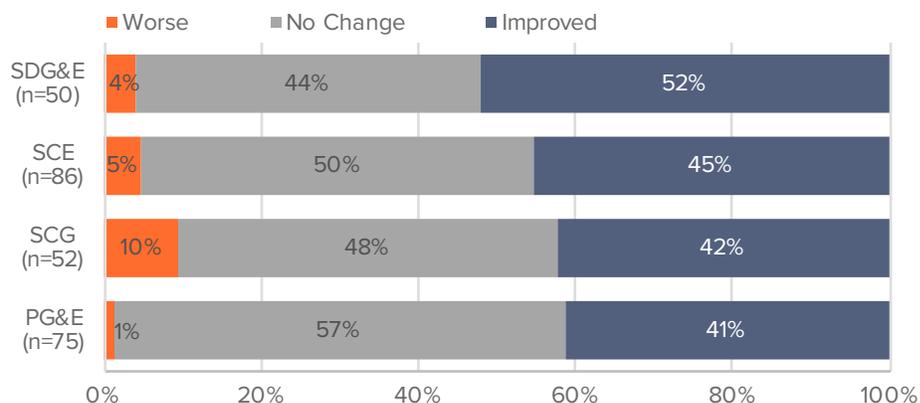
Program participants consistently indicated that the incentive process was unproblematic from their perspective. Respondents were asked to rate the extent to which completing and submitting the incentive form was difficult on a 0 (Not at all difficult) to 10 (Very difficult) scale. The average rating was a 2.0 on the 11-point scale, suggesting that the respondents did not find the process to be at all difficult. There was little variation in the average difficulty ratings between PG&E ( $M=1.8$ ), SCE ( $M=2.0$ ), SCG ( $M=2.2$ ), and SDG&E ( $M=1.9$ ).

When asked, program participants also reported that they were likely to recommend the program to a friend or colleague. On a scale from 0 (not at all likely) to 10 (extremely likely), the average likelihood of recommending was an 8.6. This rating was highest for those receiving services from SDG&E ( $M=9.2$ ), followed by PG&E customers ( $M=8.9$ ), and then those enrolled in the program under SCE ( $M=8.2$ ) and SCG ( $M=8.2$ ). This metric is commonly used to compute a “net promoter score” (NPS). NPS is calculated by subtracting the percentage of respondents who selected 0 – 6 (“Detractors”) from the percentage of respondents who selected 9 – 10 (“Supporters”), and then multiplying this value by 100. This calculation results in a score on a scale from -100 to 100. Program IOUs have the following NPSs based on this calculation: 70.0 for SDG&E, 63.3 for PG&E, 47.1 for SCE, and 38.6 for SCG. NPS is used as one indicator of participant satisfaction with a program, their likelihood to participate in future programs, and their likelihood to refer others to the program. Positive net promoter scores are considered good – an NPS of 50 or higher is considered excellent.<sup>17</sup>

<sup>17</sup> Reichheld, Frederick F. (December 2003). "One Number You Need to Grow". Harvard Business Review.

Participants also reported whether their satisfaction with their utility changed as a result of participating in the program. Overall, 45% of respondents said their opinion improved, and 51% said their opinion had not changed. Figure 4-2 shows these results by utility. SDG&E had the highest proportion of respondents who reported that their satisfaction improved (52%). SCG had the highest proportion report that their satisfaction decreased (10%). PG&E had both the lowest proportion report that their satisfaction improved (41%) and decreased (1%).

**Figure 4-2: Change in Satisfaction with Utility as a Result of Participating in Home Upgrade**



Program participants also had limited suggestions for how to improve the program. When asked, 40% of respondents stated that they would not change anything about the program to improve their experience. Other common suggestions included better training for contractors, improving contact with the IOUs, better or increased program promotion, and increasing the incentive amounts.

## Contractors

Contractors generally expressed high levels of satisfaction with the program overall. When asked about motivations for participating in the program, one HVAC Specialist who has been participating in PG&E's program for over two years highlighted the marketing benefits and the opportunity to upsell to customers: *"The ability to offer significant rebates to customers is a great selling point. And you can make them go with higher ticket items by going energy efficient."*

Nearly every participating contractor interviewed indicated that the program had provided at least some benefit to his or her business, while approximately 25% of interviewed contractors indicated that they experienced significant marketing and sales benefits as a result of their participation.

In general, contractors who had more experience working with other IOU energy efficiency programs reported a better experience with the program. A former SCE QI contractor participant reported that they were able to make a smooth transition into the Home Upgrade program, in part by leveraging the experience and branding benefits from the QI program, further stating:

*"The funds available to the customer - they're pretty significant. The things we're doing on a daily basis: duct work, duct sealing, and high efficiency A/C - those are things we're already doing, so going with Home Upgrade is a great program. We're able to get more*

*money back for the customers versus the QI program. That kind of pushed us more to the Home Upgrade program.”*

This contractor also reported a high level of satisfaction with the QI program, stating that they were able to generate leads for the Home Upgrade program from their presence on the SCE QI website and subsequent word-of-mouth marketing. Other contractors, particularly contractors with former IOU energy efficiency program experience, reported a similar ease in transitioning to Home Upgrade as they were already familiar with the IOU application process and the larger incentive amounts made the associated administrative efforts more cost-effective.

One noteworthy source of dissatisfaction raised by approximately 20% of contractors was the occasional long waits to receive incentive checks. One participating contractor in PG&E’s program, who currently conducts a relatively small volume of Home Upgrade projects and earns approximately 10% of their business’s revenue for the program, expressed concerns about increasing their participation in the program:

*“I have some issues with the program. [Program Implementer] tries to do a good job, but I have had less than good experiences. I have the feeling that the program was implemented before they were all ready and knew how to deal with the paperwork. And I’ve been a victim of that. Right now, I have two pending rebates submitted in middle of August and my clients haven’t received their rebates yet. That’s three or four months. Unacceptable. And it doesn’t do much for marketing to enhance my standing in the community as a guy who can pull it off.”*

This quote represents an unusual case among the interviewees but serves to highlight contractors’ perceptions of the damaging effects that long incentive waits can have on their reputations and ability to sell future Home Upgrade projects. Though rare in most contractors’ experiences with the program, most contractors who had experienced a long incentive delay reported concerns about being able to count on predictable revenue from the Home Upgrade program.

## Project Applications and Incentive Submissions

Since program inception, the program managers and implementers have made significant efforts to simplify and streamline the program application process. Only 2% of the near-participants reported that simplifying the program would have increased their likelihood to participate (while most did not participate due to high equipment costs).

However, several contractors reported that program paperwork can be very time consuming and places an administrative burden on their operations. In addition to current program paperwork requirements, many contractors from all IOU programs felt that they struggled to keep up with different requirements across program implementers or frequent changes in paperwork requirements:

*“The paperwork end is cumbersome and time-consuming. Even just staying current on things that change is a lot to keep up with.”*

*“When [program implementer] changes parts of programs, it’s in the newsletter. You have to read the whole things and it would be nice to have something more formal.”*

*“It made the program difficult to administer when they chose different administrators...[they] don’t all use the same program documentation.”*

Several contractors provided additional insight into these critiques of program operations. The most widely shared contractor frustration with the program was the administrative burden and confusion created by shifting program policies and forms. As one high-volume contractor in PG&E’s program stated when asked about issues with the program:

*“Nothing was especially difficult, but [the implementer] will come out with a different form and think, ‘well, it’s just one more form.’ And pretty soon it’s 10 forms, and they all take time. I don’t suppose there’s one that’s more of a headache than another one, but in total it’s a lot of paperwork.”*

Most other contractors shared similar minor frustrations about the time investment required to complete program requirements.

Additionally, most contractors reported an especially frustrating initial period of program participation in which they learned how to work with program paperwork and other requirements. One high-volume HP SCE/SCG Home Upgrade contractor described their adjustment to program paperwork and other requirements: “The only thing, in the beginning it’s intimidating with all the paperwork and all the test in and test out. So that was the biggest struggle in the very beginning, but we kind of overcame that, that little hurdle.” These complaints were typically minor and did not appear to be a significant barrier to participation.

Only a limited number of contractors whose territory spanned multiple IOU programs reported experiencing particular difficulties adapting to differences in application procedures between the programs. One of two contractors who conducted projects with several IOU programs in southern California expressed frustration with inconsistent program requirements across the SDG&E, SCE/SCG, and SCG programs.

*“Every territory has a different program. ICF, which does San Diego Gas, then LA County and Orange County, then you have BKL. And every one of them has different processing, procedures, and guidelines. So it’s supposed to be a unified program over the whole state, but every county has different things. So for one you have to process this way and it’s this way for those people. So I think, if everything was the same, it would really make it a lot easier.”*

*“San Diego Gas requires different things than Orange County even though. It’s two different logins, two different - everything’s different. Which makes it more difficult because now you have to - I have to - try and train the girl that does the processing. So the SDG&E and Orange County, we haven’t spent a lot of time training her because we don’t have that many jobs in that territory. So when we have jobs in that territory, it takes more time processing it because it’s just different. They want different things.”*

While these problems may not affect many contractors currently, even minor differences in program requirements between implementers could be magnified if the program were to increase in scale and complexity. However, other contractors, felt that the paperwork requirements were not unreasonably burdensome. One contractor even described the process

for submitting projects through Vision as “simple” while also offering a suggestion for improving the process:

*“The submission process is very simple, I think. One thing I don't like and I don't know if it's something that can be changed, or not, but I'm not sure why you need the actual [Service Agreement ID] (SAID) of the gas, electricity instead of the account number. It seems like something they could look up on their end. Because I know there are a lot of times when I'm coaching customers to read their bills, or [they] give me the wrong number completely. Then it gets kicked back to me. So it seems like it's wasting a lot of people's time if you don't get it right the first time around.”*

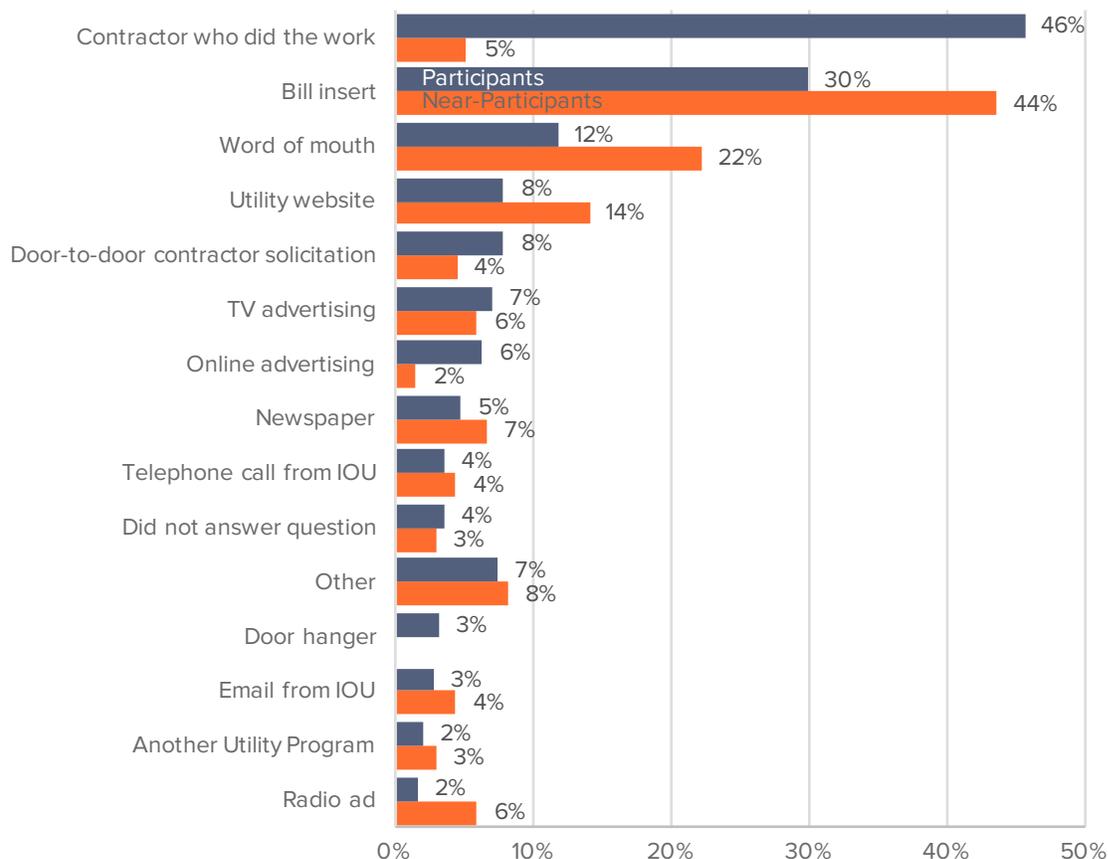
This recommendation represents the view of one contractor who may not fully understand the reporting requirements associated with the program. It is highlighted here as an example of the kinds of issues that contractors may find difficult when learning to comply with the program's paperwork requirements.

## Program Marketing

As discussed earlier, the marketing of the Home Upgrade program is primarily driven by contractors. However, program awareness is supplemented by both statewide umbrella marketing campaigns and by locally-driven IOU marketing. Reported responses from both participants and near-participants indicate that these efforts are create a “push/pull” drive towards program participation.

When asked, participants frequently reported that contractors first made them aware of the program (46%). Bill inserts (29%) and ‘other’ sources (28%) were also frequent sources of awareness of the program. Overall, these results were consistent with previous evaluation findings. Among program participants indicating ‘other’ ways of primary program awareness, the majority identified either television or door-to-door solicitation as the means by which they became aware of the Home Upgrade program. Figure 4-3 below illustrates the source of program awareness among participants.

Figure 4-3: Participant and Near-Participant Sources of Awareness



Responses regarding primary program awareness were very similar across the different utilities: contractors were consistently the primary source of awareness (PG&E: 47%, SCE: 37%, SCG: 60%, SDG&E: 43%). Bill inserts were the second most commonly reported primary source of awareness for PG&E (31%), SCE (33%), and SDG&E (31%); for SCG ‘other’ ways were the second most commonly reported source of awareness (32%).

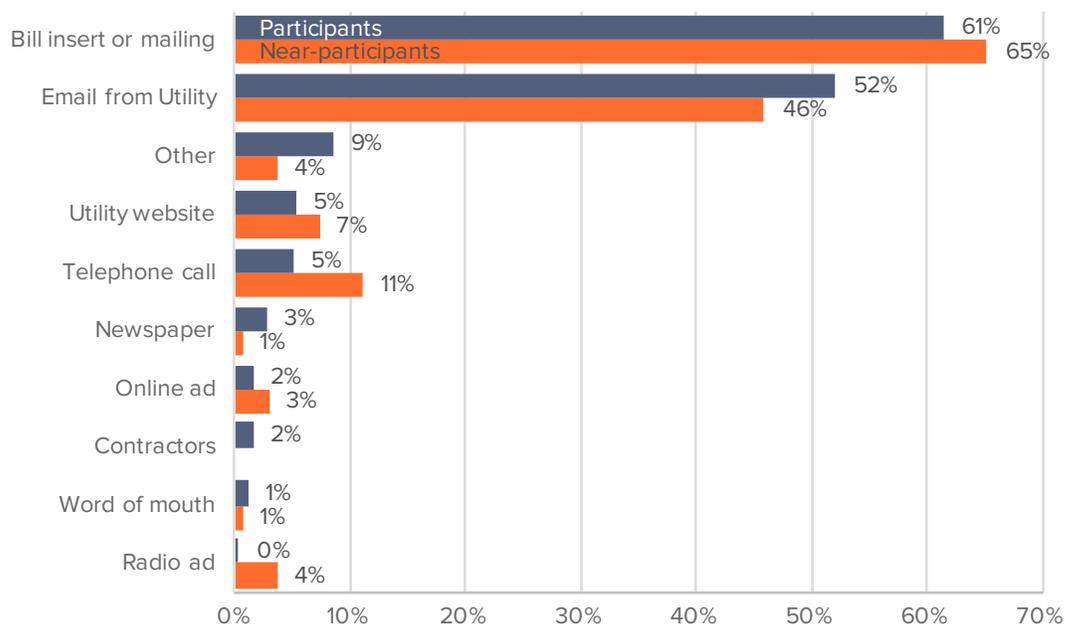
Near-participants most frequently identified utility mailings or bill inserts as a source of awareness, followed by ‘other’ sources and word of mouth, as shown in Figure 4-4. As with program participants, the most common ‘other’ source of primary program awareness reported by near-participants was television. The second most common ‘other’ source of awareness was via self-initiation—that is, they indicated that they gained awareness of the program when contacting the utility. In contrast with participants, however, only 5% of near-participants mentioned their contractor as a source of awareness of the program. This finding suggests that contractors are an effective method for driving program participation and that their efforts and encouragement are needed as a “call to action” for residential customers. Overall, sources of program awareness were similar across the utilities. Utility bill inserts were listed as the most frequent source of for PG&E (33%), SCE (55%), and SDG&E (33%). For SCG, the frequency of utility bill inserts was equal to that of another common source of awareness for other utilities – word of mouth (40% for both).

In addition, these results show an increase in utility advertising as a primary source of program awareness since the 2011 process evaluation. In 2011, communications from a utility was mentioned by 9% of participants compared with 30% of 2014-2015 participants. This finding

indicates that IOU marketing efforts have supplemented contractor efforts to encourage increased participation among a wider variety of households, not just those targeted by contractors.

Respondents were also asked to report the ways in which they would like to hear about programs like the Home Upgrade program. Responses from both participants and near-participants were highly concentrated in two categories: bill inserts or mailings from the utility (61% and 65%, respectively) and email from the utility (52% and 46%). Figure 4-4 summarizes desired sources awareness for both participants and near-participants. While bill inserts and mailings were common sources of awareness for both participants and near-participants, very few (3% and 4%, respectively) heard about the program from a utility email. These results suggest that there may be room for increasing email-based marketing and outreach efforts to reach additional potential participants.

**Figure 4-4: Participant and Near-participant Desired Sources of Awareness**



As contractors are the most frequent source of program awareness for participants, optimizing contractors’ abilities to effectively promote program participation remains one of the most important program activities in the current contractor-driven program model. There is room to improve the support provided to contractors given their importance in encourage program participation and the need to educate homeowners about the program and its benefits. First, most contractors reported that they did not use marketing materials provided by the statewide program, IOUs, or program implementers. When asked why they did not use these materials, most contractors said that they felt that the marketing materials were too complex and technical for homeowners. One PG&E contractor, an HP contractor who completes a high-volume of Home Upgrade pathway projects each year, explained why his or her firm does not use marketing materials provided by the program:

*“They put out this packet a couple of years ago. It was eight pages long. It was a folder with all kinds of information. That’s too much information for a homeowner. They’re not contractors. Keep it simple stupid. People don’t care about R-38. They don’t care about,*

*‘we’re going to reduce leakage by 30%.’ They care about hearing, ‘You’re going to be more comfortable. You’ll have better air quality. We’ll make your home safer.’ So a lot of the things they put out marketing-wise, it’s too much information.”*

One notable exception to contractors’ non-use of program marketing materials is the “Home Upgrade Digest” provided by the SCE/SCG program, described as a useful resource by several contractors in Southern California. One SCE/SCG HP contractor, who conducts a high volume of both Home Upgrade and Advanced pathway projects, described this document:

*“It’s called Home Energy Digest, and it walked the customer right through [the program]. Even if they ... They didn’t want to hear the whole building science thing from you, this was on a second, third-grade level, but people understand step one, here’s what I do, step two, here’s what I do. Step three.”*

This contractor’s description is a representative example of other contractors’ praise for the simplicity of the Home Upgrade Digest. This sentiment contrasts with contractors’ non-use of other program marketing materials, which may overestimate homeowners’ interest in and knowledge of the measures incentivized by the program. While not necessarily representative of other program contractors, these contractor interviews suggest that there may be a demand for simple marketing resources designed for customers with less awareness of program operations and energy efficient measures.

