BayREN

Single Family Moderate Income

Market Characterization Study

Grounded Research and Consulting, LLC

Final Report

CALMAC Study ID BAR0002.01

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Acknowledgements

The information in this report relies on many people providing their time to help us understand their viewpoints on energy use. We thank all BayREN members, PG&E staff, CPUC staff, and residential customers who provided us with invaluable data.

We especially acknowledge Natalie De Leon (Santa Clara County) and Jenny Berg (ABAG/MTC) for their guidance throughout our research.

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EXECUTIVE SUMMARY

Executive Summary

BayREN provides energy efficiency programs to households within the nine San Francisco Bay Area counties.[1] They contracted with Grounded Research and Consulting, LLC (Grounded Research) to characterize the single family moderate income (SFMI) population residing in their service territory because BayREN plans to move towards a robust, affordable, and accessible whole house option that will allow moderate income households to achieve deep energy savings over time. To inform the findings in this report, Grounded Research collected data from a literature review; in-depth interviews with BayREN members, CBOs and other stakeholders; and an online survey of 466 SFMI households. Grounded Research also conducted a detailed review of available American Community Survey census data.

For purposes of this study, BayREN designated single family homes as dwellings with less than five units and moderate incomes to be between $48,000 and $125,000.

Household Characteristics

Within the nine counties served by BayREN, there are slightly more than 725,000 single family moderate income (SFMI) dwellings. In every county, between 33% and 47% of the households are SFMI households. The majority of SFMI households reside in three counties (Alameda, Santa Clara, and Contra Costa) and the majority (52%) of SFMI homes have 2-3 occupants.

Most SFMI dwellings are older homes (71% built before 1980), and about 18% have older gas furnace equipment (i.e., over 15 years). Many of these households indicated that they have invested in energy efficiency at some level, including purchasing ENERGY STAR appliances, installing aerators, or installing energy efficient lighting. While this group has a larger energy burden than high-income customers, the percent of spending on energy is very low (around 2%).

Renters live in about one-third of SFMI dwellings homes, which are draftier and have fewer central air conditioners, different heating equipment (i.e., more wall-mounted furnaces), and fewer low-cost measures (less efficient lighting and fewer smart thermostats) than owner-occupied SFMI homes.

While there are some linguistically isolated households within the SFMI population, these make up a small percentage of SFMI homes (6.5% of households) and span a variety of languages including Spanish, Chinese, Vietnamese and Filipino.

Barriers

The most frequently reported barriers are financial barriers, specifically that these households have other priorities in terms of what they spend their money on. Most households do not see the value of investing in upgrades since they have low energy costs and they are not sure that the upgrades would save them money.

This is particularly true for renters. For renters, rental status, itself, appears to be the biggest barrier to taking any action as 76% of all renters indicate that it's not worth doing anything because they are a renter.

The average project costs for past whole house programs was about $14,000 – a value that is $1,000 to $9,000 higher than what the SFMI population is willing to pay for a popular set of HU measures.

In addition, many households indicate that they do not know what to do (36%) or that their home is already efficient (36%).

Even after demonstrating the value of investing in energy efficiency, any future program may still encounter other barriers. About 30% of the population prefer to make changes on their own rather than working through a contractor, and for those that are open to using a contractor, they may not know how to do find a contractor to do energy efficient upgrades.

[1] The counties are: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, Sonoma, Solano, and Marin. BayREN excludes households within the city of Palo Alto as all electric and gas utilities are provided by the local municipal utility.

DESIRED SERVICES

SFMI households are most interested in windows, insulation (for wall and attic), air sealing and refrigerators. Renters also desire low-flow toilets.

About 25% of SFMI households might be open to undertaking a sizable energy efficiency project (>$2,500) and expressed an interest in the HU program. While these households desire the measures offered by a HU program, they may find the cost of bundled packages too high.

A larger percentage of SFMI households (57%) are interested in rewards and other low-cost options. There is also moderate to high interest in a free starter package, having an expert advise them, incentives for the DIY household, or help in a long-term energy plan.

Although about 40% of SFMI customers have heard about the HU program, participation rates are very low. When developing a future program that would target SFMI households, program designers should consider:

- **Low-cost ways to engage customers to serve as an on-ramp**
  - A high percentage of SFMI customers express high interest in monthly rewards for saving energy (57% extremely or very interested).
  - There is also high interest in a free starter package (53% extremely or very interested).
  - Incentives for the DIY household (45%) may also appeal and offer a connection to some households.
- **"Packages" that include insulation and air sealing and are lower cost than existing packages**
  - The SFMI population is interested in insulation and air sealing measures. These could be considered "gateway measures" that lead to the higher cost measures such as furnaces or air conditioners. BayREN may also want to consider a long-term energy plan (44%).
- **Some level of audit or other education if the value is not self-explanatory**
  - There is slightly less interest in having experts to advise SFMI households (46%); however, there is a need for education in order to help households understand the value of taking additional energy efficiency actions in their home and prioritizing these actions over competing priorities.
- **Messaging that uses low-cost appeals that are of interest and/or that demonstrates the value to the household since households do not see HU-type actions as a priority**
  - Any future program will need to find appropriate messaging to both raise awareness and educate customers about the benefits of participating—putting forth a value proposition that will appeal to this group of customers. SFMI customers want to hear about EE programs through their utility bill or via email

Overall, financing may be useful to some households; however, given the relatively small bump in likelihood to make larger savings improvements (~6%), BayREN should educate allies about existing financing options that may complement the BayREN program, but BayREN does not need to focus on this program element.

Renters have specific considerations compared to homeowners such as draftier homes, fewer central air conditioners, different heating equipment, and more difficulty missing work to be at any program related appointments. Future programs will need to work especially hard to capture renters as the majority do not consider participating in a HU program to be worthwhile (simply because they rent).

PROGRAM DESIGN CONSIDERATIONS

Study Overview

The Bay Area Regional Energy Network (BayREN) contracted with Grounded Research and Consulting, LLC (Grounded Research) to characterize the single family moderate income (SFMI) population residing in their service territory. This document describes several key areas that relate to SFMI energy use and future participation in a program similar to the current home upgrade energy efficiency program.

Background

BayREN provides energy efficiency (EE) programs to households within the nine San Francisco Bay Area counties.[2] BayREN is funded by California investor owned utility ratepayers (under the auspices of the California Public Utilities Commission, CPUC), as well as through grants and funding from member agencies, other state and federal agencies, and foundations.

Over the past five years (since Q3 2013), BayREN has been implementing a single-family Home Upgrade (HU) program and the BayREN Home Energy Advisor Program. Over the next few years BayREN plans to transition away from HU with the intention of replacing it with a more robust, affordable, and accessible whole house option. BayREN will target the single family moderate income households with the aim of helping those households achieve deep energy savings over time.[3]

This market characterization intends to support this transition by giving BayREN an understanding of the single family moderate-income market to inform program design.

Study Goal and Objectives

Goal: The study goal is to enable data driven program design by providing characteristics of SFMI households within the BayREN service area. For purposes of this study, single family households are those with four or less units within a building and moderate income is designated by households with an annual income between $48,000 and $125,000.[4]

Objectives:[5]

1. To provide relevant statistics on the BayREN SFMI population (e.g., counts by county, income level, number of people in the household, home vintage, energy burden, etc.),
2. To gather, analyze, and report on existing literature of energy efficiency programs for the moderate-income population,
3. To determine what SFMI households want as part of an energy efficiency and/or whole house program,

At a minimum, this consumer-focused study gathered information on:

- **SFMI Household distribution and characteristics**
    - How many SFMI households are there and what are their key characteristics

[2] The counties are: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, Sonoma, Solano, and Marin. BayREN excludes households within the city of Palo Alto as all electric and gas utilities are provided by the local municipal utility.

[3] A targeted program is designed to facilitate participation by a specific population but not restrict participation to that population (Frank, 2016).

[4] BayREN specified that single family and income designations used in this study. We analyzed the SFMI households based on household size and income and found only about 3% of the BayREN SFMI population would have shifted to the low-income bracket according to CARE, a value that would not significantly change any overarching findings. For ease of analysis, we kept our income tiers based solely on income.

[5] The original scope also included "To understand how BayREN members work with the SFMI population within their jurisdictions and how they want to interact with a SFMI program." This information was explored in our interviews with BayREN members and informed the development of our questions and analysis, but we do not directly answer this objective in our report.

    - How SFMI households are distributed across the nine BayREN counties
- **Barriers to Energy Efficiency**
    - What may keep a SFMI household from taking action regarding these energy efficiency-related program services / products
- **Desired services and products**
    - A select set of program services / products SFMI households may want to purchase
    - When a SFMI household may want to buy these program services / products
    - How much a SFMI household may spend on a specific group of program products
- **Best marketing and outreach options**
    - The best ways to reach SFMI households
    - The types of messaging that may move a potential participant from not-interested to will-look-into-it and then from that stance to actual purchase

Study Approach

Grounded Research collected data from multiple sources as described in Table 1 below to support this study.

Table 1. Summary of SFMI Market Characterization Data Collection

Data Collection Activity	Objectives	Data Collection Size	Notes
Review of census data	Characterize market Help develop sample for survey	NA	We used detailed census data to obtain cross tabs of information to describe SFMI households in BayREN territory (See Appendix A for details on census data)
In-depth interviews	Understand available data and past research Provide context (e.g., on households, current program, marketing) Explore goals and options for future programs Inform survey development	12	Interviews with: Eight BayREN Member counties, One Program Implementer associated with BayREN Single Family Program One PG&E staff Two CPUC staff
Review of BayREN data, past related studies in California, and current California programs	Understand participation rates for moderate income households over time Understand existing barriers and context to inform survey Determine current EE programs (if any) that also serve the BayREN SFMI market in similar capacity as planned program	NA	Review of 7 studies
Review of existing moderate-income programs and studies from other jurisdictions	Understand what is already known about this market (e.g., barriers, successful models of outreach)	NA	Review of 5 moderate income studies (some which included multiple programs) across the country

	Determine areas to explore in the survey effort		
Online survey	Characterize targeted population	466	Survey in English with representation for owner-occupied and renter occupied SFMI homes (See Appendix B for details on survey that describes our final analysis dataset of 458)
In-depth discussions with Community Based Organizations (CBOs)	Learn if linguistically isolated populations vary from survey findings	3	These interviews occurred with CBOs (identified by counties) that work with linguistically isolated populations

Study Limitations

Our online survey under-represented the Hispanic population. Additionally, non-English speakers were not fully represented because the primary data collection for this effort was an online survey fielded in English. Linguistically isolated populations (that is, there is no one over 14 in the household that speaks English) represent 6.5% of moderate income households that live in single-family homes.[6] To better understand these populations, we spoke with CBOs that work with linguistically isolated households to help understand if the survey findings are different from the populations with whom the CBOs work.

Our method focused on households and users of energy, including both owner-occupied and renter-occupied households; however, in renter-occupied households, we focus on the renter not the owner of the home. We did not reach out to owners of renter-occupied households.

Important Notes and Terms

While this study focuses on single family moderate income, we include some information on single family high income households in this section. The California HU Program tended to draw high income participants and it is important to understand differences between participants in the current program and a future BayREN program that targets moderate income households.

Terms

Below are several important terms defined as we use them in this study:

Single Family Household (SF) – a family living in a dwelling that is detached, attached, or 2-4 units

Multi Family Household (MF) – a family living in a dwelling with 5 or more units

Low Income (LI) – a household with an annual income less than $48,000

Moderate Income (MI) – a household with an annual income between $48,000 and $125,000

High Income (HI)– a household with an annual income greater than $125,000

SFMI – single family moderate income households (the focus of this study)

SFHI – single family high income households (presented as comparison to SFMI when discussing some statistics).

[6]. Of these linguistically isolated households, 50% speak various Asian and Pacific languages and 34% speak Spanish.

Document Outline

The remainder of this document follows the key areas studied.

- SFMI Distribution and Characteristics
- SFMI Barriers
- SFMI Desired and Available Services, Products, and Programs
- Marketing and Outreach Options
- Identifying Gaps and Guidance for Future Program
- Appendices

SFMI Distribution and Characteristics

SFMI Distribution and Characteristics

Overall, there are 725,000 SFMI homes in the nine-county area served by BayREN. These SFMI homes make up 38% of the homes in the area. The large majority (71%) live in older homes (i.e., built before 1980), and about 18% have older furnace equipment (i.e., over 15 years). Many indicate that they have already invested in energy efficiency at some level.

Geographic Distribution of SFMI Homes

BayREN area has a lower percentage of moderate-income single-family households than California

The nine counties that make up BayREN include 2.6 million households and represents 21% of the households in California. Within the BayREN counties, there are slightly more than 725,000 SFMI dwellings (i.e., those to pursue for any program that targets this population).

BayREN has a similar percent of single family households as California (73%), but a higher percentage of those single-family households are high income (40% in BayREN versus 27% in California), and therefore a smaller percentage of BayREN householders are moderate or low income when compared to California. (Table 2)

Table 2. California and BayREN Single Family Household Percentages by Income

California ***(N=12.4 million)***	**BayREN** ***(N=2.6 million)***
Multifamily – 27%	Multifamily – 27%
Single-family – 73%	Single-family – 73%
Among single-family in each area…	
Single-family ***(N=9.2 million)***	Single-family *(N=1.9 million)*
SFLI – 31%	22% *(9% fewer than CA)*
SFMI – 42%	38% *(4% fewer than CA)*
SFHI – 27%	40% *(13% more than CA)*

Source: 2012-2016 ACS PUMS data

Every county has between 33% and 47% SFMI households, with the majority (58%) of SFMI households living in three of the nine BayREN counties.

SFMI households are dispersed relatively equally within each county, with Marin having the lowest percentage of SFMI in their county (33%) and Solano having the highest percent (47%). Because of this somewhat even percentages within counties, the total population within each county dictates where the most SFMI households reside. Santa Clara and Alameda have the highest populations among the nine counties and thus have the highest concentration of SFMI households in terms of number of households. (Table 3)

Note that the households we explored are not considered hard-to-reach (HTR) and that some SFMI may fit the current definition of HTR for living in a disadvantaged community, but the number is very low (less than ½ million people out of ~5.5. million people in the Bay Area).

Table 3. SFMI Populations by County

COUNTY	SFMI % of County	SFMI % of 9-county BayREN area
Alameda	39%	21%
Santa Clara	34%	21%
Contra Costa	39%	17%
Sonoma	46%	10%
San Mateo	35%	9%
San Francisco	34%	9%
Solano	47%	8%
Marin	33%	4%
Napa	45%	2%
Total	38%	100%

Source: 2012-2016 ACS PUMS data

Household Make-Up

Occupancy Type

Homeownership varies somewhat across the BayREN region with about 2/3rds of SFMI households overall owning their own home.[7] As shown in Table 4, Contra Costa includes the highest percent of homeowners (at 73%) while San Francisco has the lowest (at 57%).

Table 4. Percent of Homeowners and Renters by County and Overall

County	Homeowners as % of SFMI	Renters as % of SFMI
Contra Costa	73%	27%
Marin	71%	29%
Solano	71%	29%
Napa	68%	32%
San Mateo	68%	32%
Santa Clara	68%	32%
Sonoma	68%	32%
Alameda	66%	34%
San Francisco	57%	43%
All Counties	*68%*	*32%*

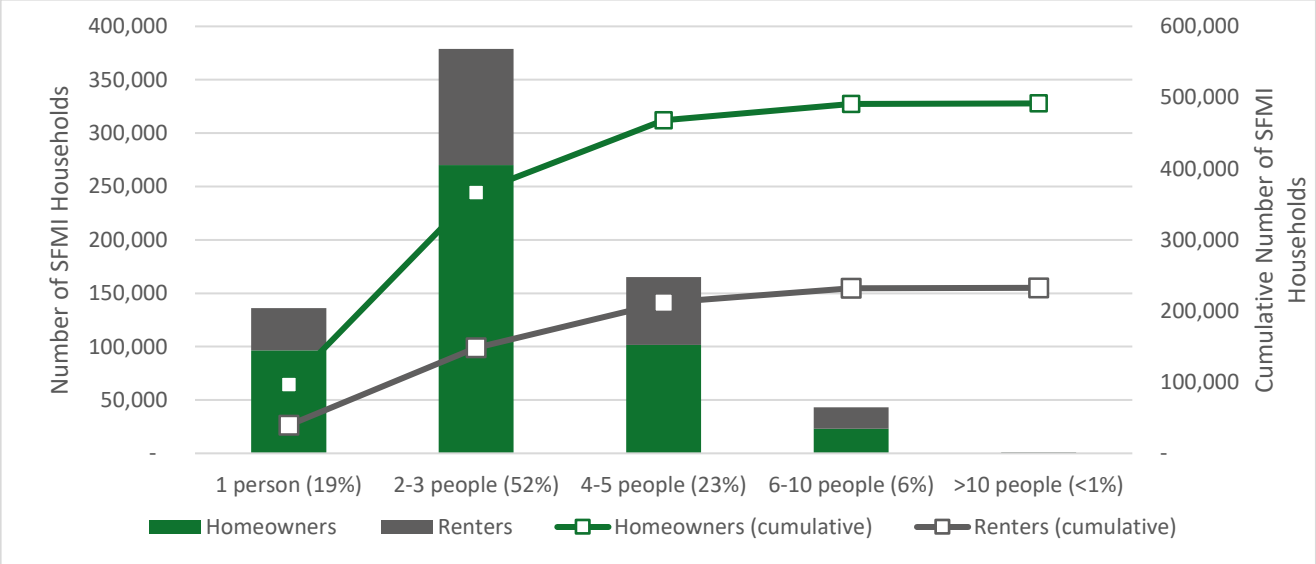
Source: 2012-2016 ACS PUMS data

Household Size

Three-quarters of SFMI households have 2 to 5 people in them. The majority (52%) fall into the category of 2-3 persons in a household.

About 30% of HH with three or less people are renters. For HH with 4-5 people, about 38% are renters. There are few SFMI HH with more than six people and renters make up about half of those HH. (See Figure 1)

Figure 1. Number of SFMI HH by HH size



Source: 2012-2016 ACS PUMS data

[7] This is less than SFHI householders of which 83% own their own home.

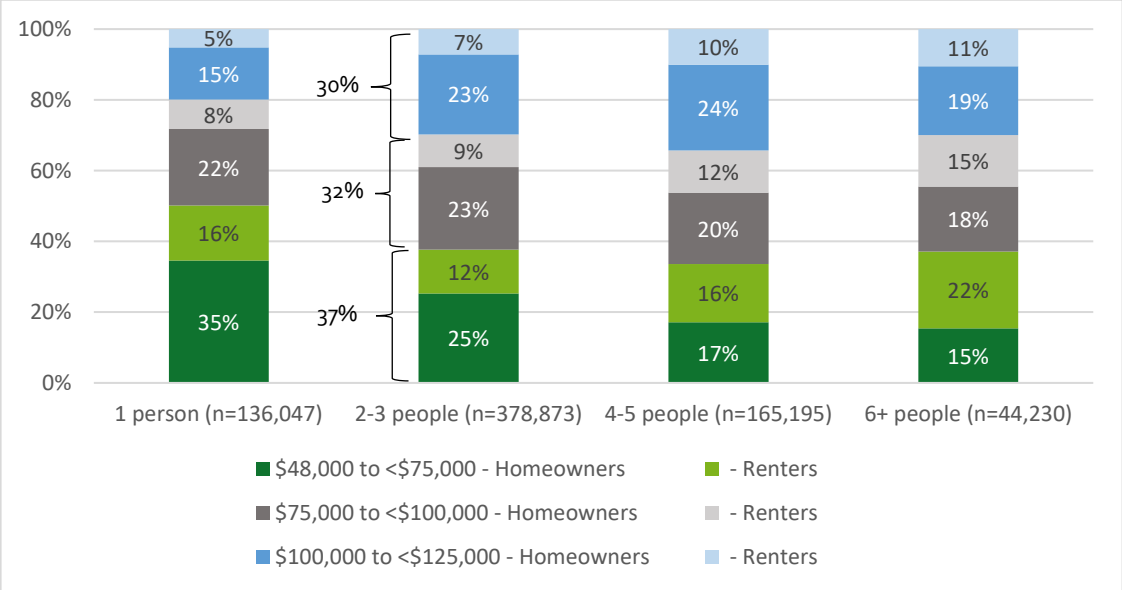
What it Means to Be Moderate Income

In general, the incomes of SFMI households tend to be at the lower end of the moderate-income range (39% of SFMI households make less than $75,000 per year compared to 29% who make between $100,000 and $125,000 per year) although this can vary by county.

SFMI renters make up a large portion of this lower end group (45% of SFMI renters make less than $75,000 per year compared to 24% who make between $100,000 and $125,000 per year). Single person HH's also tend to be in the lower range of SFMI HHs (with HH income less than $75,000 for 51% of single person HH).

Income range for the majority of SFMI HHs (52% with 2-3 people in their home) are relatively equally split between the three SFMI ranges. (See Figure 2)

Figure 2. SFMI HH Income by HH Size



Source: 2012-2016 ACS PUMS data; Note that each bar represents a different number of households

Because low-income qualifications for energy rate reductions do vary by the number of people in the household, some of those in the income range for SFMI households used in this study ($48,000-$125,000) have the potential to be appropriate for the California Alternative Rates for Energy (CARE) plan, which serves low income households. CARE participation is based on household income and household size (and therefore a SFMI household could be considered CARE qualified, low income, and dropped from our study). We analyzed the SFMI households based on household size and income and found only about 3% of the BayREN SFMI population would have shifted to the low-income bracket according to CARE.[8]

While not part of our original designation of SFMI, we note that some in the SFMI income range we used could be considered low income using the US Housing and Urban Development (HUD) assisted housing program eligibility limits, which is based on the median income across the various counties. For example, a household of three people in San Francisco, Marin, or San Mateo counties would meet the HUD low-income limit if their income was $105,700. Just a short distance away, though, in Solano county, a 3-person household would meet the low-income limit if their income was $60,300. While very different, both these limits are within our SFMI range. Table 5, below, shows that a large percentage of households with three or less people in San Francisco, Marin, or San Mateo (60%) fall into the HUD low-income category and all other counties have at least 1/3 in the low income category.

[8] We designated SFMI households for our study based solely on income.

Table 5. Percent of SFMI HUD consider Low-Income

Group of Counties used by HUD	Considered low-income by HUD *(range shows value for a 1- to 3-person home, who make up 71% of the SFMI population)*	Percentage of SFMI 1-3 person homes that fall under this level
San Francisco, Marin, San Mateo	$82,200-$105,700	60%
Santa Clara	$66,150-$85,050	42%
Alameda/Contra Costa	$62,750 - $80,650	35%
Napa	$51,450 - $66,150	34%
Sonoma	$55,000-$70,700	33%
Solano	$46,900-$60,300	32%

Source:2018 HUD limits from this website https://www.huduser.gov/portal/datasets/il.html#2018_data. Percent SFMI based on specific numbers of HH in each county with 1-3 people

Ethnicity

The majority of SFMI HH are non-Hispanic White with Marin county having the highest percentage (84%) and Alameda county having the lowest (42%).

Table 6. SFMI Ethnicity by County

County	Non-Hispanic White	Hispanic	Black	Asian	Other
Marin	84%	7%	1%	5%	3%
Sonoma	77%	16%	1%	3%	3%
Napa	67%	26%	1%	4%	2%
Contra Costa	55%	20%	8%	13%	4%
Solano	49%	19%	14%	12%	5%
San Mateo	48%	21%	2%	25%	3%
San Francisco	43%	14%	5%	35%	3%
Santa Clara	43%	25%	2%	27%	3%
Alameda	42%	20%	10%	24%	4%
Total	*51%*	*20%*	*6%*	*20%*	*4%*

Source: 2012-2016 ACS PUMS data

Among all SFMI households, 6.5% are linguistically isolated (meaning that nobody over 14 speaks English well) and these households span a variety of languages including Spanish, Chinese, Vietnamese and Filipino.

