

Who's Participating and Who's Not? The Unintended Consequences of Untargeted Programs

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ABSTRACT

This paper reports findings from a recently completed meta-study of 66 California program evaluations and market studies. This study is the first of its kind: it reviews all published data from California residential investor owned utility programs for an entire program cycle (2010-2012) and uses these data to compare the demographic characteristics of program participants and non-participants.

The study demonstrates how “untargeted” energy efficiency programs, those offered to everyone and designed for no group in particular, resulted in a participant population that was not representative of the general population. The study identifies underserved demographic segments for each program type by comparing participants to the general population.

Examples from California’s “targeted” programs (open to all but designed to facilitate participation by a specific population) and “tagged” programs (which restrict participation based on participant characteristics) bring these results into sharp relief. They demonstrate the substantial impact of program design elements like outreach approach and buy-in cost (the amount a household is required to spend in order to participate) on participant demographics. The paper also assesses the current state of demographic data collection, publication, and analysis in California and makes specific recommendations for improvement.

Introduction

This paper reports findings from a recently completed meta-study of 66 California residential program evaluations and market studies, which includes every residential program evaluation published during the 2010-2012 program cycle. The study focuses on California’s “general population” energy efficiency programs, in which participation was open to all ratepayers .

Below we compare the demographic characteristics of program participants to the general population for four types of general population programs: whole-home retrofits, plug load and appliances, online and paper home energy audits, and refrigerator recycling. We show how these “untargeted” programs, offered to everyone and designed for no group in particular, resulted in a participant population that was not representative of the general population.

We then show the substantial impact of program design on participant demographics by contrasting the characteristics of participants in general population programs with those in programs that were either “targeted” (open to all but designed to facilitate participation by a specific population) or “tagged” (in which participation was restricted based on participant characteristics).

Methodology

The study methodology was rigorous and systematic in both the process used to develop the sample frame and then to identify, extract, and aggregate demographic data from the evaluation reports.

The sample frame was created using a search of the online California Measurement Advisory Council (CALMAC) database, applying the filters: Publication type = energy efficiency; Categories = impact evaluation, market effects, process evaluation, program design; Sectors = residential; and Program years = 2010 to 2012. We also included a portfolio evaluation covering a similar period (2011-2013) published by the Los Angeles Department of Water and Power (LADWP). We chose the 2010-2012 program period because, when this study began in early 2015, it was the most recent period for which evaluation reporting was complete.

The CALMAC search (plus the LADWP study) resulted in a sample frame of 66 evaluation studies, from which we excluded 33 studies because they did not have residential participants (for example, a study of emerging technology or code development). This left a sample of 33 studies or 42 program evaluations, as some studies included evaluations of multiple programs.

Data Extraction and Aggregation

A Microsoft (MS) Excel worksheet served as the “database” for this project. An export of the search results from CALMAC created a pre-populated worksheet with all study-identifying information.

For each study in the sample, we followed a protocol to search for and extract participant demographic data. These steps included: downloading the study document, verifying that the CALMAC ID number or other identifying information in the study document matched the data in the MS Excel spreadsheet, reviewing the Table of Contents to identify sections, tables, and figures with participant demographic data, reading the methodology section to identify if participant data were collected, reading the Executive Summary to find references to participant data, reading any findings related to participant data, and performing keyword searches for “demographic,” “income,” “education,” and “home ownership.”

All participant characteristics reported in the studies were captured in the MS Excel workbook. Characteristics of participants’ homes were also captured, when available, including home size, age, and type. General population data were entered into the data set from the U.S. Census Bureau’s American Community Survey (ACS) (ACS 2013) and the California Residential Appliance Saturation Study (RASS) (KEMA 2010).

After data entry was complete, each of the authors verified the others’ entries. Data were then aggregated by program type (for example, whole-home retrofit). When there was more than one source for a variable (for example, proportion of participants in whole-home retrofit programs with incomes over \$100,000), data were averaged. No attempt to weight the data was made, given the many differences between data collection approaches taken by each study.

The State of Demographic Data Collection and Publication

While a majority of program evaluations in this study (69%) collected at least one participant demographic variable, that number drops precipitously when examining the

proportion of studies that published those data, compared participant data to a general population baseline, or used demographic data to assess program performance (Table 1).