Likewise, some contractors reported disparities in marketing support by region or implementer. The following quote, from a HP contractor with an HVAC Specialty who primarily submits Home Upgrade pathway projects, illustrates this issue:

*“There is a huge difference between marketing efforts. We call ourselves the “red-headed step-children”. We can’t get SCE or SDG&E to do any marketing in Orange County. We get less assistance and funding for marketing and other things. There is a difference in leads between SCE, about 30 leads per month, and SDG&E, which is not sending any leads.”*

The demand for additional marketing support stems from contractors’ perception that customers are not aware of the program. When asked what they would improve about the program, several contractors expressed an interest in prioritizing advertising to increase customer awareness. One HVAC Specialist, who reported submitting a low-volume of projects through the SCE/SCG program but expressed an interest in increasing their Home Upgrade project load, offered the following suggestion for improving the program:

*“I think that they could do a little more marketing. I know when they rolled out the program, they spent a lot of time and money and buses and billboards about EUC. And that kind of fizzled out. I haven’t seen much advertising about it lately. So probably spending more money on the program to advertise, so that customers know about it.”*

However, recent marketing efforts may be improving contractors’ ability to sell the Home Upgrade program to customers. Several contractors, primarily contractors working with the PG&E program, noticed a recent increase in unsolicited customer calls about the program. One PG&E HP contractor, who submits a high volume of Advanced pathway projects and a low volume of Home Upgrade pathway projects, reported noticing a beneficial impact from recent marketing

efforts:

*“Advertising is always good. It’s just – you have to decide what works and what doesn’t. And that’s always been the hardest thing to know: [how to] get the program out there and get it known. I have gotten some increased calls recently, so I have to think that whatever’s been done in the past 3-4 months has been working because I’m getting more cold calls from people. So getting the word out is the most important thing.”*

This quote, while not a conclusive finding about the effectiveness of recent marketing efforts, is suggestive of possible increases in program interest and awareness, at least among customers in the PG&E program. It also provides additional support for the finding that contractors perceive low customer awareness as a significant barrier to selling more Home Upgrade projects.

### 4.3 Participant Engagement

Home Upgrade program marketing materials appear to be appropriately targeting customers’ self-reported motivations for being initially interested in participating. However, the findings suggest that references to California’s energy goals<sup>18</sup> may not align strongly with potential participants’ motivations to save energy, while moral appeals promoting Home Upgrade as a way for homeowners to help protect the environment may be effective. Additionally, providing additional financing options with lower interest-rates may reduce barriers to participation, particularly among potential participants with incomes below \$100,000.

Home Upgrade messages primarily target the energy savings and financial benefits of making energy efficient home improvements,<sup>19</sup> which align with participants’ and near-participants’ self-reported motivations for being interested in the program. Consistent with previous evaluations, participants and near-participants are primarily interested in participating out of a desire to save money on their energy bill. However, both participants and near-participants feel strongly that they have a personal responsibility to use as little energy as possible to preserve the environment and curb climate change. Moreover, both groups were more motivated by the environmental benefits of making energy efficiency improvements than increasing the value of their home.

Additionally, while respondents valued prosocial environmental benefits of energy efficient equipment and behaviors, “helping California lead the way on saving energy” was the lowest-rated motivation for respondents’ efforts to save energy. These findings suggest that, while participants and potential participants are motivated to make energy efficiency improvements for personal-level financial benefits, they also share the more altruistic belief in taking personal responsibility for the impacts their energy use has on the environment.

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<sup>18</sup> e.g., California Public Utilities Commission & California Energy Commission. (2015). *Energy Upgrade California Home Upgrade Program fact sheet*.

<sup>19</sup> e.g., California Public Utilities Commission & California Energy Commission. (2015). Energy Upgrade California Home Upgrade Program. <https://energyupgradeca.org/en/save-energy/home/take-control-for-savings-and-comfort/get-a-home-upgrade-and-increase-comfort>.

## Household Characteristics

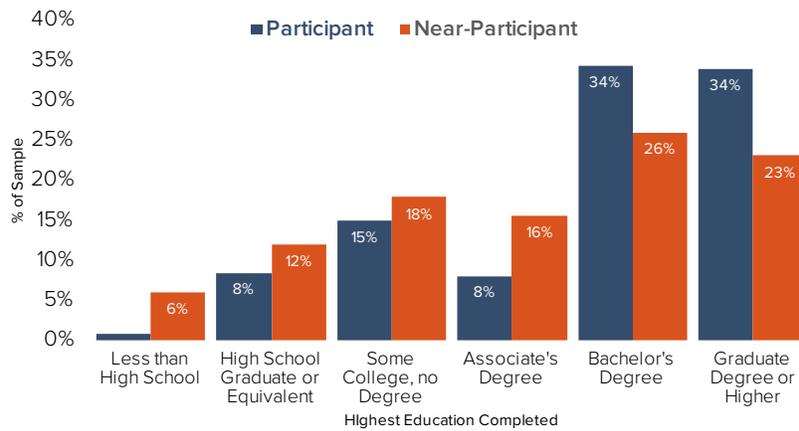
In general, participants and near-participants are very similar with two key differences. First, an analysis of income levels for participants and near-participants indicates that participants generally had higher levels of household income than near-participants. Figure 4-5 below illustrates this key difference between participants in the Home Upgrade program and near-participants. This finding supplements analysis from past research that suggested that high free-ridership was the result of high income households obtaining financial incentives as part of the program, diluting the influence of the program interventions. In addition, it further compounds first cost barriers frequently reported by near-participants (discussed later in this section). In addition, the frequency of participating high income households has not changed significantly since the 2011 process evaluation; in 2011, 54% of participating households reported household incomes higher than \$100,000 while in 2015, 50% of participating households are in the same bracket.

**Figure 4-5. Household Income for Participants and Near-Participants**



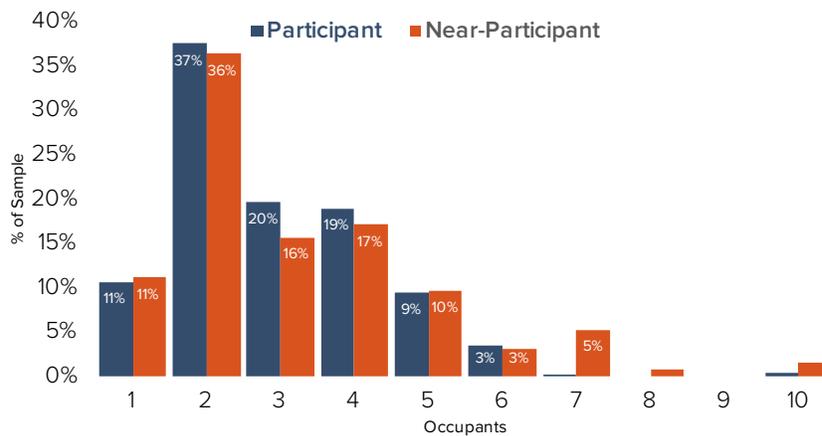
In addition, participants tended to have higher levels of formal education than near-participants. However, education levels and household income are highly correlated and given the stated participation barriers by near-participants, the differences in income are more impactful on overall participation than the differences in education. Similarly, the education level of participants has not changed significantly since the 2011 evaluation. In 2011, 72% of participants had a college degree or higher compared with 68% of participants in 2015. Figure 4-6 illustrates these educational differences for participants and near-participants.

**Figure 4-6. Education Level for Participants and Near-Participants**

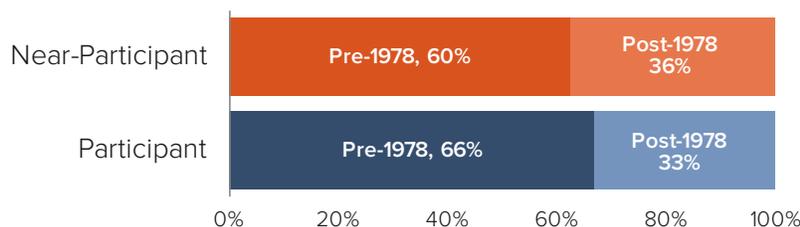


Otherwise, as shown in the figures below, participant and near-participant households were similar in terms of household size, housing vintage, two other demographic factors that may impact the potential for participating in a whole house retrofit energy efficiency program. While not significant, there has been a slight increase in the household size among participants. In 2011, 54% of the participant households had one or two members, while in 2015, the percentage has fallen to 48%. This is a positive trend for the program as it expands to larger, more active households with increased potential for energy savings.

**Figure 4-7. Household Size for Participants and Near-Participants**



**Figure 4-8. Housing Vintage for Participants and Near-Participants**



Finally, near-participants were slightly more likely to rent their home than participants as shown below in Figure 4-9. Given the required financial investment to participate in the Home Upgrade program, renters are unlikely to move forward with program participation. However, as the frequency of renters in both samples is low, this characteristic is not a major barrier to program participation.

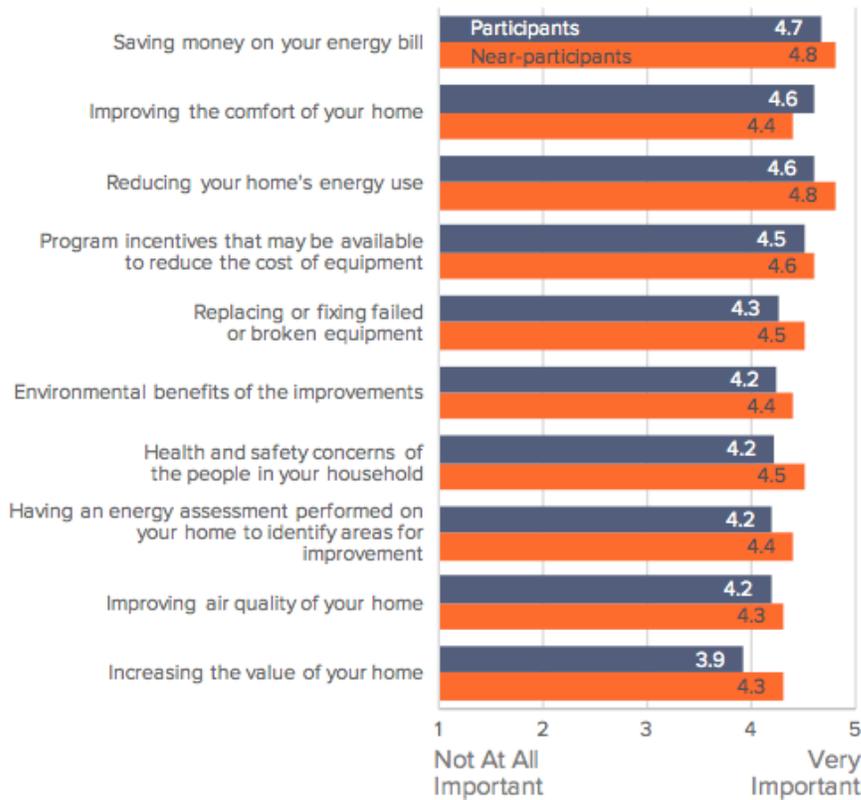
**Figure 4-9. Home-ownership for Participants and Near-Participants**



### Participant Decision-Making & Motivations

Saving money, improving home comfort, reducing energy use, and program incentives were the most important factors for program participants, as shown in Figure 4-10. Across all service territories, these four factors were consistently rated as the top four most important factors. Respondents rated most factors highly, however, with only the statement “increasing the value of your home” receiving an average importance score of less than four. Respondents were asked to rate the importance of various factors to participate in the program (or, for near-participants, to contact their utility about the program) on a scale from 1 (not at all important) to 5 (very important). These results largely support previous evaluation findings which showed that improving home comfort ( $M=4.7$ ), reducing energy use ( $M=4.6$ ), incentives ( $M=4.6$ ), and saving money on energy bills were the greatest motivators of program participation ( $M=4.5$ ) (SBW Consulting, 2012). Differences between utilities in terms of these factors were minor with the exception of SCG participants, who listed program incentives as the third most important factor in program participation ( $M=4.5$ ).

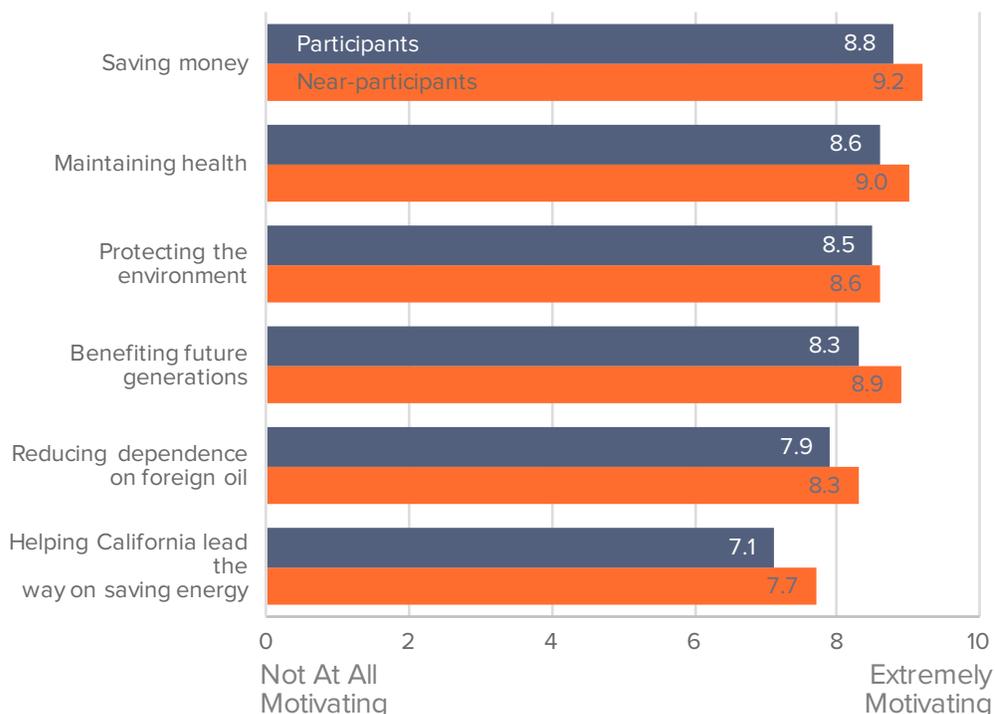
Figure 4-10: Importance of Factors for Participating in or Contacting Utility About Home Upgrade



Near-participants also indicated that reductions in energy costs were their primary motivation for wanting to participate in the program, as shown above. Results largely mirror those for participants: saving money on energy bills ( $M=4.8$ ) and reducing home energy use ( $M=4.8$ ) were two most important factors in motivating near-participants to contact their utility regarding the Home Upgrade program. However, near-participants consistently rated these factors more highly than participants, with the exception of “improving the comfort of your home.” This difference is likely the result of the differences in reported household income levels between participants and near-participants.

Similarly, respondents were asked to rate the importance of a number of potential motivations for saving energy. As shown in Figure 4-11, participants generally reported that saving money was their primary motivations for reducing energy consumption. As with the factors for participating in or contacting the utility about Home Upgrade, near-participants consistently rated motivations for saving energy more highly than participants. For participants and near-participants across all utilities, “helping California lead the way on saving energy” was the least influential in terms of stimulating energy saving actions.

Figure 4-11: Participant and Near-Participant Motivations for Saving Energy



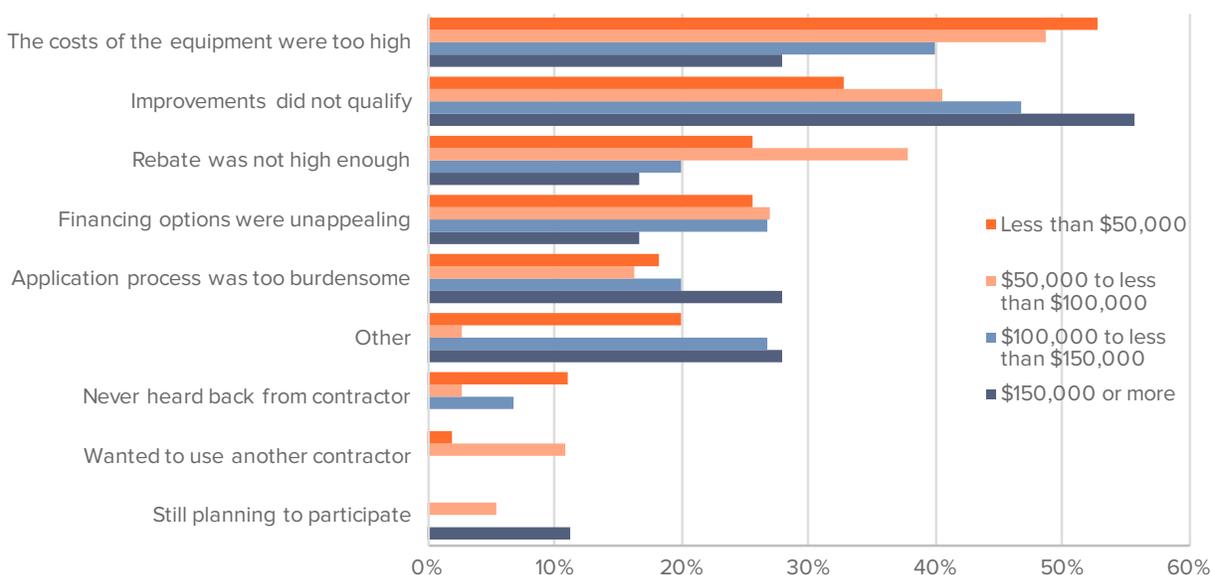
### Participation Barriers

Up-front costs for whole-home performance and retrofit energy efficiency programs are frequently identified as barriers to participation in such programs. As documented in past Home Upgrade evaluations, cost continues to be the greatest barrier to program participation among near-participants. However, program participants are increasingly turning to financing options to overcome this barrier. This suggests that the Home Upgrade program would benefit from coordinating with California energy efficiency financing options for residential customers.

As such, when asked, 47% of the near-participants reported that high costs were the reason they did not complete the home upgrade project. This barrier has a greater impact on lower income households as shown in Figure 4-12. While the top two categories were at least fairly common across income ranges, cost of the equipment was much more common among lower income respondents, whereas eligibility of the desired improvements was much more common among higher income respondents. These results suggest that even after incentives, the program may be cost-prohibitive for a larger share of lower-income households. In addition, this trend may contribute to the trends identified in the previous impact evaluation. During that research, net-to-gross analysis identified a high percentage of free-ridership that was likely due to higher income households participating in the program.

The next most common reason for not participating was also related to cost: the incentive amount was not high enough. This reason was also chosen most frequently by respondents of incomes under \$50,000 (26%) and \$100,000 (38%). Other barriers included ineligible improvements (e.g., ground-mounted solar panels), insufficient incentives, unattractive financing options, and a burdensome application process.

**Figure 4-12: Reasons for Nonparticipation by Income Level (n=135)**



Similarly, 27% of near-participants reported that higher incentive amounts would have positively impacted their decision to participate in the program. Customers reported wanting “more,” “better,” or “higher” incentives, free or “reduced” costs on upgrades, or monthly payments that were more “affordable.” While the number of near-participants who made these suggestions was fairly small, these results suggest existing program components could be leveraged to promote awareness of and education about the other financing programs available in California.

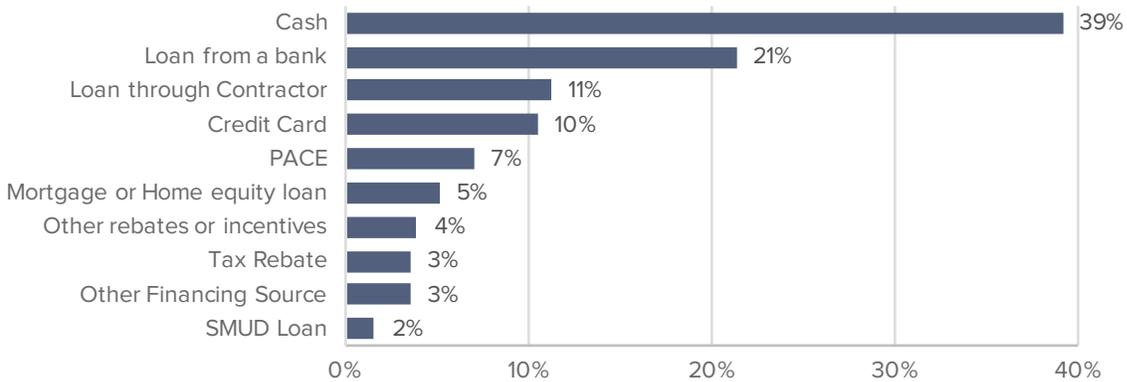
### Project Financing

While up-front costs remain a barrier for potential participants, survey data suggests expanded financing options may be helping some participants overcome these barriers. In particular, current participants are more frequently using financing options to pay for the home upgrade projects. While cash (i.e., single payment) remains the most common form of payment (39%), such payments were much more common in previous evaluations: 74% of participants paid in cash in 2011 and 71% did so in 2012.<sup>20</sup>

Of those respondents who reported financing their projects by other means, the most commonly reported method of paying for their upgrades was a bank loan (21%), followed by a loan product provided by their contractor (11%). While less common, a number of participants took advantage more recent energy efficiency finance options such as Property Assessed Clean Energy (PACE) financing – including the Home Energy Renovation Opportunity (HERO) and mPower programs, among others – and loans through the Sacramento Municipal Utility District (SMUD).

