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2019 California Low-Income Needs Assessment

Final Report: Volume 1 of 3: Summary of Key Findings

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Opinion Dynamics

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Glossary

Alternative-fuels (alt-fuels) customers: Low-income customers who do not have natural gas service and who use propane, kerosene/oil/diesel, and/or wood/pellets as their primary fuel(s) for space heating, water heating, and/or cooking.

California Alternate Rates for Energy (CARE) program: A rate assistance program offered by the IOUs that provides income qualified customers who earn 200% or less of federal poverty guidelines (FPG) a discount of up to 35% on their monthly electricity bills and up to 20% on their monthly natural gas bills.

CARE capitation agencies: Community-based organizations that provide services to local residents, including assistance with CARE enrollment, recertification, income verification, and/or high-usage processes.

CARE categorical participation: Participants who enrolled in or recertified for CARE by selecting in their CARE application the public assistance programs they participate in or that they are on fixed income instead of providing an annual income amount.

CARE-eligible nonparticipants: Low-income customers earning 200% or less of federal poverty guidelines (FPG), who have never participated in CARE as of July 2018, and who live in high poverty areas in California.

CARE enrollment: Process through which low-income customers enroll in the CARE program by providing their household size and annual income or selecting public assistance programs they participate in or that they are on fixed income in the CARE application and submitting the application to their IOU.

CARE enrollment channel: Means through which customers can enroll in (and recertify for) CARE and include CARE capitation agencies, IOU website, IOU customer call center, direct mail, data sharing between IOUs, and others.

CARE high-usage verification: Process through which CARE high-users either reduce their usage to below 400% of their baseline allowance, through ESA participation and usage monitoring, or appeal their high-usage to their IOU; participants who do not reduce their usage or whose appeal is declined are removed from CARE for up to two years.

CARE high-users: CARE participants who monthly usage exceeds 400% (high-low user) or 600% (high-high user) of their baseline allowance and are selected for high-usage verification.

CARE income verification: Process through which CARE participants who are likely not income-eligible are identified via the IOU's monthly propensity modeling and are selected to verify their income (e.g., with tax forms, check stubs, etc.) or public assistance participation (e.g., with award letters, receipts, etc.) with their IOU; participants who do not provide the proper documentation or are no longer eligible are removed from CARE for up to two years.

CARE recertification: Process through which all CARE participants must recertify, or renew, their participation in CARE by completing and submitting the CARE application to their IOU; occurs every two years for most participants and those who do not provide their information or are no longer eligible are removed from CARE.

Current CARE participant: Low-income customers currently participating in CARE as of July 2018.

Energy Burden Metrics: Energy burden is the percentage of customers' annual income that is spent on their energy bills; modified energy burden includes the monetary value of public assistance programs in the income

of customers participating in such programs; alternative energy burden includes the annual cost of alt-fuels in the annual energy costs of customers who use alt-fuels.

Energy Savings Assistance (ESA) program: An energy assistance program offered by the IOUs that provides income-qualified customers who earn 200% or less of federal poverty guidelines a free home energy assessment, energy saving equipment repair, replacements, or upgrades, and an energy education.

ESA supervisors/lead contractors: Contractors working for firms qualified by IOUs to provide ESA services and who manage or lead teams that do ESA enrollments and assessments and/or installation of ESA heating, cooling, or enclosure measures.

ESA participants: Low-income customers who participated in ESA between January 1, 2016 and June 30, 2018 (recent participants), received ESA energy education, and received at least one of the targeted ESA measures.

Family Electric Rate Assistance (FERA) program: A rate assistance program offered by the IOUs that provides income qualified customers who earn 250% or less of federal poverty guidelines (FPG) and who have three or more household members a discount of up to 12% on their monthly electricity bills.

High poverty areas: Census tracts in California where 20% or more households earn 100% or less of federal poverty guidelines (FGP).

High service reliability customers: Customers living in areas with high electricity service reliability, measured as less than one standard deviation above the SAIDI or SAIFI mean values for each IOU.

Investor-owned utilities (IOUs): The four utilities that are subject to the 2017-19 LINA and who provide energy services to most California residents; they include Pacific Gas & Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SCG), and San Diego Gas & Electric (SDG&E).

Low service reliability customers: Customers living in areas with low electricity service reliability, measured as one standard deviation or more above the SAIDI or SAIFI mean values for each IOU.