Household Energy Costs

About 2/3s of BayREN SFMI are homeowners and SFMI have a higher cost burden to live in a home than SFHI.

According to census data, about 25% of the SFMI household income goes to paying a mortgage or rent while only about 17% of SFHI household income goes towards mortgage or rent.

Additionally, SFMI cost burdens for energy payments found in the census data are relatively low (at 2.3%), but still double the energy payment cost burden for SFHI (at 1.1%).[9]

From our SFMI survey, most renters directly pay their electric bill (82%) and, for the 69% of renters with gas in the home, most pay their gas bill (85%). If not paid directly, the bill is included in their rent.

[9] Compared to low-income households with a 7.6% energy burden (energy burden is the percentage of household income spent on home energy bills).

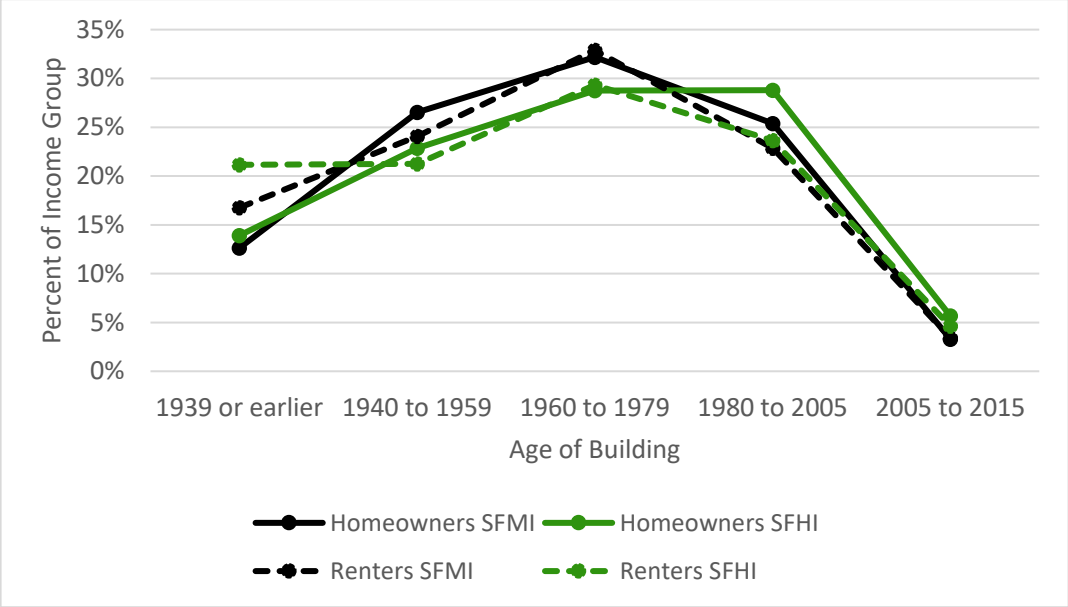
Housing Characteristics

Age of Homes

Many SFMI households live in homes built before 1980 (71%), so have the potential for needing envelope measures such as attic insulation because of lack of standards at that time.[10]

More SFMI homeowners and renters live in dwellings built between 1940 and 1980 than SFHI homeowners or renters, but the differences are small (4% or less).

Figure 3. Age of Building by Homeowner / Renter and Income



Source: 2012-2016 ACS PUMS data

While the home vintage does not vary much between SFMI and SFHI, within the SFMI population, the percentage of homes of a specific vintage varies within a county. Table 7 shows that 51% of San Francisco county's SFMI homes are from 1939 or older and that Solano has a higher percent of younger homes than other counties (at 51% younger than 1980). *(*Appendix F includes a table of HH vintage by HH size and income*.)*

Table 7. Percent SFMI Housing Vintage Overall and by County

	% of SFMI House Vintage				
County	**1939 or earlier**	**1940 to 1959**	**1960 to 1979**	**1980 to 2005**	**2005 to 2015**
Percent by Vintage	*14%*	*26%*	*32%*	*24%*	*4%*
Percent of Vintage across a County (each county sums to 100%)					
Alameda	21%	28%	28%	20%	3%
Contra Costa	5%	23%	32%	34%	6%
Marin	13%	28%	41%	15%	2%
Napa	7%	29%	31%	29%	4%
San Francisco	51%	28%	13%	7%	1%
San Mateo	10%	45%	29%	14%	2%
Santa Clara	6%	24%	45%	21%	3%

[10]The housing vintage bins are based on the bins within the PUMs Census data and do not necessarily reflect specific periods where the California energy codes may have changed significantly.

County	% of SFMI House Vintage				
	1939 or earlier	1940 to 1959	1960 to 1979	1980 to 2005	2005 to 2015
Solano	5%	13%	30%	44%	7%
Sonoma	9%	16%	33%	38%	4%

Source: 2012-2016 ACS PUMS data
Highlights designate the vintage with the highest percent of homes in that county

SFMI Home Structure

The label of "single family" includes detached, attached, and dwellings with less than 4 units. Most SFMI dwellings are single family detached (at 73%) while Solano has the highest number of single family detached dwellings (88%) and San Francisco has the lowest (36%). (See Table 8) Attached and dwellings with four or less units often have different needs for envelope type measures because of shared walls and multiple households.

Table 8. SFMI Percent of Detached Homes and Attached or < 4 Dwelling Units by County

County	Single Family Detached		Attached or <4 units	
	Homeowner	Renter	Homeowner	Renter
Solano	67%	21%	4%	8%
Contra Costa	65%	17%	9%	10%
Napa	64%	21%	5%	10%
Sonoma	62%	20%	6%	12%
Marin	61%	15%	11%	14%
San Mateo	58%	16%	10%	16%
Alameda	56%	16%	10%	18%
Santa Clara	56%	15%	12%	17%
San Francisco	28%	8%	29%	34%
Total	*57%*	*16%*	*11%*	*16%*

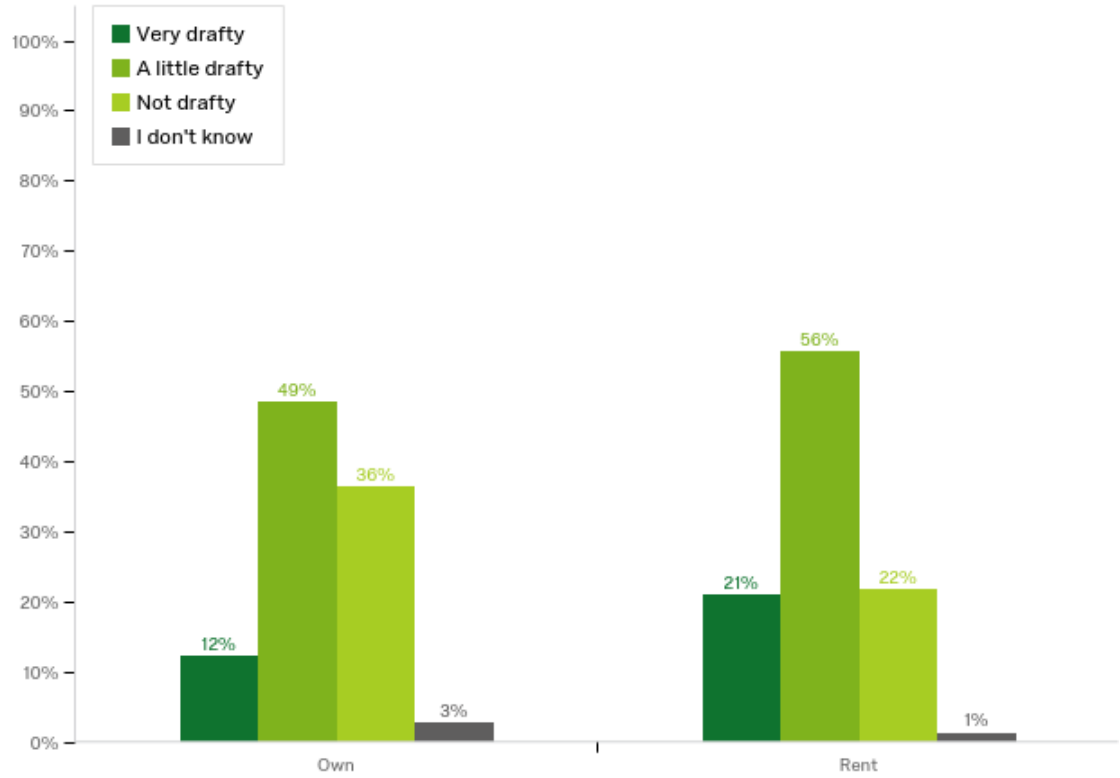
Source: 2012-2016 ACS PUMS data

Air Sealing and Insulation

Most SFMI households feel their homes are "a little drafty"

While we were not able to directly gather information on whether the homes were insulated and sealed appropriately, a drafty home can be a sign that air sealing or additional insulation is needed. Based on our SFMI survey, close to 2/3s of all SFMI households feel their home is either "very" drafty (16%) or "a little" drafty (51%). A statistically significant higher percent of renters than homeowners feel their homes are "very" or "a little" drafty (77% versus 61%, respectively, see Figure 4).

Figure 4. Drafty House by Homeowners and Renters



Source: SFMI Survey; Own (n=311), Rent (n=147)

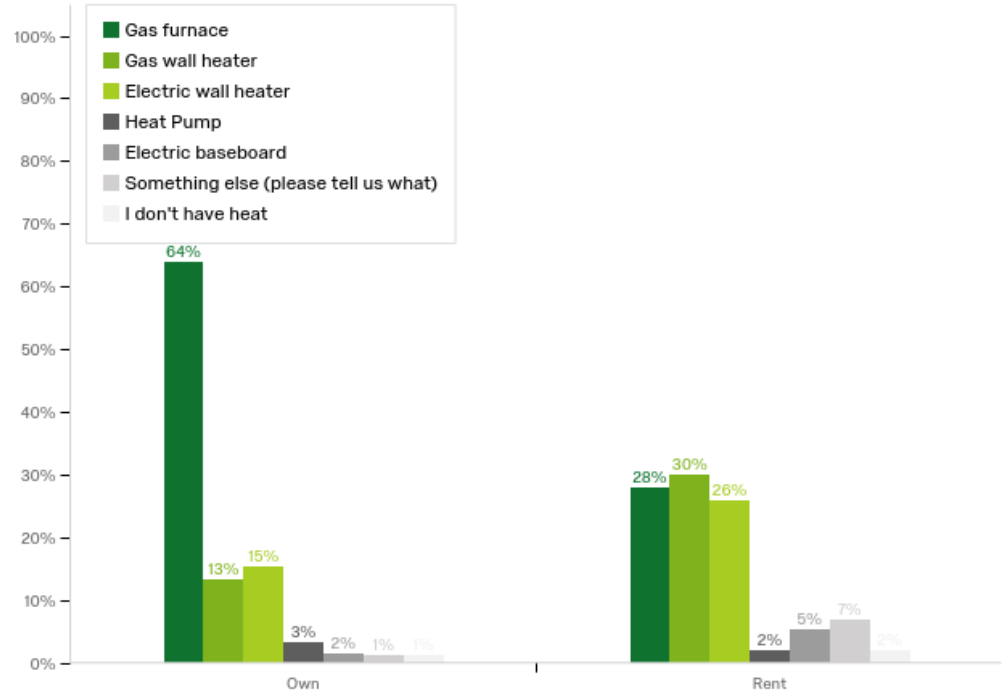
Heating and Cooling

Most SFMI Households have Gas Heating Equipment.

According to Census data, natural gas is the main heating source for BayREN households, but a slightly lower percentage of SFMI households use natural gas to heat their home (75%) than SFHI households (79%). Electricity heats 20% of SFMI households (compared to 16% of SFHI households).

SFMI homeowners generally have gas furnaces (a typical home upgrade measure) while SFMI renter households more often have heating equipment not usually retrofit through the Home Upgrade program (wall gas heaters and or electric wall or electric baseboard heaters, see Figure 5). Additionally, data from our SFMI survey indicated that San Francisco county has statistically greater number of electric wall heaters than the other counties (29% versus 17%, respectively).

Figure 5. Heating Equipment by Homeowner and Renter



Source: SFMI Survey; Own (n=311), Rent (n=147)

About one-quarter of SFMI households have equipment older than 15 years (and therefore more likely to need replacement).[11] For 85% of homeowners with older heating equipment, this older unit is a gas furnace, while for renters, these older units are split between gas furnaces (39%), gas wall heaters (44%) and electric wall heaters (13%). This data show there is a moderate number of households with the potential for a heating unit upgrade (i.e., about 22% of SFMI homeowner households may have a gas furnace over 15 years old and ready for replacement).

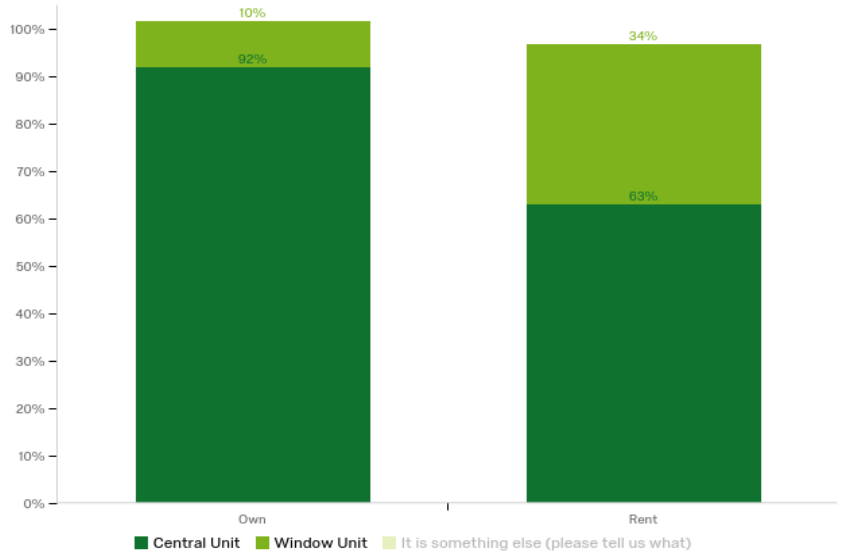
Half of SMFI Households have Air Conditioning Equipment

About half of SFMI households have air conditioning (53%) with statistically more SFMI homeowner households having air conditioning than renters (57% versus 44%). Statistically fewer San Francisco SFMI HH have air conditioning when compared to the other eight counties (40% versus 55%, respectively).

Of those with air conditioners, more homeowners have central units over window units (92% are central units versus 63% for renters) and about 14% of central air conditioners are over 15 years old. (See Figure 6)

[11] There is no statistical difference between homeowners and renters, although many renters (26%) do not know the age of their heating equipment and a smaller percentage of homeowners are uncertain the age of their heating equipment (6%).

Figure 6. Air Conditioning Equipment by Homeowner and Renter



Source: SFMI Survey; Own (n=179), Rent (n=66)

The age of the units indicates that there is a somewhat limited number of households for an air conditioner upgrade that often provides high electric savings (i.e., 5-7% of SFMI households may have a central air conditioner over 15 years old and ready for replacement).

Water consuming measures

Water saving measures may also offer opportunities for savings. Most households have clothes washers in the home, and many also have a lawn that they water. A much smaller percentage have pools. (See Table 9)

Table 9. Percent of SFMI Households with Certain Equipment

Water-consuming	Homeowners	Renters
A clothes washer	99%	84%
A lawn that they water	58%	37%
A pool *(that they maintain)*	18%	11%

Source: SFMI Survey; Homeowners (n=311), Renters (n=147); Homeowners and renters are statistically different (90% confidence level) for all items

EE equipment and environmentally-conscious purchases

About 2/3s of SFMI homeowners and half of SFMI renters indicate they made changes within the past five years that might have improved efficiency. However, further investigation is needed to understand if these projects really lead to any energy changes since ½ of homeowners and 2/3s of renters provided us with answers such as "kitchen, bath", "bought furniture" when we asked about efficiency changes. Of those able to provide detailed information on changes that might have saved energy, they most often purchased appliances and installed lighting. A few renters indicated taking conservation actions (e.g., turning down thermostat, wearing sweaters).

Respondents spent between $15 (light bulbs) to over $100,000 (remodel of home) on these items with homeowners averaging about $7,000 and renters averaging about $1,100.

<u>High percentages of SFMI households already have efficient clothes washers and low-cost items</u>

When we explored whether homes had energy saving measures in their homes, many had ENERGY STAR clothes washers low-flow showerheads and faucet aerators. Only a small percentage of households appeared to have web-enabled smart thermostats.

Table 10. Percent of SFMI Households with Certain Equipment

Household Item	Homeowners	Renters
Front loading clothes washer or top loading ENERGY STAR clothes washer	65%	42%
Low Flow Showerhead	66%	51%
Low Flow Faucet Aerator	42%	29%
>75% Efficient Lighting in the home	32%	24%
Smart Thermostat *(that learns behavior)*	12%	3%

Source: SFMI Survey; Homeowners (n=311), Renters (n=147); Homeowners and renters are statistically different (90% confidence level) for all items

A smaller percentage of the homes have also made other eco-conscious investments beyond typical energy efficiency measures, such as investing in PV systems, or purchasing a plug-in hybrid or electric car.

Table 11. Percent of SFMI Households with Certain Equipment

Indication of environmental leaning	Homeowners	Renters
Photovoltaic (PV) Solar System	17%	6%
Plug in Hybrid Car	13%	7%
All Electric Car	11%	3%

Source: SFMI Survey; Homeowners (n=311), Renters (n=147); Homeowners and renters are statistically different (90% confidence level) for all items. We note that the percent of PV systems appears high as the California Solar Statistics page indicate a little over 150,000 residential solar projects in the nine Bay area counties (about 8% of the single-family population).

SFMI Barriers

The most frequently reported barriers are financial barriers, specifically that these households have other priorities in terms of what they spend their money on; and most also just do not see the value of investing in upgrades since they have low energy costs and they are not sure that the upgrades would save them money. This is particularly true for renters.

Top Barriers to Energy Efficiency Upgrades

Figure 7, on page 19, shows all values described in the barrier discussion, next.

Among BayREN SFMI households, the top barriers are upfront cost, low energy costs, and uncertainty that there will be savings.

High Barriers

(Barriers where generally over ½ of the SFMI survey respondents indicated the barrier.)

The largest barriers among BayREN's SFMI households appear to be similar to those found in past studies that covered the moderate-income population. A past California-specific evaluation study found that the top barriers for moderate income ($50K to $100K, the range used in that study) were financial barriers (such as cost of equipment, rebates not high enough and financing options unappealing). (EMI 2016) Access to capital and competing interests were also mentioned in a NYSERDA report on providing services to low and moderate-income customers. (CEAC, 2017) Nationwide program efforts targeted to moderate income populations found similar barriers. (Zimring et. al, 2012)

Financial, or upfront costs of energy efficiency actions. Prioritizing available funds to pay for energy efficient items can be a major hurdle to overcome when there are other household uses for any income. SFMI households generally spend ~25% of their income on housing (as shown in Census data). Based on survey data, close to 2/3s of SFMI households (63%) indicated they had other items of higher priority than energy efficiency (there was no difference between homeowners or renters).

Low energy costs. Moving EE up in priority could occur if energy costs are high or a measure saves energy at times of peak costs under time-of-use rates. While Census data indicated that SFMI households spend about 2% of income on energy, reducing that burden can enable the household to spend in other areas. However, about half of SFMI households feel they already have low energy costs, with SFMI homeowners indicating this slightly more than SFMI renters (55% versus 49%). Interestingly, though, about one-quarter of our survey respondents stated they neither agreed nor disagreed with their household having low energy costs, which could point to a lack of knowledge about their energy costs or a simple belief that the costs "are what they are".

Uncertainty about value of energy upgrades. Compounding other barriers is the uncertainty among households if EE upgrades would save them much. Fifty-one percent of all respondents are unsure that upgrades would save them money. A higher percentage of homeowners are unsure of savings than renters (54% versus 43%, respectively), but as we found earlier, about one-quarter had no real opinion on this barrier.

For renters, rental status, itself, appears to be the biggest barrier to taking any action. This is discussed further under Renter Barriers below.

Moderate Barriers

(Barriers where between ¼ and ½ of the respondents indicated the barrier.)

More moderate barriers include feeling they do not need energy efficiency measures, lack of knowledge, issues with the home structure, or a desire to do the upgrade themselves (DIY).

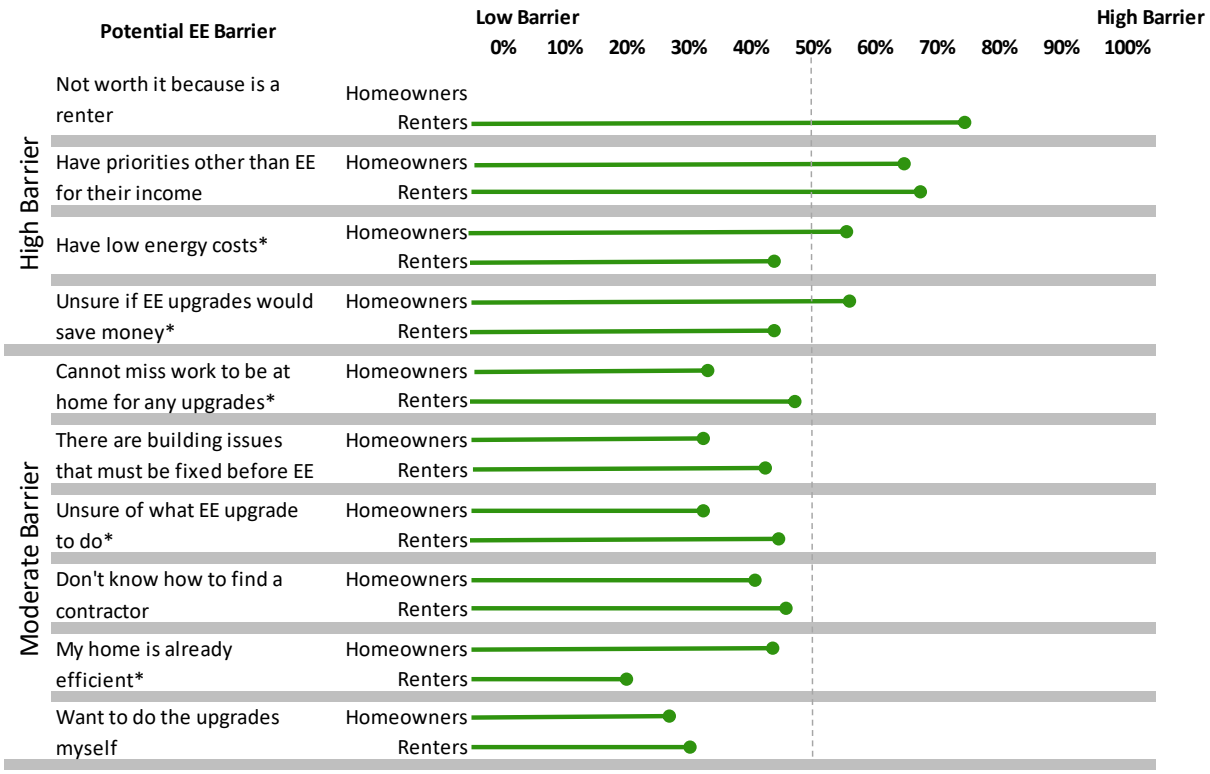
Belief that home is already efficient. People typically act only when they see a need. Within our survey, about a third of all SFMI HH felt their home was already efficient (36%) with more homeowners (41%) than renters (26%), meaning that a program will first need to show a potential participant that their home is not efficient.[12]

Lack of knowledge of what to do. Thirty-six percent of SFMI households are unsure of what EE upgrade to do

Other structural building problems. Some moderate-income programs (such as those in Massachusetts) also encountered structural issues with the home that precluded or delayed investing in measures that could save energy. This may also be an issue in about a third of BayREN's SFMI population. Thirty-six percent of respondents thought that other building issues (e.g., asbestos, poor wiring, carbon monoxide from the oven) needed fixing prior to an EE effort (no difference between homeowners and renters). Notably, this was equally as likely to be mentioned by those at the upper end of our income range as those at the lower-end.