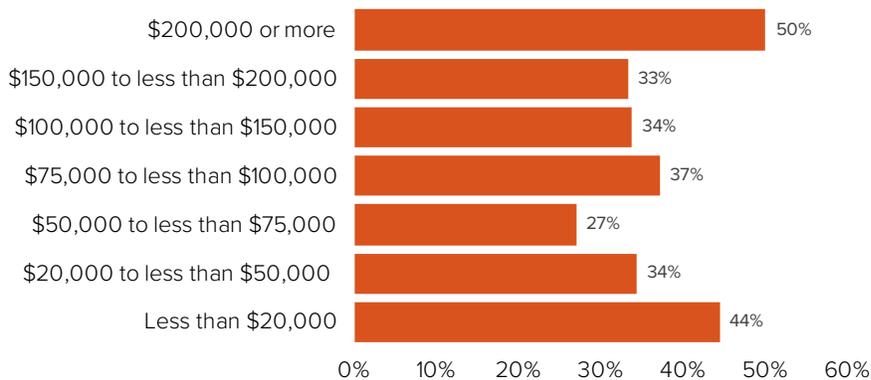
<sup>20</sup> SBW Consulting. (2013). 2010-2012 PG&E Whole House Retrofit Program Phase II Process Evaluation Study - Methods and Findings - PGE0302.06. Bellevue, WA.

**Figure 4-13: Participant Financing Methods**



Similarly, while the usage of financing has increased, that frequency has increased across all income levels. Figure 4-14 below illustrates the frequency of the use of cash (versus other financing options) to pay for the retrofit project among program participants at different income levels. This analysis suggests that high income participants are using financing options that are convenient and advantageous for them instead of using them to offset first cost barriers. However, the increased use among middle and lower income households may have a positive impact on free-ridership by encouraging broader participation.

**Figure 4-14: Percentage of Participants Using Cash by Income Level**



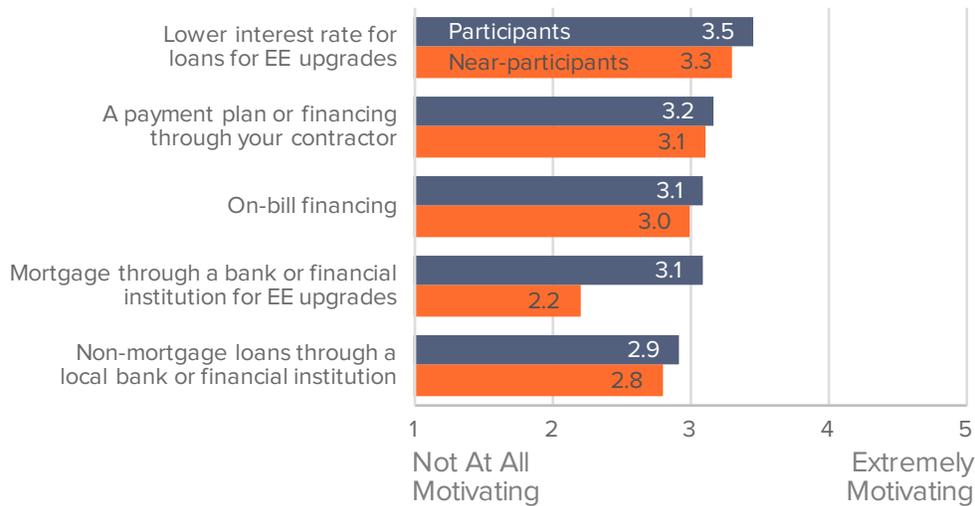
In addition, participants and near-participants reported that program-subsidized interest rates and contractor-supported financing options would increase their likelihood of completing additional energy efficiency upgrades to their home. During surveys, respondents were asked to rate the influence of these options on their likelihood to complete the energy efficiency measures if they met the following criteria:

- Respondent indicated that they did not complete any or all of the identified recommendations, and
- Respondent was planning on pursuing at least some recommendations within the next year.

Respondents rated financing options on a scale of 1 (does not increase likelihood at all) to 5 (increases likelihood a great deal). For both participants and near-participants, lower interest rates were rated most highly, with specific loan structures rated less highly. Notably, mortgage-

based financing was rated much less highly among near-participants than participants. Generally speaking, the respondents saw all financing options as increasing the likelihood of install to only a moderate extent, as the average rating for any given option did not exceed 3.5 on the 5-point scale. Note, that given the sample sizes for this group, this result is not necessarily generalizable to the participant and near-participant populations.

**Figure 4-15: Participant (n=24) and Near-participant (n=18) Average Influence Ratings of Financing Options**



### Energy Efficiency Attitudes

Respondents were asked a number of questions to ascertain their attitudes toward energy efficiency and other energy-related issues. All survey items were on a 0 (Not at all agree) to 10 (Completely agree) scale. Participants and near-participants hold strongly favorable attitudes toward energy efficiency behaviors and see these behaviors as a means to achieve personal financial benefits and as part of their personal responsibility to help protect the environment.

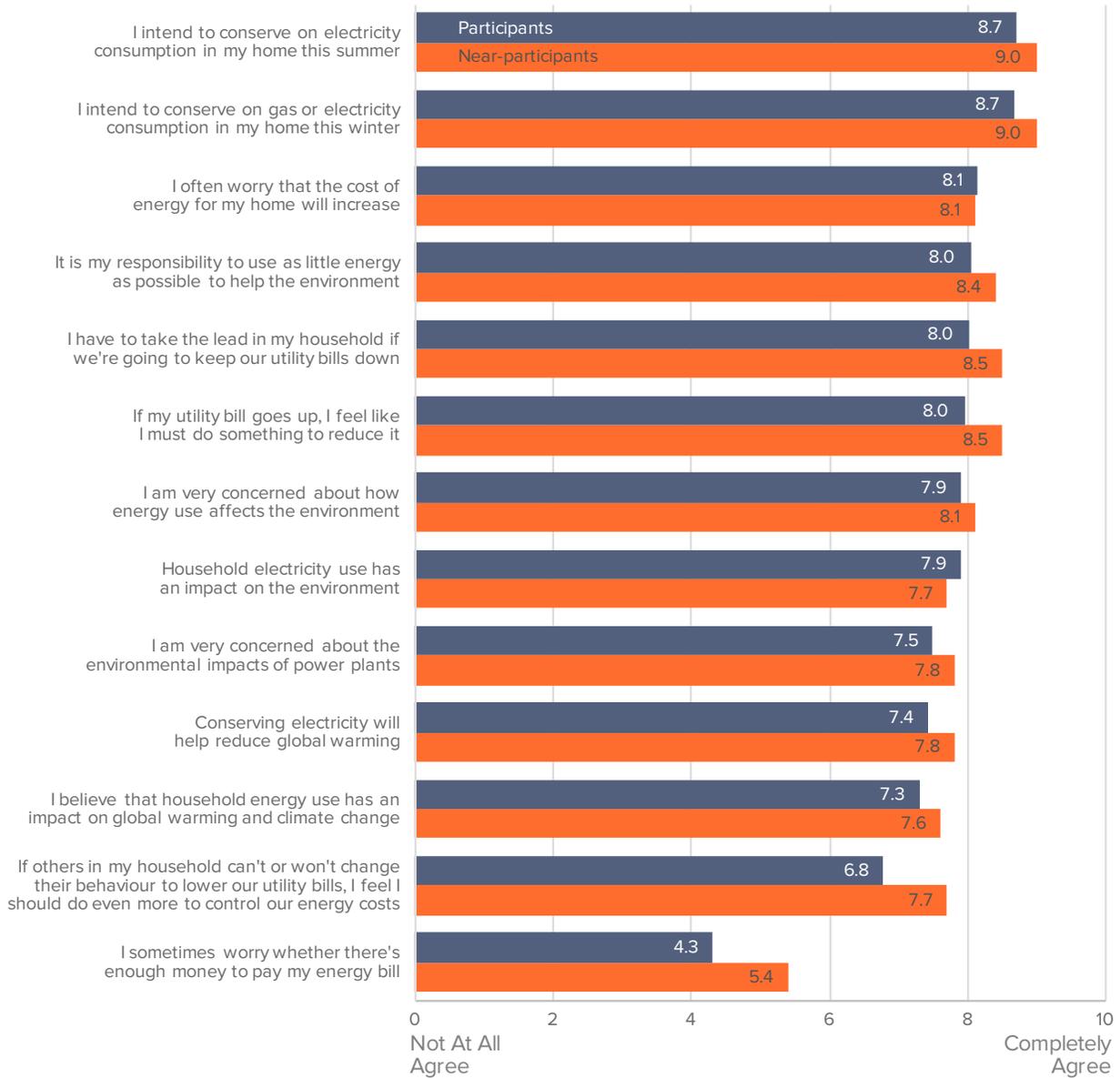
#### Program Participants

As expected, respondents had positive attitudes towards energy efficiency and energy-related issues. Only one of the thirteen energy-related items received an average agreement rating below the midpoint – “I sometimes worry whether there’s enough money to pay my energy bill” ( $M=4.3$ ). As would be expected, the average rating for this item decreased as reported income increased (e.g., less than \$50,000 a year [ $M=5.8$ ] vs. \$150,000 or more a year [ $M=2.5$ ]). Respondents showed the greatest mean agreement with intentions to conserve on electricity consumption in the home during summer ( $M=8.7$ ) and conserve on gas or electricity consumption in the winter ( $M=8.7$ ).

While slight, there were some differences between respondents receiving services from different utilities in terms of their strongest energy efficiency / energy related attitudes. When splitting the sample by IOU, the two – summer and winter months – conservation measures showed the highest mean agreement for both PG&E ( $M=8.8$  and  $M=8.7$ , respectively) and SCE ( $M=8.9$  and  $M=8.9$ , respectively). The greatest mean agreement for SCG participants was with the summer month conservation statement ( $M=8.4$ ), followed by “I have to take the lead in my household if

we’re going to keep our utility bills down” ( $M=8.4$ ). SDG&E respondents agreed most with the winter months conservation item ( $M=8.7$ ), followed by the statement “I often worry that the cost of energy for my home will increase ( $M=8.5$ ). Participants’ energy efficiency and energy-related attitudes are displayed in Figure 4-16.

**Figure 4-16: Participant and Near-Participant Energy Efficiency Attitude Agreement Levels**



## Home Energy Assessment and Energy Efficiency Measures

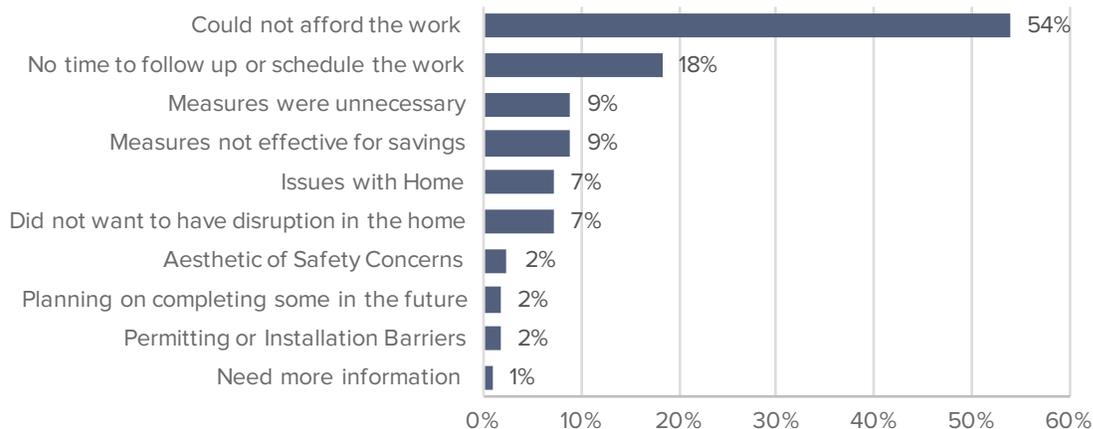
Home assessments are offered by Energy Upgrade California to identify potential energy savings measures and encourage participation in the Home Upgrade program. Home Upgrades are conducted by participating contractors and HERS raters. Both program participants and near-

participants were asked whether they had a home energy assessment. If so, follow-up questions asked about the process. Program participants were asked to respond to a number of additional items regarding recommendations, implementation, and challenges surrounding upgrading their home.

The overwhelming majority (87%) of participants had an energy assessment conducted on their home; slightly fewer than half (42%) used a rater or energy auditor separate from their contractor. The vast majority of respondents indicated that the energy assessor both went over the results of their energy assessment with them in person (90%) and left literature with them describing ways to manage energy use in their home (87%). Nearly all (98%) of those respondents who had a home energy upgrade followed-through on either all (41%) or some (57%) of the recommendations they received.

Respondents who did not implement *all* of recommendations received via their home energy assessor were asked to provide the reasons they decided not to do so. Over half of these respondents (54%) indicated that they were not able to afford all the recommendations. Nearly one-fifth (18%) indicated they did not have the time to follow up or schedule the work. Next, respondents felt the upgrades were not necessary (9%) or effective for bill savings (9%), had specific issues with the home such as inaccessible walls or attics (7%), or did not want a disruption in their home (7%).

**Figure 4-17: Reasons Participants Did Not Complete All Recommendations from Energy Assessment**

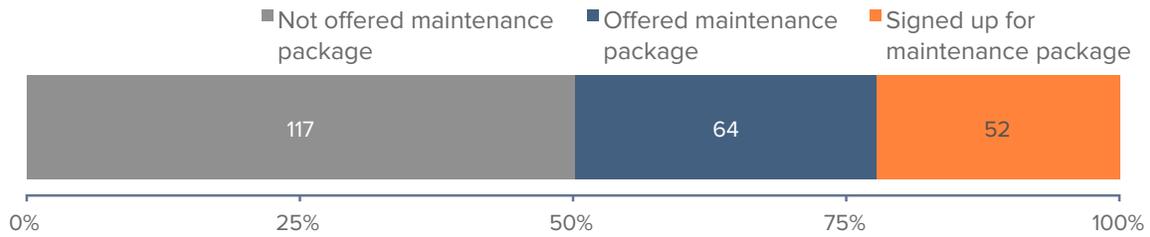


Respondents who indicated completing either none or a portion of the recommendations were also asked whether they planned to implement improvements within the next year. Slightly over one-quarter (27%) were planning upgrades within this timeframe.

The research team also assessed whether participants were offered or chose to purchase a maintenance package on their new equipment.

Figure 4-18 shows half (50%) of respondents reported that their contractor offered them an ongoing maintenance service plan, and of those slightly less than half (46%) of those offered signed up for the plan.

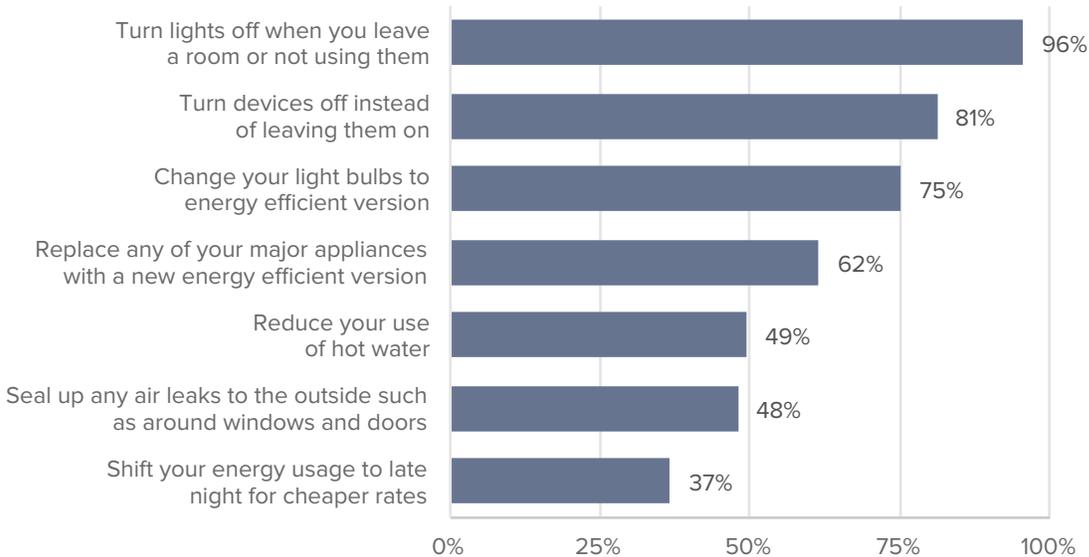
**Figure 4-18: Proportion of Participants to be Offered and to Sign up for a Maintenance Package**



### Pre- and Post-Program Behaviors

To qualitatively explore any impact of the home energy assessment on participants’ behavior, respondents were asked to report their energy efficiency behaviors in the year before starting the program. At least half of respondents reported turning off lights when leaving the room (96%), turning off electronic devices when not in use (81%), changing light bulbs to energy efficient versions (75%), and replacing any major appliance with a new energy efficient version (62%). A single respondent (0.4%) reported none of the energy efficient behaviors. These results suggest that program participants were actively involved in energy efficiency behaviors before enrolling in the Home Upgrade program.

**Figure 4-19: Participant Pre-program Behaviors**

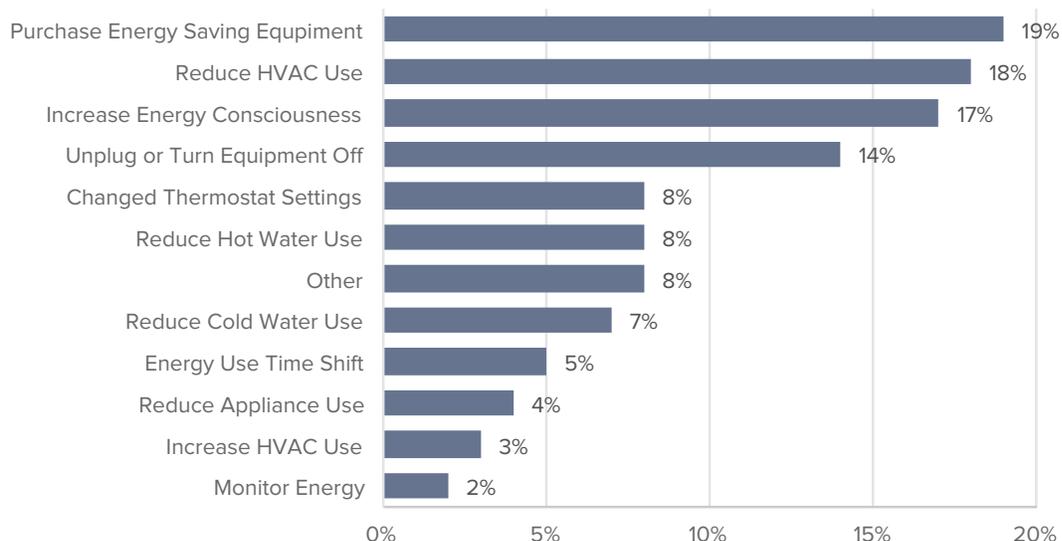


Program participants were also asked to report whether or not their energy usage behaviors had changed since participating in the program. Respondents were not prompted with examples of energy savings actions, and described a wide range of energy saving behaviors. Respondents reported that, after participating in the program, they:

- **Purchase Energy Saving Equipment:** Participants purchase energy efficient appliances, thermostats, and lighting. In some cases, it was unclear whether respondent was referring to purchases or decisions made since the program, or equipment installed during the program itself.