Table 1. Collection, publication, and analysis of demographic data in California residential program evaluations, 2010-2012

Evaluations . . .	Number of evaluations	Percent of total studies (42)	Percent of studies that collected demographic data (29)
With residential participants	42		
Collected participant demographic data	29	69%	
Published demographic data	20	48%	69%
Included demographic findings/summaries in the report	16	38%	55%
Provided an analysis of program performance incorporating participant demographics	7	17%	24%
Made program design recommendations based on demographic findings	7	17%	24%
Collected and published comparison population data (i.e. U.S. Census)	6	14%	21%
Made program design recommendations based on comparison data	1	2%	3%

The rate of collection and publication of demographic data varied by program type, with the greatest deficit among home energy report and lighting program evaluations. Few evaluations of these programs collected, and none of the reports published, data on participant characteristics (Table 2).

Table 2. Collection and publication of participant demographic data in California residential program evaluations, by program type, 2010-2012

Program Type	Total number of studies with residential participants	Number of studies that . . .	
		Collected demographic data	Published demographic data
Whole-home retrofit	8	7	5
Lighting	5	2	0
HVAC	4	3	1
Plug load/Appliances	8	6	3
Appliance recycling	5	5	4
Home energy reports	7	1	0

The rate of collection of the different types of demographic information also varied considerably. Among household characteristics, income and education were the most frequently collected (86% of studies that collected demographic data). Primary language spoken was the least frequently collected (21% of studies that collected demographic data) (Table 3).

Table 3. Collection and publication of participant demographic data in California residential program evaluations, by variable type, 2010-2012

Variable type	Number of studies for which demographic data was . . .	
	Collected (Percent of 29 studies that collected demo. data)	Published (Percent of studies that collected the variable)
Household income	25 (86%)	16 (64%)
Educational attainment	25 (86%)	14 (56%)
Home ownership	19 (66%)	8 (42%)
Age	19 (66%)	7 (37%)
Race/ethnicity	16 (55%)	9 (56%)
Primary language spoken	6 (21%)	3 (50%)

Challenges Impairing the Use of Demographic Data in California Program Evaluations

Despite the considerable number of evaluations that collected and published demographic data, two challenges impaired their utility: the lack of tabular data in evaluation reports and the lack of standardization in response types.

Several studies published demographic data but did not include those data in tabular form. Some studies referenced select demographic findings in the narrative discussion (for example, the proportion of white participants, but not the proportion of respondents of other race/ethnicities) (Cadmus 2013a). One study included demographic data in figures only, which did not include numerical data labels (DNVGL 2014a).

The lack of standardized response types made the data difficult to aggregate and to compare to general population data. For example, only five of the 16 studies that published income data included incremental data for households earning less than \$50,000. Another five studies published only scant income data (for example, median income, or percent of participants with income below and above \$100,000).

The collection of race/ethnicity data was also quite variable. The category “Hispanic,” for example, is typically used to describe Spanish speakers, who may identify with other racial categories like white, African American, mixed race, etc. However, some studies required respondents to select a single race or ethnicity from a list that included Hispanic as well as other response options (SBW 2012). Other studies provided respondents a single list and allowed for multiple responses (Evergreen 2012a). Still others asked for race/ethnicity in two separate questions, one of which included response options like “Caucasian” or “Asian” and a second that asked, for example, “Are you Spanish, Hispanic, or Latino?” (NMR 2015).

Given this study’s focus on participant demographic characteristics, it is important to make one additional comment regarding the collection of participant data. Some studies noted they collected data from only, or primarily, English speakers. In one study, for example, the authors noted they performed 6% of participant surveys in Spanish and none in Asian languages, despite the fact that Spanish and Asian language speakers made up 36% and 28% of participants, respectively. The same authors, in their evaluation of an in-language outreach program that provided all of its services to non-English speakers, noted that all participant surveys were conducted in English due to “evaluation budget constraints” (Evergreen 2012a).

Use of Demographic Data in Analysis of Program Performance

Seven program evaluations that collected participant demographic data used those data to assess program performance (17% of all evaluations, 24% of evaluations that collected demographic data). These studies incorporated participant demographics into their process or impact analyses. Examples of their findings include: When funding from the American Recovery and Reinvestment Act was not available, participants were more likely to live on the Pacific coast (DNVGL 2014b); The utility’s residential portfolio was providing good “coverage” to households at all income levels and in all geographies (Evergreen 2012b); The amount of rebates a participant received “increases slightly with income” (Evergreen 2012a); “The PG&E rebate is more influential with moderate income customers” (SBW 2013b).