Difficulty identifying contractors and DIY leanings. About 40% of SFMI households did not know how to find a contractor to do EE upgrades (no difference between homeowners and renters). Close to a third of SFMI homeowner and renter households wanted to do upgrades themselves (30%), regardless of whether they knew how to find a contractor or not.

Figure 7. Barrier Summary



**Difference between homeowners and renters is statistically different (90% Confidence level)*

Source: SFMI Survey; Percentages of those who "Strongly Agree" and "Somewhat Agree"

Renter Barriers

Renters believe their homes are not efficient yet are unsure of what to do. This is coupled with low energy costs and being unsure that any upgrades would save money. Additionally, they described difficulty missing work.

Close to ¾ of renters (76%) thought that pursuing energy efficiency was not worth it simply because they were a renter. Renters felt they had low energy costs (49%), were not sure what upgrades to do (45%) and were

[12] This is not a new idea as home audits are supposed to show what could be done to improve efficiency in a home.

unsure that EE upgrades would save them money (43%). Even if renters were to purchase upgrades, close to half of them (47%) indicated that missing work to enable upgrades to occur at their house would be difficult (versus 33% for homeowners).

Split incentives are a known issue and renters themselves have little idea how to overcome this barrier. When we asked renters about what could help the landlord take EE actions. About one-third either didn't know (18%) or thought that nothing would help (11%). Less than 10% suggested that talking with the landlord, proving cost-effectiveness of upgrades, or providing money might help (7% for each group). Fewer (6%) thought that raising the rent could bring about EE improvements while very few (3%) thought it would take a government mandate or law to force their landlord to make improvements.

Barriers to Non-English speakers

While only a small part of the SFMI population are linguistically isolated (at 6.5% of households), there are a few barriers that are unique to this population. For example, a SFMI household with linguistically isolated individuals may have one household member who speaks English, but they are the person with a job and do not generally have time to attend a workshop that teaches about the HU program. It falls to the other adult(s) in the household to explore energy efficiency options, yet these people may not speak well. Like English-speaking households, we heard that many of these household also have other priorities that are more pressing.

Other Studies

As mentioned above, studies of moderate income populations in other areas of the country have also explored barriers. A market characterization study of moderate income customers in Massachusetts (Navigant and ILLUME 2018) found that customers that fall within the existing moderate-income group face greater economic and energy challenges than the higher income households surveyed. They are more likely to report difficulty with paying bills and that they sacrifice comfort. The greatest barriers to participation in the Massachusetts Moderate Income offering were customer time and availability, perception of their home's need for energy efficiency, and the need for more information. Notably, the study also found that factors such as owning a home (rather than renting) and age of household members (i.e., older individuals more than younger families with children) were more likely to influence participation decisions than income; however, our survey found that adults with children were more aware of the program and more interested in participating.

Similar to both this study's findings, and those in moderate income populations in Massachusetts, a NYSERDA study found that low and moderate income (LMI) customers often face barriers including access to capital, competing interests, lack of information, building structural issues and split incentives. (CEAC 2017) In addition, that study mentioned other challenges when offering a moderate-income program, including:

- **Identifying moderate income households**. Both NYSERDA and MA program administrators have found that identification of moderate income customers is difficult, unless the customer directly applies for a program and provides documentation of income eligibility. (CEAC 2017)
- **Fragmented program administration**. Multiple program processes and rules can create confusion for both service providers and customers. (CEAC 2017)

SFMI Desired and Available Services / Products

SFMI Desired and Available Services, Products, and Programs

Focus on insulation and air sealing for homeowners and include measures such as low-flow toilets and appliance rebates for renters. SFMI households are also interested in rewards and other low-cost options.

Measures Desired

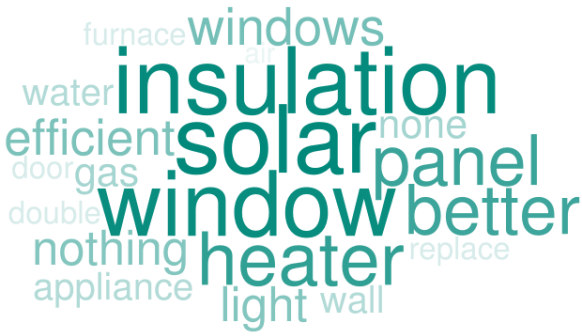
We used both open and closed ended questions to determine the type of energy efficiency services and products in which respondents were interested. Open ended questions tend to get at those "top of mind" products while a list of options limits the responses to specific categories.

When we asked SFMI respondents a "top of mind" question about the top three items that they felt their home needed, they mentioned (unaided): 1) insulation 2) solar, and 3) windows (see Table 12).[13]

Table 12. "Top of Mind" Products Desired by SFMI Respondents

Products	% of Respondents
Insulation	24%
Solar	23%
Windows	22%
Appliances	20%
Furnace	17%
AC	12%
Other*	12%
Lighting	9%
Air Sealing	5%
Water Heating	4%
Behavioral Action	2%
Duct Sealing	1%

Source: SFMI Survey (n=458)
**Example of other responses includes water saving toilets, smart thermostats, and whole house fans*



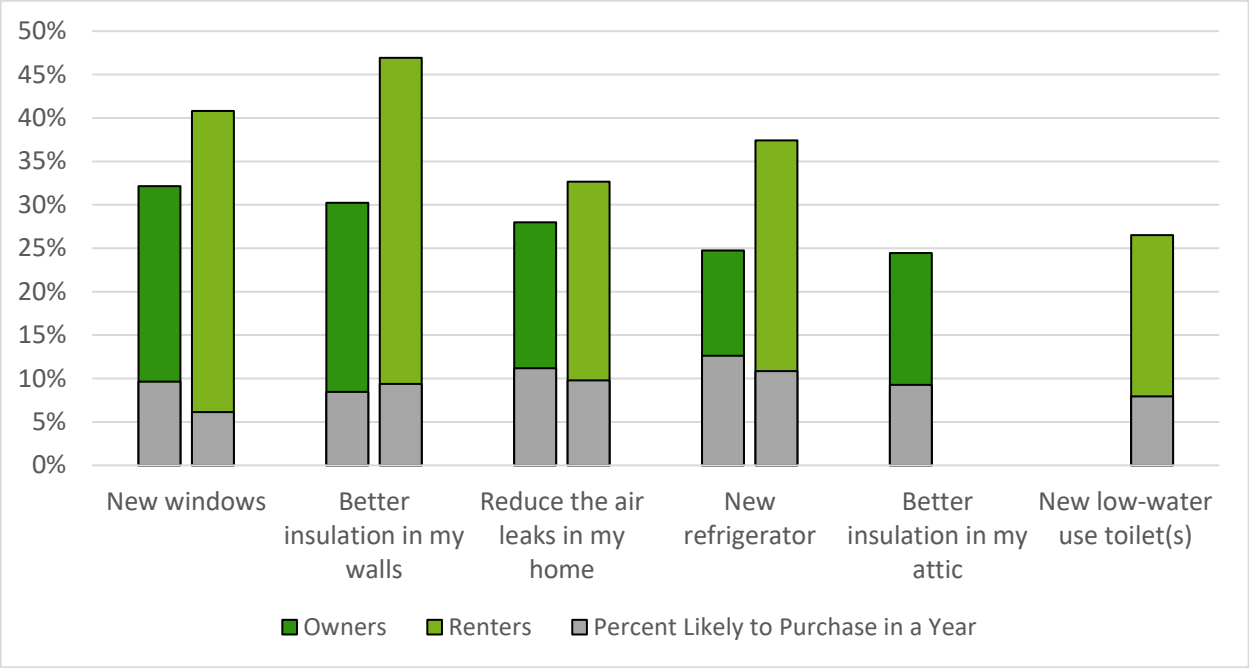
When we explored those measures that save energy (i.e., excluding solar) by asking respondents to choose from a given list, respondents continued to choose envelope measures with air sealing being ranked among the top five desired products (with no differences among the income ranges in our study). While not showing up in large numbers when asked as an open-ended question, low-water use toilets were among the top five for renters. (Figure 8)

Notably, furnace or AC upgrades were not at the top of the list.

As shown in Figure 8, when we explored whether households were likely to make these purchases within a year (an indication of readiness to act) about half of homeowners and 1/3 of renters indicate they may purchase one of their top five items within a year. Refrigerators are the most likely to be purchased among either homeowners or renters. However, about 1/3 of both homeowners and renters are unsure when they may purchase these measures.

[13] On the open-ended question, about one-quarter provided an answer that we could not use (i.e., items like "closet" or "electricity" are not useful for our purposes).

Figure 8. Top Five Products from List Desired by SFMI Respondents



Source: SFMI Survey (n=311 for owners and 147 for renters)
Note: Products chosen from list provided to respondents and then ranked for their top five Percentages are those who indicate likely to buy within 6 months or within a year.

In terms of measures desired, we heard anecdotally from BayREN members that potential participants frequently come to workshops because they are interested in solar or windows. Windows are also challenging in some areas for other reasons. In San Francisco, we heard that much of the building frontage is historic, so windows may not be able to be cost-effectively replaced with efficient double paned windows. As such, households may change their mind about what actions to take after being educated. Some BayREN members mentioned that participants are drawn to the current HU program through a blend of comfort and safety and may come to the program because they have an old heater, or because their heating system is old and unsafe.

Reactions to Bundle Costs

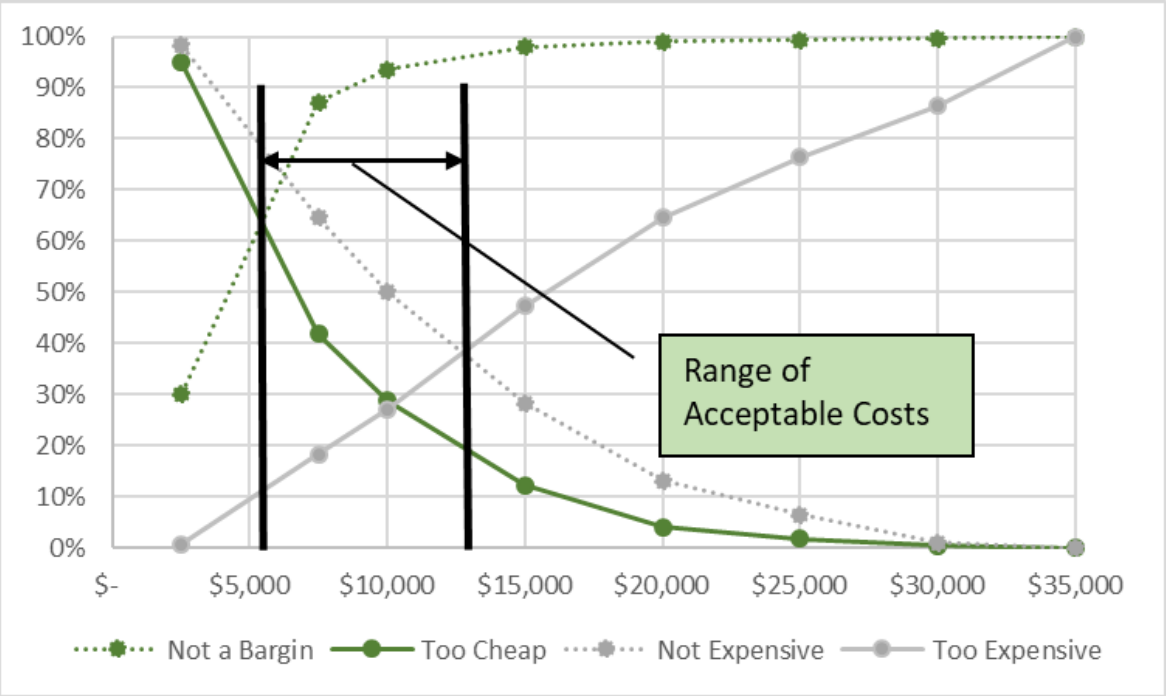
According to BayREN members, the average cost for HU projects (basic and advanced) was ~$14,000—a value that is $1,00 to $9,000 higher than what the SFMI population is willing to pay for a common set of energy efficiency measures installed through the HU program.[14]

To gauge reactions to this typical project cost, we asked all respondents about a package of three energy efficiency items. This package included a new central gas furnace, duct sealing for the home, and more attic insulation—note that a central furnace was not among the most desired, listed above.[15] We used a set of four questions to each person to think about the cost of the package as if they were going to buy it even if the package did not apply to their current living situation.

[14] Note that the actual HU projects were not identical to the set package used in this survey, but the past average project size provides a sense of comparison to the values found in the survey.
[15] The package we asked about was described as a popular set of measures by the implementer.

Our respondents indicated that they thought an acceptable range for these products topped out below the average HU project. Figure 9 shows that SFMI households feel that a range of about $5,500 to $12,500 seemed about right for the package.[16]

Figure 9. Range of Acceptable Costs for Set Package of EE Products



Source: SFMI Survey;(n=458) Package was a new central gas furnace, duct sealing for the home, and more attic insulation

Percentage Interested or Willing to Invest in Home Upgrades

In addition to exploring reactions about the cost of a bundle of energy efficiency measures, we also explored what percentage might be willing to invest in a package of options.

About 38% said they would undertake a $2,500 project in the next few years. Of this group, about 2/3rds were also interested in the HU program, leading to about one-quarter of the SFMI respondents stating they were both willing to invest some money and also interested in the HU program.

These 25% are equally likely to be homeowners or renters, but are statistically higher income (i.e., $100,000 to $125,000).

Among those who had not heard of the HU program, many were extremely or very interested in a program that provided the HU components (40% of homeowners and 35% of renters).

More SFMI households (44%) are extremely or very interested in working with someone to create a five-year energy bill-savings plan, which may show potential for elongating the process for purchasing energy efficiency measures (if other barriers can be overcome) rather than one expensive bundle upfront.

[16] The top of the range was about $500 higher for homeowners and about $1,500 lower for renters.

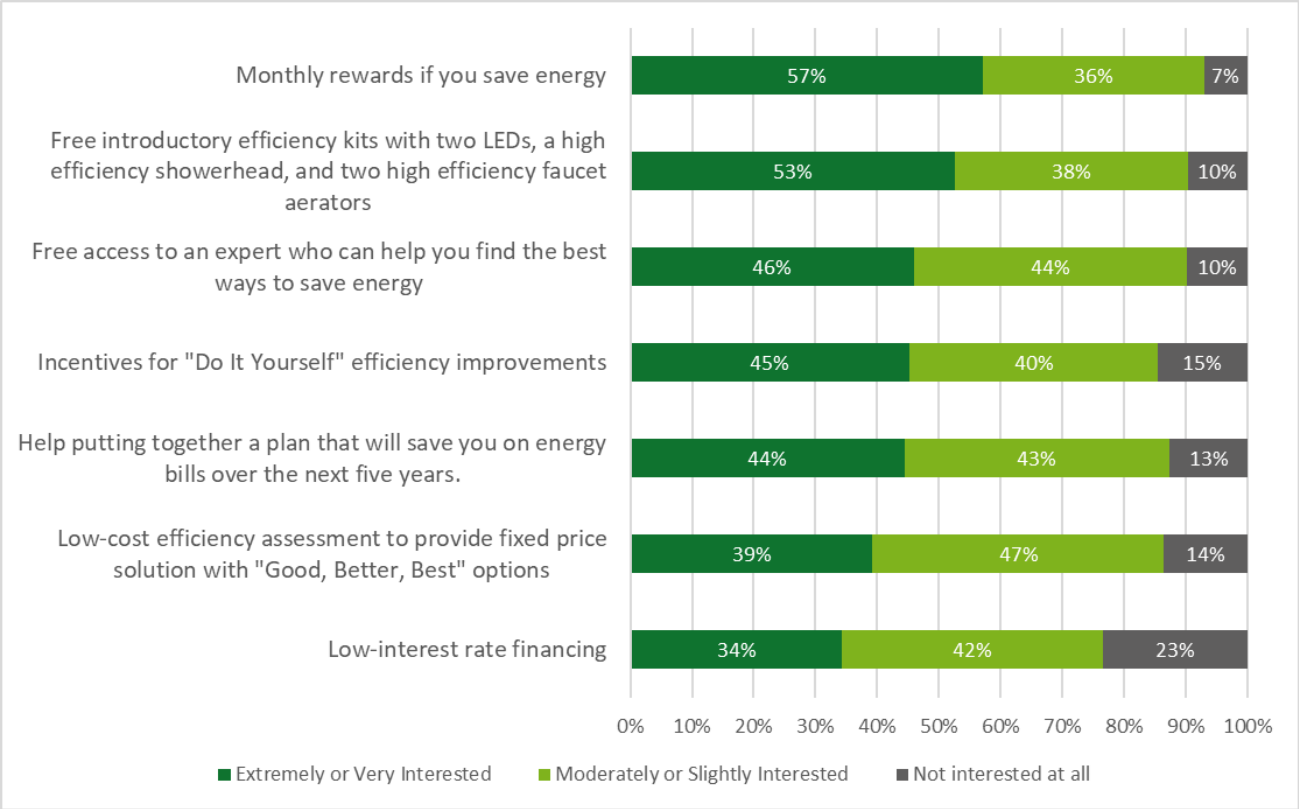
Offers to Engage SFMI Households

As a complement to any HU package, there may be a need to use a low cost or introductory offer to draw in and start to engage households. We explored several possible options to understand the best low-cost ways to engage households.

- **Monthly rewards.** The SFMI population showed high interest (57% were extremely or very interested) in a program that provided them with monthly rewards if they save energy
- **Introductory efficiency kit.** Kits including lightbulbs, aerators, and sometimes advanced power cords are often used to engage potential customers. Among the SFMI population, 53% were extremely or very interested in a free kit (with 2 LEDs, a high efficiency showerhead, and 2 high efficiency faucet aerators).
- **Energy Advisors.** BayREN is planning to continue to use Energy Advisors to engage potential customers. Note that about half (46%) were extremely or very interested in a program with free access to an expert, a role handled by the Energy Advisor in the current program.
- **Low cost energy assessment.** There was less interest in a low-cost energy assessment that provided fixed price solutions (39%).

We also looked at financing as a solution, described more below. There was less interest in financing than in the other possible program components that we explored. (See Figure 10)

Figure 10. SFMI Interest in Various Program Components



Source: SFMI Survey;(n=458)

Financing

Financing has been discussed among EE professionals as one possible solution to help overcome cost barriers. Past evaluations pointed towards financing as positively influencing participation in the whole house program. In general, financing increased the likelihood of participation (SBW, 2013), financed projects saved more (DNV-

GL 2017), customers who financed align with moderate income (Cadmus 2016), those who financed had larger projects (Cadmus 2016, Opinion Dynamics 2017), and financing increased the cost effectiveness of the program to over 1 (for the TRC and SCT) when using a model that accounts for financing benefits (Opinion Dynamics 2017). In Colorado, they tried offering financing rather than rebates. It dropped participation by 10% but according to implementers, led to market rate forces that really worked towards transformation and reduce the number that did not need the help. (Boulder County, 2013)

About half of SFMI respondents indicated they would have no difficulty obtaining a loan (55%).[17] We found that SFMI homeowners feel they have less difficulty than renters (65% thought it would be "not at all difficult to obtain a $2,500 loan for EE" versus 34% for renters). However, for SFMI in BayREN, financing appears to have a small influence in households taking energy savings actions. For the 40% of SFMI households in our survey who stated they were *unlikely* to making energy savings improvements in the next two years that cost over $2,500, inclusion of financing increased their likelihood only by 6% or less. (High rebates[18] and on-bill financing providing the highest increase, see Table 13).

Table 13. Percent likely to make energy savings improvements over $2,500

Financing Option	Homeowners or Renters
Likely to take an energy savings action >$2,500 in the next two years	38%
Likely to take an energy savings action >$2,500 in the next two years with…	
A rebate equal to 20% of the cost	44%
A loan repayable on your utility bills	44%
A low-cost loan at a 6% interest rate and a rebate equal to 20% of the cost	42%
A loan repayable through your property tax *(homeowners only)*	40%
A low-cost loan at a 6% interest rate	39%

Source: SFMI Survey (n=458)

PACE financing is often described as a good tool for home improvements. The Cadmus study (2016) found that attractive financing was influential for HERO participants. However, PACE programs often go through local governments or non-profits and only about one-quarter of SFMI households are aware of any financing available to them from local governments, cities, municipalities or non-profit organizations. Additionally, for the 32% of SFMI that are renters, this type of financing (i.e., tied to the property) is unavailable.

Overall, financing is good to have available for the population that can use it and there are options out there. Given the relatively small bump in likelihood to make larger savings improvements, the BayREN program does not need to focus on this area but should educate allies about this type of complementing option.

Labeling for Renters

As mentioned above, renters have large barriers, including split incentives. The data above shows an interest in a different set of measures, but we also explored the option of labeling rentals to see if Home Energy Ratings would make a difference to renters.

Renters are somewhat interested in understanding the energy use of a home before they rent. As shown in Figure 11, about a third felt that knowing something like a Home Energy Rating before renting would make a big difference in whether they rent or not. This type of information would make only a small difference for

[17] We found no statistical differences between the SFMI respondents in this survey and the general respondents in the financing baseline study for those indicating it was "very" or "somewhat" difficult to obtain a loan (Opinion Dynamics, 2016).

[18] The average project cost for the current HUP is around $14,000 according to BayREN members. A 20% rebate for this average project would be $2,800 and the current HUP rebate maximum is $3,000.

another 43%, which could be due to the known difficult rental market in the Bay area (i.e., it can be hard to find an affordable place, much less one that also has low energy use).

Figure 11. Difference a Home Energy Rating could make before renting

BEST MARKETING AND OUTREACH OPTIONS

Marketing and Outreach Options

Any future program will need to both raise awareness and educate customers about the benefits of participating—putting forth a value proposition that will appeal to this group of customers. SFMI customers want to hear about EE programs through their utility bill or via email.

Past Home Upgrade Marketing

Within our SFMI survey population, past HU marketing led to 42% awareness of the HU program. Based on in-depth interviews with the HU implementer and eight BayREN members, marketing is primarily conducted by the counties (or BayREN members) and the type and level of marketing varies depending on the strengths and needs of the area. Workshops, and outreach to drive households to the workshops, are the primary methods of marketing.

- **Workshops** – Counties usually conduct from two to ten workshops per year and, through Q4 2017, have conducted 160 since 2013. This outreach method is used because of the complexity of the HU program.
    - *Benefits of workshops*. This method can convey a depth of information about the program that helps convince potential customers to participate.
    - *Drawbacks of workshops*. The counties had some concern that this will only appeal to individuals that have the time to spend at a workshop—so may be less appealing to moderate income families. This is also a resource intensive method, both in that it requires effort to get households to the workshops, and then additional resources to put on the workshops.

The counties generally rely on one of two ways to get potential participants to workshops:

- **Mailers** – Some counties mail HU invitation letters (to let households know about the workshops) with property taxes or using assessor data to target; or as an insert with waste/recycling bills. While some counties saw limited success with mailings, Santa Clara county did see success in using mailers to get potential participants to workshops when the mailers had the county seal on the envelop and letter. In the past, they sent approximately 2,000-2,500 letters per event and had about 80 potential participants per workshop. They did describe this method, however, as expensive. Contra Costa county provided a similar assessment. They use county assessor data to target. After mailing to about 5,000, they usually see 50-100 per workshop.
- **Nextdoor** – This social media channel was the most effective channel for San Francisco county. San Francisco county uses this channel to guide potential participants to workshops. This is a free channel so much less expensive than mailing in areas where Nextdoor is common. San Mateo county also found this to be an effective channel for getting potential participants to the workshops. On its own, however, Nextdoor does not seem to lead to meaningful interactions that would encourage people to participate.