- **Reduce HVAC Use:** Participants use less heating and cooling, such as turning the AC off at night or when away from home, or opening doors or using fans to cool the home when present. In some cases, it appeared these reports were directly related to installation and air sealing completed through the program, reducing respondents' HVAC needs, but not necessarily reflecting a change in behavior.
- **Increase Energy Consciousness:** Participants reported becoming more "conscious," "cautious," or "aware" of their energy consumption and opportunities to save energy. Frequently, they suggested that they used this awareness to save energy, but did not mention specific changes in energy usage behaviors.
- **Unplug or Turn Equipment Off:** Participants unplug or turn off appliances, electronic devices, and lighting when not in use.
- **Changed Thermostat Settings:** Participants reduced the thermostat temperature in the winter, increased it in the summer, or programmed thermostat to turn on and off automatically.
- **Reduced Hot Water Use:** Participants mentioned water saving measures specific to hot water, such as reducing shower length or wash clothes in cold water rather than hot.
- **Reduced Cold Water Use:** Participants mentioned water savings measures that did *not* impact water heating, such as reducing lawn watering or turning off the faucet while brushing teeth. This response was not expected, given that such water savings do not directly impact customer energy consumption and costs. The severe drought in California, and the accompanying increases in water prices, statewide focus on environmental issues, and water conservation initiatives, may be partially responsible for participants' water-saving behaviors.
- **Energy Use Time Shift:** Participants mentioned changing their electric consumption to get better rates, or mentioned using electricity during a specific time of day (usually evening).
- **Reduced Appliance Use:** Participants mentioned doing larger or less frequent loads of laundry, hanging clothes to dry rather than using the dryer, running the dishwasher only when completely full, and reducing pool pump or heater operation.
- **Increased HVAC Use:** A small number of individuals indicated that they *increased* use of their heating and cooling system because it was now more cost-effective to do so due to increased HVAC system efficiency and improved home insulation or air sealing.
- **Monitor Energy:** A few respondents mentioned that they are able to monitor their energy use through smart home equipment, wireless-enabled thermostats, and other web- or app-based energy platforms. Similar to those who mentioned increasing energy consciousness (above), these individuals did not always mention specific energy-saving behaviors, but implied that monitoring energy use allowed them to make changes to save energy.

Figure 4-20 summarizes participants' behavior changes after participating in the program.

**Figure 4-20: Post-participation Changes in Energy Behaviors**

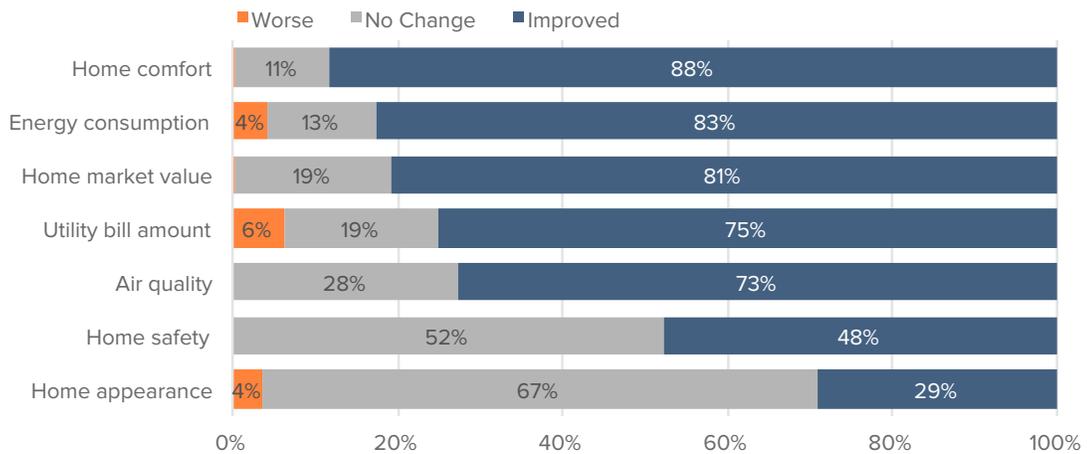
While the majority (67%) of respondents reported changing behaviors, it was unclear in a number of these reports whether the actions described were actually changes since participating. For example, the most frequently mentioned change in behavior was purchasing energy saving equipment (19%) such as LEDs or efficient appliances. While in some cases the respondent clearly reported that they have made sure to seek out efficient products since participating, others seemed to refer to the energy saving equipment installed through the program. Similarly, respondents frequently mentioned reducing HVAC use, but again, in some cases this may have been a direct result of measures completed through the program such as insulation and air sealing, rather than change in behaviors.

Frequently, however, respondents mentioned being more energy conscious after participating in the program (17%). They used words like “conscious,” “cautious,” and “aware” of their energy use, but did not necessarily mention specific energy-saving actions. In addition, a majority of participants reported that their energy bill decreased after participation (72%).

### Non-energy Impacts

Participants also experienced significant non-energy impacts. Respondents were asked about other effects of the program: while decreased energy consumption was the most reported program effect (83%), respondents also reported improved air quality (73%), and improved home market value (81%). Results regarding the effects of program participation are displayed in Figure 4-21.

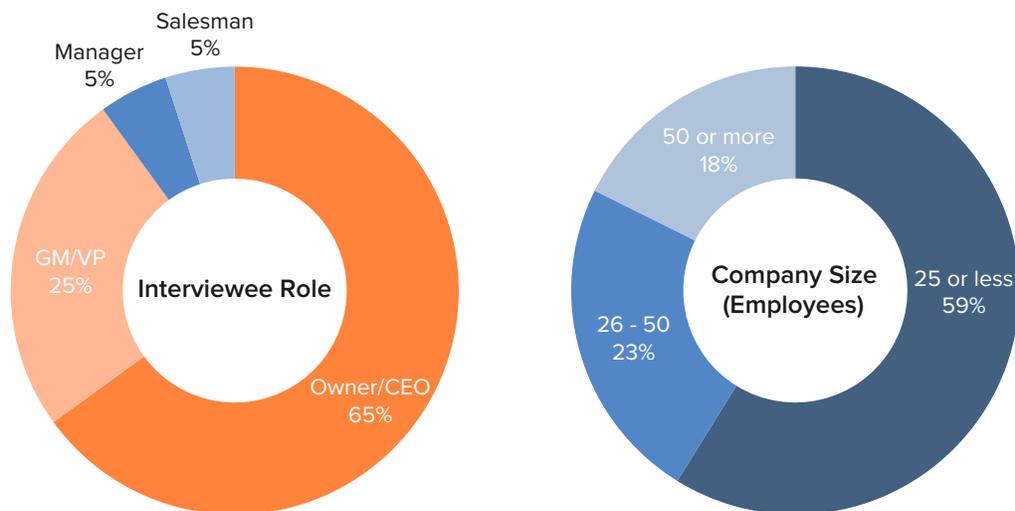
**Figure 4-21: Change in Home Performance Characteristics After Installation**



## 4.4 Contractor Characteristics

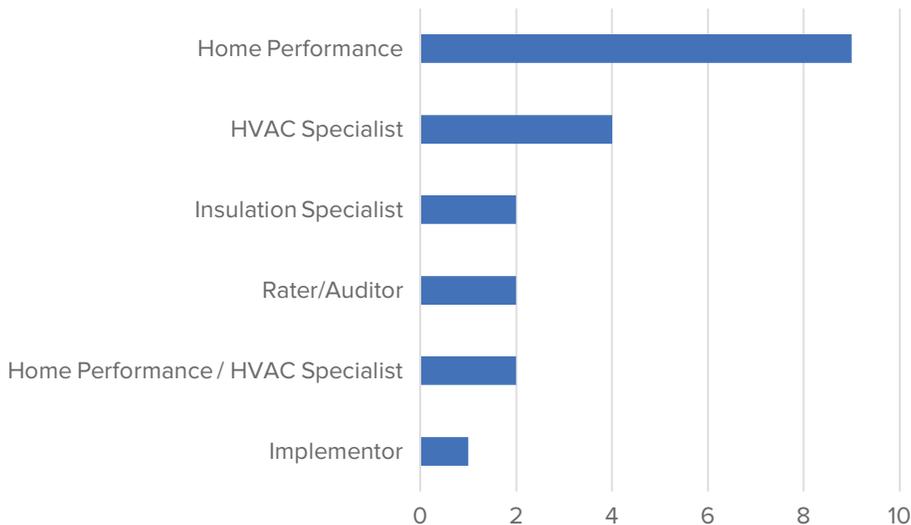
Overall, participating contractors primarily worked within relatively small organizations. When asked, 59% of contractors reported that their organizations had 25 or fewer employees, and 82% had fewer than 50 employees. Six companies had five or fewer employees. Figure 4-22 summarizes contractor roles and company size. In total, 18 out of 20 participating contractors (90%) identified themselves as either an Owner/CEO or a General Manager/Vice President.

**Figure 4-22: Interviewed Contractor Occupational Role and Company Size**



The majority of interviewed contractors (9 of 20) are HP contractors, followed by HVAC specialists. The two insulation specialists and two raters provided a different perspective than other contractors, as they primarily market their services to other contractors to serve as subcontractors on their Home Upgrade projects. Participating contractor specialties are depicted in Figure 4-23.

**Figure 4-23: Participating Contractor Specialty**

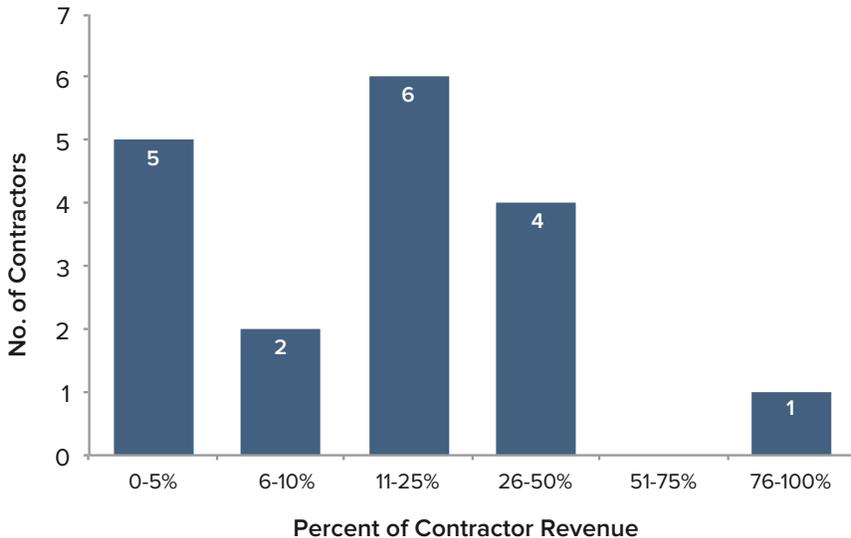


Half of interviewed contractors reported that Home Upgrade projects make up 11-50% of their revenue, while another seven reported a figure of 10% or less. Only one contractor said that the program accounts for more than 75% of their revenue. As one contractor cautioned, however, many of these revenue figures are very rough estimates, as several contractors had difficulty disentangling revenue derived solely from Home Upgrade installations from associated projects.

*It's complicated because while we run all of our jobs through the program, there are pieces of those jobs that aren't necessarily related. I would say 95% of our clients - of our revenue - gets run through the program. It gets shown on the invoice whether it got modeled or not.*

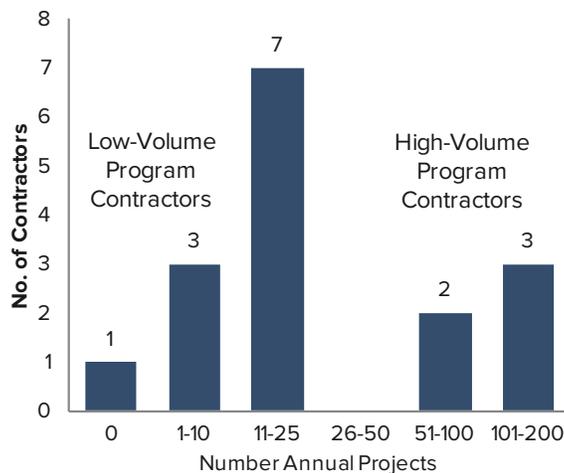
Figure 4-24 summarizes contractors by the self-reported proportion of their annual revenue that is derived from Home Upgrade projects.

**Figure 4-24: Percent of Participating Contractor Revenue Associated with Home Upgrade Projects**



The contractors the evaluation team interviewed tended to land at ends of a spectrum. Eleven firms completed 25 or fewer projects annually while another five completed 50 or more. We found that a few small home performance firms focus on deep retrofits through the Advanced path and completing a small number of projects. However, only larger firms have the capacity to comply with the testing and administrative requirements to complete large numbers or projects. For analyzing contractor responses, the evaluation team grouped contractors as “high-volume” or “low-volume” contractors based on their relative number of annual projects (these groups are indicated in Figure 4-25).

**Figure 4-25: Estimated Number of Contractor Annual Projects**



In contrast to past studies, the evaluation team’s sample showed most contractors (70%) submitting more Home Upgrade pathway projects than Advanced projects. In one previous research study, over 90% of projects were going through the Advanced Home Upgrade path.<sup>21</sup> That study, among others, recommended improvements to the Home Upgrade path.

Although this group of contractors represents a small sample, it is possible that recent program administrators’ efforts to garner contractor support for the Home Upgrade path have been successful. One high-volume HVAC specialist in PG&E’s service territory mentioned that switching from Advanced to Basic path projects helped their business: “The point system that was set up with the basic package was incredibly impactful. When we switched to that a couple years ago is when we were able to take the ball and run with it. It launched us at that point.”

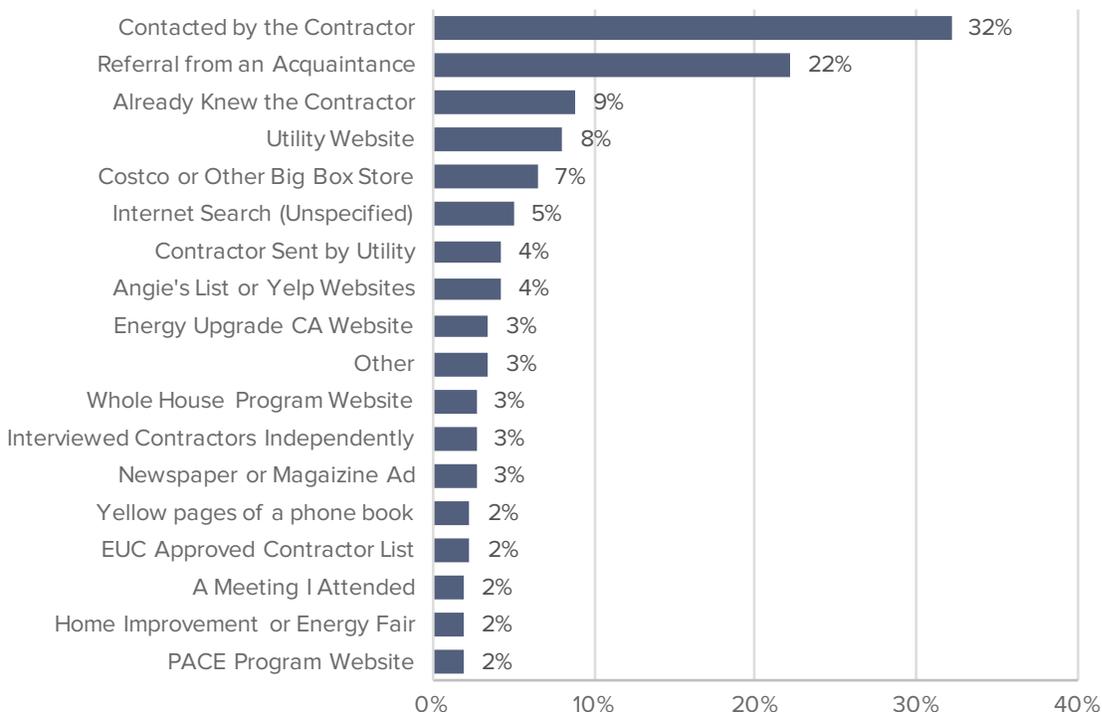
## 4.5 Contractor-Customer Interactions

By design, contractors are very engaged in customers’ decision to implement Home Upgrade projects and are increasingly proactive in engaging customers. Nearly one-third (32%) of participants reported that they were contacted by the contractor. For other participants, referrals from acquaintances (22%) and previous relationships with contractors (9%) were common methods for selecting their contractors. In aggregate, energy-related websites were also common, such as the utility (8%), EUC (3%), Whole House Program (3%), and PACE program (2%)

<sup>21</sup> <sup>21</sup> SBW Consulting. (2013). 2010-2012 PG&E Whole House Retrofit Program Phase II Process Evaluation Study - Methods and Findings - PGE0302.06.

websites, totaling about 15%. Non-energy related websites such as Angie's List or Yelp (4%) and unspecified/general other internet searches (5%) were also fairly common at nearly 10% in total.

**Figure 4-26: Participant Means of Finding Contractor**

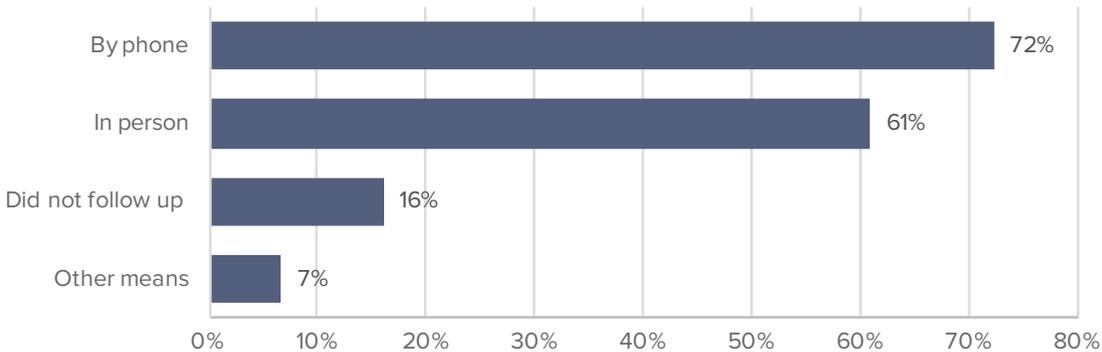


These results represent a departure from previous evaluations that found referrals to be the most common means of identifying a contractor, with the greatest number of participants now being contacted by the contractor. However, the proportion of participants who report identifying their contractor from a referral continues to decline: 29% in 2011 and 24% in 2012, to 22% in 2015. Similarly, though to a much greater extent the proportion of participants to be contacted by the contractor increased from 6% in 2011 and 10% in 2012 to 32% in 2015.<sup>22</sup> These results indicate that personal outreach and relationships generally are still the most common drivers for identifying contractors, and that contractors are taking the initiative by contacting customers directly.

Results indicate that the vast majority of contractors followed up with their customers after install. Figure 4-27 shows the method or methods that participants' contractors followed up with them. Typically, contractors conducted follow-up communications by phone (72%) and in person (61%). Only 16% of respondents indicated that their contractor did not follow-up with them in some fashion after install. The vast majority of respondents felt that the amount of communication with their contractor was sufficient (85%).

<sup>22</sup> SBW Consulting. (2013). 2010-2012 PG&E Whole House Retrofit Program Phase II Process Evaluation Study - Methods and Findings - PGE0302.06.