Past CARE participants: Low-income customers who formerly participated in CARE any time between January 1, 2015 and June 30, 2018 but were removed from CARE as of July 2018.

System Average Interruption Duration Index (SAIDI): Measure of an IOU's annual average duration of electricity outages, where larger numbers mean longer outages.

System Average Interruption Frequency Index (SAIFI): Measure of an IOU's annual average frequency of electricity outages, where larger numbers mean more frequent outages.

Targeted ESA measures: The heating, cooling, and enclosure measures that are the focus of the 2017-19 LINA and identified as higher-cost and/or labor intensive: furnace repair or replacement; central air conditioning (AC) tune-up, repair, or replacement; room/window AC replacement; evaporative cooler replacement; attic insulation; weatherization; and, windows and doors.

1. Executive Summary

1.1 Background

The California investor owned utilities (IOUs) provide two energy assistance programs to income-qualified customers with annual incomes 200% or less of Federal Poverty Guidelines (FPG). The California Alternate Rates for Energy (CARE) program provides discounted energy rates of up to 35% on their monthly electric bills and up to 20% on their monthly natural gas bills. The Energy Savings Assistance (ESA) program provides participants no-cost energy efficiency services, including an energy assessment, education, and equipment upgrades. These programs seek to alleviate low-income customers' energy burden and improve their health, comfort, and safety.

As per Assembly bill 327 (AB 327) enacted in 2013, the California Public Utilities Code Section 382(d) requires the California Public Utilities Commission (CPUC) to conduct a Low-Income Needs Assessment (LINA) every three years with the assistance of the Low-Income Oversight Board (LIOB). After conferring with LIOB members and other stakeholders, and in response to statutory mandates and directives set forth in Commission Decision (D.) 16-11-022, the CPUC's Energy Division staff determined the 2019 LINA needed to address the following overall topics:

- CARE program eligibility and participation barriers, including the enrollment process and the post-enrollment (PE) processes of recertification, income verification, and high-usage verification.[1]
- Impacts of select ESA heating, cooling, and enclosure measures (targeted measures) on customers' health, comfort, and safety (HCS).[2]
- Energy burden and hardships of customers who rely on alternative fuels (propane, wood, etc.) for their primary energy source (alt-fuels customers).
- Energy burden and hardships experienced by customers living in areas that have less reliable electricity service (low service reliability customers) as indicated by each IOU's System Average Interruption Duration Index and System Average Interruption Frequency Index (SAIDI/SAIFI).[3]

The 2019 LINA is the fourth conducted on behalf of the CPUC and IOUs, which includes Pacific Gas & Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas and Electric (SDG&E). The 2019 LINA addresses four overarching research objectives (ROs) and the findings and recommendations are intended to provide information that may be useful for planning and/or implementing the next cycle of the CARE and ESA programs.

[1] Participants self-certify eligibility by reporting the 200% or less FPG annual income requirements or selecting other qualified public assistance programs they participate in (categorical participation). They are required to recertify their eligibility every two years or, for those on fixed income, every four years. A small percentage of participants are subject to post-enrollment verification (PEV) of income or categorical participation and are selected monthly via the IOUs' probability models and random sampling. Participants whose monthly usage exceeds 400% of their baseline usage are "high-users" who must go through the PEV process, participate in ESA, and agree to monthly usage monitoring, or make an appeal to their IOU in an attempt to justify their high usage.

[2] Targeted heating measures: furnace replacement, repair, or tune-up. Targeted cooling measures: central AC (CAC), room AC, and evaporative cooler replacement, and CAC repair or tune-up. Targeted enclosure measures: attic insulation, caulking, glazing, weather-stripping, wall repairs, and door and window replacements and repairs.

[3] SAIDI is a measure of the average duration of electrical outages and SAIFI is a measure of the average frequency of electrical outages in an IOU's service territory.

1.2 Data Collection Methods and Sources

We used numerous sources and data collection methods to conduct the 2019 LINA and address the research objectives, including existing IOU customer and program data, customer survey data, ESA contractor in-depth interviews (IDIs), CARE capitation agency staff IDIs, and a brief literature review.