In general, even those that are seeing some success in workshops are looking for less expensive methods for educating households.

Some counties have also used tabling at events. However, tabling was seen as a less successful method because it is difficult to convey the information needed, and help households understand how they can overcome the upfront cost, with such a short interaction.

San Francisco county and Santa Clara county also mentioned that they have gone door-to-door but that this method was not successful in getting people to sign up for the program or for workshops. It is also a more resource intensive method of outreach.

One county, Napa, also mentioned placing ads in a local circular, Napa Valley Marketplace.

While there are some marketing materials that have been translated into Chinese or Spanish, the non-English marketing to date has been limited. San Francisco county, however, did indicate that they have done lots of in-language marketing, working closely with community-based organizations (CBOs).

Contractors

The methods above describe the marketing by the BayREN member counties. Some mentioned that participating contractors may also do marketing, but generally, the counties indicated that the participating contractors probably don't mention the program. "They sell based on rodents, dirty air from duct work, etc." Counties also mentioned that most of the contractors are smaller contractors that don't have budgets for marketing. Notably, based on conversations with the current program implementer, some contractors use the program as part of their marketing strategy and others do not. If BayREN wants to reach a larger group of individuals, contractors can help, but they will need to understand the value proposition that will help them encourage customers to participate and feel that it is easy for them to participate in the program.

Household Preferred Approaches

To date, the most often described method of learning about energy efficiency programs was through a notice with their utility bills. The utility bill, along with email, is the preferred method for learning about future programs. (See Figure 12) Marketing through the utility channel, however, requires BayREN to coordinate with PG&E (the utility) since BayREN does not have recurring interactions through utility bills. If BayREN works to obtain customer emails, though, it could be a positive approach.

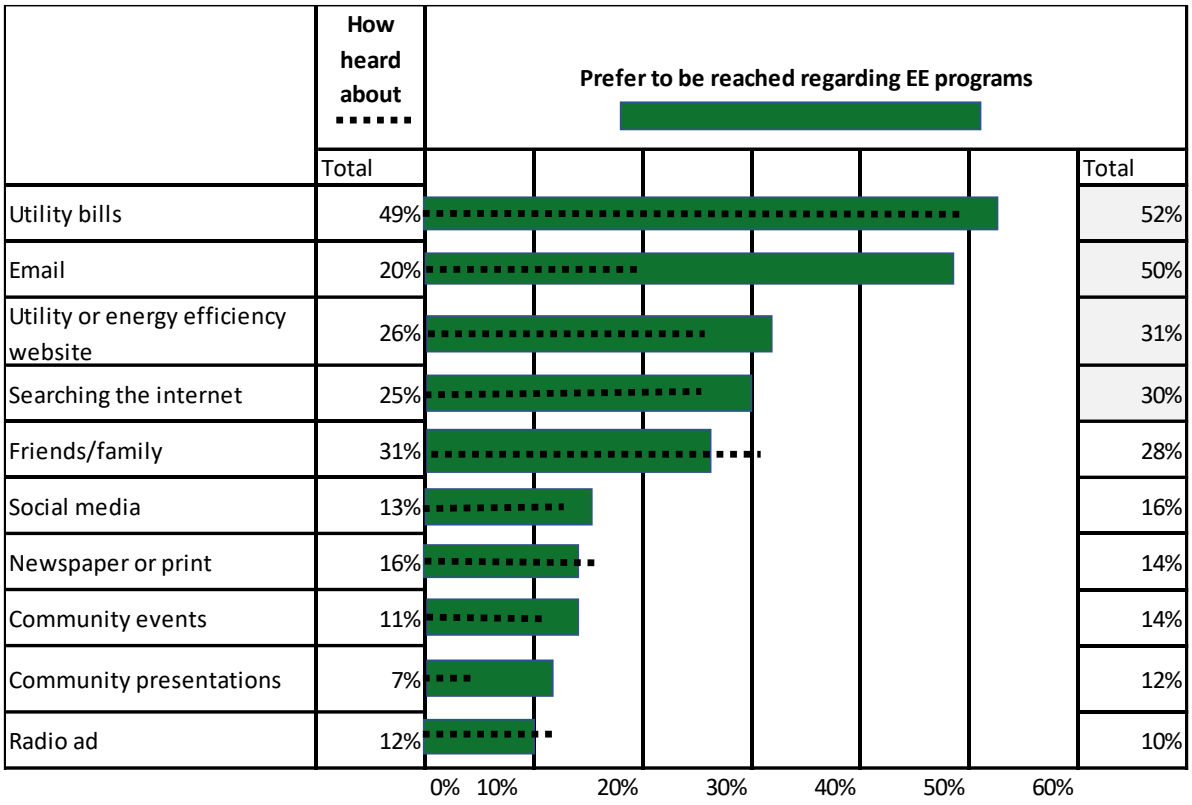
Utility or other websites, internet searches, and from friends and family were also suggested as good ways to reach out to households.

Some of the methods used by BayREN and the counties, such as community events or presentations, were mentioned by 11-14% of the population. While these were only mentioned by a small percentage, the benefits of presentations (or workshops) include the ability to delve deeper into the subject matter.

Other programs sometimes try to market to many households at the same time through "neighborhood blitzes". Colorado found that these neighborhood blitzes did not translate into high conversion rates (Boulder County, 2013)

There were no differences in preferred approaches between homeowners and renters, but future SFMI efforts most likely should focus on owners since 74% of renters in SFMI homes just don't think it's worth participating in this type of a program because they are renting.

Figure 12. How heard about EE programs and preferred outreach method



Source: SFMI Survey (n=458)

Marketing Messages

The HU program can be a hard program for people to wrap their heads around. San Mateo county has tried bundling messaging about the HU program with other efforts, such as PACE and Home Energy Score (HES) and has found this bundling to be somewhat successful. Others (Marin and Alameda) bundle HES and HU together when reaching out to their respective communities and feel that this bundling is generally a good approach since customers are often interested in the audit piece of the program (HES) more than the more in-depth and costly full HU program.

There needs to be a good "value proposition" in the marketing of this, and then there needs to continue to be a strong educational piece (such as the Energy Advisor piece, workshops or something else) because these are not easy fixes or easy decisions. BayREN will also have to figure out how to help people see this as a priority, as only about 10% currently see energy as a priority. BayREN will need to convince SFMI customers about the value of upgrading their home because many do not understand the value.

According to feedback from the BayREN members, reducing energy use has ***not*** been the most successful messaging to date, but other types of messaging may work better than just talking about energy costs:

- San Francisco county and San Mateo counties felt that the comfort messaging has been the most successful marketing to date.
- Marin talks about comfort messaging (including home value) and air quality.
- Sonoma county markets the co-benefits of the program, such as health and lowering bills.
- Alameda county felt that the marketing should talk about cash flow rather than payback.

Counties are curious as to whether environmental messaging or health would be effective, but these were not explored through our survey efforts.

Based on findings from other areas of the country (Zimring 2011) the perceived benefits of these programs include lowering bills, increasing integrity of home, improving health and comfort, and reducing exposure to rising energy prices. As such, this national review describes four messages that appear to be persuasive messages with moderate and low-income customers. This includes:

- Maintain the value of your home
- Replace aging/broken equipment
- Solve health and safety issues
- Save money by reducing energy bills

Among both owners and renters, there are some messages such as "leakiness" and "monthly rewards" that may appeal to both owners and renters. The large majority (65%) of households (61% owners and 77% renters) described their homes as drafty. Most homes have heat and 50% have cooling so helping to plug leaks is a message that will most likely resonate with customers.

CBOs

BayREN members have also mentioned working with CBOs to reach out to non-English speaking populations. There are several organizations in the counties that serve these populations, but the BayREN members have not had many partnerships with them yet specifically around the HU program.

Program will need to be strategic about who and how to work with CBOs as many may not be the right fit. For example, some CBOs tend to work with the low-income population (not MI populations). Others simply do not have sufficient staff to add anything more to their activities.

IDENTIFYING GAPS AND GUIDANCE FOR A FUTURE SFMI TARGETED PROGRAM

Identifying Gaps and Guidance for Future SFMI-targeted program

There is a low interest in the existing HU program and a low perceived need for energy efficiency. Other areas of the country are using MI-specific offerings such as enhanced incentives for MI households and bulk purchasing for HU type programs to engage MI customers

Current Program Offerings in California

There are several EE programs currently available to the BayREN SFMI population, although there will be changes over the next few years as PG&E renews their portfolio. Besides any BayREN or PG&E programs there are statewide programs and programs available through Marin Clean Energy (MCE). The information shown below in Table 14 is based on data from CEDARS.[19]

BayREN is planning to file a document that describes the full extent of overlaps and their coordination activities. This report does not attempt to recreate that filing but presents an overarching view to bring out that there are several programs available to the SFMI population.

Table 14. Programs Available to the BayREN SFMI Population

Program Administrator	Program Name	Program CPUC ID	Type of Program	Program includes measures desired by SFMI*
BayREN	Home Upgrade** *(Basic Path)*	BAYREN01	Incentive	✓
	Home Energy Advisor***	BAYREN01	Information	✓
	Financing	BAYREN04	Financing	
MCE	Single Family	MCE03	Incentive	✓
	Financing Pilots	MCE04	Financing	
PG&E	Advanced Home Upgrade	PGE21004	Incentive	✓
	Energy Advisor***	PGE21001	Information	
	Residential Energy Fitness (includes Moderate Income Direct Install)	PGE210011	Information and Direct Install	✓
Statewide	Plug Load and Appliances	PGE21002	Incentive	✓
	Primary Lighting	PGE21041	Incentive	
	Residential HVAC	PGE21006	Incentive	
	Energy Savings Assistance (only if qualify)	PGE_ESA	Reduced Rate	

**Programs checked are ones that include one of the top five measures desired by the SFMI respondents (see Figure 8) or where over half of respondents were extremely or very interested in a program component offered by the checked program (see Figure 10). Some people may desire financing but is not included here because survey responses indicated financing increased the likelihood of making improvements by only about 6%.*

***BayREN may split this program in the near future into the Single Family On Ramp and Single Family Package Measures programs.*

****The BayREN Home Energy Advisor and the PG&E Energy Advisor are independent of each other and are different due to the typical modality in which they touch customers. BayREN's program includes person-to-person contacts while the PG&E program includes online interactive engagement and information.*

[19] https://cedars.sound-data.com/programs/list/, accessed in June 2018

Several, but not all of the existing type programs support measures that the SFMI respondents ranked among their top five desired measures. Additionally, over half of the SFMI respondents were interested in free measures that are often offered by BayREN's Home Energy Advisor or PG&E's Residential Energy Fitness program).[20]

Past Program Participation

Past Energy Upgrade (Home Upgrade and Advanced Home Upgrade, just called HU here for ease of reading) offerings have seen low levels of overall participation. With about 1.3 million single family homeowners in the Bay area (of any income level), the five years of 2013 to 2017 had 9,883 participating households (about 0.8% of that population).[21]

While reaching relatively few participants, previous HU programs have served SFMI households in proportion to their BayREN population.[22] One review of multiple studies claimed a "disproportionate" level of high-income households (53% over $100,000) participated in the HU program when comparing to the overall state population (Frank 2016).[23] However, as shown above (in Table 2), the Bay Area has more high-income households while our analysis indicates that moderate income households have been participating equal to or greater than their BayREN population proportion. Specifically, Table 15 shows moderate income population percentages are similar to the participation rates in program year 2011 and 2012 (SBW Consulting 2013) and 2014-2015 (EMI Consulting 2016). Additionally, the EMI study found that 1% of 2014-2015 participants were renters, which corresponds to the high barriers we heard from the renters in our study.

*Table 15. Past Home Upgrade Participation Rates and Census Data Comparison**

Data Source	Moderate Income Range	Moderate Income	High Income *(income greater than high end of moderate income range)*
Home Upgrade Programs		*Participation Rate*	
SBW Consulting, 2013 *(PY 2011 and 2012)*	Under $100,000	25%	57%
EMI Consulting, 2016 *(PY 2014 and 2015)*	$50,000 to $100,000	33%	50%
BayREN Service Territory *(single family)*		*Percent of Population*	
2012 - 2016 ACS PUMS	$50,000 to $100,000 *(direct comparison to previous studies)*	26%	51%
2012 - 2016 ACS PUMS	$48,000 to $125,000 *(used in this study)*	38%	40%

** These two studies described about 17% participants being low income (i.e., under $50,000).*

Our study found a higher than expected number of SFMI respondents stating they had participated in the HU program (3%) and that most respondents had not heard of the program (59%).

[20] The BayREN Business Plan describes low-cost toolkits similar to direct install programs that may be included in future programs.

[21] There were 5,786 Home Upgrade and 4,097 Advanced Home Upgrade participants (2013-2017) and an average of 2,494 combined participants per year for the past three years (2015-2017).

[22] Past evaluation studies have used slightly different ranges for moderate income households than our SFMI study.

[23] We note that this study indicated that high income was anything over $100,000 while our SFMI population goes up to $125,000. Additionally, this study defined targeted programs as those designed to facilitate participation by a specific population but not restrict participation to that population. The authors concluded that untargeted programs left some households underserved (Frank 2016).

Challenges Faced by the Existing Program Offering

There are several challenges in the current HU program that BayREN will need to consider as they design a new program.

- **There is limited interest as well as other constraints (e.g., time, hesitation to work with contractors) that may prevent people from participating in the existing HU Program**. When briefly described to them in the survey, less than half were extremely or very interested in a HU type program (39%).[24] A home upgrade program can have multiple touch points and many in the SFMI population can't miss work to be at home for multiple meetings with auditors/contractors (36%). Additionally, some want to do the work themselves (30%).
- **Low Perceived Need.** Our study found barriers that were not new but are worth repeating. Most SFMI households have higher priorities than EE for their income (64%), feel that their energy costs are low already (52%), or are unsure that EE would save them money (51%). A large percentage of renters feel that energy efficiency is not worth it (76%).
- **Measures too expensive**. A HU type program is often expensive because of the multiple measures included. The average project costs for past programs was about $14,000 – a value that is $1,000 to $9,000 higher than what the SFMI population thought was an acceptable cost for a popular set of measures.[25]
- **Contractor Issues.** We heard anecdotal evidence regarding contractor issues from the BayREN members. Specifically:
    - Specialty contractors resist expanding their scope of work and simply sell the same packages with very small changes to meet program requirements, rather than selling what is best for the home.
    - Contractors prioritize higher cost measures to increase profits rather than energy savings. This emphasizes mechanical upgrades rather than envelope upgrades.
    - The rebates are used to inflate prices rather than bring prices down.
    - The program processing is a burden for small contractors.

SFMI Options Explored in Other Areas of the Country

While results are not directly transferable between regions, we did review findings from other areas of the country such as Massachusetts, Colorado, Arizona, Idaho and New York that have offered moderate income programs in the past. They offered recommendations about audits and the types of measures that might work to overcome the challenges listed above. These findings may apply to BayREN and are described below. We note that the specific dollar values from other regions or times are not directly transferrable to the current Bay Area context.

Audits

BayREN is planning to use energy advisors, and one Alameda based Home Energy Score contractor familiar with the program offered feedback that is somewhat aligned with what an advisor can do. This person said that "a program that educates and empowers the customer to know what their home needs could enable the free market to fix many of these problems. By incentivizing a third-party energy audits, homeowners could gather the information they need and then shop for those measures with contractors. A list of approved contractors

[24] Noteworthy, though, is the acknowledged difficulty in explaining this type of program that we described in the marketing section.

[25] The set package of a furnace upgrade, duct sealing, and more attic insulation was a popular set of measures according to the HU implementer.

could still be provided but an incentive for the actual work would be left out of the equation or reserved only for the cost-effective measures recommended by the audit."

Some programs that have tried to reach out to moderate-income customers with in-person home energy audits have been met with limited success and moved to less resource intensive options, such as phone audits or no audits at all.

- In Denver, to improve participation, the program removed the requirement for an in-home audit. They switched to primarily offering phone advising because it is half the cost of in-home, although they still offered some in-home advising to increase interest (without it, demand dropped). They also use Salesforce or similar tool to systematically track engagement, developed a standardized process for advising to ensure consistent high-quality work, and offered partnership program for contractors to make sure that the information was consistently being provided to customers (Boulder County 2013)
- In the early years (2010-2012) in Massachusetts, the program administrators (PAs) targeted communities offering no cost home energy assessments with instant saving measures (programmable thermostats, water saving devices, efficient light bulbs). They partnered with CBOs to reach out to specific communities, and geographically targeted areas. While this method was tried for several years—and did result in higher participation due to the personal contact—it took a significant amount of resources to work with multiple CBOs and ensure consistent information. The Massachusetts PAs eventually changed over to just additional enhanced incentives. (Informal discussions with Massachusetts PAs over time)
- The LBNL study that reviewed a variety of moderate income programs also suggested the option of "forgo[ing] the costly audit process (usually $100 to $600) and offer pre-packaged sets of measures that are widely expected to save energy across a range of properties." (Zimring 2011)

Measures – start with the basics

Our findings about interest in measures and bundles in the BayREN counties and the costs people may find acceptable appears to align with findings nationally. A review of national moderate-income programs recommended starting with the basics and offering this market air sealing and climate appropriate insulation at a cost of $2,000 to $5,000 while engaging with homes and encouraging them to make efficient upgrades each time they replace equipment. This same study also recommended pre-packaged measures that are expected to save measures in any home. (Zimring 2011)

In addition, many moderate incomes have found success in offering additional financial support to their moderate-income populations since this appears to be one of the largest barriers. Past efforts have tried enhanced incentives or escalating incentives.

Enhanced incentives – additional incentives just for MI customers and not a whole different program

- In Massachusetts, the PAs began providing enhanced incentives to income-eligible households that participate in their Home Energy Services program through what they referred to as their Moderate-Income offer, which included a home energy assessment, and rebates for insulation, refrigerators and clothes washers. All customers receive information about the Moderate Income offer at the end of the home energy audit, and some receive information in advance of the audit. The information is also available on the website. Most of the PAs use a third party to conduct the income verification. (Navigant and ILLUME 2018) Some customers, however, did not want to go through the income verification process and in Massachusetts, the contractors were handing out information on the Moderate Income offering but not always explaining it. After about two years of implementation, the program moved to covering 100% of the insulation costs up to $3,000 (or without a cap for some PAs) for moderate income customers (which his higher than for other customers not meeting the income requirements).
- In New York State, NYSERDA offers an Assisted Home Performance with Energy Star Program where customers receive a discount covering 50% of the costs up to $4,000 per project for single family homes,

and up to $8,000 for homes with 2 to 4 units. Other utilities across the country offer similar Assisted HPwES programs. (CEAC 2017, Zimring 2011) NYSERDA also offered 50% rebates (double its standard rebates) for moderate income customers. (Zimring 2011)

Escalating or tiered incentives – higher levels of incentives per measure when done together

- Based on their best practice review, the LMI study also recommend encouraging deeper retrofits by providing escalating incentives. (CEAC 2017) If customers do more, they would receive more funding and support. That is, insulation alone would receive one level of rebate, while the insulation rebate would be higher if the household did multiple measures.

Other options include phased improvements, group buy options, and targeted financing.

Phased improvements

- The LMI study suggested that to support the low-to moderate income populations, program administrators should adopt or develop a tool that engages homeowners and encourages the phasing in of clean energy improvements over time, such as the DOEs Home Advisor. (CEAC 2017)

Group buy for insulation

- Groundwork Denver ran a moderate-income insulation group buy pilot program. The group concept did not work for households because homes often were not ready to make insulation purchases at the same time, but it worked behind the scenes—or from the implementer's perspective—because the implementer could make bulk purchases on behalf of those who were ready to reduce the overall program costs. (Boulder County 2013). According to the current program implementer, group buy and bulk purchasing was also tried by the Davis Energy Group under ARRA with limited success.

Financing

- Traditional financing products may be familiar to customers but may not overcome the barriers in the moderate-income group. On-bill products, PACE and savings backed arrangements are likely to address moderate-income barriers better. (SEE Action 2017)

Interestingly, the LBNL review of moderate income programs that looked at the best options innovative design methods for overcoming barriers specific to this market stated that the programs still may not be enough to really scale efficiency. The report states that "while these approaches may be effective on the margin, they are not enough to be effective at the requisite scale for addressing broad public policy goals. Instead, these approaches should be seen as potential bridges or complements to robust public policies for all market sectors." (Zimring 2011)

Future Program Options

Although about 40% of SFMI customers have heard about the HU program, participation rates are extremely low. Among those that are aware but have not participated, many considered the existing program and chose not to participate (most likely because the offering did not appeal to them or because of other barriers). Based on the findings within this study, we offer the following options for consideration when designing a future program that would target SFMI households.

Design options include:

- **Low-cost ways to engage customers can serve as an on-ramp to the HU program**
  - A high percentage of SFMI customers express high interest in monthly rewards for saving energy (57% extremely or very interested).
  - There is also high interest in a free starter package (53% extremely or very interested).
  - Incentives for the DIY household (45%) may also appeal and offer a connection to some households.

- **"Packages" that include insulation and air sealing and are lower cost than existing packages will appeal to more customers**
    - The SFMI population is interested in insulation and air sealing measures. These could be considered "gateway measures" that lead to the higher cost measures such as furnaces or air conditioners. Many also want to consider a long-term energy plan (44%).
- **Some level of audit or other education will continue to be important if the value is not self-explanatory.**
    - A little less than half the population are interested in having experts to advise them (46%); however, there is a need for education in order to help households understand the value of taking additional energy efficiency actions in their home and prioritizing these actions over competing priorities.
- **Messaging that uses low-cost appeals that are of interest and/or that demonstrate the value to the household will be important since households do not see HU-type actions as a priority**
    - There needs to be a good value proposition in the marketing of any future programs. This will need to occur alongside a strong educational piece (such as the Energy Advisor piece, workshops or something else). Messaging should emphasize areas of interest (rewards) or challenges that they face (e.g., drafty homes). When marketing, email as a good way to contact this population to inform them about EE programs (as are utility bills). Linguistically isolated households make up ~6.5% of all SFMI households and first program touches in language will be beneficial for those households.

Overall, financing may be useful to some households; however, given the relatively small bump in likelihood to make larger savings improvements, the BayREN program should educate allies about existing financing options that may complement the BayREN program, but not focus on this program element.

Renter Specific Considerations

Renters will most likely need their own offerings within a Home Upgrade type program. While our study found the expected barriers to renters (i.e., lack of interest in paying for items such as envelope or HVAC measures as these stay with a building and having different HVAC equipment), any program targeting SFMI includes renters. While the eventual program design may choose to reduce emphasis on renters because of known barriers, to target the program to renters, program designers should keep in mind the following areas that differ from homeowners:

- Renters indicate have draftier homes and do not feel their homes are efficient, so inclusion of a low-cost air sealing option may appeal to them.
- Renters ranked a desire for low-water use toilets as high, indicating that inclusion of water savings options within a program may resonate.
- This population has less opportunity for HVAC upgrades (fewer central air conditioners and different heating equipment).
- More renters cannot miss work to be at any program related appointments, so implementation would need a very easy.
- Renters have less efficient lighting and few smart thermostats, so may be amenable to a low-cost kit.
- Offering something like an energy score for rentals may make a relatively small difference in the market, so a program should not spend effort in this area (but could include it if already present in the market).

The appendices that follow describe how we used the census data, specifics on completions within the online survey, a bibliography of literature resources we used in the study, and the data collection instruments.

APPENDICES

Appendix A. PUMS Census Data

Most of the statistics created for this report used Public Use Microdata Sample (PUMS) as the data source. This appendix describes PUMS data, where to obtain the data, and how we manipulated the data to arrive at statistics.