Figure 4-27: Contractor Follow Up Contact Method(s) (n=256)



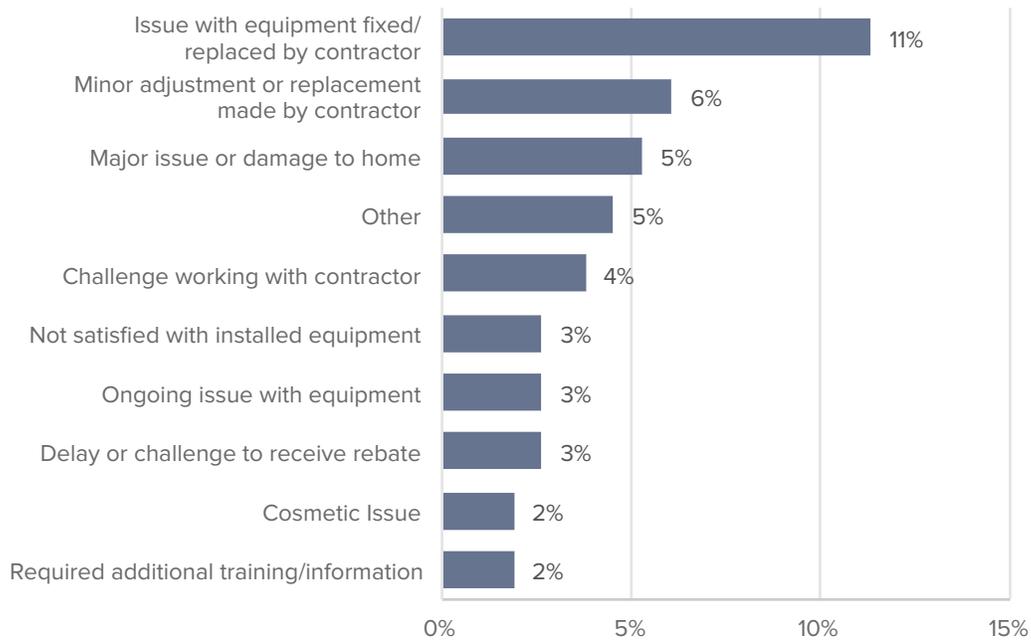
Participants also described challenges or issues with their experience after the upgrades were complete. The majority of participants (60%) did not experience issues at all after install. The remaining 40% were asked to describe the issues they encountered after installation. The evaluation team grouped their responses into the following categories:

- **Issue with equipment fixed or replaced by contractor:** A problem with the installation or equipment that required contractor to fix, replace, and/or re-install equipment. In most cases, respondents noted this was taken care of by the contractor free of charge and quickly.
- **Minor adjustment or replacement made by contractor:** Similar to the above, but adjustments were either planned (e.g. adjustments) or caused by faulty equipment installed and replaced under warrantee. Examples include balancing airflow between rooms or replacing a programmable thermostat.
- **Major issue or damage to home:** In contrast to above categories, issues resulted in damage to home, caused respondent to undertake costly repairs or replacement (not covered by contractor), or danger to residents. Examples include water damage due to leaks in A/C equipment or leaks caused by roof damage, replacing appliances shortly after installation, or leaving a natural gas leak.
- **Challenge working with contractor:** Challenges unrelated to installed equipment or upgrades, but involving contractor. Issues included disputes over the price charged for upgrades, not providing all the upgrades promised (such as LEDs), and contacting or scheduling follow-up appointments with contractors.
- **Dissatisfaction with installed equipment:** Equipment was functional, but did not meet participant expectations. Examples included less efficient equipment installed, or equipment that requires frequent repairs or maintenance.
- **Ongoing issue with equipment:** Respondents described issues such as those addressed by contractor (above), but had yet to be remedied.
- **Delay or challenge to receive incentive:** Incentive took longer than expected, or faced other challenge to receiving incentive. Unique examples included contractor going out of business and not receiving incentive because the utility account was under a tenant's name rather than the owner.
- **Cosmetic issue:** Cosmetic issues were generally related to repainting and filling in holes after completing energy-related upgrades.

- **Required additional training or information:** Participants reported that they had trouble using new, energy-efficient equipment. In most cases, the contractor later provided training or documentation on how to use the equipment.

Figure 4-28 shows the relative frequency of each post-installation issue. Issues with equipment installed (11%) and minor adjustments or replacements (6%) made by the contractor were the most common. These issues do not appear to be problematic for respondents, as they were addressed by contractors. However, 5% of respondents reported major issues with the equipment installed.

**Figure 4-28: Post-installation Issues Reported by Participants (n=265)**



## 5. SUMMARY AND RECOMMENDATIONS

In general, this evaluation found that the Home Upgrade program is working as intended and that program operations are efficient and effective. However, as noted earlier, based on the results from recent impact evaluation research, the program is currently not cost-effective. As such, the evaluation team has provided 13 recommendations below based on our conclusions from this evaluation that will improve the overall effectiveness of the program. These recommendations are documented below and are grouped into three main categories: (1) Overall Program Design, (2) Customer and Contractor Experience, (3) Program Marketing.

### 5.1 Overall Program Design Recommendations

Recommendation #1: Continue to improve statewide coordination efforts.

Program staff should continue their efforts to maximize consistency across implementers and program regions. While the evaluation team did not identify any major inconsistency in program implementation across service territories, several contractors operating across multiple IOU service territories reported difficulty navigating different program requirements between implementers. However, the evaluation team acknowledges the considerable recent efforts to improve statewide coordination and that some of these perceptions may be the result of participation in the early “ramp-up” program. As such, we recommend the IOUs review application standards across service territories for consistency. In addition, in order to mitigate contractor misconceptions, the IOUs should include education for contractors on key administrative similarities and unavoidable differences as part of contractor outreach activities.

As the Home Upgrade Working Group continues these efforts as a statewide team, increasing consistency will likely reduce marginal costs of scaling program operations, improve contractor satisfaction with the program, and reduce administrative burden on program implementers. Improving consistency in these materials may be especially beneficial for programs operated by SDG&E, SCE, and SCG, as contractors may operate across several IOU territories. In addition, these efforts will be critical as the program administrators engage national manufacturers and distributors. Consistent statewide implementation will lower barriers to their participation in the program efforts.

Recommendation #2: Include additional energy efficiency financing options to encourage greater participation among non-free-riders.

Based on the results of past net-to-gross analysis, a high percentage of partial free-riders participates in the Home Upgrade program, reducing net savings and overall cost-effectiveness. In summary, many participants would have installed some portion of the project but the program assistance allowed them to increase the project’s scope. Qualitatively, our research aligns with this assessment. The cost of equipment continues to be a major barrier to participation, particularly among near-participants who reported an annual income below \$100,000 and participation is greatest among higher income household which are households least likely to be influenced by financial incentives.

However, more participants are taking advantage of existing financing options than in previous studies, suggesting an opportunity to leverage financing to increase program participation,

mitigating first cost barriers. The emerging portfolio of energy efficiency financing programs in California, such as the Residential Energy Efficiency Loan Assistance Program (REEL) and Energy Financing Line Item Charge (EFLIC), will provide additional options for homeowners looking to make energy efficiency upgrades and increase participation among homeowners outside of the highest income brackets. The Home Upgrade Working Group should coordinate on how to best incorporate these options into the program. Importantly, by comprehensively incorporating financing options into the program, households with lower incomes and limited access to capital will have fewer barriers to participation. Based on the results from past impact evaluations, by encouraging program participation among households with lower incomes, the program may lower the percentage of partial free-riders participating in the program and increase overall cost-effectiveness. The evaluation team has provided additional recommendations below about possible opportunities.

## 5.2 Customer and Contractor Experience Recommendations

Recommendation #3: Provide opportunities to Home Performance and Whole House contractors to differentiate themselves from non-participating contractors.

Currently, the program provides significant training and marketing support to contractors. This support has largely been successful at achieving a “push” program participation model; contractors are frequently the source of program awareness for homeowners, and customers require their support in order to participate. However, contractors find that their participation in the program provides market differentiation and improves their ability to sell whole house projects. Additional support may provide greater market differentiation for these trade allies from non-participating contractors and would likely increase engagement among non-participating contractors as they work to adapt to a competitive marketplace. Examples of this support could include a tiered contractor rating system or co-branding materials. Note that increasing the pool of participating contractors would also require increased efforts from program staff to monitor contractor performance, “trimming” poor performing contractors from the program that do not meet participation standards.

This support aligns with program goals to broaden participation among contractors and capture more non-participating contractors. It also expands existing efforts to train and mentor contractors on whole house retrofits. Finally, it aligns with the SMT framework to engage market actors as part of the program. This engagement and support from contractors is necessary to fully scale the program to meet market demand in California.

Recommendation #4: Develop simplified and streamlined contractor marketing materials to supplement detailed brochures.

Contractors continue to be the primary method for program awareness, with 46% of participants reporting that their contractors told them about the Home Upgrade program. However, participating contractors frequently requested additional materials to help them market whole home retrofits (and by association, the Home Upgrade program) to potential customers. While these materials currently exist, contractors frequently reported that they were too long, complex, or technical for most homeowners. They requested materials that were more straightforward, used less technical language, provided additional information regarding non-energy benefits, and clearly explained the program process.

Specifically, several contractors cited the Home Digest<sup>23</sup> provided by SCE and SCG as a good example for the type of content needed to speak with homeowners about the program. In addition, other contractors requested something similar to the Home Digest but shorter (one to two pages) and with greater emphasis on non-energy benefits. These requests are not mutually-exclusive; likely, both types of materials can be used by contractors to target business development depending on the motivations of potential customers.

Recommendation #5: Continue to refine program documentation for contractors.

Contractors across all four IOU service territories requested comprehensive documentation that provides more detailed instructions on completing project incentive request forms and meeting installation requirements. While this documentation already exists and program staff continue to improve this documentation based on contractor feedback, many contractors reported that they needed to contact program implementers to request clarification about program requirements. In contrast to contractors' requests for simplified marketing materials, these contractors requested more detailed instructions for participating in the program.

Future program documentation could incorporate material drawn from implementers' experiences responding to frequently asked contractor questions. Contractors reported that these materials would help them to train internal staff and reduce the frequency with which they called implementers to clarify program processes.

Recommendation #6: Provide contractors with training on energy efficiency financing and other program options available to Home Upgrade participants.

Program participants are increasingly turning to financing options to fund the capital cost associated with whole home retrofits. The percentage of participants reporting using cash to pay for the project dropped from 74% in 2011 to 39% in 2015. In addition, several energy efficiency financing programs are currently launching in California, increasing the number of options available to homeowners. Regardless of source, increased usage of financing mitigates the first cost barrier associated with whole home retrofits and increases the influence of the program on the purchase decision (thus reducing free-ridership). Related, many near-participants reported income levels that would qualify them for additional program options such as the Energy Savings Assistance Program.

Given these trends, the possible benefits of financing, and the existence of other programs, the evaluation team recommends that the program staff include training for participating contractors on the available energy efficiency and income-qualified options for homeowners. With increased awareness and understanding of the benefits of these options, contractors will be better equipped to include financing options as part of the business development efforts. This training could include program documentation, sales training, and financial payment calculators.

Recommendation #7: Continue to promote collaborative or "witness" inspections.

To supplement program training and streamline installation and inspection processes, project inspectors recommended that program staff expand opportunities for inspectors to provide education and mentorship to participating contractors. Inspectors felt that the existing collaborative or "witness" inspections, in which contractors accompany inspectors during

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<sup>23</sup> <https://www.socalenergyupgradecontractors.com/sites/default/files/public/HomeEnergyDigest2014.pdf>

inspections of their projects, were effective mentorship opportunities, although they expressed concern that few contractors take advantage of these opportunities.

To encourage contractors to participate in these inspections, the evaluation team recommends that the Home Upgrade Working Group coordinate on possible incentives and requirements that are consistent at the statewide level. Options could include financial rewards (e.g., a \$200 gift card for completing two inspections) or incorporating the inspections into a tiered contractor recognition program. However, the evaluation team does not recommend mandating these inspections as that would likely increase the perception that program participation is overly burdensome and complicated by non-participating contractors. By encouraging inspections through incentives, the quality of work completed by contractors would likely improve resulting in more satisfied homeowners and lower overall administration costs. In addition, the impact of this recommendation should be weighed by the additional cost of expanding these opportunities.

**Recommendation #8:** Coordinate with Quality Installation/Quality Maintenance efforts in California to improve the operationalization of QI standards and awareness of QI benefits within the Home Upgrade program.

The Home Upgrade program should continue to coordinate marketing messages with statewide Quality Installation/Quality Maintenance programs (e.g., the AC Quality Care program) to raise awareness of the benefits of Quality Installation as part of whole home retrofits. As part of this evaluation, contractors reported that while they understood Quality Installation in principle, they did not believe there was enough market demand to justify the increased installation costs. Customers did not see the value of Quality Installation and assumed that all HVAC installations were “quality.”

Given that Home Upgrade program and QI/QM programs share objectives (installing energy efficient HVAC systems as part of high performing homes), continued coordination to drive awareness among homeowners will increase demand for QI services from participating contractors.

**Recommendation #9:** Clearly communicate program time commitments to both new contractors and potential participants during the application process.

While most participants were generally very satisfied with their participation in the Home Upgrade program, one suggestion for improvement that was frequently mentioned was to better communicate the time commitment associated with program participation. Depending on which track homeowners selected, the commitment could include up to three visits from program staff. The evaluation team understands that these visits are an essential component of the test-in/test-out design and we are not recommending that the visits be scaled back. Instead, the evaluation team recommends that these requirements be clearly stated as part of the program application process, focusing on flexibility of program inspectors’ schedules to minimize household disruption.

### 5.3 Program Marketing Recommendations

**Recommendation #10:** Continue to focus on pre-1978 homes in outreach materials.

Based on past evaluation research, homes built prior to 1978 likely provide a greater opportunity for energy savings than homes built after 1978 due to the adoption of California’s Building Energy

Efficiency Standards. The program is currently focused on this population with 65% of survey respondents reporting that their homes were built before 1978 (compared to 50% of overall population of residential homes). Increasing the frequency with which the program serves homes built prior to 1978 will likely increase the realized energy savings per home, further increasing the cost-effectiveness of the program.

To increase participation among this group, the evaluation team recommends that customer-facing outreach materials include messages about the benefits to retrofitting older homes. These materials could include images of older vintage homes and copy targeting “classic” or “traditional” style dwellings. This recommendation aligns with previous recommendations regarding providing non-technical messages to homeowners that focus on comfort and energy savings. In addition, program administrators should harness data-mining techniques to target pre-1978 homes in any IOU-led marketing campaigns. In addition, these efforts could be used to target newer, inland homes that may also benefit from retrofits.

Recommendation #11: In addition to energy savings, continue to include non-energy benefits as part of program marketing materials.

As identified in other California evaluation research, non-energy benefits continue to be a primary driver for participation in the Home Upgrade program. Participants ranked increasing the comfort of their home as the second most important motivation for participating in the program (after saving money on their energy bill). In addition, participants reported several non-energy benefits as a result of participation. These include increased comfort, increased home value, and better air quality. While this study did not quantify the value of these benefits, evidence suggests that the benefits are real and valued by participants.

As such, the evaluation team recommends that program staff include non-energy benefits (e.g., comfort and home value) as part of customer-focused and contractor-focused outreach activities. Combined with energy cost reductions, these benefits can make a compelling case for investing in a whole house retrofit project. These efforts should align with contractor training efforts and contractor marketing materials.

Recommendation #12: Include energy efficiency financing options in program marketing materials.

As discussed elsewhere, the process evaluation research indicates that Home Upgrades participants are increasingly relying on financing options to fund the whole house retrofit project. Coordinating with the launch of several statewide energy efficiency financing programs, program staff can capitalize on this interest and include messages regarding the availability and benefits for energy efficiency financing as part of participation in the Home Upgrade program. A number of participants took advantage more recent energy efficiency finance options such as Property Assessed Clean Energy (PACE) financing – including the Home Energy Renovation Opportunity (HERO) and mPower programs, among others – and loans through the Sacramento Municipal Utility District (SMUD). Directing potential participants to these options could mitigate first cost barriers.

Encouraging greater use of financing as part of the Home Upgrade has two benefits. First, it mitigates first cost barriers (the most frequently stated barrier among non-participants contacted as part of this evaluation), increasing program participation. Second, it encourages households from middle income brackets to invest in whole home retrofit projects. Given the cost of the

whole home projects, current participation is focused on upper income households. This has contributed to a large percentage of partial free-riders (based on past impact evaluation results), lowering net savings. By encouraging middle-income households to participate, the program can mitigate the participation of free-riders, thus increasing the per household net savings.

# APPENDIX A: SURVEY INSTRUMENT

## SAMPLE VARIABLES

<b>CaseID</b>	Unique case identifier assigned by Tetra Tech
<b>IOU</b>	Investor-owned utility 1 Pacific Gas and Electric (PG&E) 2 Southern California Edison (SCE) 3 Southern California Gas Company (SCG) 4 San Diego Gas and Electric (SDG&E)
<b>TRACK</b>	Program track for participants 1 Home Upgrade 2 Advanced Home Upgrade
<b>SAMPLE_TYPE</b>	Participant or near-participant flag as marked in original sample. 1 Participant 2 Near-participant
<b>TYPE</b>	Resulting participant or near-participant flag that could have changed mid-survey.
<b>TYPE_CHANGE</b>	Flag indicating that the case's TYPE changed during survey.
<b>CONTACT_NAME</b>	Customer first and last name
<b>MAIL_ADDR</b>	Customer mailing street address
<b>MAIL_CITY</b>	Customer mailing city
<b>MAIL_ST</b>	Customer mailing state
<b>MAIL_ZIP</b>	Customer mailing zip
<b>TEL01</b>	Customer's area code and telephone number
<b>EMAIL</b>	Customer email address
<b>MEAS_DESC</b>	Equipment/measure participant received
<b>INSTALL_DATE</b>	Date of participation
<b>INCENTIVE</b>	Incentive amount received for measure(s) installed
<b>KWH_SAVINGS</b>	Kilowatt-hour savings for measure(s) installed

<b>FUEL_TYPE</b>	Fuel type used to heat building (Electric, gas, or combination)
<b>CUSTOMER_ID</b>	Unique ID assigned by EMI
<b>PREMISE_ID</b>	Customer premise ID
<b>APPLICAT_ID</b>	Customer application ID
<b>CONT_COMPANY</b>	Company name of contractor who installed measures
<b>CONT_CONTACT</b>	Contact name at contractor who installed measures
<b>CONT_PHONE</b>	Contact phone number at contractor who installed measures

### INTRODUCTION

INT01 Hello, my name is \_\_\_\_\_, and I'm calling on behalf of *[IOU FULL NAME]* *[IF TYPE=1 Participant SHOW: "regarding your household's participation in their Energy Upgrade California Home Upgrade program"]*.

*[IF PARTIAL: "I'm calling to complete the interview that we had started earlier. Do you have time to complete the survey at this time?"]*

May I speak with *[IF CONTACT IS NOT BLANK SHOW: "[CONTACT] or someone else", ELSE "someone"]* who is familiar with your household's *[IF TYPE=1 Participant SHOW: "participation with this program?"]*  
*[IF TYPE=2 Near-participant SHOW: "energy use?"]*

*[IF NEEDED: As a small way of saying thank you for your time, we are offering a \$50 incentive to participants who answer our 20 minute survey.]*

1	Yes, I can do the survey	
2	No, R not knowledgeable	
3	No, R is not currently available	<i>[SCHEDULE CALLBACK]</i>

C\_INT01\_SKP *[IF TYPE=1 Participant AND INT01=1 OR 2 CONTINUE TO C1]*  
*[IF TYPE=2 Near-participant AND INT01=1 SKIP TO AW1]*  
*[IF TYPE=2 Near-participant AND INT01=2 SKIP TO C2]*

C1 *[ASK IF TYPE=1 Participant ELSE SKIP]*  
 Now just to confirm, our records indicate that you received an incentive for completing a project in your home through the *[TRACK]* program around *[INSTALL\_DATE]*. Do you recall participating in this program?

*[IF NEEDED: "Our records show that you installed *[MEASURE\_DESC]* through the program."]*

1 Yes, got an incentive *[SKIP TO C4]*  
 2 No, does not recall getting an incentive *[CONTINUE TO C2]*  
 -6 Programmed skip

C2 Is there someone else we should speak with that might know about your household's *[IF TYPE=1 Participant SHOW: "participation with *[IOU]*'s *[TRACK]* program?"]* *[IF TYPE=2 Near-participant SHOW: "energy use?"]*

1 Yes  
 2 No *[IF TYPE=1: CHANGE TO TYPE=2 AND SKIP TO AW1; IF TYPE=2: THANK AND TERMINATE]*  
 -6 Programmed skip  
 -8 Don't know *[THANK AND TERMINATE]*  
 -9 Refused *[THANK AND TERMINATE]*

C3 May I please speak with that person?

1 Yes *[BEGIN SURVEY WITH NEW RESPONDENT AT INTO1]*  
 2 Yes, but R is currently not available *[SET UP CALLBACK]*  
 3 No *[THANK AND TERMINATE]*  
 -6 Programmed skip  
 -8 Don't know *[THANK AND TERMINATE]*  
 -9 Refused *[THANK AND TERMINATE]*

**AW1** *[ASK IF TYPE=2 Near-participant ELSE SKIP TO C4]*  
 Before today, had you heard of *[IOU]*'s Home Upgrade Program or the Advanced Upgrade Program?