- The IOUs' customer, billing, service reliability, and program data were used to develop survey samples and in-depth interview (IDI) lists, calculate energy burden, and conduct select analyses.
- An omnibus customer survey designed to address multiple research objectives was conducted via web and phone survey modes in English and Spanish in March 2019 with 1,505 customers.
  - The survey averaged about 20 minutes to complete and included some common questions asked of all sampled customers about their characteristics and some customized questions asked only to customers in one of the sampled groups listed below.
  - The survey sample was stratified to include a sufficient number of low-income customers who:
    - Currently participate in CARE (current participants)
    - Previously participated in CARE but were removed or discontinued their participation (past participants)
    - Never participated in CARE but are income eligible (CARE-eligible nonparticipants) [4]
    - Participated in ESA and received one or more heating, cooling, and/or enclosure measures (ESA participants)
    - Use alternative fuels such as propane or wood/pellets for space heating, water heating, and/or cooking (alt-fuels customers) [5]
    - Live in areas with lower electric service reliability where more frequent and/or longer outages occur (low service reliability customers) [5]
- Individual IDIs with 12 ESA program supervisors and lead technicians (at least two in each IOU territory) were conducted in March 2019, averaged about 50 minutes, and included questions about the impacts of ESA measures on participants' health, comfort, and safety (HCS).
- Individual IDIs with staff at seven CARE capitation agencies (at least one in each IOU territory) were conducted in February 2018, averaged about 30 minutes, and included questions about CARE enrollment trends and barriers among their immigrant and non-English speaking customers.

[4] The surveyed CARE-eligible nonparticipants reported never previously participating in CARE and annual incomes of 200% or less of 2017 FPG. We limited the sample to nonparticipants living in areas of California with higher concentrations of eligible customers (Census tracts where 20% or more households earn 100% or less of FPG), which enabled us to obtain a sufficient number of survey respondents for high statistical confidence/precision. The results reflect the experiences of eligible nonparticipants in areas with high concentrations of eligible customers and others like them in the state and may potentially be found among the entire California population.

[5] Alt-fuels customers were identified from survey responses and low service reliability customers were identified with IOUs' electrical reliability (SAIDI/SAIFI) data, and both groups are a subset of the four surveyed CARE and ESA customer groups. Alt-fuels customers do not use natural gas and low service reliability is based on electrical usage so neither group includes SCG customers. Due to the sample design for these groups, those who responded to the survey may not represent all low-income alt-fuels customers and low service reliability customers in California but the results do reflect the experiences of those surveyed and others like them in the state. In addition, the sample sizes of both groups are large enough for high statistical confidence/precision at the state level, but the sizes of the subgroups by IOU territory or CARE/ESA participation are too small for conclusive statistical results.

- The qualitative review of 11 recent studies focused on trends in and barriers to immigrants' use of public assistance programs like CARE.

1.3 Research Objectives, Questions, Conclusions, and Recommendations

The 2019 LINA includes four primary areas of inquiry that were developed into four overarching research objectives. The first objective (RO.1), about the effectiveness of the CARE program, is divided into two sub-objectives: RO.1a focuses on CARE PE processes and RO.1b focuses on CARE marketing, education, and outreach (ME&O), particularly among immigrants. The second objective (RO.2) is about the effectiveness of ESA program heating, cooling, and enclosure measures at improving participants' health, comfort, and safety (HCS). The third and fourth research objectives (RO.3 and RO.4) focus on the energy burden and unique hardships of low-income alt-fuels customers and low service reliability customers, respectively.

1.3.1 RO.1a: Informing CARE Program Post-Enrollment (PE) Processes

For the first subobjective of RO1, we compared current (retained) and past (removed) CARE participants at each PE process – recertification, income verification, and high-user verification – using data from the customer survey and the IOUs to inform the effectiveness of CARE PE processes. See Chapter 3 for summary results and Appendix C in Volume 2 for detailed results.

RO.1a Research Questions and Answers

What are the differences in characteristics between current (retained) and past (removed) CARE participants?

Surveyed current CARE participants are reportedly more likely than surveyed past participants to have higher energy burdens and greater economic hardship, among other associated characteristics indicative greater need for CARE, suggesting the overall appropriateness of the PE processes.

To what extent do CARE PE processes remove ineligible participants and retain eligible participants?

CARE PE processes appear to be removing most of the participants who are ineligible for CARE:

- Among the surveyed current CARE participants, 13% were income-ineligible based on the household information they reported in the survey.
- The ineligible current participants are very similar to ineligible past participants in that both demonstrate lower burden/hardship and less need for CARE.