What is PUMS data:

PUMS datasets are derived from the United States census data collection that occurs annually through the American Community Survey (ACS). Every year, the Census Bureau contacts over 3.5 million households across the country to complete the ACS. PUMS files are untabulated records from the ACS with each record representing individual people or housing units (i.e., the raw data maintains confidentiality and includes housing or individual weights). PUMS files are available annually as well as a single file with five-years of data. Within the five-year PUMS file, the Census Bureau includes appropriate adjustments to the weights and inflation adjustment factors.

PUMS data goes beyond the ACS data that is available online through American FactFinder, enabling us to create custom cross tabulations and pull out county specific information.[26]

Our research used the 2012-2016 ACS 5-year PUMS datasets, which contain data on roughly 5% of the United States population.

Where to obtain PUMS data:

PUMS documentation is here: https://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.html A good overview is of PUMS is provided in the PUMS Read Me file on this website.

PUMS data is here: https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

California specific information is available as two files:

- Household data is in the California Housing Unit Records (~100 MB)
- Person specific data is in the California Population Records (~280 MB)

Number of records in the PUMS data used by the study:

The first step was to isolate PUMS data to only the nine-bay area counties. The table below presents the number of records that we began with and number used in our analysis.

Activity	N records in dataset	Notes
California Housing Units dataset	772,328	All California regions
Reduce housing records to those in BayREN service territory only	150,028	Used PUMA values (PUMA is the smallest geographic area within PUMS data) as obtained from MCT Research group in the population dataset to create dataset that was just households in the nine bay area counties. Kept housing unit records where there were matching population records (i.e., merged on the variable SERIALNO).

[26] According to PUMS documentation, estimates created with PUMS data will be slightly different from that found on American FactFinder because PUMS files include about 2/3s of cases that American FactFinder uses and PUMS files include additional edits.

Activity	N records in dataset	Notes
		Palo Alto, who is not part of BayREN, is included in this dataset as it cannot be easily removed. *(Using a different data source, Palo Alto is about 4.3% of Santa Clara county's housing units.)*
California Population dataset	368,776	All California regions; we requested all records for 29 variables from the MCT Research group as MCT had the software to open and parse the very large dataset.
Reduce population records to those in BayREN only	136,423	Applied the same logic as for the household dataset to obtain records of people in the nine bay area counties. This dataset includes Palo Alto. *(Using a different data source, Palo Alto is about 3.5% of Santa Clara county's population.)*

Important points in our use of PUMS data

- When we used currency variables (e.g., mortgages, income, etc.) we applied the adjustment variable included in the PUMS data to bring all values into a single year. All currency values are in 2016 dollars.
- For certain cases, we calculated confidence intervals (90±10) to determine if there was a significant difference between moderate-income and high-income households. We used the General Design Factor (GDF) approach to estimate standard errors, obtaining the California design factors from the PUMS Accuracy of the Data document (Attachment A-6), and then multiplying the standard error by 1.654 to estimate the interval value. The GDF algorithms are included in the Accuracy of Data document.[27]
- When calculating variable averages, we weighted them by the housing weight or the person weight, whichever was appropriate.

[27] https://www2.census.gov/programs-surveys/acs/tech_docs/pums/accuracy/2012_2016AccuracyPUMS.pdf

Appendix B. Online Survey Details

Grounded Research conducted an online survey of SFMI households in the nine targeted counties using a panel provided by Qualtrics. We purchased responses from the Qualtrics panel after having little response from purchased emails (that included a chance at $100 or $35 gift cards). Response rates were not available due to the panel-based approach.

We completed 466 surveys split between owner-occupied homes (68%) and renter-occupied homes (32%). This split in survey responses between homeowners and renters exactly matches the SFMI population split.

We sought to represent five geographic regions including the three largest counties (Alameda, Santa Clara, and Contra Costa), as well as the other North Bay counties and the SF/San Mateo area. Table 16 shows the population from census data and our final response percentages by these county groups.[28]

Table 16. BayREN Population and Completed Survey County Percentages

County Grouping	Population*	SFMI Survey Completions
	707,080	*466*
Alameda	21%	20%
Santa Clara	20%	23%
Contra Costa	17%	16%
North Bay *(Marin, Napa, Sonoma, Solano)*	25%	14%
Peninsula *(San Francisco, San Mateo)*	18%	28%

**Data from ACS 2011-2015 PUMs data with adjustment to Santa Clara county using rough estimates from Data USA that indicates approximately 7,600 MI households in Palo Alto. We removed Palo Alto zip codes from our survey respondents. Population counts rounded to the nearest tens, population percentages do not sum to 100% due to rounding.*

We considered weighting by county group to account for differences between the respondents and the populations (e.g., the North Bay and Peninsula county groups were different from the population by about 10%). We analyzed key results both with and without weights and found little differences (e.g., responses are different by 1% to 3% over unweighted results). Additionally, weighting did not affect the top five measures chosen from our list of desired products (although changed their percentages slightly). We chose not to weight due to seeing small difference when weighting and being uncomfortable up-weighting less than 20 responses by over 200%.[29]

The SFMI survey generally represent the diversity of the BayREN population, as shown in Table 17, although is a little low in Hispanic respondents.

Table 17. BayREN and SFMI Survey Ethnicity Percentages

	Census Data*	SFMI Survey
White alone, Not Hispanic	41%	54%
Asian	25%	28%

[28] Because San Francisco BayREN members thought that their housing stock may be very different from the other Bay area counties, we oversampled from San Francisco households.

[29] Best practice in surveying describe not using weights over 2.0 or under 0.5 (i.e., 200% weighting or 50% weighting). To obtain county percentages that were more aligned with the population would have meant using weights over 2.0 (for Napa and Solano) and close to 0.5 (for San Francisco).

	Census Data*	SFMI Survey
Hispanic	24%	10%
Black	6%	3%
Two or more races	4%	4%
Other	1%	1%

**Data from ACS 2011-2015. This dataset is by individuals, not households.*

Additionally, eight respondents indicated a housing situation that was not fully as an owner, nor were they renters (e.g., they lived with a family member). This group was not included in the responses, reducing the number from 466 to 458 total respondents.

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Appendix D. Data Collection Instruments

Draft In-depth Interview Guide for BayREN single family team members

Main Objective: To understand how BayREN members work with the SFMI population within their jurisdictions and how they want to interact with a SFMI program

Other objectives:

- To understand available data and past research
- To explore desired goals and options for a future program
- To understand if there is one or more area of high importance that they want to ask within our online survey

Grounded Research will explore the topics outlined below to gather information that will help us answer our objectives. We will talk with the BayREN single family team members via phone. See list on next page.

In-depth Interview Guide

- Introduce self and explain a little about the market characterization we are performing.
    - Type of information to be provided by the study
    - Online sample size by county
- Ask about their involvement with the current Home Upgrade program.
    - If involved, what are the parts of the program that are good / poor?
    - What type of marketing do they use to perform program outreach? Probe on:
        - whether marketing is stand alone or bundled with other information;
        - what type of marketing do they think works to move the population from awareness to participation in a program;
        - Are there particular messages or methods of outreach that they would consider using to reach MI populations?
    - How do they think the current program helps their population?
    - What program participation barriers do they see in their population? Are there any barriers that are specific to MI customers (or ones that they think are more prominent in this group)?
- Ask about desired future program.
    - What would you like to see a future SFMI program accomplish? (i.e., what are desired program goals?)
    - What new program components would you like to see? Which could be dropped?
    - Are there specific measures (or offerings) that are needed by MI in your area?
    - Which financing products tend to be used for home upgrades in your county?
    - How would you like you/your county to interact with the program implementer that is different from how you interact now?
- Determine any potential county specific SFMI data or research that may be useful to include in the study to characterize the market.
    - Confirm % MI in the county (see table below). Any data specific to this population?
- Do you work with CBOs in your county to reach non-English speaking populations? Discuss how we plan to analyze the survey data and then approach appropriate CBOs to reflect on results. Ask if they have one or two CBOs that specifically work with non-English speaking populations who would be good to approach in their county. (Follow up as needed to obtain contact information.)

In-depth Interview Guide for CPUC and PG&E staff

March 6, 2018

Grounded Research plans to speak with CPUC staff involved in the single-family area (Nils Strindberg and possibly Peter Franzese) and the relevant person at PG&E (potentially Al Gaspari or Adam Scheer) the week of March 5th or 12th.

Interview Purpose

The objectives of these interviews are:

- To understand PG&E and CPUC perspectives on the Single-Family Moderate-Income (SFMI) population
- To understand whether respondents know of available data or past research that could inform our study
- To gather hypotheses about this market and/or suggestions for program offerings that could be explored through the survey effort

Grounded Research will explore the topics outlined below to gather information that will help us answer our objectives. ***We anticipate that these discussions won't directly follow the order of the questions below, but the bullets below will be used to guide the conversation.***

Areas for Discussion

1) Introduction
   a) Explain the purpose of the BayREN market characterization and the types of data that will be collected
2) Ask both PG&E and CPUC
   a) What program participation barriers do you see in the SFMI population? Are there barriers that are more prominent in this group than in other populations?
3) Questions for PG&E person
   a) What else can you tell us about the SFMI population in the PG&E territory?
   b) PG&E's Moderate Income Direct Install (MIDI) Program
      i) Is PG&E continuing to pursue the MIDI program?
      ii) What research did PG&E (or others) conduct prior to developing the MIDI program?
      iii) Do you think the current MIDI program fully serves this population? Why or why not?
   c) Do you think that moderate-income (MI) customers need more targeted program offerings? Why or why not?
   d) What, if anything, does PG&E plan to do to reach the SFMI population in the future?
   e) Do you see any issues with how a BayREN SFMI program might interact with PG&E's other offerings? (Please describe)
   f) Do you think the SFMI population needs are different in the Bay area versus other PG&E areas?
4) Questions for CPUC person
   a) Do you think that MI customers need more targeted program offerings? Why or why not?
   b) What would the CPUC like to see in a future SFMI program?
      i) What new program components would you like to see? Which could be dropped?
      ii) Are there specific measures (or offerings) that SFMI need?
      iii) What do you see as the constraints on a future whole house offering that targets SFMI?
5) Final questions for both PG&E and CPUC
   a) Are you aware of any studies or research on the moderate-income population (conducted by our industry or others/in California or elsewhere) that may be useful to our study?
   b) What data would you like to see us collect and/or report on?

Community Based Organization Interview Guide

We will perform up to 10 in-depth interviews with Community Based Organizations (CBOs) who work with linguistically isolated households. Our interviews will seek to understand:

- If specific survey findings for SFMI English speakers also apply to the populations served by the CBOs. (We will compare our survey findings with what the CBOs tell us in three areas, denoted with an * in the questions below.)
- Other important information or trends the CBOs see in terms of energy use within the populations they serve (which may include HTR populations that are not linguistically isolated).
- Whether the CBOs serve HTR populations.

Introduction

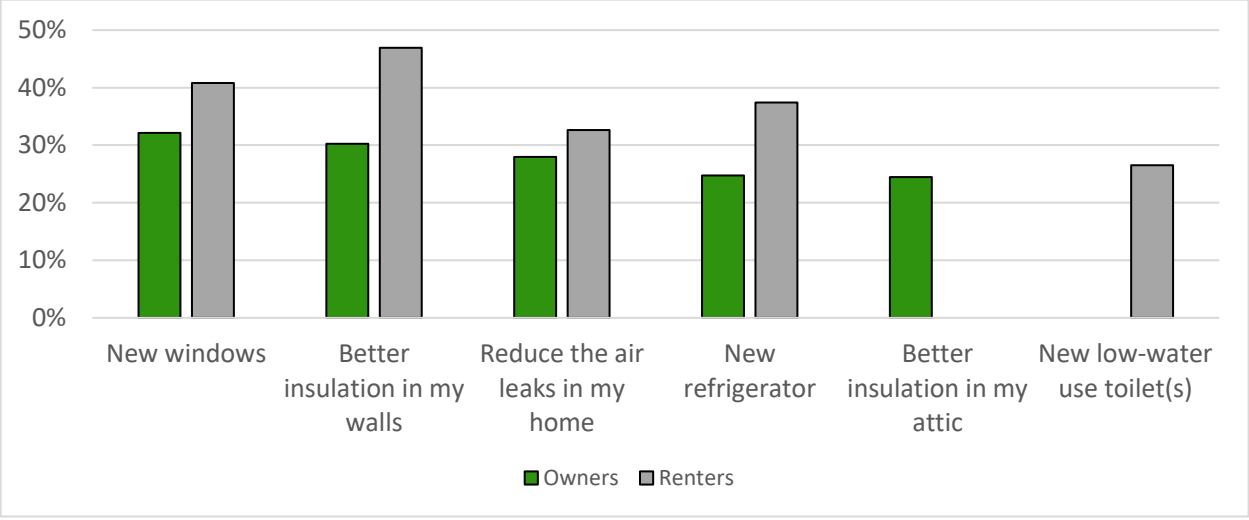
We will explain our survey effort – the purpose for it and the population we reached and what we hope to learn from our conversation with the CBO.

CBO Population and Services

1. What are the characteristics of the population you serve? (e.g., languages, income, homeowners/renters, SF/MF, age) (Probe for split between homeowners / renters if not indicated, percent of SFMI population served) *[If they don't serve SFMI population at all, thank and terminate interview]*
2. What are the top three services you provide?
3. Where do the people that you serve live? (e.g., all of the county, specific areas)
4. Do you think the population you serve:
    a. has easy access to energy efficiency program information?
    b. participates much in EE programs? If not, why not? (probe for language, income, MF)
5. Do you provide or promote any energy efficiency programs or services? Which ones? What information do you or others in your organization share about EE programs? (Probe for ESA/LI programs, MIDI, and Home Upgrade.)

Interest and Best Ways to Reach this Population

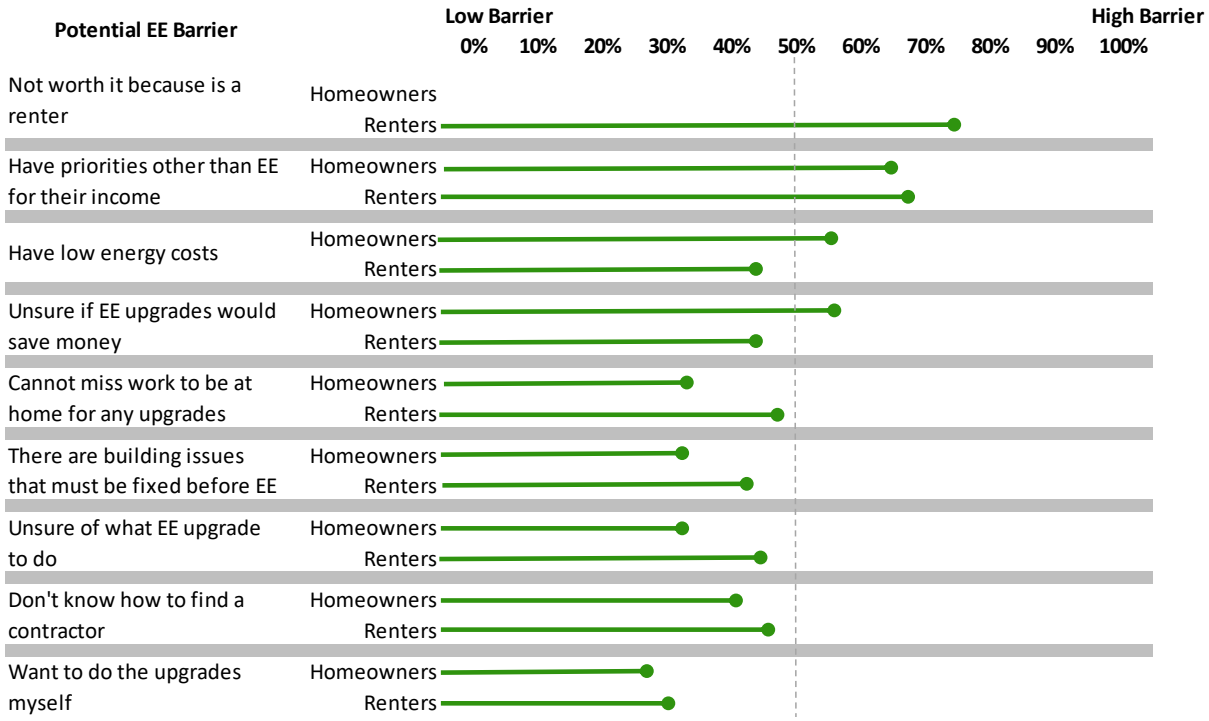
6. *Do you think that the population that you serve would be interested in [Top measures from survey in figure below – open ended responses included solar as well]?



7. *What are the best ways to reach this population to discuss EE?
8. What type of EE messaging do you think would resonate with your population? (Probe for comfort, health, payback)

Barriers

9. *What do you see as the barriers to participation in an upgrade program for your population? [OPEN END first and then probe for these barriers if they don't come up:]
    a. Competing demands for money (We have other things that are of higher priority to spend our money on other that EE upgrades)
    b. Low energy costs (Our household has low energy costs, home is already efficient)
    c. Multiple interests in the home (Others in my household do not want to spend money on EE)
    d. Don't think that they will save money (I am unsure that EE upgrades would save much money)
    e. Can't miss work (I can't miss work to be at the house for some of the work around upgrades)
    f. More pressing health or safety problems with home (I think that there are problems with the house that I have to fix first (e.g., asbestos, poor wiring, carbon monoxide from my oven))
    g. DIY population. Don't want to work with contractors (I want to do the upgrades myself and not use a contractor)
    h. Knowledge about what to do (I don't know what EE upgrades to do, I don't know how to find a contractor to do EE upgrades)
    i. Renter (It isn't worth it because I am a renter)



Other Population Characteristics Related to Energy

10. Do you have anything to share with us about how your population may use energy? (Probe about whether they have difficulty paying energy bills, are on CARE)

BayREN SFMI - Qualtrics Panel

Q49 What county do you live in?

- Alameda (1)
- Contra Costa (2)
- Marin (7)
- Napa (3)
- San Francisco (6)
- San Mateo (8)
- Santa Clara (9)
- Solano (4)
- Sonoma (5)
- A different county (10)

Skip To: End of Block If Q49 = 10

Q51 Please enter your zip code.

_____

Q38 Which of the following describes your home?

- One family detached home (1)
- One family attached home (we share a wall with another family) (2)
- A home with 2-4 units (3)
- A home with over 5 units (4)

Skip To: End of Block If Q38 = 4

Q11 Which income bracket best describes your household income last year (2017)?

- Less than $48,000 (1)
- $48,000 to (2)
- $75,000 to (3)
- $100,000 to (4)
- $125,000 or over (5)

Skip To: End of Block If Q11 = 1
Skip To: End of Block If Q11 = 5

Q2
Have you heard of BayREN or PG&E's Home Upgrade Program?
Home Upgrade helps you identify ways to strengthen your home's energy efficiency. Rebates and incentives are available for home improvements that include air sealing, duct sealing, attic insulation, high-efficiency furnaces, cooling systems, water systems, wall insulation, and more.

- Yes (1)
- No (2)

Display This Question:

If Q2 = 1

Q3 Has your household participated, or considered participating in the Home Upgrade Program?

- ○ Yes, we participated (1)
- ○ We considered it, but did not participate (2)
- ○ No, we did not consider participating (3)

Display This Question:

If Q3 != 1

Or Q2 = 2

Q6 How interested would you be in a program like Home Upgrade if it had the following components?

1) an energy audit of your home for a small fee,
2) access to a free advisor, and
3) you could receive up to $2,500 in rebates by working with a participating contractor to install three or more upgrades through program?

As we said before, rebates and incentives are available for home improvements that include air sealing, duct sealing, attic insulation, high-efficiency furnaces, cooling systems, water systems, wall insulation, and more.

- ○ Extremely interested (1)
- ○ Very interested (2)
- ○ Moderately interested (3)
- ○ Slightly interested (4)
- ○ Not interested at all (5)

Display This Question:

If Q3 != 1

Q7 Why wouldn't you participate in this program?

_____

Q8 In the past five years, have you made any changes in your home that might have improved its efficiency?

Examples include buying high efficient appliances or adding ceiling insulation.

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Q8 = 1

Q9 What changes did you make?

_____

Display This Question:

If Q8 = 1

Q10 And about how much did you spend?

_____

Q12 Do you rent or own your home?

- ○ Own (1)
- ○ Rent (2)
- ○ Other (Please tell us what) (3)

_____

Q13 What type of heater do have?

- ○ Gas furnace (1)
- ○ Gas wall heater (2)
- ○ Electric wall heater (3)
- ○ Heat Pump (4)
- ○ Electric baseboard (5)
- ○ Something else (please tell us what) (6) _____
- ○ I don't have heat (8)

Display This Question:
If Q13 != 8

Q14 About how old is your heater?

- ○ 5 years old or less (1)
- ○ >5 to 10 years old (2)
- ○ >10 to 15 years old (3)
- ○ Older than 15 years old (4)
- ○ I don't know (5)

Q15 Do you have air conditioning in your home?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Q15 = 1

Q16 Is your air conditioner a central unit (that is, cold air blows through the duct system) or is it a window unit?

- [ ] Central Unit (1)
- [ ] Window Unit (2)
- [ ] It is something else (please tell us what) (3) _____

Display This Question:

If Q15 = 1

Q17 About how old is your air conditioner?

- ○ 5 years old or less (1)
- ○ >5 to 10 years old (2)
- ○ >10 to 15 years old (3)
- ○ Over 15 years old (4)
- ○ I don't know (5)

Q18 Does your home have a pool that you maintain?

- ○ Yes (1)
- ○ No (2)

Q19 Which of these do you have?

	Yes (1)	No (2)	I don't Know (3)
Low Flow Showerhead (1)	○	○	○
Low Flow Faucet Aerator (2)	○	○	○
Photovoltaic (PV) Solar System (3)	○	○	○
All Electric Car (4)	○	○	○
Plug in Hybrid Car (5)	○	○	○

Q20 What two or three things do you feel your home needs to become more energy efficient?

○ Most needed change: (1) _____

○ Second most needed change: (2)

_____

○ Third most needed change: (3)

_____

Q21 Which of the following would you be interested in for your home? (choose all that are of interest)

Highlighted rows are Home Upgrade type measures

- [ ] New windows (1)
- [ ] New central air conditioner (2)
- [ ] New central furnace (3)
- [ ] New heat pump (4)
- [ ] New refrigerator (5)
- [ ] New dishwasher (6)
- [ ] New screw-in LED light bulbs (7)
- [ ] Light bulbs that I can control from my phone (8)
- [ ] Thermostat that I can control from my phone (9)
- [ ] Better insulation in my attic (10)
- [ ] Better insulation in my walls (11)

If Which of these do you have? Please choose an answer for each item on the left - Yes Is Selected

- [ ] New water heater (with a tank) (15)
- [ ] New gas on-demand water water (no tank - a tankless on-demand type) (16)

☐ New low flow showerhead(s) (17)

☐ New low-water use toilet(s) (18)

Q18 = 1

☐ New pool pump (19)

☐ Reduce the air leaks in my home (21)

Q13 = 1
Or Q13 = 4
Or Q16 = 1

☐ New ducts for my central HVAC system (22)

☐ Sealing the small holes in my HVAC system ducts (23)

Carry Forward Selected Choices from "Q21"

Q22 Please rank these from 1 to 5

Pull top five here and move them up or down to rank them from (#1) most interested to (#5) fifth interested

This question shows only those measures that the respondent checked from above

Carry Forward Selected Choices In Group from "Q22"

Q23 When might you buy these items?

	Within the next 6 months (1)	Between 6 months and a year (2)	Between 1 and 2 years (3)	Over 2 years from now (4)	I don't know (5)	Never (6)
Top five options were here in survey	○	○	○	○	○	○

Q24

Please answer the following four questions as if you were going to buy this package of three energy efficiency items for your home:

1) a new central gas furnace,
2) duct sealing for the home, and
3) more attic insulation

This question may or may not apply to your experience right now, but please answer it to the best of your ability.