1 Yes *[SKIP TO AW3]*  
 2 No, does not recall  
 -6 Programmed skip  
 -8 Don't know

**AW2**

The Home Upgrade Program and Advanced Upgrade Programs offer incentives to home owners who make several energy efficiency improvements to their homes at the same time. This program also offers home assessments that identify areas where equipment may be replaced with more energy efficient equipment, or the interior or exterior of the home can be improved, such as insulation and air sealing, to increase the comfort of the home and reduce energy bills.

Have you ever contacted *[IOU]* about these programs?

- 1 Yes
- 2 No *[THANK AND TERMINATE]*
- 6 Programmed skip
- 8 Don't know *[THANK AND TERMINATE]*

**AW3**

Did you complete the program and receive an incentive?

- 1 Yes *[COUNT THEM A PARTICIPANT]*
- 2 No *[COUNT THEM A NEAR PARTICIPANT]*
- 6 Programmed skip
- 8 Don't know *[COUNT THEM A NEAR PARTICIPANT]*

**C4**

I'm with Tetra Tech, an independent research firm.

*[IF TYPE=1 Participant SHOW: "I am calling to learn about your experiences participating in *[IOU]*'s *[TRACK]* program."]*

*[IF TYPE=2 Near-participant SHOW: "*[IOU]* has hired us to conduct an evaluation to learn about their customers' awareness and use of their energy efficiency programs. This study will help *[IOU]* better understand their customers' need for energy efficiency programs and services."]*

If you are eligible and complete the survey, as a small way of saying thank you for your time, we are offering a \$50 incentive to participants who answer our 20 minute survey.

I'm not selling anything. I'd just like to ask your opinions.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored. Let me assure you that your responses will be kept confidential

- 1 Continue

FAQ

[IF TYPE=1 Participant SHOW: “Who is doing this study: [IOU] has hired our firm to evaluate the Home Upgrade program. As part of the evaluation, we’re talking with customers that participated in the program to understand their experiences with the program.”]

[IF TYPE=2 Near-participant SHOW: “Who is doing this study: [IOU] has hired our firm to evaluate the awareness and participation levels of their energy efficiency programs. As part of the evaluation, we’re talking with customers that may have been referred to one of their programs by a contractor or have begun steps to participate in one of their programs.”]

Why are you conducting this study: Studies like this help [IOU] better understand customers’ need for energy efficiency programs and services. As a small way of saying thank you for your time, we are offering a \$50 Visa gift card to participants who answer our 20 minute survey.

Timing: This survey should take about 20 minutes of your time. Is this a good time for us to speak with you? [IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070]

Sales concern: I am not selling anything; we would simply like to learn about your experience with the program. Your responses will be kept confidential and not revealed to anyone unless you grant permission. If you would like to talk with someone from [IOU] about this study, feel free to call [IOU contact and number].

1 Continue

**CELL PHONE**

CELL1 First, have I reached you on your cell phone?

- 1 Yes
- 2 No [SKIP TO A1]

CELL2 Then I would just like to confirm that you are in a location where it is safe to talk to you on your cell phone [NOTE: We want to be sure the respondent is not talking on their cell phone while driving a car.]

- 1Yes, it is okay to continue conversation
- 2 No [SCHEDULE A TIME TO CALLBACK AND TERMINATE]
- 6 Programmed skip

**AWARENESS**

**A0** In what year would you say that you first became interested in participating in the [IOU] [TRACK] program?

- \_\_\_\_\_ [RECORD 1900 to 2016]  
 -8 Don't know  
 -9 Refused

**A1** How did you first hear about [IOU]'s [TRACK] program?  
 [DO NOT READ; SELECT ALL THAT APPLY]  
 [PROBE: Any other way?]

For A1\_1 through A1\_14

- 0 Not mentioned  
 1 Mentioned  
 -8 Don't know  
 -9 Refused

- A1\_1** [IOU] bill insert or direct mailing
- A1\_2** Telephone call from [IOU]
- A1\_3** Utility website
- A1\_4** Email from [IOU]
- A1\_5** Contractor who did the work
- A1\_6** Radio advertising
- A1\_7** Newspaper
- A1\_8** Door hanger
- A1\_9** Word of mouth [friend / relative / neighbor / co-worker]
- A1\_10** Landlord
- A1\_11** On a roadside billboard
- A1\_12** Online advertising
- A1\_13** Regional Energy Network
- A1\_14** Other [SPECIFY]

**A1\_14\_OTH** Description of other way heard about [IOU]'s [TRACK] program.

A2 How would you prefer to receive information from [IOU] about their energy efficiency programs in the future?  
[DO NOT READ; SELECT ALL THAT APPLY]

For A2\_1 through A2\_14

- 0 Not mentioned
- 1 Mentioned
- 8 Don't know
- 9 Refused

- A2\_1 [IOU] bill insert or direct mailing
- A2\_2 Telephone call from [IOU]
- A2\_3 Utility website
- A2\_4 Email from [IOU]
- A2\_5 Contractors
- A2\_6 Radio advertising
- A2\_7 Newspaper
- A2\_8 Door hanger
- A2\_9 Word of mouth [friend / relative / neighbor / co-worker]
- A2\_10 Landlord
- A2\_11 Billboards
- A2\_12 Online advertising
- A2\_13 Regional Energy Network
- A2\_14 Other [SPECIFY]

A2\_OTH Description of other way prefer to receive information from [IOU] about their energy efficiency programs in the future.

AW4 [ASK IF TYPE=2 Near-participant] When you first contacted [IOU] about these programs, what types of home improvements were you interested in?  
[RECORD VERBATIM RESPONSE]

- 1 [SPECIFY]
- 6 Programmed skip
- 8 Don't know

AW4\_1\_OTH Description of types of home improvements interested in.

**AW5** *[ASK IF TYPE=2 Near-participant]* What other energy efficiency programs does *[IOU]* offer that you are aware of?  
*[RECORD VERBATIM RESPONSE]*

- 1 None
- 2 *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know

**AW5\_2\_OTH** Other energy efficiency programs aware of.

**DECISION-MAKING**

**A5** Using a scale of 1 to 5 where 1 means “not at all important” and 5 means “very important”, how important were the following in your decision to  
*[IF TYPE=1 SHOW “participate in the [TRACK] program...?”]*  
*[IF TYPE=2 SHOW “contact [IOU] about the program...?”]*  
*[READ LIST; ROTATE STATEMENTS]*

For A5\_A through A5\_J

- \_\_\_\_\_ *[RECORD IMPORTANCE (1-5)]*
- 8 Don't know
- 9 Refused

- A5\_A** Improving the comfort of your home
- A5\_B** Reducing your home’s energy use
- A5\_C** Program incentives that may be available to reduce the cost of the equipment
- A5\_D** Saving money on your energy bill
- A5\_E** Having an energy assessment performed on your home to identify areas for improvement
- A5\_F** Replacing or fixing failed or broken equipment
- A5\_G** The environmental benefits of the improvements
- A5\_H** Health and safety concerns of the people in your household
- A5\_I** Improving air quality of your home
- A5\_J** Increasing the value of your home

**A6** Were there any other reasons why you decided to  
*[IF TYPE=1 SHOW “participate in the [TRACK] program”]*  
*[IF TYPE=2 SHOW “contact [IOU] about the program”]*  
that I did not mention?  
*[RECORD VERBATIM RESPONSE]*

- 1 No other reasons
- 2 *[SPECIFY]*
- 8 Don't know

**A6\_2\_OTH** Other reason for participating in the *[TRACK]* program / contacting *[IOU]* about the program.

**A7NP** *[ASK IF TYPE=2 Near-participant]* How worried are you about global warming?  
Are you not at all worried, a little worried, somewhat worried, very worried, or extremely worried?

- 1 Not at all worried
- 2 A little worried
- 3 Somewhat worried
- 4 Very worried
- 5 Extremely worried
- 6 Programmed skip
- 8 *[DO NOT READ]* Don't know
- 9 *[DO NOT READ]* Refused

**A7** *[ASK IF TYPE=1 Participant]* Using a scale of 0 to 10 where 0 is “not at all concerned” and 10 is “very concerned”, before participating in the program how concerned were you with each of the following:  
*[READ LIST; ROTATE STATEMENTS]*

For A7\_A through A7\_D

- \_\_\_\_\_ *[RECORD CONCERN (0-10)]*
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**A7\_A** The cost of heating or cooling your home  
**A7\_B** Keeping your home free from drafts and uneven temperatures  
**A7\_C** Global warming  
**A7\_D** Finding ways to control your home's energy costs

A8 Using a scale of 0 to 10, where 0 means “not at all agree” and 10 means “completely agree,” please tell me how much you agree with each of the following statements:  
*[READ LIST; RANDOMIZE STATEMENTS]*

For A8\_A through A8\_M

\_\_\_\_\_ *[RECORD AGREEANCE (0-10)]*

- 8 Don't know
- 9 Refused

- A8\_A** I sometimes worry whether there is enough money to pay my energy bill.
- A8\_B** I often worry that the cost of energy for my home will increase.
- A8\_C** I am very concerned about how energy use affects the environment.
- A8\_D** It is my responsibility to use as little energy as possible to help the environment.
- A8\_E** I am very concerned about the environmental impacts of power plants.
- A8\_F** I intend to conserve on gas or electricity consumption in my home this winter.
- A8\_G** I intend to conserve on electricity consumption in my home this summer.
- A8\_H** If my utility bill goes up, I feel like I must do something to reduce it.
- A8\_I** I have to take the lead in my household if we're going to keep our utility bills down.
- A8\_J** If others in my household can't or won't change their behavior to lower our utility bills, I feel I should do even more to control our energy costs.
- A8\_K** Household electricity use has an impact on the environment.
- A8\_L** I believe that household energy use has an impact on global warming and climate change.
- A8\_M** Conserving electricity will help reduce global warming.

A9 I'm going to read you a list of reasons why people might change their daily actions to save energy. Using a scale of 0 to 10 where 0 means “not at all motivating” and 10 means “extremely motivating,” how motivating are the following factors in your decision to save energy?  
*[READ LIST; ROTATE STATEMENTS]*

For A9\_A through A9\_F

\_\_\_\_\_ *[RECORD MOTIVATION (0-10)]*

- 8 Don't know
- 9 Refused

- A9\_A** Saving money
- A9\_B** Maintaining health
- A9\_C** Protecting the environment
- A9\_D** Benefiting future generations
- A9\_E** Reducing dependence on foreign oil
- A9\_F** Helping California lead the way on saving energy

A10 *[ASK IF TYPE=2 Near-participant]* Which of the following statements best describe your reason or reasons for cancelling your participation in the program?  
*[READ CHOICES; SELECT ALL THAT APPLY]*

For A10\_1 through A10\_6

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

- A10\_1** The improvements I wanted to make were not eligible for the program
- A10\_2** The costs of the equipment were too high
- A10\_3** The incentive was not high enough
- A10\_4** The financing options were unappealing
- A10\_5** The program application process was too burdensome
- A10\_6** *[DO NOT READ]* None of these
- A10\_7 Wanted to use another contractor
- A10\_8 Program too complicated
- A10\_9 Did not want to pursue enough upgrades to qualify
- A10\_10 Never heard back from contractor
- A10\_11 Did not qualify (unspecified)
- A10\_12 Scheduling issues
- A10\_13 Not a good investment (payback, return)
- A10\_14 Still participating/planning to complete the program

**A11** *[ASK IF TYPE=2 Near-participant]* Were there any reasons why you did not participate in the program that I did not mention?  
*[RECORD VERBATIM RESPONSE]*

- 1 No other reasons
- 2 *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know

**A11\_2\_OTH** Other reason(s) for not participating in the program.

**FINANCING**

*[ASK SECTION IF TYPE=1 Participant ELSE SKIP TO H1]*

**FINANCE1** On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “very influential,” how influential was the incentive on your decision to install the equipment?

- \_\_\_\_\_ *[RECORD INFLUENCE (0-10)]*
- 6 Programmed skip
  - 8 Don't know
  - 9 Refused

**FINANCE2** Aside from incentives, what kind of financing did you use to pay for this project?  
*[DO NOT READ LIST; SELECT ALL THAT APPLY]*

For FINANCE2\_1 through FINANCE2\_6

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**FINANCE2\_1** Cash

**FINANCE2\_2** Credit card

**FINANCE2\_3** Second mortgage / Home equity line of credit

**FINANCE2\_4** Loan from a bank

**FINANCE2\_5** Other incentives or incentives *[SPECIFY: “From who?”]*

**FINANCE2\_6** Other *[SPECIFY]*

**FINANCE2\_5\_OTH** Source of incentives or incentives.

**FINANCE2\_6\_OTH** Other kind of financing used to pay for project.

## HOME ENERGY ASSESSMENT

**H1** *[IF TYPE=1 Participant SHOW: “As part of your participation in the [TRACK] program did you have”*  
*[IF TYPE=2 Near-participant SHOW: “In the past three years have you had”] an energy assessment conducted on your home?*

*[IF NECESSARY, READ: During a home energy assessment, a Home Upgrade professional makes an evaluation of the heating, cooling, and water heating systems in your home and then recommends upgrades that will make your home more energy efficient.]*

- 1 Yes
- 2 No *[SKIP TO H12]*
- 8 Don't know *[SKIP TO H12]*
- 9 Refused *[SKIP TO H12]*

**H1\_YEAR** In what year would you say that you received the energy assessment?

- \_\_\_\_\_ *[RECORD 1900 to 2016]*
- 6 Programmed skip
  - 8 Don't know
  - 9 Refused

**H2** Did you use a rater or energy auditor separate from your contractor to perform the home energy assessment?

- 1 Yes
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**H3** Did the energy assessor go over the results of your energy assessment with you in person?

- 1 Yes
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**H4** Did the energy assessor leave behind literature describing general ways to manage energy use in your home?

- 1 Yes
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**H5** Have you done all, some, or none of the recommendations from the energy assessment?

- 1 All
- 2 Some
- 3 None
- 6 Programmed skip
- 8 Don't know *[SKIP TO H9]*
- 9 Refused *[SKIP TO H9]*

**H7** *[ASK IF H5=2 or 3]* What is the main challenge preventing you from implementing those recommendations?  
*[DO NOT READ; SELECT ALL THAT APPLY]*

For H7\_1 through H7\_10

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

- H7\_1** Could not afford the rest of the work / Ran out of money
- H7\_2** They were unnecessary
- H7\_3** They were relatively unimportant / Not effective for savings
- H7\_4** Planning on completing some in the future
- H7\_5** They were not covered by the incentive
- H7\_6** Did not want to have disruption in the home
- H7\_7** Haven't had the time to follow up or schedule the work
- H7\_8** Have not found right contractor
- H7\_9** Need more information
- H7\_10** Other *[SPECIFY]*

**H7\_10\_OTH** Other main challenge preventing implementation of recommendations.

**H8** *[ASK IF H5=1 or 2]* Of the improvements you did make, did any of them replace broken equipment or install additional equipment that you didn't have before?

- 1 Yes
- 2 No *[SKIP TO H12]*
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**H9** *[ASK IF H5<>1]* Are there improvements recommended from the energy assessment that you are planning to make within the next year?

- 1 Yes
- 2 No *[SKIP TO H12]*
- 6 Programmed skip
- 8 Don't know *[SKIP TO H12]*
- 9 Refused *[SKIP TO H12]*

**H11** *[ASK IF H5<>1]* Using a scale of 1 to 5 where 1 means "does not increase at all" and 5 means "increases a great deal", please indicate whether the following financing options would increase your likelihood to install the recommended equipment from your home energy assessment?  
*[READ LIST; ROTATE STATEMENTS]*

For H11\_A through H11\_E

- \_\_\_\_\_ *[RECORD LIKELIHOOD (1-5)]*
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**H11\_A** On-bill financing

**H11\_B** Non-mortgage loans through a local bank or financial institution

**H11\_C** A payment plan or financing through your contractor

**H11\_D** Lower interest rate for loans for energy efficiency upgrades

**H11\_E** Mortgage through a bank or financial institution for energy efficiency upgrades

*[IF NECESSARY, READ FOR H11\_A]* On-bill financing is a loan that *[IOU]* would offer to you to pay for energy efficiency improvements. The loan repayments are collected on the utility bill until the loan is repaid.]

*[IF NECESSARY, READ FOR H11\_E]* Energy Efficiency mortgages help homebuyers or homeowners finance the cost of energy efficiency features as part of their home purchase or refinancing mortgage.]

**H12** *[ASK IF TYPE=2 Near-participant]* Is there anything else that would help you to participate in home upgrade activities to reduce energy consumption in your home?  
*[RECORD VERBATIM RESPONSE]*

- 1 No, nothing else
- 2 *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know

**H12\_2\_OTH** Other factor that would help to participate in home upgrade activities to reduce energy consumption in your home.

**PROGRAM PARTICIPATION**

*[ASK SECTION IF TYPE=1 Participant ELSE SKIP TO N1]*

Now, I'm going to ask you about the process of participating in the program.

**P1** On a scale of 0 to 10, where 0 means "not at all difficult" and 10 means "very difficult," how difficult was it for you to complete and submit the rebate form?

- \_\_\_\_\_ *[RECORD DIFFICULTY (0-10)]*
- 6 Programmed skip
  - 7 Not applicable
  - 8 Don't know
  - 9 Refused

**P2** What suggestions, if any, do you have for improving the rebate form and submission process? *[RECORD VERBATIM RESPONSE]*

- 1 No suggestions
- 2 *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know

**P2\_2\_OTH** Other suggestions for improving the rebate form and submission process.

## CONTRACTOR INTERACTIONS

[ASK SECTION IF TYPE=1 Participant ELSE SKIP TO N1]

These next few questions are about your interactions with the contractor who installed the equipment.

CON1 How did you find the contractor for your energy upgrade project?  
[MULTIPLE RESPONSE] [READ LIST IF NEEDED]

For CON1\_1 through CON1\_9

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON1\_1** Referral from a friend / neighbor / coworker  
**CON1\_2** Contacted by the contractor.  
**CON1\_3** Found the contractor from the Whole House Program website  
**CON1\_4** Found the contractor from the [IOU] website  
**CON1\_5** Found the contractor from yellow pages of a phone book.  
**CON1\_6** Already knew the contractor  
**CON1\_7** A workshop/meeting I attended about the program  
**CON1\_8** Energy Upgrade California website  
**CON1\_9** Other [SPECIFY]

**CON1\_9\_OTH** Other method used to find contractor.

CON2 After installation, did the contractor follow up with you at any time by phone, in person, or both? [MULTIPLE RESPONSE]

For CON2\_1 through CON2\_4

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON2\_1** Did not follow up  
**CON2\_2** In person  
**CON2\_3** By phone  
**CON2\_4** Other means [SPECIFY]

**CON2\_4\_OTH** Other means by which contractor followed-up.

**CON3** Did you experience any post-installation challenges or issues with the program or the equipment installed through the program?

- 1 Yes [*SPECIFY: "What were they?"*]
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON3\_1\_OTH** Post-installation challenges or issues experienced with the program or the equipment installed through the program

**CON4** Do you feel the amount of communication with your contractor was sufficient?

- 1 Yes
- 2 No [*SPECIFY: What would you change?*]
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON4\_2\_OTH** Changes would make to the amount of communication with contractor.

**CON5** Did the contractor offer you the opportunity to sign up for an ongoing maintenance service plan?

- 1 Yes
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON6** [*ASK IF CON5=1*] Did you sign up for the service plan?

- 1 Yes
- 2 No [*SPECIFY: "Why did you not sign up?"*]
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**CON6\_2\_OTH** Reason for not signing up for the service plan.

## NON-ENERGY BENEFITS

[ASK SECTION OF ALL]

N1 Using a scale of 0 to 10 where 0 is “not at all valuable” and 10 is “extremely valuable,” how valuable to you are each of the following to you?  
[READ LIST; ROTATE ITEMS]

For N1\_A through N1\_I

\_\_\_\_\_ [RECORD VALUE (0-10)]

-8 Don't know

-9 Refused

**N1\_A** Better home comfort  
**N1\_B** Reducing outside noise  
**N1\_C** Reducing heating and cooling system noise  
**N1\_D** Increasing equipment durability  
**N1\_E** Increasing home value or the ability to sell the home  
**N1\_F** Increasing home appearance and/or aesthetics  
**N1\_G** Increasing home safety  
**N1\_H** Increasing indoor air quality  
**N1\_I** Decreased energy costs

**PROGRAM SATISFACTION**

*[ASK SECTION IF TYPE=1 Participant ELSE SKIP TO D1]*

These next few questions ask about your satisfaction with the program overall along with various aspects of the program.