The PE processes do not appear to be retaining as many eligible participants as possible:

- Over half (54%) of the surveyed past participants removed from CARE were reportedly still income-eligible and possibly could have been retained.
- The eligible past participants are very similar to the eligible current participants in that both demonstrate higher burden/hardship and a greater need for CARE.

The eligible past participants most commonly reported being removed from CARE because it was inconvenient to (42%) or they didn't know how to (23%) complete the PE process.

About 20% or less also reported not knowing why they were removed (21%), experiencing issues with the PE process (8%), not knowing they were removed (8%), moving residences frequently (8%), having privacy concerns (4%), and not needing CARE any longer (3%).

Only about 2% of the past participants were flagged by their IOU as participating in the Family Electric Rate Assistance (FERA) program.

What are the key differences in eligibility and characteristics between current and past CARE participants at the different PE processes?

Among the surveyed current CARE participants, each of the PE processes are removing most of the ineligible participants:

- About 18% of those recently enrolled reported ineligible household information but this is reduced to about 10% among those who recently recertified. [6]
- About 10% of those who recently income verified and 6% of those who recently high-usage verified are reportedly income-ineligible. [7]

In contrast, among surveyed past participants, the PE process appear to be removing many who are eligible for CARE:

- About 70% of those removed at income verification, 55% removed at high-usage verification, and 44% removed at recertification are reportedly eligible for CARE and removed for reasons other than ineligibility (e.g. inconvenience, didn't know what to do, etc.).

Trends in current and past participants' characteristics support these findings.

- Those removed at recertification demonstrated burden and hardship lower than those retained and were more likely to report not knowing that they were removed or no longer needing CARE.
- In contrast, those removed at income verification demonstrated burden and hardship that is more similar to those who were retained and were more likely to report not knowing how to continue on CARE or having privacy concerns.

RO.1a Conclusions and Recommendations

CARE PE processes are removing most ineligible participants and are retaining most eligible participants overall. However, the PE processes are also removing many eligible participants, particularly the income verification and, to a lesser extent, the high-usage and recertification processes. The eligible past participants removed from CARE also demonstrate higher levels of burden and hardship similar to those who were retained and also reported being removed from CARE because it is an inconvenience or they don't know how to continue on CARE. Many of the past participants likely qualify for FERA but very few appear to be participating.

- **Recommendation 1a.1:** Consider updating the probability model used for selecting participants for income verification to reduce the number of potentially eligible participants who are selected (and then

[6] Recertification is required of all CARE participants every two years for most participants and every four years for participants on fixed income.

[7] Income verification is required of participants either randomly selected or selected via an IOU's probability model as likely to be income ineligible, which ranged from 2% to 5% of participants annually in 2018, and high usage verification is required of participants whose monthly electrical usage is greater than 400% of their baseline allowance, which ranged from 4% to 6% of participants annually in 2018.

removed). This could involve updating the inputs to the model and/or the algorithm(s) it uses with the inputs to identify likely ineligibles.

- **Recommendation 1a.2:** Consider revising or updating the advanced ME&O notifications informing CARE participants of an upcoming PE process to more effectively reach participants and address concerns reported by the past CARE participants recently removed due to a reason other than ineligibility (e.g., inconvenience, don't know what to do, don't know why removed, etc.), including informing them about reduced rates available via FERA as an alternative to CARE.

1.3.2 RO.1b: Informing CARE Marketing, Education, & Outreach (ME&O)

For the second subobjective of RO.1, we compared CARE-eligible nonparticipants with current CARE participants, including subgroups of immigrants and non-English speakers, using data from the customer survey and the IOUs to inform the effectiveness of CARE ME&O. [8] According to the IOUs' 2018 annual CARE reports, CARE penetration is about 90% of the CARE-eligible population in California, leaving about 10% who are eligible nonparticipants. The eligible nonparticipants living in the high poverty areas of the state comprise about 36% of the total eligible nonparticipant population (or about 3.6% of the total eligible population). See Chapter 4 for summary results and Appendix D in Volume 2 for detailed results.

RO.1b Research Questions and Answers

What are the differences in characteristics between current CARE participants and CARE-eligible nonparticipants?