Seven studies (17% of all evaluations, 24% of evaluations that collected demographic data) made specific, actionable program design recommendations based on findings related to participant characteristics. Examples include: Maintain a focus on outreach to Hispanic communities (RIA 2012b); Target moderate income customers because the utility incentive is more influential and will result in higher net savings for the utility and offer financing to help attract these customers (SBW 2013a); Refocus the program on inland areas and scale financial incentives and financing to a household’s available capital in order to increase net savings and target middle-income households with lower price-point products (DNVGL 2014b); Determine if English-language forms are a barrier, as most participants’ primary language is not English (Cadmus 2013b).

General Population Program Findings

By definition, one would expect the characteristics of participants in a general population program to mirror the general population. In fact, the findings show that identifiable demographic segments of California ratepayers were consistently underrepresented in general population programs. They included households that were non-white, lower- and middle-income, non-college educated, or non-English-speaking. Nor were these underrepresented households served by California’s low-income programs. Some had incomes too high to qualify for low-income programs. Others likely would have qualified, yet participated in general population programs in surprising numbers, suggesting their efficiency needs were not being met by low-income programs.

Overview of Participant Demographic Findings by Program Type

On the whole, participants in two of the biggest residential programs (by authorized budget), whole-home retrofit (\$100 million budget) and plug load and appliance incentive programs (\$141 million budget) were more likely than the comparable general population to be white, English speakers, homeowners, have incomes over \$100,000, or have a college degree. Participants in programs providing online and paper energy audits (\$32 million budget) were marginally more likely to have higher household incomes or a college degree, and were more likely to be white or a homeowner. Participants in refrigerator recycling programs (\$68 million budget) were more likely than the comparable general population to have very low incomes or be homeowners, and marginally more likely to have a college degree. Data on the proportion of

refrigerator recycling participants who self-identified as white varied greatly between the two studies that captured this variable, thus no conclusions can be drawn.

Whole-home Retrofit Programs

Whole-home retrofit programs were operated by all the investor owned utilities (IOUs) during the 2010-2012 program cycle: Pacific Gas & Electric (PG&E), Southern California Edison (SCE), SoCalGas (SCG), and San Diego Gas & Electric (SDG&E). Four studies collected and published participant demographic data (DNVGL 2014b, DNVGL 2014c, SBW 2012, SBW 2013b). Participants differed substantially from the comparable general population on most characteristics. They were disproportionately high-income, college-educated, white, lived in 3-4-bedroom homes, or homes built before 1970. The proportion of participants with children in the home was similar to RASS single-family homeowners (Table 4).

Table 4. Characteristics of California whole-home retrofit participants, compared to the general population, 2010-2012

Variable		Percent of . . .		
		Participants, all IOUs	ACS, California	RASS, single-family homeowners, all IOUs
Income	Less than \$50,000	14% ¹	44%	26%
	More than \$100,000	53% ²	28%	33%
Educational attainment	No college degree	25% ²	61%	39%
	College degree or more	74% ³	39%	57%
Race/ ethnicity	White	72% ⁴	39%	58%
	Hispanic	9% ⁴	38%	16%
	Asian	9% ⁵	13%	13%
	African American	Unknown	Unknown	2%
Primary language	English	Unknown	56%	84%
Household	Children in the home	39% ⁴	32%	42%
Home characteristics	3-4 bedrooms	80% ⁶	50%	76%
	Built before 1970	61% ⁷	43%	44%

Sources: ¹SBW 2012, SBW 2013b, DNVGL 2014c; ²SBW 2012, SBW 2013b, DNVGL 2014b, DNVGL 2014c; ³SBW 2012, DNVGL 2014b, DNVGL 2014c; ⁴SBW 2013a, SBW 2013b; ⁵SBW 2012; ⁶DNVGL 2014b; ⁷SBW 2012, SBW 2013b, DNVGL 2014b

Plug Load and Appliance Programs

Plug load and appliance programs were operated by all IOUs and LADWP during the 2010-2012 program cycle. They included three types of programs: appliance incentive programs, a set-top box pilot program, and a midstream consumer electronics program. Only the appliance program evaluations collected and published demographic data (the set-top box pilot evaluation included only educational attainment and number of residents per household).