S3            Using a 0 to 10 scale, where 0 is “very dissatisfied” and 10 is “very satisfied,” how would you rate your satisfaction with the following aspects of the program?  
*[READ LIST; ROTATE ITEMS]*

For S3\_A through S3\_F

\_\_\_\_\_ *[RECORD SATISFACTION (0-10)]*  
-6        Programmed skip  
-8        Don't know  
-9        Refused

- S3\_A**        The overall quality of the program
- S3\_B**        The ease of application process
- S3\_C**        The energy efficiency improvements available
- S3\_D**        The overall quality of the work performed
- S3\_E**        The financing options available
- S3\_F**        The amount of the incentive you received

S4 *[REPEAT FOR ALL RESPONSES TO S1<=5] Can you explain why you were not very satisfied with [S1 ITEM]? [RECORD VERBATIM RESPONSE]*

For S4\_A through S4\_F

- 1 *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know

- S4\_A** The overall quality of the program
- S4\_B** The ease of application process
- S4\_C** The energy efficiency improvements available
- S4\_D** The overall quality of the work performed
- S4\_E** The financing options available
- S4\_F** The amount of the incentive you received

**S4\_A\_1\_OTH** Reason for not being satisfied with the overall quality of the program

**S4\_B\_1\_OTH** Reason for not being satisfied with the ease of application process

**S4\_C\_1\_OTH** Reason for not being satisfied with the energy efficiency improvements available

**S4\_D\_1\_OTH** Reason for not being satisfied with the overall quality of the work performed

**S4\_E\_1\_OTH** Reason for not being satisfied with the financing options available

**S4\_F\_1\_OTH** Reason for not being satisfied with the amount of the incentive received

S7 What, if anything, could [IOU] change to improve your experience with the program?  
 [DO NOT READ; SELECT ALL THAT APPLY]

For S7\_1 through S7\_10

- 0 Not mentioned
- 1 Mentioned
- 4 Interviewer mistake
- 5 Programming error
- 6 Programmed skip
- 8 Don't know
- 9 Refused

- S7\_1** Nothing / Wouldn't change anything / Keep program as is
- S7\_2** Include additional types of equipment [SPECIFY: What types?]
- S7\_3** Increase the incentive level [SPECIFY: To what?]
- S7\_4** Change the application process [SPECIFY: How?]
- S7\_5** Change the incentive process [SPECIFY: How?]
- S7\_6** Reduce the amount of time it takes to receive the incentive check
- S7\_7** Provide more information about who is eligible for the program [SPECIFY]
- S7\_8** Provide more information about the application process [SPECIFY]
- S7\_9** Provide more information about the incentive process [SPECIFY]
- S7\_10** Other [SPECIFY]

- S7\_2\_OTH** Additional types of equipment would like to include.
- S7\_3\_OTH** Level to which incentive should be increased.
- S7\_4\_OTH** How application process should be changed.
- S7\_5\_OTH** How incentive process should be changed.
- S7\_7\_OTH** Information that should be provided about who is eligible for the program
- S7\_8\_OTH** Information that should be provided about the application process
- S7\_9\_OTH** Information that should be provided about the incentive process
- S7\_10\_OTH** Other aspect of the program would like to be changed.

**S8** Considering your experiences with the *[TRACK]* Program, using a scale of 0 to 10, where 0 means “not at all likely” and 10 means “extremely likely”, how likely are you to recommend the program to a friend or colleague?

- \_\_\_\_\_ *[RECORD LIKELIHOOD (0-10)]*  
-6 Programmed skip  
-8 Don't know  
-9 Refused

**S9** Would you say your opinion of *[IOU]* has improved, worsened, or not changed since your participation in the program?

- 1 Improved  
2 Worsened  
3 Has not changed  
-6 Programmed skip  
-8 Don't know  
-9 Refused

**S10** *[ASK IF S9=2]* Why has your opinion worsened since participating in the program?  
*[RECORD VERBATIM RESPONSE]*

- 1 *[SPECIFY]*  
-6 Programmed skip  
-8 Don't know

**S10\_1\_OTH** Reason opinion of *[IOU]* has worsened since participating in the program.

**POST-PROGRAM EXPERIENCE**

[ASK SECTION IF TYPE=1 Participant ELSE SKIP TO D1]

**X1** Think back to the year before you started participating in the program. During that year before participating in the program, did you...?  
*[READ CHOICES; SELECT ALL THAT APPLY]*

For X1\_1 through X1\_8

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

- X1\_1** Turn-off devices instead of leaving them on
- X1\_2** Turn-off lights when you leave a room or are not using them
- X1\_3** Change your light bulbs to energy efficient versions
- X1\_4** Seal up any air leaks to the outside such as around windows and doors
- X1\_5** Shift your energy usage to late night for cheaper rates
- X1\_6** Replace any of your major appliances with a new energy efficient version
- X1\_7** Reduce your use of hot water
- X1\_8** *[DO NOT READ]* None of these

**X2** Is there anything else that you did to reduce energy usage BEFORE you participated in the project that I did not mention?  
*[RECORD VERBATIM RESPONSE]*

- 1 Yes *[SPECIFY]*
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**X2\_1\_OTH** Methods of reducing energy usage before participating in the project.

**X3** Since participating in the program, do you feel that you have changed your energy usage behaviors?  
*[IF NEEDED: "Such as turning off devices when not in use, using less energy, shifting the time during the day that you use energy, etc."]*

- 1 Yes
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**X4** *[ASK IF X3=1]* Can you please briefly describe the changes in your energy usage behaviors since participating in the program?

- 1 Yes *[SPECIFY]*
- 2 No
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**X4\_1\_OTH** Changes in your energy usage behaviors since participating in the program.

**PP2** Now I'm going to read you a list of items. For each item, please tell me whether it improved, worsened, or did not change since participating in the program.

For PP2\_A through PP2\_G

- 1 Improved
- 2 Worsened
- 3 Did not change
- 6 Programmed skip
- 8 Don't know
- 9 Refused

*[RANDOMIZE PP2\_A through PP2\_G]*

**PP2\_A** Energy consumption  
**PP2\_B** Utility bill amount  
**PP2\_C** Air quality  
**PP2\_D** Home market value  
**PP2\_E** Home appearance  
**PP2\_F** Home comfort  
**PP2\_G** Home safety

**PP3** *[ASK IF 2 OR MORE PP2 A-G = 1]* Now considering the cost of your recent retrofit, I'm going to read the list of these main improvements that you've experienced and ask you to express the value of each of these improvements by distributing 100 dollars across your list. How much out of this 100 dollars would you distribute to the following?

*[IF NEEDED: "For example would you distribute one-fourth (25%) or half (50%) of the \$100 to the first item?"]*

For PP3\_A through PP3\_G

\_\_\_\_\_ *[RECORD PROPORTION OF \$100 SPREAD ACROSS CATEGORIES (0-100)]*

-6 Programmed skip

-8 Don't know

- PP3\_A** *[SHOW IF PP2\_A=1]* Energy consumption
- PP3\_B** *[SHOW IF PP2\_B=1]* Utility bill amount
- PP3\_C** *[SHOW IF PP2\_C=1]* Air quality
- PP3\_D** *[SHOW IF PP2\_D=1]* Home market value
- PP3\_E** *[SHOW IF PP2\_E=1]* Home appearance
- PP3\_F** *[SHOW IF PP2\_F=1]* Home comfort
- PP3\_G** *[SHOW IF PP2\_G=1]* Home safety

\$\_\_\_ Total *[MUST ADD TO \$100]*

**PP4** Since participating in the *[TRACK]* program, have you installed any other energy efficient products or equipment for which you did NOT receive a program incentive?

1 Yes *[SPECIFY: What other products/equipment?]*

2 No

-6 Programmed skip

-8 Don't know

-9 Refused

**PP4\_1\_OTH** Other energy efficient products or equipment installed without receiving a program incentive.

PP5 How have you changed your overall energy usage behaviors since participating in the [TRACK] program?  
[DO NOT READ; SELECT ALL THAT APPLY]

For PP5\_1 through PP5\_10

- 0 Not mentioned
- 1 Mentioned
- 6 Programmed skip
- 8 Don't know
- 9 Refused

- PP5\_1 No / No changes
- PP5\_2 Installed LED or compact fluorescent light bulbs
- PP5\_3 Wash laundry in cold water
- PP5\_4 Lowered the water heater temperature
- PP5\_5 Changed the furnace filter
- PP5\_6 Sealed up leaky windows or doors with caulk, plastic, or other materials to avoid drafts
- PP5\_7 Turn off lights when leaving the room
- PP5\_8 Unplug electronics and appliances when not in use
- PP5\_9 Turned down the thermostat in the winter
- PP5\_10 Other [SPECIFY]

PP5\_10\_OTH Other behaviors changed since participating.

PP6 Do you think your energy bill increased, decreased, or stayed the same after completing an energy efficiency project through the [TRACK] program?

- 1 Increased
- 2 Decreased
- 3 Stayed the same
- 6 Programmed skip
- 8 Don't know
- 9 Refused

PP7 What other programs or offerings would you like to see from [IOU] in the future?  
[RECORD VERBATIM RESPONSE]

- 1 None
- 2 [SPECIFY]
- 6 Programmed skip
- 8 Don't know

PP7\_2\_OTH Programs or offerings would like to see from [IOU] in the future

<b>DEMOGRAPHICS</b>
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**D1** Finally, I have a few questions about your home and energy use. All information you provide will be kept confidential.

Which of the following types of housing units would you say best describes your home? Is it a... *[READ LIST]*

- 1 Single-family detached house
- 2 Single-family attached house (townhouse, row house, excluding duplex)
- 3 Duplex
- 4 Building with 2 to 4 units
- 5 Building with 5 or more units
- 6 Mobile home or house trailer
- 7 Other *[SPECIFY]*
- 8 Don't know
- 9 Refused / Prefer not to answer

**D1\_7\_OTH** Other type of housing unit lived in.

**D2** Do you own or rent your home?

- 1 Own / Buying
- 2 Rent
- 7 Occupy rent free
- 8 Don't know
- 9 Refused / Prefer not to answer

**D3** In what year was your home constructed? If you are not sure of the exact year, please provide your best estimate.

- \_\_\_\_\_ *[RECORD YEAR BUILT (1800 to 2016)]*
- 8 Don't know
  - 9 Refused

**D4** Not including unfinished basements and garages, what is the approximate square footage of your home?

*[READ LIST; STOP READING ONCE RESPONDENT PROVIDES AN ANSWER]*

- 1 Less than 1,000 square feet
- 2 1,000 to less than 1,500 square feet
- 3 1,500 to less than 2,000 square feet
- 4 2,000 to less than 2,500 square feet
- 5 2,500 to less than 3,000 square feet
- 6 3,000 to less than 3,500 square feet
- 7 3,500 or more square feet
- 8 *[DO NOT READ]* Don't know
- 9 *[DO NOT READ]* Refused / Prefer not to answer

**D5** Including yourself, how many people lived in your household in 2015?

\_\_\_\_\_ *[RECORD NUMBER OF PEOPLE (0 to 25)]*

- 8 Don't know *[SKIP TO D28]*
- 9 Refused *[SKIP TO D28]*

**D6** Including yourself, how many people fall into the following age groups?  
*[RECORD THE NUMBER OF PEOPLE IN EACH APPLICABLE AGE GROUP]*

For D6\_A through D6\_H

\_\_\_\_\_ *[RECORD NUMBER OF PEOPLE (0 to 25)]*

- 8 Don't know
- 9 Refused

- D6\_A** Less than 5 years old
- D6\_B** 6 to 17 years old
- D6\_C** 18 to 24 years old
- D6\_D** 25 to 34 years old
- D6\_E** 35 to 44 years old
- D6\_F** 45 to 54 years old
- D6\_G** 55 to 64 years old
- D6\_H** 65 or older

**D7** Did the number of occupants in your household change during 2015?  
For example, a new child or additional person living in the home?

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**D7\_SPEC** [ASK IF D7=1] How many people lived in your home prior to this change?

- \_\_\_\_\_ [RECORD NUMBER OF PEOPLE (0 to 25)]
- 6 Programmed skip
  - 8 Don't know
  - 9 Refused

**D8** In the past year, has the use of your home changed, for example, someone retiring, working from home, or in the home more often?

- 1 Yes [SPECIFY: In what way has your home-use changed?]
- 2 No
- 8 Don't know
- 9 Refused

**D8\_1\_OTH** Ways in which home-use has changed.

**D9** How many years have you lived in your current home?

- \_\_\_\_\_ [RECORD NUMBER OF YEARS (0.00 to 100.00)]
- 8 Don't know
  - 9 Refused

**D10** How many more years do you expect to live in your current home?

- \_\_\_\_\_ [RECORD NUMBER OF YEARS (0.00 to 100.00)]
- 7 [DO NOT READ] For the foreseeable future / Until I die / Forever
  - 8 Don't know
  - 9 Refused / Prefer not to answer

**D11** Which of the following categories includes your household's total annual income before taxes in 2015? Was it...

[READ LIST; STOP READING ONCE RESPONDENT PROVIDES AN ANSWER]

- 1 Less than \$20,000
- 2 \$20,000 to less than \$50,000
- 3 \$50,000 to less than \$75,000
- 4 \$75,000 to less than \$100,000
- 5 \$100,000 to less than \$150,000
- 6 \$150,000 to less than \$200,000
- 7 \$200,000 or more
- 8 [DO NOT READ] Don't know
- 9 [DO NOT READ] Refused / Prefer not to answer

**D12**

What is the highest level of education completed by the head of household?  
*[READ LIST; STOP READING ONCE RESPONDENT PROVIDES AN ANSWER]*

- 1 Less than high school
- 2 High school graduate or equivalent
- 3 Some college, no degree
- 4 Associate's degree
- 5 Bachelor's degree
- 6 Graduate degree or higher
- 8 *[DO NOT READ]* Don't know
- 9 *[DO NOT READ]* Refused / Prefer not to answer

**CONCLUSION**

**E1** Your 50 dollar gift card should be delivered within 2 to 3 weeks. To ensure it arrives, would you please tell me your correct mailing address?

- 1 Yes
- 2 No *[SKIP TO E3]*
- 9 Refused *[SKIP TO E3]*

**E2** Please tell me your correct mailing address:

*[IF NEEDED: "The address we have on record is [NAME] at [MAILING ADDRESS]" ]*

**E2\_NAME\_OPN** Name  
**E2\_ADDR\_OPN** Street Address  
**E2\_CITY\_OPN** City  
**E2\_ST\_OPN** State  
**E2\_ZIP\_OPN** Zip code

**E3** *[ASK IF TYPE=1 PARTICIPANT ELSE SKIP E5]* *[IOU]* is considering implementing a follow up component to program participants to periodically check on the condition and satisfaction of the new equipment, answer any questions the participant may have, and share tips on how to maintain or increase energy savings in the home. As a participant of the program, is this something you would be interested in?

- 1 Yes
- 2 No *[SKIP TO E5]*
- 6 Programmed skip
- 8 Don't know *[SKIP TO E5]*
- 9 Refused *[SKIP TO E5]*

**E4** *[ASK IF E3=1]* How would you prefer to be contacted for these follow-ups?  
*[DO NOT READ; SELECT ALL THAT APPLY]*

- 1 Phone
- 2 Email
- 3 In person
- 4 Other *[SPECIFY]*
- 6 Programmed skip
- 8 Don't know
- 9 Refused

**E4\_4\_OTH** Other contact method specified.

**E4\_PHONE** *[ASK IF E4=1]* What is the best phone number to contact you at?  
*[INTERVIEWER NOTE: The phone number we have on file is: *[PHONE]*]*

\_\_\_\_\_ *[RECORD PHONE NUMBER (###-###-####)]*

**E4\_EMAIL** *[ASK IF E4=2]* What is the best email address to contact you at?  
*[INTERVIEWER NOTE: The email address we have on file is: *[EMAIL]*]*

\_\_\_\_\_ *[RECORD EMAIL (AAAA@AAA.AAA)]*

**E5** As part of our evaluation, we may need to follow-up on some of this information.  
Would it be all right if someone contacted you if needed?

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**E6** Thank you for taking the time to complete this survey. Do you have any additional comments or questions? Have a great morning/afternoon/evening!

- 1 Yes, record comment *[SPECIFY]*
- 2 No
- 8 Don't know

**E6\_1\_OTH** Respondent comments.

*[END CALL]*

**GENDER**     *[RECORD FROM VOICE; DO NOT READ]*

- 1     Male
- 2     Female
- 8    Unsure

## APPENDIX B: CONTRACTOR INTERVIEW GUIDE

Hello, can I speak with [NAME]? This is \_\_\_\_\_ with EMI Consulting. I believe we have an appointment set up for today. Is that correct?

Thanks for taking the time to talk with us. As you may know, you are part of a panel of contractors we are interviewing to better understand challenges and opportunities of the Energy Upgrade California - Home Upgrade program. Just so you know, the information from this interview will remain confidential and may be aggregated for future research.

And, do you mind if I record our conversation for my notetaking purposes?

I'll be covering a number of topics today including your experience with the program, how you market the program, any challenges you've experienced and your general opinions about energy efficiency.

Do you have any questions before we get started?

### Section A: Engagement

**A1.** To begin, how would you describe your company's line of work? *(Record category.)*

1. Specialty HVAC
2. Home Performance
3. Construction
4. Remodeling
5. Other

**A2.** What is your role at your company?

**A2a.** How many employees does your company have?

**A3.** How did you first hear about the Home Upgrade program?

**A4.** What originally motivated you to get involved with the Program?

**A5.** How does the Home Upgrade Program fit into your business model? Is it a key part of your work or a supplementary service?

**A5a.** Do you submit "Basic" ("Home Upgrade") or "Advanced" ("Advance Home Upgrade") projects?

*(Clarify if necessary: The Basic HU Program provides incentives for a set list of eligible equipment. The Advanced HU Program requires modeling and awards incentives based on energy savings.)*

**A5b.** About how many projects do you attempt to complete per year? Are you on track to complete that many this year?

**A5c.** How long have you been involved with the Home Upgrade program?

**A5d.** About what percentage of your company's revenue is derived from Home Upgrade?

**A6.** Aside from the [*Utility Name*] Home Upgrade Program, does your company work with any other energy efficiency programs? Any other utilities or cities?

**A7.** Do you have any staff dedicated to Home Upgrade projects? Office staff? Field staff or installers?

**A8.** Are you interested in increasing the amount of work you do with the Home Upgrade Program? (*Very interested, somewhat interested, neither interested nor disinterested, not at all interested*).

**A8b.** Is there anything the program could do to help you increase your participation in the program?

## Section M: Marketing

- M1.** How do you typically market the program? (*Select all that apply.*)
1. Referrals from past customers
  2. Referrals from the program
  3. Upsell to regular customers
  4. Cold calls
  5. Print advertisements
  6. Online advertisements and social media
  7. Customers contact us from IOU website listing
  8. Customers contact us via other listing
  9. Community events and canvassing
  10. Direct mail
- M1a.** Which methods have you found to be most effective for generating leads? Why?
- M2.** Does being affiliated with the Home Upgrade Program provide a marketing benefit for you?
- M2a.** Are there any awards, certifications, or other affiliations you include in your marketing?
- M2b.** What do you see as your company's competitive selling points? Are you competing on cost or reputation of your work?
- M3.** About what percentage of customers have heard of the program before you mention it?
- M4.** What types of customers do you target? What kinds of customers are typically interested?
- M5.** How do you talk to customers about the benefits of energy efficiency upgrades?
- M6.** Do you think that customers feel like they have enough information to decide whether to participate in the program?
- M7.** Have you used program materials or program implementation staff as resources to help explain the benefits of the program?
- M7a.** Have you found any of these materials or other resources to be particularly useful? Why?
- M7b.** Could any of these materials be improved? How so?

- M8.** Have recent changes to the incentive limits (per project) affected the amount of work you are able to sell through the program?

## Section T: Training

- T1.** Have you or your staff attended any utility-offered BPI-certification or Home Upgrade program trainings?
- T1a.** (If yes) Which aspects of the trainings were most useful to you? Least useful?
- T1b.** (If yes) How well did the program trainings prepare you for doing program jobs?
- T2.** Were there any areas you think could have been better covered in the trainings?
- T3.** Are there any subjects you would like additional training on?