Surveyed CARE-eligible nonparticipants reported greater energy burdens but fewer other associated hardships than corresponding surveyed current CARE participants, suggesting that the nonparticipants may have less need for CARE overall even though they are reportedly income-eligible.

What are barriers to CARE enrollments among CARE-eligible nonparticipants that can inform how ME&O can be more effective?

Surveyed CARE-eligible nonparticipants reported lack of awareness of CARE (62%) as the most common barrier to enrolling in CARE.

Among the eligible nonparticipants who reported awareness of CARE, the most common barriers to enrolling include an uncertainty over eligibility (38%), a perception that enrolling is an inconvenience (30%), a lack of knowledge about how to enroll (25%), and a lack of need for CARE (11%).

Not knowing how to apply for CARE was cited more by those eligible nonparticipants with lower annual incomes (vs. those with higher incomes).

[8] The surveyed CARE-eligible nonparticipants reported never previously participating in CARE and annual incomes of 200% or less of 2017 FPG. We limited the sample to nonparticipants living in areas of California with higher concentrations of eligible customers (Census tracts where 20% or more households earn 100% or less of FPG), which enabled us to obtain a sufficient number of survey respondents for high statistical confidence/precision. The results reflect the experiences of eligible nonparticipants in areas with high concentrations of eligible customers and others like them in the state and may potentially be found among the entire California population. In addition, for purposes of comparisons, we also limited the surveyed current participants to those only living in the same Census tracts as the surveyed nonparticipants.

How much does CARE maximize enrollments of low-income immigrant and non-English speaking customers?

About one-third of surveyed CARE-eligible nonparticipants reported a foreign-born household member (immigrant) or speaking a non-English language in the home, suggesting that CARE enrollments are not maximized among these subgroups. [9]

However, about one-third of current CARE participants also reported immigrant household members or speaking a non-English language, indicating that these subgroups are not underrepresented in CARE. [10]

In addition, comparisons between the nonparticipants and participants show that participants reported greater energy burdens, economic hardship, and other characteristics associated with higher burden and greater need for CARE, suggesting that immigrant and non-English speaking customers who likely most need CARE are participating.

What are barriers to CARE enrollments among CARE-eligible nonparticipant immigrants and non-English speaking customers that can inform how ME&O can be more effective?

Lack of awareness of CARE is also the greatest enrollment barrier reported by immigrant (70%) and non-English speaking (66%) CARE-eligible nonparticipants, even more than for nonparticipants without these subgroups (59%).

Among those who reported awareness of CARE, the most common barriers to enrolling include a perception that enrolling is an inconvenience (38%-39%), an uncertainty over eligibility (28%-38%), a lack of knowledge about how to enroll (23%-27%), and a lack of need for CARE (11%-17%). [11]

Interviewed CARE capitation agency staff also reported that the immigrants they serve faced few barriers to enrolling in CARE but acknowledged they don't see all the immigrants in their communities who may face enrollment barriers and that awareness of CARE and their services could be improved.

In addition, a review of studies about trends in immigrants' enrollments in public assistance programs indicate that the CARE program already includes many the practices that help facilitate enrollments, like providing materials in multiple languages, allowing categorical participation, and leveraging community organizations, but it is too soon for definitive evidence about whether immigrants' use of public assistance like CARE is on a long-term decline and what may be causing the decline (e.g., no trust vs. no need).

RO.1b Conclusions and Recommendations

CARE-eligible nonparticipants, including immigrants and non-English speakers, reported characteristics indicating less need for CARE as those currently participating but are reportedly income-eligible, and either are not aware of CARE or perceive that they are ineligible, enrolling is an inconvenience, or don't know how to enroll. CARE has not maximized enrollments among immigrants and non-English speakers, but these

[9] Based on survey responses, the CARE-eligible immigrant and non-English speaking nonparticipants are estimated to comprise about one-third of all the CARE-eligible nonparticipant customers in areas with high concentrations of eligible customers, about 11% of all CARE-eligible nonparticipants throughout the state, and about 1% of all CARE-eligible customers (participants and nonparticipants) in California.

[10] If immigrants and non-English speakers were underrepresented in CARE, the percentage of CARE participants who are immigrants would be much lower than the percentage of nonparticipants who are immigrants. We find very similar percentages between the groups, suggesting equal representation.