Move the slider to somewhere between $2,500 and $35,000. Your choice will show above the slider (don't worry about being too precise, but you do have to move each slider and we assume that the costs will be higher for each successive row below)

	$2,500 ... $35,000
At what price is this package..... ...**so inexpensive** that you would question the quality? (1)	
....such **a good value** that you would definitely buy it? (2)	
.... **starting to get expensive**, but you would still consider buying? (3)	
....**so expensive** that you would not even consider buying? (4)	

Q25
How much do you agree or disagree with the following statements?

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
We have other things that are of higher priority to spend our money on other than energy efficiency upgrades (2)	○	○	○	○	○
Our household has low energy costs (3)	○	○	○	○	○
Others in my household do not want to spend money on energy efficiency (4)	○	○	○	○	○
I am unsure that energy efficiency upgrades would save much money (5)	○	○	○	○	○

Q26 How much do you agree or disagree with the following statements?

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I can't miss work to be at the house for some of the work around the upgrades (1)	○	○	○	○	○
I think there are problems with the house that I have to fix first (e.g., asbestos, poor wiring, carbon monoxide from my oven) (2)	○	○	○	○	○
My home is already efficient (3)	○	○	○	○	○
I don't know what energy efficiency upgrades to do (4)	○	○	○	○	○
I don't know how to find a contractor to do energy efficiency upgrades (5)	○	○	○	○	○
Q12 = 2					
It isn't worth it because I am a renter (6)	○	○	○	○	○
I want to do the upgrades myself and not use a contractor (7)	○	○	○	○	○

Display This Question:

If Q12 = 2

Q27 What do you think it would take to get your landlord to make energy efficiency improvements to your house?

_____

Display This Question:

If Q12 = 2

Q28 How much of a difference would it make if you knew the energy use of a house before you rented?

This might include something like a home energy score that rates your home efficiency based on energy use.

- ○ A big difference (1)
- ○ A small difference (2)
- ○ No difference (3)
- ○ I don't know (4)

Q29 Are you aware of any local governments, cities, municipalities or non-profit organizations that offer financing for making energy savings upgrades in your home?

- ○ Yes (1)
- ○ No (2)

Q30 Please answer the following....

	Not at all likely (1) (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very likely (7) (7)
How likely are you to make energy savings improvements in your home within the next two years that cost over $2,500? (1)	○	○	○	○	○	○	○

Q31 How likely is it that you would make energy savings improvements in your home costing over $2,500 if you could receive…

	Not at all likely (1) (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very Likely (7) (7)
A low cost loan at a 6% interest rate (1)	○	○	○	○	○	○	○
A rebate equal to 20% of the cost (2)	○	○	○	○	○	○	○
Q12 = 1							
A loan repayable through your property tax (3)	○	○	○	○	○	○	○
A loan repayable on your utility bills (4)	○	○	○	○	○	○	○
A low cost loan at a 6% interest rate and a rebate equal to 20% of the cost (5)	○	○	○	○	○	○	○

Q32 In general, how difficult would it be for you to qualify for a loan of over $2,500 for making energy saving improvements?

- ○ Not at all difficult (1)
- ○ Somewhat difficult (2)
- ○ Very difficult (3)
- ○ I don't know (4)

Q33 How interested would you be in a program that provides you with:

	Extremely interested (1)	Very interested (2)	Moderately interested (3)	Slightly interested (4)	Not interested at all (5)
Free access to an expert who can help you find the best ways to save energy (1)	○	○	○	○	○
Free introductory efficiency kits with two LEDs, a high efficiency showerhead, and two high efficiency faucet aerators (2)	○	○	○	○	○
Monthly rewards if you save energy (3)	○	○	○	○	○
Help putting together a plan that will save you on energy bills over the next five years. (4)	○	○	○	○	○
Incentives for "Do It Yourself" efficiency improvements (5)	○	○	○	○	○
Low-cost efficiency assessment to provide fixed price solution with "Good, Better, Best" options (6)	○	○	○	○	○
Low-interest rate financing (7)	○	○	○	○	○

Q34 Within the past five years, did you participate in a program that installed free items in your home?
These items could be LED light bulbs, showerheads, faucet aerators, a power strip, or a smart thermostat.

- ○ Yes (1)
- ○ No (2)
- ○ I don't remember (3)

Q35 How would you *prefer to be reached* regarding energy efficiency programs? (choose all that apply)

- ☐ email (1)
- ☐ Social media like Facebook or Twitter (2)
- ☐ Radio Ad (3)
- ☐ Newspaper / print ad (4)
- ☐ Community events (5)
- ☐ Community presentations (6)
- ☐ Utility bills (7)
- ☐ Friends / family (8)
- ☐ Searching the internet (9)
- ☐ Utility or energy efficiency website (10)

Q36 How *have you learned* about energy efficiency programs in the past? (choose all that apply)

- [ ] Friends / family (1)
- [ ] Through social media such as Facebook or Twitter (2)
- [ ] Internet search (3)
- [ ] Utility or energy efficient specific website (4)
- [ ] Utility bills (5)
- [ ] email (6)
- [ ] Radio add (7)
- [ ] Newspaper / print ad (8)
- [ ] Community events (9)
- [ ] Community presentations (10)

Q37 You are almost done! Just a few more easy questions about your home and yourself.

Q39 About when was your home built?

- ○ Before 1960 (over 58 years old) (1)
- ○ 1960 to 1979 (39 to 58 years old) (2)
- ○ 1980 to 2004 (14 to 38 years old) (3)
- ○ 2005 or later (13 years or less) (4)
- ○ I don't know (5)

Q40 How many people living in your household are:

	Please put a number in the box that match the ages. (1)
Under 18 years old (1)	
Between 18 and 65 years old (2)	
Over 65 years old (3)	
Total	

Q41 Does your home have a lawn that you water?

- Yes (1)
- No (2)

Q42 How "drafty" (cold air getting into your home) is your home?

- Very drafty (1)
- A little drafty (2)
- Not drafty (3)
- I don't know (4)

Q43 When you think about all the lights in your home, about what percent are efficient bulbs, that is, CFLs or LEDs?

- Up to 25% (1)
- >25%-50% (2)
- >50%-75% (3)
- >75%-100% (4)
- I don't know (5)

Q44 What type of clothes washer is installed in your home?

- Front loading (1)
- Top loading regular washer (2)
- Top loading ENERGY STAR washer (3)
- We don't have a clothes washer (4)

Q45 What type of thermostat do you have for controlling the heater or air conditioner in your home?

- It is a programmable thermostat (1)
- It is a manual thermostat (2)
- It is a smart thermostat (it learns my behaviors) (3)

Q46 Can you adjust the thermostat setting from your phone?

- Yes (1)
- No (2)

Q47 Does your home have natural gas?

- Yes (1)
- No (2)

Display This Question:
If Q12 = 2

Q48 Who pays your energy bills?

	My household pays this bill (1)	Q12 = 2 This bill is included in my rent (2)	I don't know (3)
Electric Bill (1)			
Q47 = 1 Gas Bill (2)			

Q50 What is your ethnicity?

- White, not Hispanic (1)
- Hispanic (2)
- Black (3)
- Asian (4)
- Mix of two or more ethnicity's (5)
- An ethnicity not listed here (6)

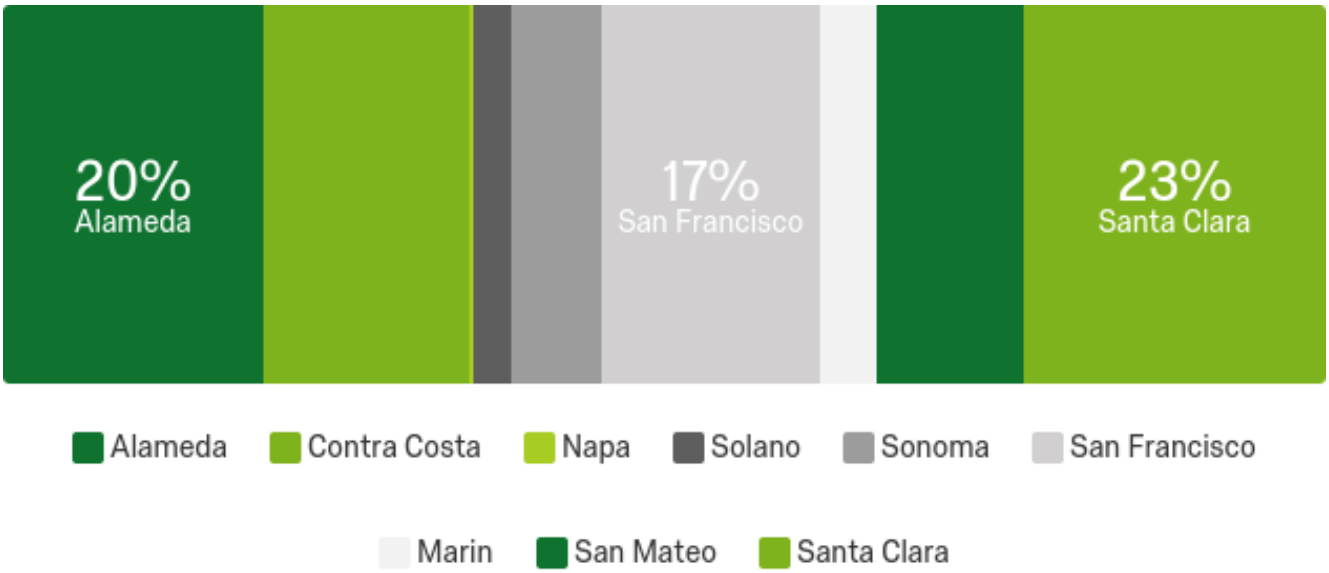
Appendix E. Online Survey Results

Survey Frequencies

BayREN SFMI

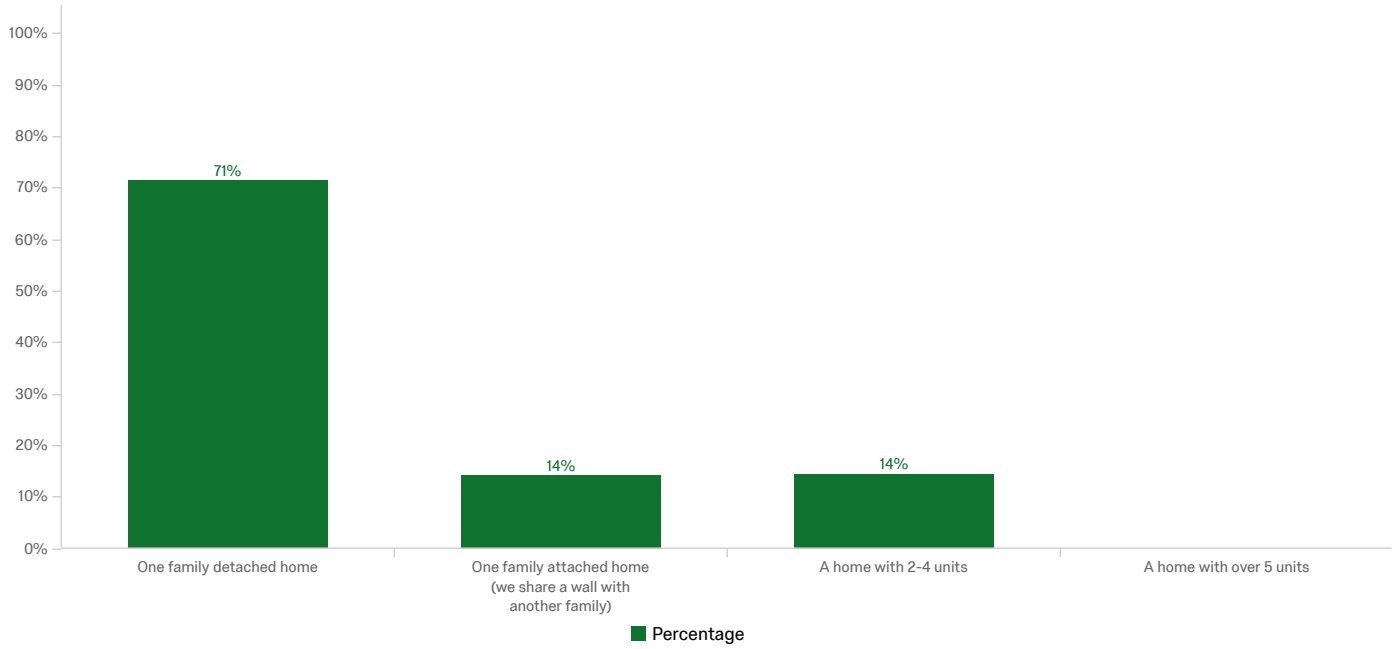
Data shown below match the order (and question number) of the questions in the survey (see Appendix D).

Q49 - What county do you live in?



#	Answer	%	Count
1	Alameda	20%	90
2	Contra Costa	16%	71
7	Marin	4%	20
3	Napa	0%	1
6	San Francisco	17%	76
8	San Mateo	11%	51
9	Santa Clara	23%	105
4	Solano	3%	13
5	Sonoma	7%	31
10	A different county	0%	0
	Total	100%	458

Q38 - Which of the following describes your home?



#	Field	Own	Rent
1	One family detached home	84%	46%
2	One family attached home (we share a wall with another family)	9%	24%
3	A home with 2-4 units	7%	30%
		311	147

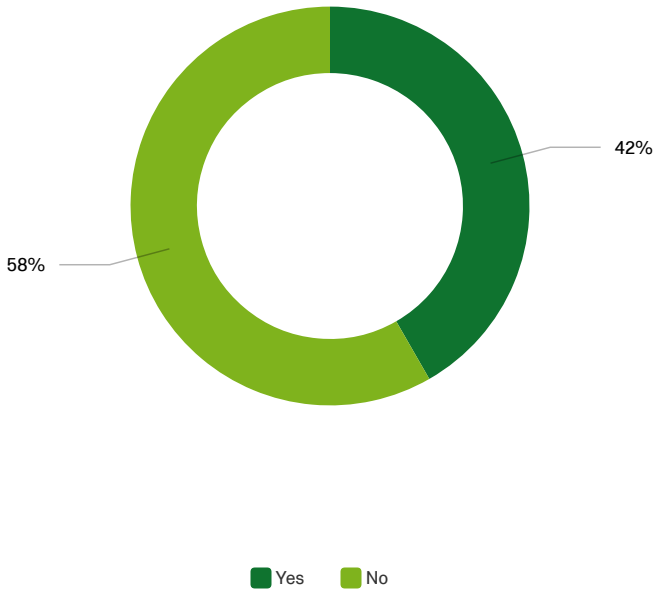
Showing Rows: 1 - 4 Of 4

Q11 - Which income bracket best describes your household income last year (2017)?

#	Field	Own		Rent	
2	$48,000 to <$75,000	35%	108	44%	65
3	$75,000 to <$100,000	37%	116	38%	56
4	$100,000 to $125,000	28%	87	18%	26
			311		147

Showing Rows: 1 - 4 Of 4

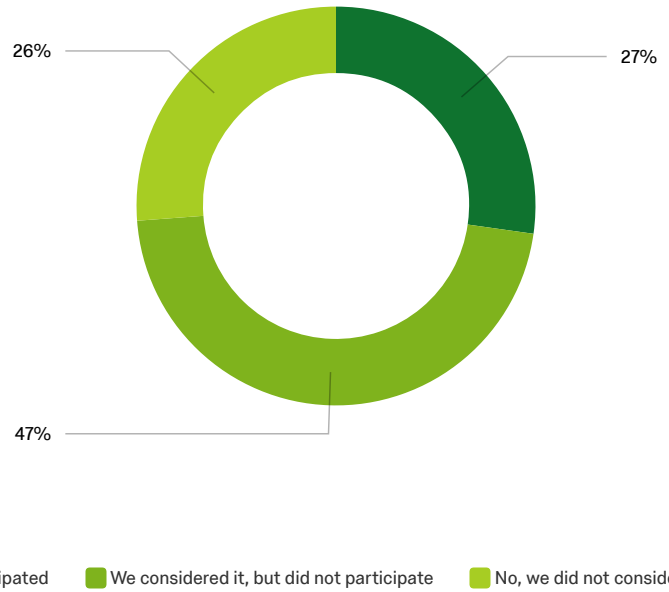
Q2 - Have you heard of BayREN or PG&E's Home Upgrade Program? Home Upgrade helps you identify ways to strengthen your home's energy efficiency. Rebates and incentives are available for home improvements that include air sealing, duct sealing, attic insulation, high-efficiency furnaces, cooling systems, water systems, wall insulation, and more.



#	Field	Own		Rent	
1	Yes	43%	133	39%	58
2	No	57%	178	61%	89
			311		147

Showing Rows: 1 - 3 Of 3

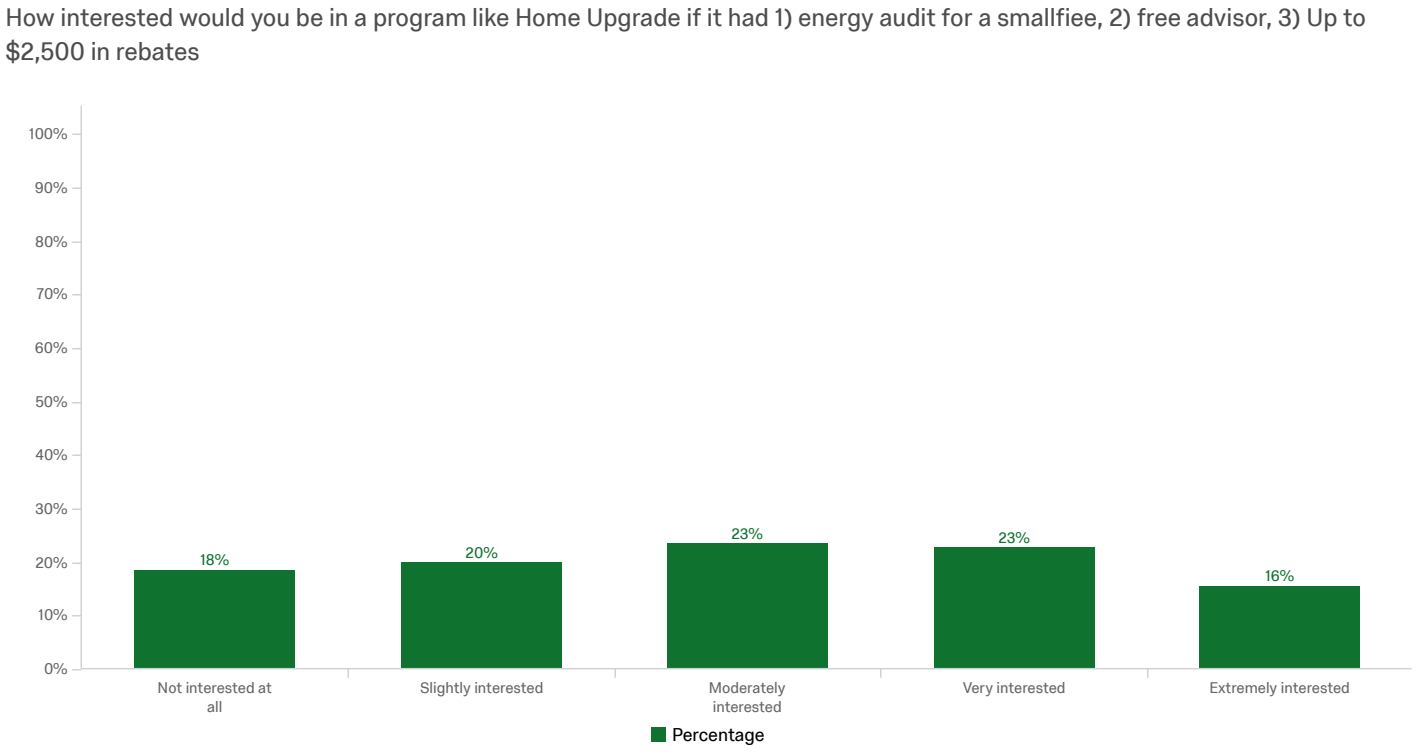
Q3 - Has your household participated, or considered participating in the Home Upgrade Program?



#	Field	Own		Rent	
1	Yes, we participated	30%	40	21%	12
2	We considered it, but did not participate	45%	60	50%	29
3	No, we did not consider participating	25%	33	29%	17
			133		58

Showing Rows: 1 - 4 Of 4

Q6 - How interested would you be in a program like Home Upgrade if it had the following components? 1) an energy audit of your home for a small fee, 2) access to a free advisor, and 3) you could receive up to $2,500 in rebates by working with a participating contractor to install three or more upgrades through program? As we said before, rebates and incentives are available for home improvements that include air sealing, duct sealing, attic insulation, high-efficiency furnaces, cooling systems, water systems, wall insulation, and more.



#	Field	Own		Rent	
5	Not interested at all	17%	47	21%	28
4	Slightly interested	19%	52	21%	29
3	Moderately interested	24%	64	23%	31
2	Very interested	24%	64	21%	28

1	Extremely interested	16%	44	14%	19
			271		135

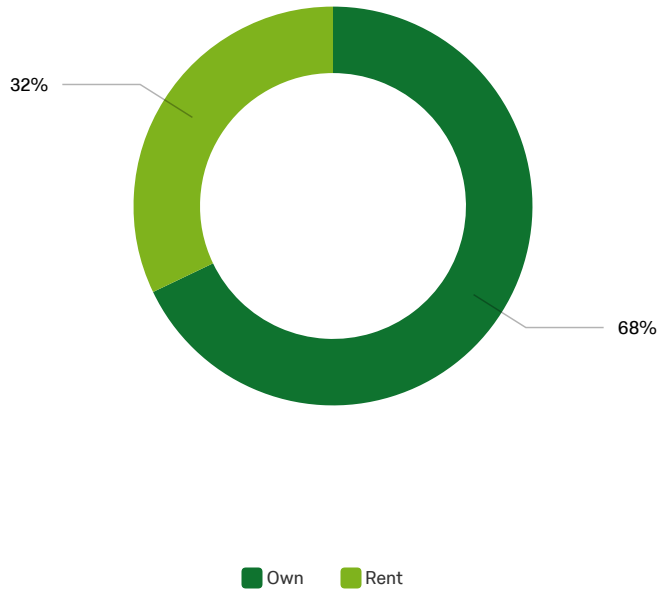
Showing Rows: 1 - 6 Of 6

Q8 - In the past five years, have you made any changes in your home that might have improved its efficiency? Examples include buying high efficient appliances or adding ceiling insulation.