The IOUs' appliance program, operated as the "Home Energy Efficiency Retrofit (HEER)" program, paid end-user incentives on a variety of appliances, heating and cooling equipment, and pool pumps. However, the program was dominated by three appliance products.

In PG&E territory, 94% of rebates were paid on clothes washers (64%) or dishwashers (30%). In SCE territory, 94% of rebates were paid on refrigerators (89%) or pool pumps (6%) (RIA 2012a).

LADWP’s program, the “Consumer Rebate Program,” paid end-user incentives on refrigerators, pool pumps, and a variety of home heating and cooling products. Like SCE, LADWP’s program was dominated by refrigerators and pool pumps, which accounted for 66% and 19% of rebates, respectively.

Two studies collected and published participant demographic data on the utilities’ appliance programs (RIA 2012b and Navigant 2015). The former, the IOU program process evaluation, included data from a general population study conducted in the same period which includes an ideal, but small, comparison population: respondents who purchased an appliance of the type included in the utility program (for example, a refrigerator) in the previous two years, but *did not purchase* and *were not “seeking”* an Energy Star product (the efficiency criteria of the IOU program).

As in whole-home retrofit programs, appliance program participants differed substantially from the comparable general population and non-participants on most characteristics. Participants were much more likely to be homeowners than the comparable PG&E, SCE, and LADWP utility populations. Like whole-home participants, appliance program participants were disproportionately high-income and college-educated. The two studies did not collect data on participants’ race/ethnicity, language, or housing characteristics (Table 5).

Table 5. Characteristics of California appliance program participants, compared to the general population and a comparable non-participant population, 2010-2012

Variable		Percent of . . .			
		Participants, PG&E, SCE, LADWP ¹	RASS, all respondents PG&E, SCE, LADWP	RASS, homeowners, PG&E, SCE, LADWP	Non-participants who purchased a non-qualifying appliance, PG&E, SCE ³
Home ownership	Own	95%	69%	n/a	55%
Income	Less than \$50,000	17%	38%	28%	58%
	More than \$100,000	48%	25%	30%	18%
Educational attainment	No college degree	14% ²	43%	37%	34%
	College degree or more	87% ²	51%	57%	51%
Race/ ethnicity	White	Unknown	57%	60%	58%
	Hispanic	Unknown	12%	10%	Unknown
	Asian	Unknown	14%	15%	Unknown
	African American	Unknown	4%	2%	5%
Home characteristics	Single family	83% ⁴	59%	74%	Unknown

Sources: ¹RIA 2012b and Navigant 2015, except as noted; ²RIA 2012b; ³RIA 2012a; ⁴Navigant 2015

Online/paper Energy Audits

Virtual home energy audits were offered by PG&E, SCE, and SDG&E under the statewide “Home Energy Efficiency Survey (HEES)” program, which was initiated during the 2010-2012 program cycle. PG&E and SDG&E offered only online audits; SCE offered audits

online, by mail, by phone, and onsite, with 98% of audits taking place by mail (59%) or online (39%) (Itron 2013).

Two studies collected and published participant demographics (Itron 2013 and Cadmus 2014). Not surprisingly, participants were more likely to be homeowners. Among all utility participants, 94% were homeowners (Itron 2013), compared to 69% of utility customers (KEMA 2010).

Several demographic characteristics are available for SCE participants. Like whole-home retrofit and appliance programs, SCE audit participants were more likely than the comparable population to be white or to live in single-family homes. But unlike retrofit and appliance participants, SCE participants were similar to the general population in income, educational attainment, and proportion of Hispanic participants, and also included a proportion of low-income households that slightly exceeded the general population (Table 6).

Table 6. Characteristics of California online/mail energy audit program participants, compared to the general population, 2010-2012

Variable		Percent of...			
		Participants, SCE ¹	RASS, single-family home-owners, SCE	Participants, PG&E, SCE, SDG&E ²	RASS, single-family homeowners, PG&E, SCE, SDG&E
Income	Less than \$50,000	31%	29%	Unknown	27%
	More than \$150,000	20%	15%	Unknown	15%
Educational attainment*	No college degree	40%	43%	42%	40%
	College degree or more	60%	53%	58%	55%
Race/ ethnicity	White	74%	53%	Unknown	60%
	Hispanic	21%	22%	Unknown	15%
	Asian	Unknown	11%	Unknown	11%
	African American	Unknown	3%	Unknown	2%
Primary language	English	74%	83%	Unknown	85%
Home characteristics	Single-family home	86%	--	90%	--
	3-4 bedrooms	70%	74%	Unknown	75%
	Built before 1970	29%	47%	Unknown	43%
	Built 1970-2000	31%	38%	Unknown	42%
	Built after 2000	22%	11%	Unknown	11%