[11] The surveyed low-income immigrant and non-English speaking nonparticipants who reported being are aware of and interested in CARE are too small for conclusive statistical results. However, the results do reflect the experiences of those surveyed and others like them in the state and may potentially be found among the entire California population of the subgroups.

subgroups also do not appear to be underrepresented in CARE, and those who appear to need CARE most are currently participating. CARE capitation agencies also reported success in enrolling immigrant and non-English speaking subgroups in CARE but acknowledged that lack of awareness of the agencies and of CARE is a barrier.

If IOUs' prioritize increasing the CARE penetration rate above 90% through enrolling more nonparticipants, the following recommendations should be considered:

- **Recommendation 1b.1:** Consider revising and/or broadening existing ME&O strategies designed to increase awareness of CARE by, for example, using ME&O channels that have been underutilized or not utilized previously (e.g., text messaging, social media, media advertisements, etc.), including non-English languages spoken among different subgroups of customers that are not currently included in ME&O (if any), and/or expanding into areas where CARE has not previously been advertised (e.g., less in areas with concentrations of those on public assistance or fixed income and more in areas high concentrations of service, agricultural, and other low-wage employment; more in cooler climate zones, in the Desert/Mountain regions, and in areas with high concentrations of multifamily residences).
- **Recommendation 1b.2:** Consider revising ME&O to more effectively address the CARE-aware nonparticipants' reasons for not applying, like their uncertainty about their eligibility, lack of knowledge of how to apply for enrollment, and perception that applying is an inconvenience or too much trouble.
- **Recommendation 1b.3:** Consider expanding coordination with CARE capitation and similar agencies that provide services primarily to immigrant and non-English-speaking customers in an effort maximize enrollments and/or prevent attrition among CARE-eligible members of these subgroups.

1.3.3 RO.2: Examining ESA Program Health, Comfort, and Safety (HCS) Impacts

For the second research objective, we examined changes in HCS in the homes of recent ESA participants who received heating, cooling, and/or enclosure measures (targeted measures) using data from the customer survey, interviewed ESA contractor supervisors and lead installers, and the IOUs. See Chapter 5 for summary results and Appendix E in Volume 2 for detailed results.

What are ESA participants' perceptions of the non-energy HCS impacts of heating, cooling, and enclosure ESA measures and the conditions under which the measures provide more or less HCS impacts?

Surveyed ESA participants who received heating, cooling, and/or enclosure measure(s) reported improvements in the comfort of their home and, to lesser extent, in making their home a healthier and safer place to live.

- HCS improvements included reducing uncomfortably hot and cold temperatures, drafts, pests, and mold/mildew/fungus/moisture.

The greatest HCS impacts were reported by participants who received a cooling or heating measure in combination with enclosure measures.

- The greatest HCS impacts from single measures were reported by participants who received central ACs and evaporative coolers, followed by enclosure measures, then furnaces and room/window ACs.
- ESA participants also rated their home's overall HCS as better (or higher) than nonparticipants' ratings of their homes' HCS.

Surveyed participants who recalled receiving HCS advice from their ESA contractors reported the greatest HCS improvements, suggesting the importance of the ESA energy education.

- In addition, other conditions that reportedly lead to more or less HCS impacts varied across the HCS issues but include climate zone, housing type, household composition, and retirement status.

What are ESA contractors' perceptions of the non-energy HCS impacts of heating, cooling, and enclosure ESA measures and the conditions under which the measures provide more or less HCS impacts?

Interviewed ESA contractors' perceptions of HCS impacts were largely consistent with surveyed participants' perceptions.

- They reported HCS improvements in many of the participants' homes they serviced with the targeted measures, mentioned that cooling measures likely had the greatest impacts, followed by enclosure measures, and then the heating measures, and conveyed that the comfort of participants' homes was often the most improved, followed by safety and health.

Interviewed ESA contractors reported HCS impacts are often greatest in homes with elderly, disabled, or very young household members, and can vary by measure type, climate zone, and housing characteristics.

The ESA contractors also mentioned that rental homes, particularly multifamily units, where landlords will not sign installation waivers and homes without heating or cooling equipment or that are otherwise infeasible to service are not very common but often need HCS improvements that they are unable to receive.

The contractors could not identify any measures that could be cost-effective substitutes of the targeted measures and still deliver similar HCS impacts.