#	Field	Own		Rent	
1	Yes	68%	210	47%	69
2	No	32%	101	53%	78
			311		147

Showing Rows: 1 - 3 Of 3

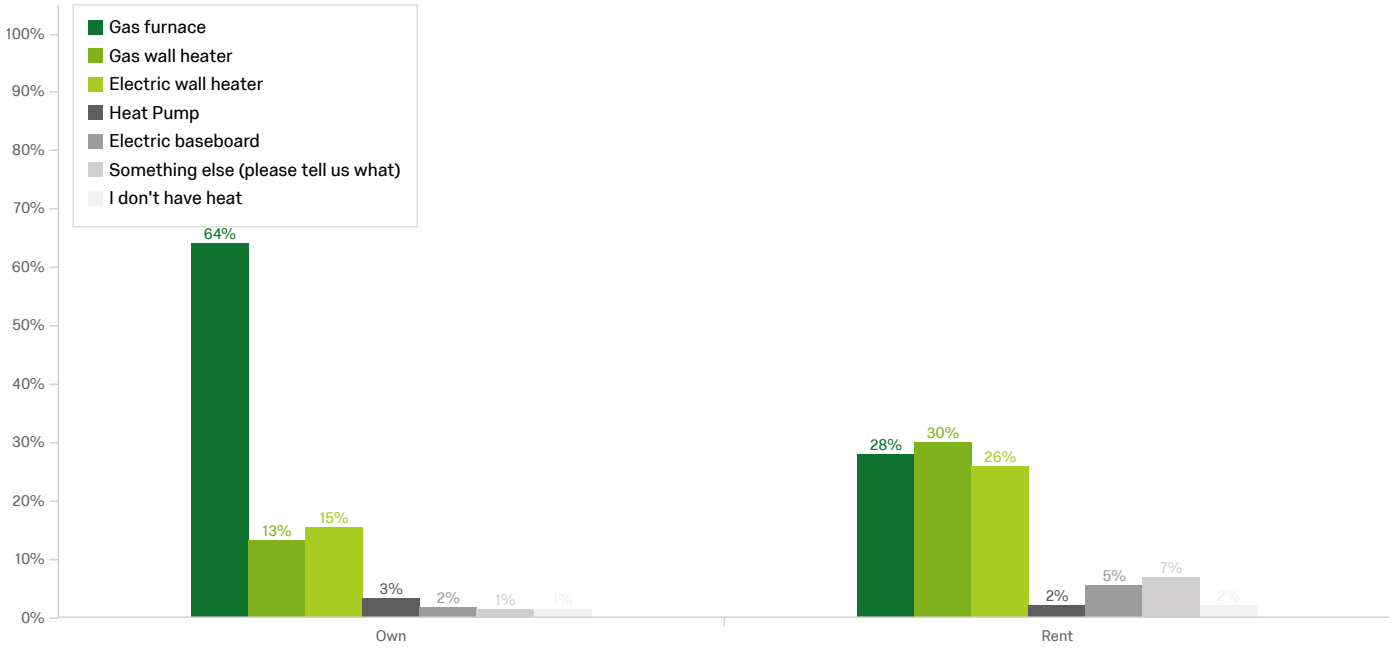
Q12 - Do you rent or own your home?



#	Field	Choice Count	
1	Own	68%	311
2	Rent	32%	147
			458

Showing Rows: 1 - 3 Of 3

Q13 - What type of heater do have?



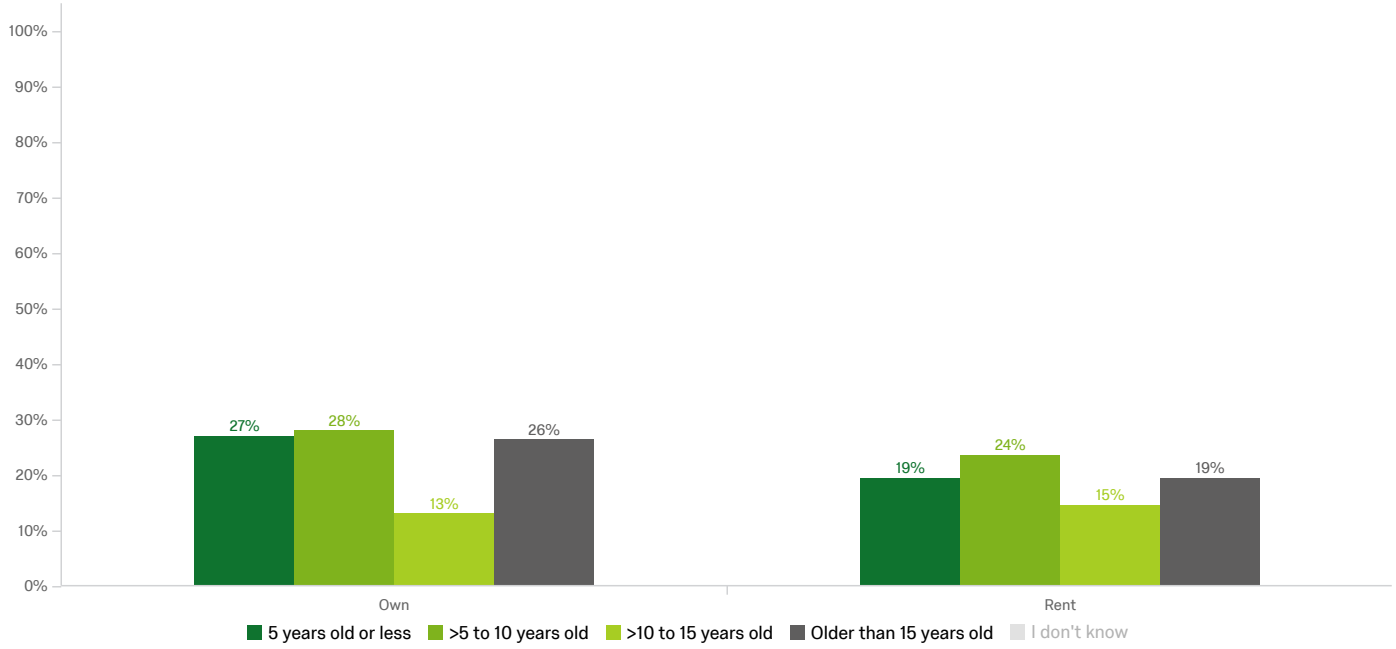
#	Field	Own		Rent	
1	Gas furnace	64%	199	28%	41
2	Gas wall heater	13%	41	30%	44
3	Electric wall heater	15%	48	26%	38
4	Heat Pump	3%	10	2%	3
5	Electric baseboard	2%	5	5%	8
6	Something else (please tell us what)	1%	4	7%	10
7	I don't have heat	1%	4	2%	3
			311		147

Showing Rows: 1 - 8 Of 8

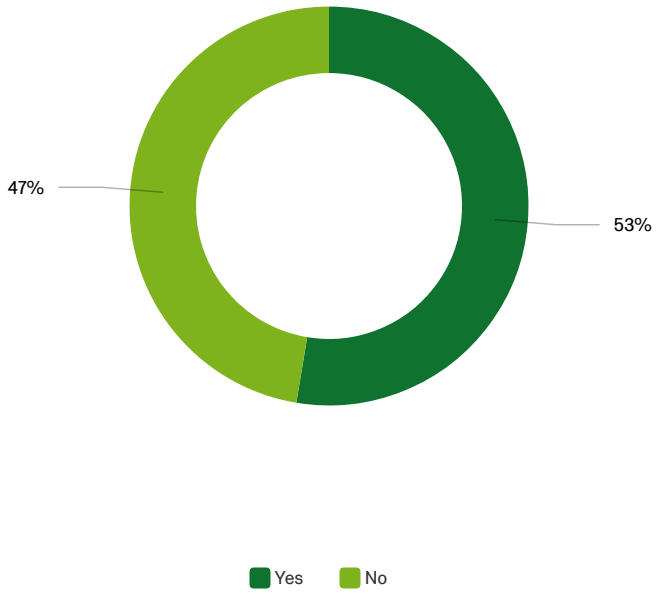
Q14 - About how old is your heater?

#	Field	Own	Rent
1	5 years old or less	27%	19%
2	>5 to 10 years old	28%	24%
3	>10 to 15 years old	13%	15%
4	Older than 15 years old	26%	19%
5	I don't know	6%	23%
		307	144

Showing Rows: 1 - 6 Of 6



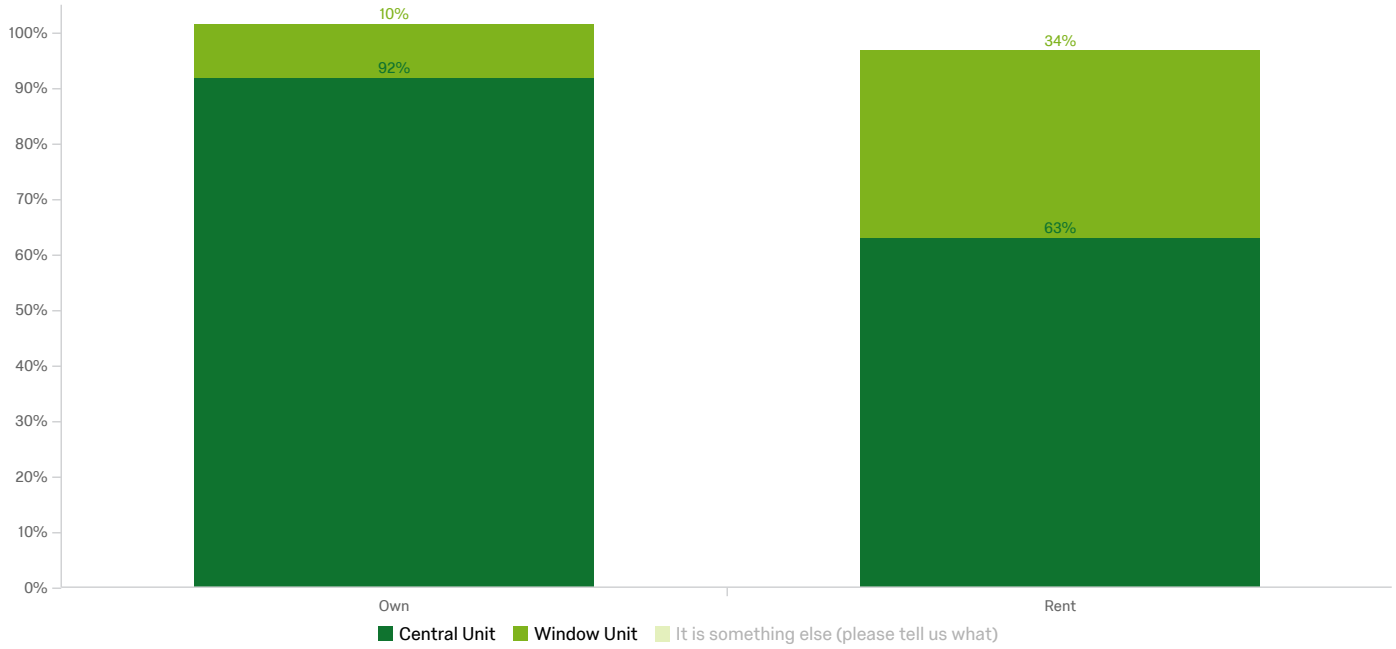
Q15 - Do you have air conditioning in your home?



#	Field	Own		Rent	
1	Yes	57%	176	44%	65
2	No	43%	135	56%	82
			311		147

Showing Rows: 1 - 3 Of 3

Q16 - Is your air conditioner a central unit (that is, cold air blows through the duct system) or is it a window unit?

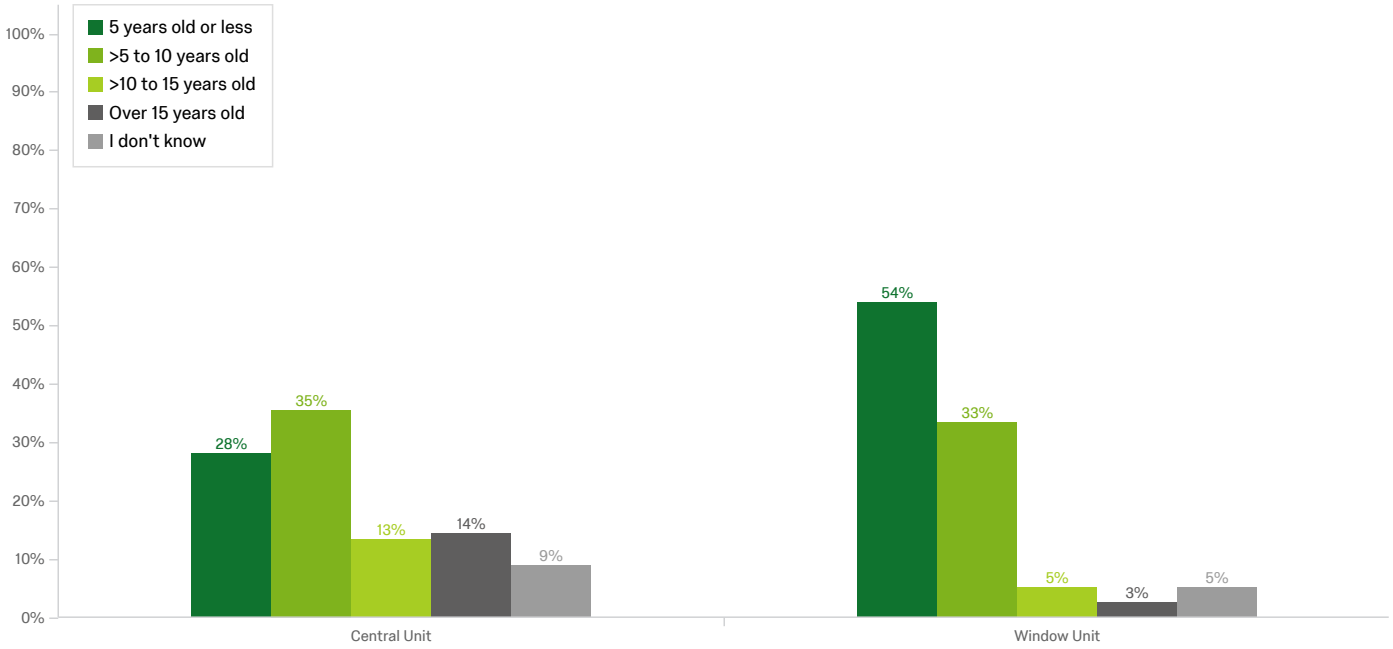


#	Field	Own		Rent	
1	Central Unit	91%	162	62%	41
2	Window Unit	9%	17	33%	22
3	It is something else (please tell us what)	0%	0	5%	3
			179		66

Showing Rows: 1 - 4 Of 4

Note: Three homeowners had both a central and window unit (so sums to 179 rather than the 176 with AC shown in Q15) and one renter had both a central and window unit (so total is 66 rather than the 65 with AC shown in Q15)

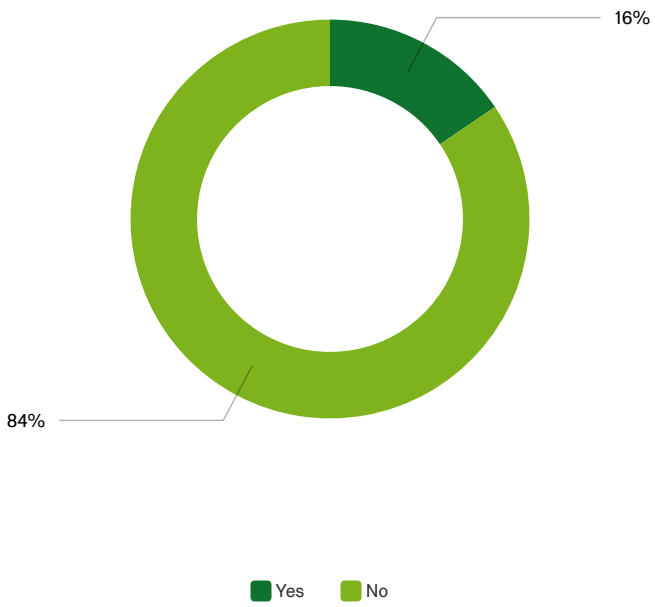
Q17 - About how old is your air conditioner?



#	Field	Own		Rent	
1	5 years old or less	30%	53	38%	25
2	>5 to 10 years old	34%	60	37%	24
3	>10 to 15 years old	14%	24	8%	5
4	Over 15 years old	15%	27	5%	3
5	I don't know	7%	12	12%	8
			176		65

Showing Rows: 1 - 6 Of 6

Q18 - Does your home have a pool that you maintain?

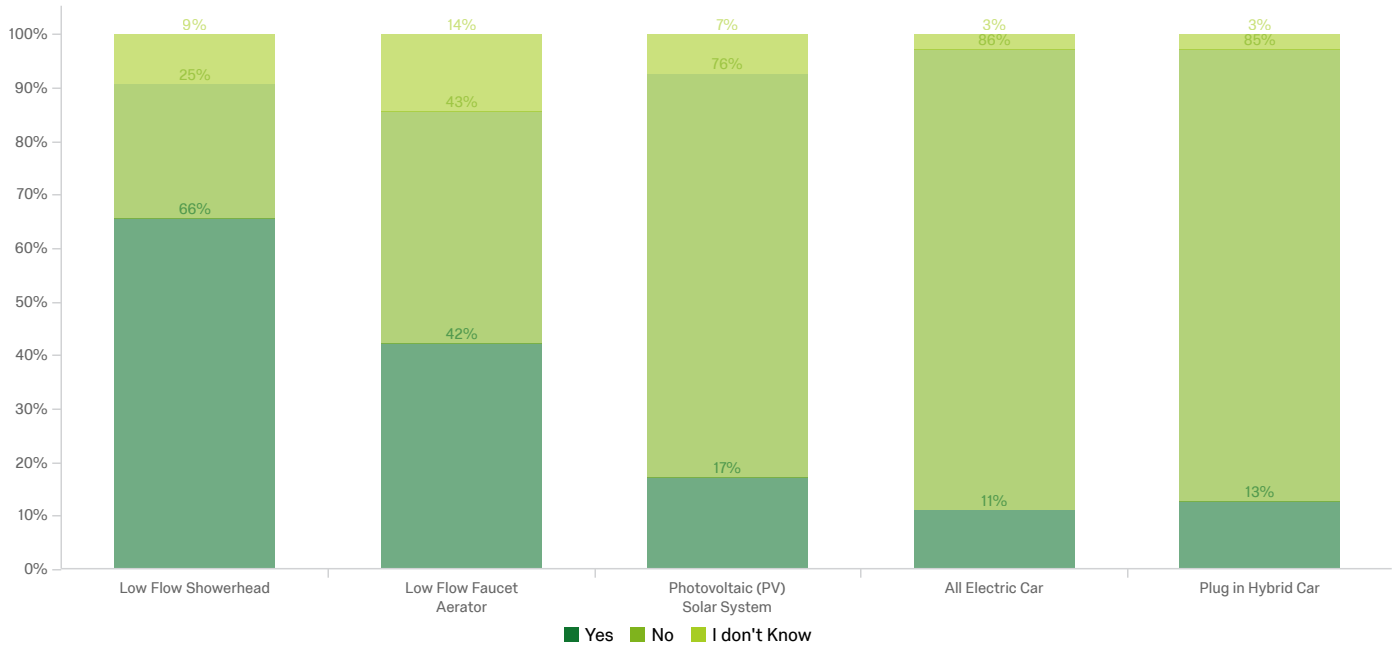


#	Field	Own		Rent	
1	Yes	18%	55	11%	16
2	No	82%	256	89%	131
			311		147

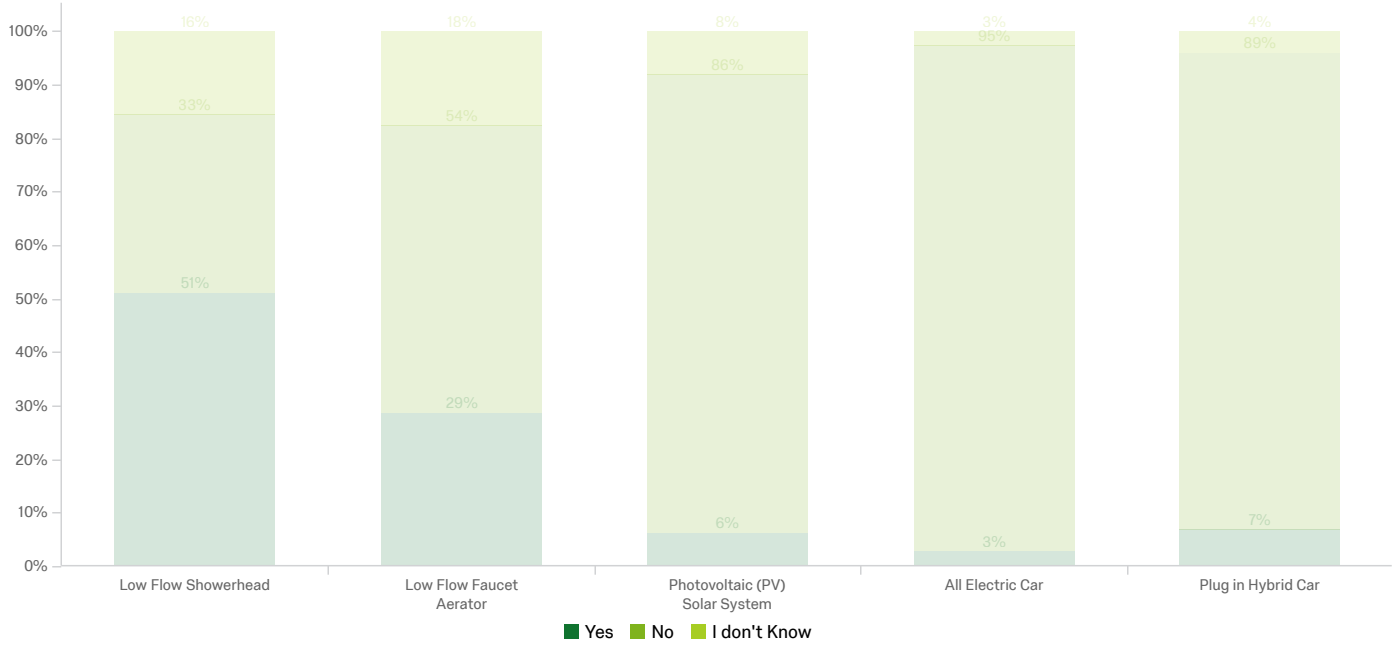
Showing Rows: 1 - 3 Of 3

Q19 - Which of these do you have?