## Section B: Barriers

- B1.** (As applicable). Could any of the projects you do outside of program be eligible for the Home Upgrade program?
- B1a.** (If yes) What keeps them from being part of the program?
- B2.** Overall, about how much time and resources does it take to complete a Home Upgrade project compared to an unincentivized project? (*Prompt for Percent*) Probe for details such as paperwork, customer sales, inspections and testing.
- B3.** Thinking about your work with the Home Upgrade program, did you experience any difficulties in terms of program paperwork, incentive processing, or inspections and testing?
- B4.** Are there any other areas where you think the program could be improved?

## Section E: Attitudes toward Energy Efficiency

- E1.** We are almost done. Before we finish-up, we want to quickly read you a few statements about the environment and energy efficiency. After we read each statement, please tell us how much you agree with that statement using a 0 to 10 scale, where 0 means, “Completely Disagree” and 10 means, “Completely Agree.” Please keep in mind that there are no right or wrong answers, we are only interested in your opinion.
- E1a.** Household electricity use has an impact on the environment.

- E1b.** I am very concerned about how energy use affects the environment.
- E1c.** I am concerned that global climate change will increase if homeowners do not make their homes more energy efficient.
- E1d.** It is not my responsibility to help the environment by encouraging my customers to save energy.
- E1e.** I very often encourage my customers to do a comprehensive retrofit of their homes to reduce energy use and increase comfort.
- E1f.** I often worry that the cost of energy for my own home will increase.
- E1g.** It is not my responsibility to use as little energy as possible to help the environment.
- E1i.** It is my responsibility to highlight the potential financial savings that can result from energy assessments and retrofits to my customers.

## Section C: Closing

- C1.** Do you have any other thoughts about the program that we haven't covered? Anything you want us to convey to the program?
- C2.** Thank you. Those are all the questions I have today.  
  
**[THANK AND TERMINATE]**

# APPENDIX C: NON-PARTICIPATING CONTRACTOR INTERVIEW GUIDE

## Introduction

Hi, my name is \_\_\_ calling from EMI Consulting on behalf of the California Utilities. May I speak with [CONTACT NAME]? We are conducting short, compensated interviews with select California contractors to identify ways that we might improve the program. It would be great to get your input. This interview will take 20-30 minutes and as a thank you we are offering a \$50 Visa Gift Card for completing it. Is now a good time to talk?

[CLARIFY, IF NEEDED]: This is a research study to help the Energy Upgrade California Home Upgrade Program understand barriers for contractors to participate in the program as well as to understand any historical experiences that have led some contractors, such as yourself, to not participate. Your participation in this interview is anonymous and voluntary. Your individual answers will remain confidential and reported only in the aggregate.

## Section A: Engagement

**Introduction: Thank you for taking the time to talk with us.**

**A1.** How would you describe your company's line of work? (*Record category.*)

1. HVAC
2. Home Performance
3. Construction
4. Remodeling
5. Other

(THANK AND TERMINATE IF NOT AN HVAC, WHOLE HOUSE, OR RELATED SPECIALTY)

**A1a.** What types of contracting services do you provide in this area?

**A1b.** What utility territory / territories do you work within?

**A2.** Are you familiar with the Energy Upgrade California Home Upgrade program? (note – contractors might know the program as simply Home Upgrade or Whole House Retrofit)

**A2a.** (If yes) how did you first hear about it?

**A2b.** Have you ever started a project? (If, yes) How far along in the process did you get?

(If A2=no) Explain program, e.g., "Energy Upgrade California Home Upgrade is a statewide whole home retrofit initiative managed by four California Investor-Owned Utilities (IOUs). It provides

education, audits, and incentives for home upgrades involving multiple energy efficiency measures.”

- A4.** (If familiar with the program) Why did your company decide to not to work with the Home Upgrade Program? About when did you make your decision?
- A5.** Are you interested in working with the Home Upgrade Program in the future? (*Very interested, somewhat interested, neither interested nor disinterested, not at all interested*).
- A5a.** Why or why not?
- A5b.** Is there anything the program could do to help you increase your work with the program / interest in the program?

## Section B: Barriers

*Probes for response to A4:*

- B1.** If too much paperwork (*Prompt: You mentioned paperwork...*): Was there a particular form or step that was particularly time-consuming?
- B1a.** How much extra time would you estimate that your staff would have to spend on Home Upgrade paperwork?
- B1b.** How could the paperwork be streamlined? Is there specific information you thought was unnecessary?
- B1c.** Did you contact program staff for assistance?
- B1d.** Would training have helped with the paperwork?
- B2.** If not cost-effective or projects take too long: What made the program not worth your time? (Incentives? Paperwork?)
- B2a.** How much extra time did program requirements add to the timeline of a project?
- B2b.** How much time do you think a Home Upgrade project should take (or needs to take to be profitable)?
- B2c.** Which incentives were too low?
- B2d.** If there were less paperwork or steps to go through, would you reconsider working with the program?
- B3.** If not a business priority or previous negative experience: What kind of work does your company prioritize over Home Upgrade projects?

- B3a.** How does that work compare to a Home Upgrade project in terms of profitability?
- B3b.** If you had additional staff, would you consider doing more Home Upgrade projects?
- B4.** If lack of experience in whole house measures: What types of home upgrades were you unfamiliar with? (Note: Participants may not be familiar with any of the upgrades)
- B4a.** If you were provided training in these areas, would you consider doing Home Upgrade projects?
- B5.** If customers not interested: What kind of support from the program would be useful to help you sell work?  
**Probe as necessary:**
- Additional referrals
  - Program materials (mailed ahead of time or handed out)
    - o What types of materials?
  - Follow-up with customers
  - Financing

## Section M: Marketing

- M1.** *(For all respondents that tried to participate in the program)* When you were trying to sell Home Upgrade projects, how did you market the opportunity? (Upsell to existing customers, cold call, mentioned only to some customers, etc.)
- M1a.** Which types of customers did you mention the program to? *(Probe for any demographic or home characteristics)* Which customers were interested?
- M1b.** Had any of these customers heard of the Home Upgrade Program?
- M1c.** How did the uninterested customers respond? Why weren't they interested?
- M1d.** Did any of your customers have difficulties with financing?

## Section P: Potential

- P1.** Are you aware of any Home Energy Upgrade incentives your company would be eligible for? If so, which ones?
- P2.** About what percentage of your customers could benefit from additional energy efficiency improvements? (air sealing, ductwork, insulation, hot water work, etc.)
- P3.** Does your company work with any other energy efficiency programs? Have you worked other utilities' programs?

- P5. To your knowledge, have you encountered competition from contractors participating in Home Energy Upgrade programs?

## Section T: Training

- T1. Have you attended any utility-offered energy efficiency training programs? (If yes) Which ones?
- T2. How well did these trainings prepare you for your work?
- T3. (If yes to T1) Are there any subjects you would like additional training on?

## Section Q: Quality Installation

- Q1. Are you familiar with the term “Quality Installation” for HVAC installations? (Yes/No) *If yes:* How would you define Quality Installation?
- Q2. If not mentioned, do you or your technicians follow any specific standards for HVAC installation?
- Q3. Have you or your technicians received training related to HVAC installation or hold any certifications (such as NATE)?
- Q4. (optional) Have you had trouble with installed equipment not qualifying for program incentives?

## Section E: Attitudes toward Energy Efficiency

- E1. We are almost done. Before we finish-up, we want to quickly read you a few statements about the environment and energy efficiency. After we read each statement, please tell us how much you agree with that statement using a 1 to 10 scale, where 1 means, “Completely Disagree” and 10 means, “Completely Agree.” Please keep in mind that there are no right or wrong answers, we are only interested in your opinion.
- E1a. Household electricity use has an impact on the environment.
- E1b. I am very concerned about how energy use affects the environment.
- E1c. I am concerned that global climate change will increase if homeowners do not make their homes more energy efficient.
- E1d. It is not my responsibility to help the environment by encouraging my customers to save energy.

- E1e. I very often encourage my customers to do a comprehensive retrofit of their homes to reduce energy use and increase comfort.
- E1f. I often worry that the cost of energy for my own home will increase.
- E1g. It is not my responsibility to use as little energy as possible to help the environment.
- E1h. I intend to conserve electricity in my own home next summer.
- E1i. It is my responsibility to highlight the potential financial savings that can result from energy assessments and retrofits to my customers.
- E1j. I intend to promote energy efficiency to my customers.

## Section G: Firmographic info

- G1.** What is your role within your company?
- G2.** How many employees does your company have?

## Section C: Closing

- C1.** Do you have any other thoughts about how the program could be improved?
- C2.** Would you be willing to participate in future interviews or be available for follow-up questions?
- C3.** Thank you. **[Get address and name they would prefer to use for mailing the gift card]** Those are all the questions I have today.

**[THANK AND TERMINATE]**

## APPENDIX D: INSPECTOR RIDE-ALONG GUIDE

### Section A: Introduction

- A1.** Thanks for taking the time to talk with us. To begin, how long have you been in your position as an inspector for the Energy Upgrade California Home Upgrade Program?
- A1a.** What is your relationship to the other program parties? (e.g., employee of implementer or IOU, independent contractor, employee of 3<sup>rd</sup> party).
- A2.** What is your work and experience background? Before this position, did you have any experience in whole home retrofits, HVAC, or energy modeling?
- A3.** Can you provide a brief summary of your day-to-day responsibilities?

### Section I: Inspections and Quality Installation

- I1.** Can you walk me through the steps you go through on a typical inspection/field verification? What are the key things you're looking for?
- I2.** How much do you review contractors' models and calculations in terms of frequency and depth?
- I3.** Do contractors whose work you are inspecting ever accompany you on inspections/field verifications?
- I4.** There have been a number of efforts across the state to encourage "quality installation" of HVAC equipment. Are you familiar with the term "Quality Installation"? Do you follow any specific standards for QI?
- I5.** (*As necessary*) What are you looking for when inspecting the following attributes of HVAC equipment:
  - 1. Unit sizing (Follow up: *Do you ensure equipment is not oversized? How?*)**
  - 2. Ductwork (Follow up: *Do you assess proper sizing of ductwork? How?*)**
  - 3. Airflow**
  - 4. Refrigerant levels**
- I6.** How do you define "Quality Installation" for other measures, such as insulation, hot water heaters, and lighting?
- I7.** What are the quality issues you encounter most often? Are there different levels of "failure" for each issue? How do you document these?

- I8. How do you resolve issues with quality installation? Do contractors learn from these experiences?

## Section Q: Quality Installation Next Steps

- Q1. How do you think Quality Installation could be improved in the Home Upgrade Program?
- Q2. Do you think contractors would benefit from additional training in Quality Installation?
- Q3. What do you perceive as the reason(s) why proper sizing of HVAC installation is often not achieved (or realized) during an HVAC change-out? How Do you think contractors could be guided or motivated to be receptive to making more rigorous load and sizing calculations for HVAC equipment? If the calculations were optional and encouraged via a bonus?
- Q4. *(If unfamiliar with QI)* Would you be interested in additional training around HVAC Quality Installation?

## Section C: Customer

- C1. How much do you interact with the customer during the inspection?
- C2. Do customers understand the purpose of your visit? Do they request additional identification?
- C3. Do customers ever express concerns about the work conducted by the contractor? (e.g. ask you questions about the equipment, cost, energy savings, etc.)

## Section P: Process

- P1. From your perspective, could the inspection process be improved to encourage greater energy savings and quality installations? How so?
- P2. Could the inspection process be improved to become more efficient? How so?

## Section R: Ride-along

- R1. Document what parameters and characteristics you measure during your inspection.

### HVAC Equipment:

- Sizing
- Ductwork

- Airflow
- Refrigerant levels

**Envelope:**

- Wall insulation
- Floor insulation
- Duct insulation
- Windows
- Air sealing

**R2.** Where possible, observe interactions with customer and customer attitudes.

**Introduction:**

*Does the customer ask the inspector for identification? Is the customer skeptical that the inspector is from the utility?*

*Does the customer appear to be annoyed at having the inspection or having another person involved in the process? Does the customer seem excited about the project? Does the customer talk about why they wanted to participate?*

**Inspection:**

*Does the customer join the inspection? What are the customer's questions and priorities? How knowledgeable does the customer seem about the project? About energy efficiency?*

*Does the customer share any feedback as to the overall process? Are they happy with the work that was done? Are they realizing some benefits such as greater comfort, less energy usage/lower energy bills?*

# APPENDIX E: PROGRAM STAFF INTERVIEW GUIDE

## Introduction/Background

This section will define the program manager or key stakeholder's roles and responsibilities related to the Energy Upgrade California Home Upgrade program and how long they have been involved with the program.

- Can you describe your role as it relates to the Energy Upgrade California Home Upgrade program? How long have you been in that role?

## Program Design

This section will explore topics related to the current and past design of the Home Upgrade program. The evaluation team will use this section to better understand the roles of key program actors, including contractors, marketing staff, inspectors and field staff. In addition, we will discuss program goals and changes to the program design.

- What are the program's goals (in terms of participation, energy savings, etc.)?
- What changes in program delivery have been made since the program began?
- What changes in program delivery have been made in response to evaluations?
- How do you monitor and track program data and activities?

## Program Implementation

This section will explore a wide range of topics related the implementation of the Home Upgrade program, including program successes and challenges, customer and contractor participation, customer and contractor satisfaction, awareness of the program, and barriers to participation. In addition to these high-level topics, we will ask specific questions related to program marketing, program logistics (e.g. application processing, incentive payments, etc.), statewide coordination of program activities, and contractor training/engagement.

### *Successes and Challenges:*

- To date, what have been the EUC Home Upgrade program's successes and challenges from your perspective?
- Where did you expect the program to be at this point?
- How has homeowner participation compared with targets? Does participation vary based on the Home Upgrade vs. Advanced tracks?

### *Contractors:*

- What are requirements for contractors to participate?
- How has contractor participation compared with goals?
- Are contractors satisfied with the EUC Home Upgrade program processes?
- What do you think are barriers to contractor participation? How has the program attempted to address these barriers?

### *Drivers and Barriers:*

- What are the primary drivers of participation among homeowners?
- What would you say are the most significant barriers that have prevented IOU customers from participating in the program?
  - What has the program done to address these barriers?
  - How has the program addressed the upfront cost barrier?
  - What financing options are available to customers? How are customers informed about these options?

*Marketing:*

- How is the program marketed to customers?
  - How do you coordinate marketing efforts with statewide marketing?

*Program Logistics:*

- What kinds of data does the program track?
- Has the EUC Home Upgrade program experienced challenges in program implementation logistics in your territory? Statewide? (Probe on application processing, incentive payments, energy savings modeling, etc.)
- Have the efforts to standardize the program statewide worked?

## Incorporating Work Quality

This section will explore current program efforts related to Quality Installation (QI), staff perceptions of the most important aspects of QI, and feasibility of integrating additional QI processes into the program design.

Example questions include:

- How does the EUC Home Upgrade program currently incorporate checking for work quality in the program design?
- Is there coordination statewide?
- Have you explored others ways to ensure work quality in the EUC Home Upgrade program?

## Key Concerns

This section will be exploratory and tailored to the program staff or stakeholder being interviewed in order to explore key concerns related to their role in the EUC Home Upgrade program. The goal for this section is to discuss key concerns program staff or key stakeholders have about the program in order to inform later evaluation activities (e.g. customer and near-participant surveys and interview/ride-alongs with inspectors). The evaluation team will probe on what's driving the key concerns and how future evaluation activities might address these concerns.

Example questions include:

- What questions do you currently have about the market for the EUC Home Upgrade program?
- What concerns do you have about the EUC Home Upgrade program's implementation?
- Is there anything we have not covered today that you feel is important for us to understand?
- If you could make changes to the program, what would they be?

## Questions about the Evaluation

This section will allow program staff and key stakeholders to ask the evaluation team questions about planned evaluation activities in order to ensure that concerns about the evaluation are addressed and assist in the prioritization of evaluation questions through-out the research.

## APPENDIX F: RECOMMENDATIONS SUMMARY

The following table provides a summary of each recommendation so that the appropriate entity can provide a follow-up response within 60 days for the final report submission.

**Table A-1. Recommendation Summary**

Item	Page	Finding	Recommendation
1	70	While the evaluation team did not identify any major inconsistency in program implementation across service territories, several contractors operating across multiple IOU service territories reported difficulty navigating different program requirements between implementers.	We recommend the IOUs review application standards across service territories for consistency. In addition, in order to mitigate contractor misconceptions, the IOUs should include education for contractors on key administrative similarities and unavoidable differences as part of contractor outreach activities.
2	70	More participants are taking advantage of existing financing options than in previous studies, suggesting an opportunity to leverage financing to increase program participation, mitigating first cost barriers. Also, The cost of equipment continues to be a major barrier to participation, particularly among near-participants who reported an annual income below \$100,000.	We recommend that the Home Upgrade Working Group should coordinate on how to best incorporate the emerging portfolio of energy efficiency financing programs into the program.
3	71	Contractors are frequently the source of program awareness for homeowners and find that their participation in the program provides market differentiation among non-participating contractors and improves their ability to sell whole house projects.	We recommend providing additional support to participating trade allies from non-participating contractors. Examples of this support could include a tiered contractor rating system or co-branding materials.
4	71	Participating contractors frequently requested additional materials to help them market whole home retrofits (and by association, the Home Upgrade program) to potential customers.	We recommend that the program managers develop simplified and streamlined contractor marketing materials to supplement detailed brochures.

Item	Page	Finding	Recommendation
5	72	Contractors across all four IOU service territories requested comprehensive documentation that provides more detailed instructions on completing project incentive request forms and meeting installation requirements.	We recommend that program managers continue to refine program documentation for contractors and incorporate material drawn from implementers' experiences responding to frequently asked contractor questions.
6	72	Program participants are increasingly turning to financing options to fund the capital cost associated with whole home retrofits.	We recommend that the program staff include training for participating contractors on the available energy efficiency and income-qualified options for homeowners.
7	72	Inspectors felt that the existing collaborative or "witness" inspections, in which contractors accompany inspectors during inspections of their projects, were effective mentorship opportunities, although they expressed concern that few contractors take advantage of these opportunities.	We recommend that the program managers continue to promote collaborative or "witness" inspections.
8	73	Contractors reported that while they understood Quality Installation in principle, they did not believe there was enough market demand to justify the increased installation costs. Customers did not see the value of Quality Installation and assumed that all HVAC installations were "quality."	The Home Upgrade program should continue to coordinate marketing messages with statewide Quality Installation/Quality Maintenance programs (e.g., the AC Quality Care program) to raise awareness of the benefits of Quality Installation as part of whole home retrofits.
9	73	While most participants were generally very satisfied with their participation in the Home Upgrade program, one suggestion for improvement that was frequently mentioned was to better communicate the time commitment associated with program participation.	Clearly communicate program time commitments to both new contractors and potential participants during the application process.

Item	Page	Finding	Recommendation
10	73	Homes built prior to 1978 likely provide a greater opportunity for energy savings than homes built after 1978 due to the adoption of California's Building Energy Efficiency Standards. The program is currently focused on this population with 65% of survey respondents reporting that their homes were built before 1978 (compared to 50% of overall population of residential homes).	The evaluation team recommends that customer-facing outreach materials include messages about the benefits to retrofitting older homes. These materials could include images of older vintage homes and copy targeting "classic" or "traditional" style dwellings.
11	74	Non-energy benefits continue to be a primary driver for participation in the Home Upgrade program. Participants ranked increasing the comfort of their home as the second most important motivation for participating in the program (after saving money on their energy bill). In addition, participants reported several non-energy benefits as a result of participation.	The evaluation team recommends that program staff include non-energy benefits (e.g., comfort and home value) as part of customer-focused and contractor-focused outreach activities. Combined with energy cost reductions, these benefits can make a compelling case for investing in a whole house retrofit project.
12	74	Home Upgrades participants are increasingly relying on financing options to fund the whole house retrofit project. Coordinating with the launch of several statewide energy efficiency financing programs, program staff can capitalize on this interest and include messages regarding the availability and benefits for energy efficiency financing as part of participation in the Home Upgrade program.	The evaluation team recommends that program managers incorporate energy efficiency financing options into program marketing materials.