RO.2 Conclusions and Recommendations

The ESA heating, cooling, and enclosure measures appear to be delivering HCS improvements in participants' homes. The greatest HCS impacts are perceived by participants who received a combination of measures, followed by central ACs and evaporative coolers, then by enclosure measures, then furnaces and, lastly, room/window ACs. The targeted measures deliver the greatest improvements for participants who recalled receiving the energy education as part of their participation and who have household members who tend to be home more often (retirees) and/or who tend to have the greatest need for HCS benefits, like the elderly, disabled, and young children. Challenges to making HCS improvements are greatest in rental units where landlords will not permit installation of equipment and in other infeasible homes.

- **Recommendation 2.1:** Continue offering all the ESA heating, cooling, and enclosure measures in eligible homes and consider changing measure eligibility if there are restrictions by climate zone, housing type, or other characteristics not related to equipment safety or cost effectiveness requirements to ensure that customers who would greatly benefit from the targeted measures, and potential HCS improvements, are eligible to receive them.

- **Recommendation 2.2:** Consider implementing ME&O that will provide a follow-up energy education to participants a few weeks after they receive heating, cooling, or enclosure measures to increase awareness and persistence of HCS and other benefits. Examples include a direct mailer, an email, an onsite check-up from the ESA contractor, and/or a dedicated website or toll-free number.

- **Recommendation 2.3:** Consider increasing coordination efforts with landlords of rental units, particularly but not exclusively in multifamily buildings, to address their concerns about installing

equipment in their units. This could involve in-person consultations, ME&O addressing their concerns about split incentives and other issues related to upgrading equipment, and/or connecting nonparticipant landlords with participant landlords in their area.

1.3.4 Research Objective 3: Assessing Alternative Fuels Customers' Hardships

For the third objective, we assessed the burdens and unique hardships of low-income PG&E, SCE, and SDG&E alt-fuels customers, in comparison to non-alt-fuels customers, using data from the customer survey and IOUs.[12] See Chapter 6 for summary results and Appendix F in Volume 2 for detailed results.

What are the energy burdens, unique hardships, and key characteristics of alt-fuel customers compared to non-alt-fuels customers and how do alt-fuel customers' energy burdens and hardships vary by key characteristics and drivers?

Energy burden is higher for surveyed alt-fuels customers (8.7%) than for non-alt-fuels customers (5.5%) when it accounts for alt-fuels customers' self-reported annual alt-fuels costs.

Alt-fuels customers appear uniquely burdened by the costs of alt-fuels because their energy burden that accounts for only electricity costs (5.1%) is slightly lower than that of non-alt-fuels customers (5.5%).

Alt-fuels customers also reported greater economic and health hardships and other associated characteristics than non-alt-fuels customers.

How do alt-fuel customers' energy burdens and hardships vary by key characteristics and drivers?

The primary, unique drivers of alt-fuels customers' higher burden and hardships are living in the Central Valley region (vs. other regions), lower education, renting (vs. owning), and/or living in a manufactured/mobile home (vs. other housing types).

- Other drivers of burden and hardship, like being on fixed-income or public assistance, are similar between alt-fuels and non-alt-fuels customers.

In addition, the type of alt-fuel also has an impact:

- propane using alt-fuel customers reported greater burden and hardships than wood/pellets users and appear to be uniquely burdened by not having access to natural gas or electricity-using equipment since most reported this as the reason for why they use propane.

To what extent do CARE and ESA programs mitigate alt-fuel customers' energy burden and hardships?

Available evidence suggests that, among surveyed alt-fuels customers, those who have the greatest burdens and hardships have been participating in CARE, ESA, and/or IOUs' other energy assistance or efficiency programs compared to those with lower burden and hardships.

[12] Due to the sample design for this study, the surveyed low-income alt-fuels customers may not be representative of all such customers in the state and the sample sizes for the surveyed alt-fuels subgroups of CARE and ESA participants are too small for conclusive statistical results. However, the results do reflect the experiences of those surveyed and others like them in the state and may potentially be found among the entire California population of the groups.

In addition, trends in CARE and ESA program impacts among alt-fuels participants are similar to those for non-alt-fuels participants, suggesting that both groups receive benefits from participation.

- The benefits of CARE and ESA participation are slightly less than for non-alt-fuels customers because alt-fuels ESA participants' equipment that use alt-fuels is not eligible for ESA upgrades and alt-fuels CARE participants do not receive discounts on the costs of alt-fuels.