Sources: ¹Cadmus 2014; ² Itron 2013

Refrigerator Recycling

Refrigerator recycling programs were offered by all IOUs and LADWP. Four evaluation studies collected and published participant demographic data (Cadmus 2013a, DNVGL 2014a, Innovologie 2013, and Navigant 2015).

Recycling program participants appeared quite similar to the comparable general population, with a few exceptions. As in retrofit, appliance, and audit programs, participants were more likely to be homeowners (83% compared to 69% of utility customers) (Cadmus 2013a and DNVGL 2014a). In terms of income, recycling participants were more similar to audit participants, in that low-income households represented a larger share of the participant population than in the comparable general population.

Race and ethnicity data for white participants varied considerable between the two studies that collected it and no conclusions can be drawn. The one study that published data on Hispanic, Asian, and African American participants, however, showed the recycling program to be the only utility program type in which non-white households participated at rates even approaching those at which they appear in the general population (Table 7).

Table 7. Characteristics of California refrigerator recycling program participants, compared to the general population, 2010-2012

Variable		Percent of . . .			
		Participants, PG&E, SCE, SDG&E	RASS, homeowners, PG&E, SCE, SDG&E	Participants, PG&E, SCE, SDG&E, LADWP ⁴	RASS, homeowners, PG&E, SCE, SDG&E, LADWP
Income	Less than \$50,000	Unknown	30%	34%	30%
	More than \$100,000	Unknown	28%	29%	28%
Educational attainment*	No college degree	44% ¹	41%	Unknown	
	College degree or more	54% ¹	55%	Unknown	
Race/ ethnicity	White	59% ² 77% ³	61%	Unknown	
	Hispanic	14% ²	14%	Unknown	
	Asian	6% ²	11%	Unknown	
	African American	4% ²	2%	Unknown	
Primary language	English	94% ³	85%	Unknown	
Household	Children in the home	31% ³	37%	Unknown	
Home characteristics	Single-family home	79% ¹	74%	Unknown	
	Built before 1970	47% ³	39%	Unknown	

Sources: ¹Cadmus 2013a and DNVGL 2014a; ²DNVGL 2014a; ³Cadmus 2013a; ⁴Cadmus 2013a, Innovologie 2013, DNVGL 2014a, Navigant 2015.

Targeted and Tagged Program Findings

A social program is *targeted* when it is designed to facilitate participation by a specific population, but does not restrict participation to that population. *Tagged* programs, in contrast, restrict participation based on participant characteristics (Alcott 2015). In energy efficiency, low-income programs are the most widely known example of a tagged program.

The programs described above were neither targeted nor tagged. Participation was open to any ratepayer and the program designs were not intended to engage participants with any particular demographic characteristics.

Some California energy efficiency programs, however, *were* targeted or tagged. These included in-language outreach and education programs (targeted) and mobile and manufactured home direct install programs (tagged). These targeted and tagged programs, as well as a refrigerator recycling pilot program, demonstrate the substantial impact of program design on participant demographics. And they bring into sharp relief the unintended consequences of untargeted programs.

California’s in-language information programs show the impact of outreach method on participant characteristics. These targeted programs provided free energy efficiency education in participants’ native language (primarily Asian languages), were advertised in in-language publications, and conducted at venues in the language-speakers’ neighborhoods. They were successful in engaging their desired audiences as almost none of the participants in these programs were primarily English speakers. They were, however, homeowners (68%) with low incomes (73% had incomes under \$50,000) (Cadmus 2013b).

Direct install programs for manufactured and mobile home residents show how targeting a particular housing type is one way to engage participants with shared demographic characteristics. While available to any ratepayer living in a manufactured or mobile home, these programs served a participant population that differed substantially from participants in the four general population programs. Nearly 90% had low incomes and 56% had very low incomes, few had a college degree, and they were predominantly white with a large minority of American Indians (Table 8).

Table 8. Characteristics of California participants in targeted and tagged programs, compared to participants in general population programs and the general population, 2010-2012

Variable		Percent of program participants in . . .				Percent of . . .
		In-language education ¹	Manufact’d and mobile home direct install ³	Whole-home retrofit	Plug load and appliances	ACS, California
Home ownership	Own	68%	Unknown	Unknown	95%	54%
Income	Less than \$20,000	39%	56% ⁴	Unknown	6% ⁵	12-22% ⁶
	Less than \$50,000	73%	87%	14%	17%	44%
	More than \$100,000	10%	Unknown	53%	48%	28%
Educational attainment*	No college degree	45%	Unknown	25%	14%	61%
	College degree or more	56%	11%	74%	87%	39%
Race/ ethnicity	White	0% ²	94%	72%	Unknown	39%
	Hispanic	11% ²	Unknown	9%	Unknown	38%
	Asian	82% ²	3%	9%	Unknown	13%
	African American	Unknown	1%	Unknown	Unknown	6%
	American Indian	Unknown	6%	Unknown	Unknown	1%
Primary language	English	3%	Unknown	Unknown	Unknown	56%
	Spanish	2%	Unknown	Unknown	Unknown	29%
	Asian language	94%	Unknown	Unknown	Unknown	10%
Household	Homeowners	68%	Unknown	100%	95%	54%
	Children in the home	Unknown	29%	39%	Unknown	32%
Home characteristics	Single-family home	69%	n/a	100%	83%	58%
	3-4 bedrooms	69%	Unknown	80%	Unknown	50%
	Built before 1970	47%	Unknown	61%	Unknown	43%

Sources: ¹Cadmus 2013b, except as noted; ²Evergreen 2012a; ³Evergreen 2012b except as noted; ⁴Cadmus 2013c, Evergreen 2012b; ⁵RIA 2012b; ⁶Precise figure not known due to ACS category reporting, lower figure is households with income under \$15,000, higher figure is households with income under \$25,000.

A small refrigerator recycling pilot points to the potential impact of implementation channel on participant characteristics. In this experimentally designed pilot, recycling was offered by both the utility and big-box retailers. Participants who recycled a refrigerator with a retailer had higher incomes and larger homes than those who recycled through the utility. The

refrigerators they recycled were different too – they were larger, newer, and more likely to be side-by-side units (Innovologie 2013).

In all these program examples, it is interesting to note that participant characteristics correlate with a program’s “buy-in” – the amount a household is required to spend in order to participate. Programs with a high buy-in were more likely to have participants with high incomes, high educational attainment, who were white, or English speakers. Programs with no buy-in, or even with a negative buy-in (the program paid an incentive or provided a service without requiring any spend at all) were more likely to have participants with low or middle incomes or a larger proportion of non-white participants (Table 9).

Table 9. Participant characteristics by program “buy-in” for California residential programs, 2010-2012

Program “buy-in”	Program types	Participants more likely to be . . .
High <ul style="list-style-type: none"> • \$600 for least expensive Energy Star appliance • \$6,000 for average home retrofit 	Plug load and appliance incentives Whole-home retrofit	Upper-income (over \$100,000) College educated White Homeowners English speakers
	In-language educational programs	Low income Non-white Non-English speakers
Neutral <ul style="list-style-type: none"> • No out-of-pocket financial cost • Participation requires time commitment 	Online and paper energy audits	White English speakers
	Refrigerator recycling	Lower income College educated Homeowners English speakers
Negative <ul style="list-style-type: none"> • No out-of-pocket financial cost • Participants receive a cash incentive, measure installation, other direct service 	Manufactured/mobile home direct install	Very low income High-school degree or less White

Conclusions

This first-of-its kind study reveals both deficits and opportunities in the current state of energy efficiency program design and evaluation. Certainly, there is room for improvement in the collection, publication, and use in analysis of participant demographic data. Most importantly, the study demonstrates how untargeted energy efficiency programs, those offered to everyone and designed for no one in particular, result in a participant population that is not representative of the general population. Untargeted programs leave several identifiable groups underserved, including households that are non-white, lower- and middle-income, not college-educated, or non-English speaking.

Although this study did not seek to quantify the savings potential from engaging these populations, the size of their underrepresentation in some programs is substantial. Reaching them holds both the potential for energy savings and the opportunity to improve social equity in California’s general population energy efficiency programs.

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