RO.3 Conclusions and Recommendations

The following conclusions and recommendations apply to the surveyed alt-fuels customers and others in California who are similar to those surveyed.

The surveyed alt-fuels customers have greater energy burden and other hardships than the surveyed non-alt-fuels customers, in part due to the higher costs of alt-fuels and lack of availability or uptake of less expensive options like natural gas service or possibly electricity-using equipment. Surveyed alt-fuels customers who reported the greatest need for CARE and ESA appear to be participating or have participated in the programs and the programs' benefits seem slightly less for alt-fuels than non-alt-fuels participants because alt-fuels are not discounted by CARE and alt-fuels-using equipment is ineligible for ESA upgrades.

- **Recommendation 3.1:** Consider providing unique ME&O to alt-fuels customers, particularly propane users, to inform them of options to switch to natural gas, electricity-using equipment, or other possible alternatives to help reduce their reliance on alt-fuels. This could be done through the CARE and ESA programs and through targeting ME&O in areas in California with high concentrations of alt-fuels customers (available via the American Community Survey).
- **Recommendation 3.2:** Continue monitoring alt-fuels customers' characteristics via ongoing research efforts, such as the Residential Appliance Saturation Study and other planned IOU and CPUC studies that provide opportunities to include alt-fuels customers, as well as monitoring their program participation in ESA and, to the extent possible, in CARE for whether there is differential participation based on alt-fuel usage.

1.3.5 RO.4: Assessing Low Service Reliability Customers' Hardships

For the fourth and final objective, we assessed the burdens and unique hardships of low-income PG&E, SCE, and SDG&E customers who live low electrical service reliability areas in California, in comparison to those who live in higher service reliability areas, using data from the customer survey and IOUs. [13] See Chapter 7 for summary results and Appendix G in Volume 2 for detailed results.

What are the energy burdens, unique hardships, and key characteristics of low service reliability customers compared to high service reliability customers?

Energy burden is higher for surveyed low service reliability customers (6.6%) than for high service reliability customers (5.3%).

[13] Due to the sample design for this study, the surveyed low-income customers who live in low service reliability areas may not be representative of all such customers in the state and the sample sizes for the surveyed low service reliability subgroups of CARE and ESA participants are too small for conclusive statistical results. However, the results do reflect the experiences of those surveyed and others like them in the state and may potentially be found among the entire California population of the groups.

Low service reliability customers reported few other hardships or associated characteristics compared to high service reliability customers, indicating that the groups are mostly similar on average.

How do low service reliability customers' energy burdens and hardships vary by key characteristics and drivers?

The primary, unique drivers of low service reliability customers' higher burden are non-white race/ethnicity, senior household members, smaller household sizes, and living in a manufactured/mobile home (vs. other housing types).

- Other drivers of burden and hardship, like being on fixed-income or public assistance, are similar between low and high service reliability customers.

In addition, low service reliability customers reported experiencing more outages but of shorter duration, on average, compared to high service reliability customers, and also reported that outages they experienced tend to cause more difficulty for their households compared to high service reliability customers.

To what extent do CARE and ESA programs mitigate low service reliability customers' energy burden and hardships?

Available evidence suggests that, among surveyed low service reliability customers, those who have the greatest burdens and hardships have been participating in CARE and/or ESA compared to those with lower burden and hardships.

In addition, trends in CARE and ESA program impacts among low service reliability participants are similar to those for high service reliability participants, suggesting that both groups receive similar benefits from participation.

RO.4 Conclusions and Recommendations

The following key findings and recommendations apply to the surveyed low service reliability customers and others in California who are similar to those surveyed.

Surveyed low service reliability customers have greater energy burden and electrical outages cause them more difficulty compared to high service reliability customers. However, there are few other differences between surveyed low and high service reliability customers, suggesting that low service reliability has little to no effect on customers' burdens and hardships. Available evidence also suggests that surveyed low service reliability customers who reported the greatest need for CARE and ESA are participating or have participated in the programs and that trends in the programs' impacts are similar for low and high service reliability customers

- **Recommendation 4.1:** Consider using SAIDI/SAIFI data to monitor CARE and ESA penetration rates in low and high service reliability areas for whether there is differential participation based on service reliability and to monitor energy usage patterns and bill amounts of low service reliability program participants relative to high service reliability participants to measure potential program impacts.