Own



Rent



Own

#	Field	Yes		No		I don't Know		Total
1	Low Flow Showerhead	66%	204	25%	78	9%	29	311
2	Low Flow Faucet Aerator	42%	131	43%	135	14%	45	311
3	Photovoltaic (PV) Solar System	17%	53	76%	235	7%	23	311

4	All Electric Car	11%	34	86%	268	3%	9	311
5	Plug in Hybrid Car	13%	39	85%	263	3%	9	311

Showing Rows: 1 - 5 Of 5

Rent

#	Field	Yes		No		I don't Know		Total
1	Low Flow Showerhead	51%	75	33%	49	16%	23	147
2	Low Flow Faucet Aerator	29%	42	54%	79	18%	26	147
3	Photovoltaic (PV) Solar System	6%	9	86%	126	8%	12	147
4	All Electric Car	3%	4	95%	139	3%	4	147
5	Plug in Hybrid Car	7%	10	89%	131	4%	6	147

Showing Rows: 1 - 5 Of 5

Q21 - Which of the following would you be interested in for your home? (choose all that are of interest)

Field	Own		Rent	
New windows	9%	119	10%	76
New central air conditioner	6%	84	6%	43
New central furnace	6%	80	4%	27
New heat pump	1%	19	2%	15
New refrigerator	7%	98	10%	73
New dishwasher	5%	76	6%	48
New screw-in LED light bulbs	6%	84	6%	47
Light bulbs that I can control from my phone	4%	56	6%	42
Thermostat that I can control from my phone	6%	86	6%	44
Better insulation in my attic	7%	96	5%	34
Better insulation in my walls	8%	114	10%	75
New water heater (with a tank)	4%	62	3%	26
New gas on-demand water water (no tank - a tankless on-demand type)	5%	72	3%	25
New low flow showerhead(s)	3%	46	4%	32
New low-water use toilet(s)	6%	81	6%	48
New pool pump	1%	20	1%	4
Reduce the air leaks in my home	8%	111	9%	64
New ducts for my central HVAC system	3%	44	1%	11
Sealing the small holes in my HVAC system ducts	3%	47	2%	13
		1395		747

Showing Rows: 1 - 20 Of 20

Q22 - Please rank these from 1 to 5

QID59 - Pull top five here and move them up or down to rank them from (#1) most int... - Own

#	Choice	Sum of 1-5	1		2		3		4		5		6	
1	New windows	100	13%	37	10%	25	7%	15	9%	14	8%	9	0%	0
2	New central air conditioner	67	8%	24	6%	16	5%	10	7%	10	6%	7	0%	0
3	New central furnace	61	7%	19	7%	18	6%	12	5%	8	4%	4	0%	0
4	New heat pump	5	0%	1	1%	2	0%	1	1%	1	0%	0	8%	1
5	New refrigerator	77	8%	24	4%	11	6%	13	11%	16	12%	13	0%	0
6	New dishwasher	45	2%	7	4%	10	6%	13	6%	9	6%	6	8%	1
7	New screw-in LED light bulbs	60	5%	14	2%	5	9%	20	5%	7	13%	14	0%	0
8	Light bulbs that I can control from my phone	37	4%	13	2%	6	2%	5	4%	6	6%	7	8%	1
9	Thermostat that I can control from my phone	62	6%	18	5%	13	7%	15	7%	10	6%	6	8%	1
10	Better insulation in my attic	76	8%	24	9%	23	8%	18	5%	7	4%	4	8%	1
11	Better insulation in my walls	94	8%	23	11%	29	10%	22	11%	16	4%	4	8%	1
15	New water heater (with a tank)	44	4%	13	5%	12	4%	8	5%	8	3%	3	0%	0
16	New gas on-demand water (no tank - a tankless on-demand type)	57	4%	11	7%	19	7%	16	5%	7	4%	4	8%	1
17	New low flow showerhead(s)	30	3%	9	5%	12	2%	4	2%	3	2%	2	0%	0
18	New low-water use toilet(s)	54	5%	15	5%	13	5%	10	5%	7	8%	9	23%	3

19	New pool pump	16	1%	2	2%	6	1%	3	1%	2	3%	3	0%	0
21	Reduce the air leaks in my home	87	9%	27	9%	22	8%	18	8%	12	7%	8	15%	2
22	New ducts for my central HVAC system	24	1%	4	2%	6	4%	8	1%	2	4%	4	0%	0
23	Sealing the small holes in my HVAC system ducts	25	2%	7	3%	7	2%	5	3%	5	1%	1	8%	1
	Total		Total	292	Total	255	Total	216	Total	150	Total	108	Total	13

QID59 - Pull top five here and move them up or down to rank them from (#1) most int... - Rent

#	Choice	Sum of 1-5	1		2		3		4		5		6	
1	New windows	60	18%	24	6%	8	11%	13	9%	8	10%	7	0%	0
2	New central air conditioner	33	6%	8	7%	9	8%	10	2%	2	6%	4	0%	0
3	New central furnace	19	4%	6	1%	1	3%	3	9%	8	1%	1	0%	0
4	New heat pump	5	1%	1	3%	4	0%	0	0%	0	0%	0	0%	0
5	New refrigerator	55	12%	16	10%	12	10%	12	10%	9	9%	6	0%	0
6	New dishwasher	32	4%	5	6%	7	3%	3	8%	7	15%	10	0%	0
7	New screw-in LED light bulbs	26	3%	4	4%	5	7%	8	8%	7	3%	2	25%	1
8	Light bulbs that I can control from my phone	26	4%	5	2%	3	8%	9	6%	5	6%	4	25%	1
9	Thermostat that I can control from my phone	30	4%	5	4%	5	7%	8	7%	6	9%	6	0%	0
10	Better insulation in my attic	24	4%	6	6%	8	3%	4	4%	4	3%	2	0%	0
11	Better insulation in my walls	69	16%	22	17%	21	13%	15	8%	7	6%	4	0%	0
15	New water heater (with a tank)	19	2%	3	5%	6	3%	4	4%	4	3%	2	0%	0
16	New gas on-demand water (no tank - a	15	4%	5	2%	3	1%	1	3%	3	4%	3	0%	0

	tankless on-demand type)													
17	New low flow showerhead(s)	19	2%	3	5%	6	5%	6	3%	3	1%	1	25%	1
18	New low-water use toilet(s)	39	4%	6	7%	9	9%	11	9%	8	7%	5	0%	0
19	New pool pump	2	0%	0	0%	0	1%	1	0%	0	1%	1	0%	0
21	Reduce the air leaks in my home	48	9%	12	14%	17	8%	10	7%	6	4%	3	25%	1
22	New ducts for my central HVAC system	7	1%	1	1%	1	0%	0	1%	1	6%	4	0%	0
23	Sealing the small holes in my HVAC system ducts	6	1%	2	0%	0	0%	0	1%	1	4%	3	0%	0
	Total		Total	134	Total	125	Total	118	Total	89	Total	68	Total	4

Q23 - When might you buy these items?

Own

#	Field	Within the next 6 months	Between 6 months and a year	Between 1 and 2 years	Over 2 years from now	I don't know	Never	Total
1	New windows	12% 12	18% 18	28% 28	16% 16	27% 27	0% 0	101
2	New central air conditioner	9% 6	25% 17	25% 17	13% 9	27% 18	0% 0	67
3	New central furnace	5% 3	23% 14	33% 20	11% 7	28% 17	0% 0	61
4	New heat pump	0% 0	17% 1	17% 1	33% 2	33% 2	0% 0	6
5	New refrigerator	23% 18	28% 22	30% 24	5% 4	14% 11	0% 0	79
6	New dishwasher	13% 6	24% 11	30% 14	7% 3	24% 11	2% 1	46
7	New screw-in LED light bulbs	57% 34	22% 13	8% 5	3% 2	10% 6	0% 0	60
8	Light bulbs that I can control from my phone	41% 16	23% 9	10% 4	3% 1	23% 9	0% 0	39
9	Thermostat that I can control from my phone	20% 13	25% 16	19% 12	9% 6	23% 15	3% 2	64
10	Better insulation in my attic	12% 9	26% 20	14% 11	13% 10	32% 25	3% 2	77
11	Better insulation in my walls	6% 6	22% 21	20% 19	12% 11	37% 35	3% 3	95
15	New water heater (with a tank)	9% 4	27% 12	32% 14	9% 4	23% 10	0% 0	44
16	New gas on-demand water water (no tank - a tankless on-demand type)	7% 4	9% 5	24% 14	17% 10	43% 25	0% 0	58
17	New low flow showerhead(s)	57% 17	13% 4	7% 2	7% 2	17% 5	0% 0	30
18	New low-water use toilet(s)	23% 13	19% 11	23% 13	9% 5	26% 15	0% 0	57
19	New pool pump	38% 6	25% 4	19% 3	6% 1	13% 2	0% 0	16
21	Reduce the air leaks in my home	13% 12	27% 24	18% 16	12% 11	29% 26	1% 1	90
22	New ducts for my central HVAC system	8% 2	13% 3	29% 7	21% 5	29% 7	0% 0	24
23	Sealing the small holes in my HVAC system ducts	8% 2	50% 13	19% 5	8% 2	15% 4	0% 0	26

Showing Rows: 1 - 19 Of 19

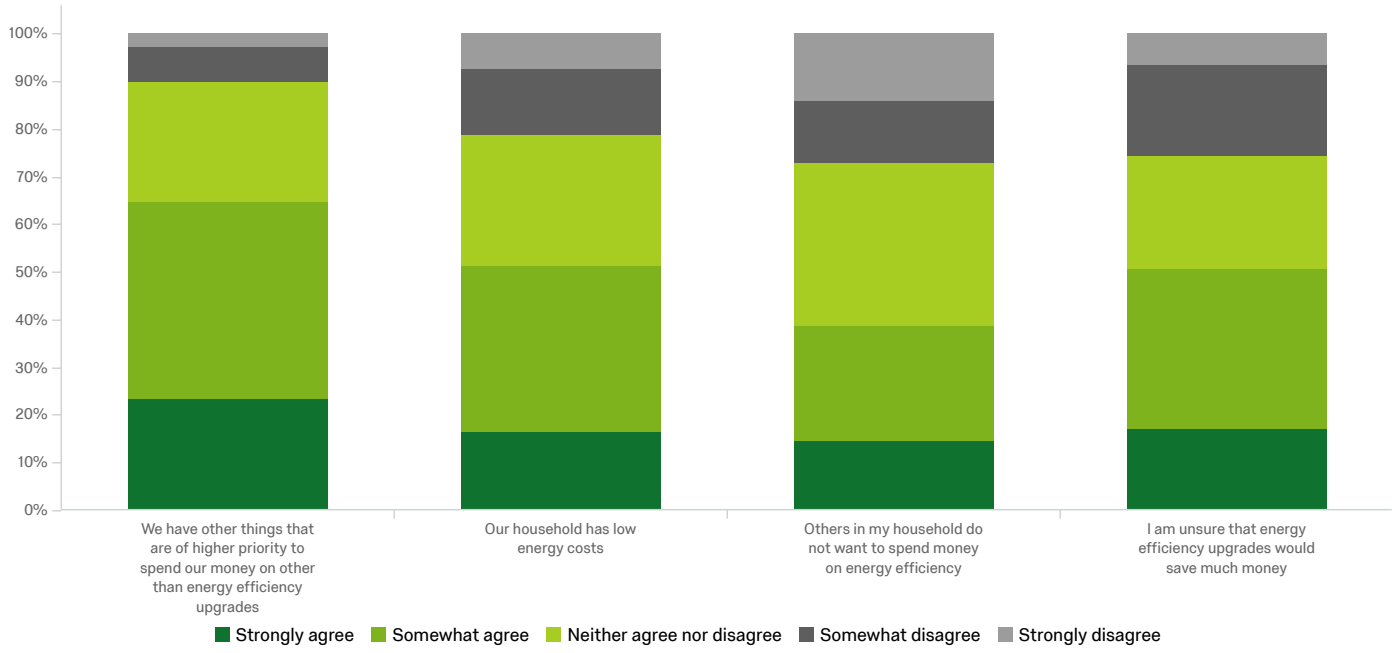
Rent

#	Field	Within the next 6 months	Between 6 months and a year	Between 1 and 2 years	Over 2 years from now	I don't know	Never	Total
1	New windows	5% 3	10% 6	15% 9	10% 6	31% 19	30% 18	61
2	New central air conditioner	6% 2	18% 6	12% 4	18% 6	24% 8	21% 7	33
3	New central furnace	0% 0	16% 3	21% 4	0% 0	26% 5	37% 7	19
4	New heat pump	20% 1	40% 2	20% 1	20% 1	0% 0	0% 0	5
5	New refrigerator	11% 6	18% 10	24% 13	9% 5	33% 18	5% 3	55
6	New dishwasher	13% 4	13% 4	19% 6	13% 4	25% 8	19% 6	32
7	New screw-in LED light bulbs	33% 9	26% 7	11% 3	0% 0	22% 6	7% 2	27
8	Light bulbs that I can control from my phone	19% 5	30% 8	22% 6	4% 1	19% 5	7% 2	27
9	Thermostat that I can control from my phone	7% 2	30% 9	17% 5	7% 2	30% 9	10% 3	30
10	Better insulation in my attic	8% 2	13% 3	4% 1	13% 3	21% 5	42% 10	24
11	Better insulation in my walls	7% 5	13% 9	10% 7	10% 7	26% 18	33% 23	69
15	New water heater (with a tank)	11% 2	26% 5	21% 4	5% 1	21% 4	16% 3	19
16	New gas on-demand water water (no tank - a tankless on-demand type)	7% 1	13% 2	13% 2	0% 0	47% 7	20% 3	15
17	New low flow showerhead(s)	10% 2	35% 7	15% 3	15% 3	25% 5	0% 0	20
18	New low-water use toilet(s)	15% 6	15% 6	15% 6	5% 2	36% 14	13% 5	39
19	New pool pump	0% 0	50% 1	0% 0	0% 0	50% 1	0% 0	2
21	Reduce the air leaks in my home	16% 8	14% 7	8% 4	6% 3	33% 16	22% 11	49
22	New ducts for my central HVAC system	0% 0	29% 2	29% 2	0% 0	29% 2	14% 1	7
23	Sealing the small holes in my HVAC system ducts	17% 1	33% 2	17% 1	0% 0	0% 0	33% 2	6

Showing Rows: 1 - 19 Of 19

Q25 - How much do you agree or disagree with the following statements?

Q25 - How much do you agree or disagree with the following statements?



Own

#	Field	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
1	We have other things that are of higher priority to spend our money on other than energy efficiency upgrades	19% 60	44% 136	27% 85	7% 21	3% 9	311
2	Our household has low energy costs	20% 61	34% 107	28% 88	11% 34	7% 21	311
3	Others in my household do not want to spend money on energy efficiency	13% 41	24% 74	34% 106	14% 42	15% 48	311
4	I am unsure that energy efficiency upgrades would save much money	19% 60	35% 108	23% 70	19% 58	5% 15	311

Showing Rows: 1 - 4 Of 4

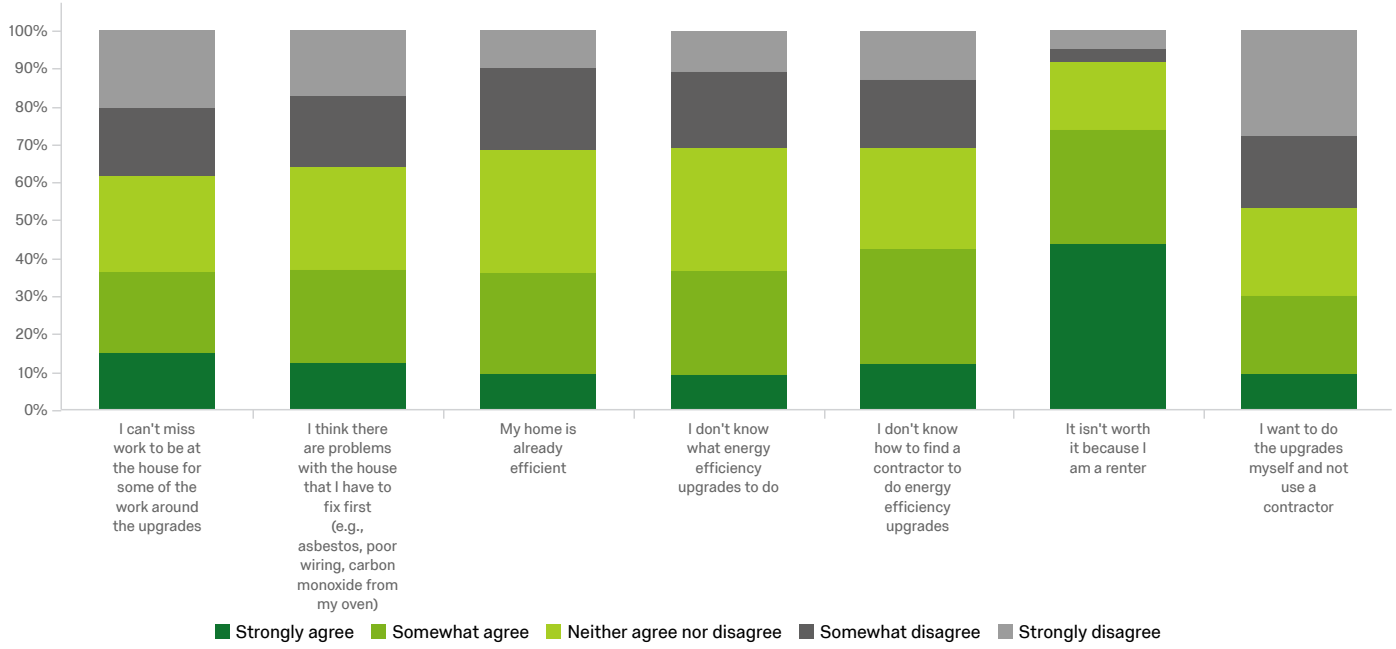
Rent

#	Field	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
1	We have other things that are of higher priority to spend our money on other than energy efficiency upgrades	32% 47	36% 53	21% 31	8% 12	3% 4	147
2	Our household has low energy costs	10% 14	36% 53	26% 38	20% 29	9% 13	147

3	Others in my household do not want to spend money on energy efficiency	17%	25	25%	37	35%	51	12%	17	12%	17	147
4	I am unsure that energy efficiency upgrades would save much money	12%	18	31%	46	26%	38	20%	30	10%	15	147

Showing Rows: 1 - 4 Of 4

Q26 - How much do you agree or disagree with the following statements?



Own

#	Field	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
1	I can't miss work to be at the house for some of the work around the upgrades	13% 41	18% 57	25% 77	19% 60	24% 76	311
2	I think there are problems with the house that I have to fix first (e.g., asbestos, poor wiring, carbon monoxide from my oven)	11% 35	23% 72	25% 78	20% 61	21% 64	310
3	My home is already efficient	12% 37	29% 90	31% 96	20% 62	8% 26	311
4	I don't know what energy efficiency upgrades to do	7% 23	26% 81	35% 107	21% 64	11% 34	309
5	I don't know how to find a contractor to do energy efficiency upgrades	10% 32	30% 93	28% 86	19% 58	14% 42	311
6	It isn't worth it because I am a renter	0% 0	0% 0	0% 0	0% 0	0% 0	0
7	I want to do the upgrades myself and not use a contractor	9% 28	20% 63	22% 69	18% 57	30% 92	309

Showing Rows: 1 - 7 Of 7

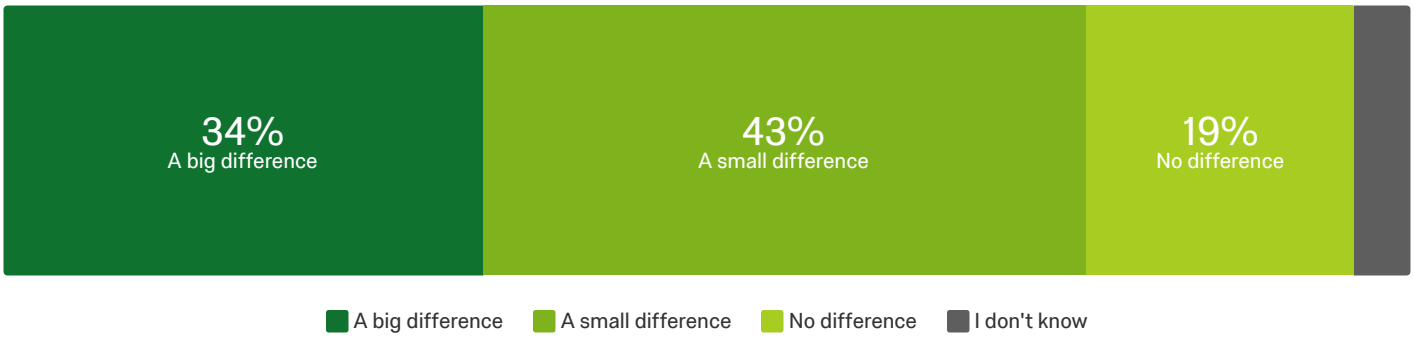
Rent

#	Field	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total

1	I can't miss work to be at the house for some of the work around the upgrades	19%	28	28%	40	27%	39	14%	21	12%	17	145
2	I think there are problems with the house that I have to fix first (e.g., asbestos, poor wiring, carbon monoxide from my oven)	15%	22	27%	40	31%	45	16%	24	10%	15	146
3	My home is already efficient	5%	7	21%	31	36%	53	25%	37	13%	19	147
4	I don't know what energy efficiency upgrades to do	13%	19	30%	43	28%	40	19%	28	10%	15	145
5	I don't know how to find a contractor to do energy efficiency upgrades	16%	24	31%	45	24%	36	17%	25	12%	17	147
6	It isn't worth it because I am a renter	44%	64	30%	44	18%	26	3%	5	5%	7	146
7	I want to do the upgrades myself and not use a contractor	10%	15	21%	31	25%	37	20%	29	24%	35	147

Showing Rows: 1 - 7 Of 7

Q28 - How much of a difference would it make if you knew the energy use of a house before you rented? This might include something like a home energy score that rates your home efficiency based on energy use.



#	Field	Own		Rent	
1	A big difference	0%	0	34%	50
2	A small difference	0%	0	43%	63
3	No difference	0%	0	19%	28
4	I don't know	0%	0	4%	6
			0		147

Showing Rows: 1 - 5 Of 5

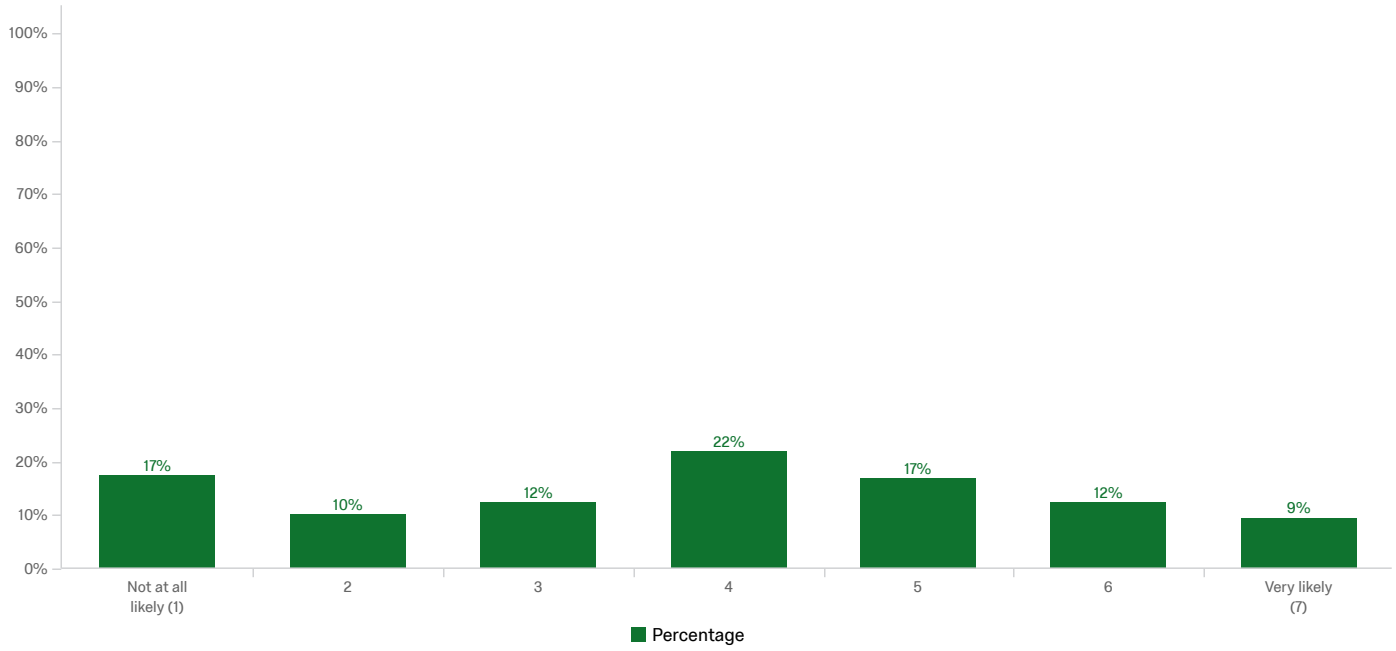
Q29 - Are you aware of any local governments, cities, municipalities or non-profit organizations that offer financing for making energy savings upgrades in your home?

#	Field	Own		Rent	
1	Yes	28%	88	24%	36
2	No	72%	223	76%	111
			311		147

Showing Rows: 1 - 3 Of 3

Q30 - Please answer the following....

How likely are you to make energy savings improments in your home within the next two years that cost over $2,500?



#	Field	Own		Rent	
1	Not at all likely (1)	10.00%	31	32.65%	48
2	2	8.71%	27	12.93%	19
3	3	12.58%	39	11.56%	17
4	4	24.52%	76	16.33%	24
5	5	19.35%	60	11.56%	17
6	6	14.52%	45	7.48%	11
7	Very likely (7)	10.32%	32	7.48%	11
			310		147

Showing Rows: 1 - 8 Of 8

Q31 - How likely is it that you would make energy savings improvements in your home costing over $2,500 if you could receive…

How likely is it that you would make energy savings improement in hour costing over $2,500 if you could receive...

Own

#	Field	Not at all likely (1)	2	3	4	5	6	Very Likely (7)
1	A low cost loan at a 6% interest rate	29%	14%	13%	18%	10%	7%	8%
2	A rebate equal to 20% of the cost	8%	10%	10%	23%	23%	15%	11%
3	A loan repayable through your property tax	28%	13%	14%	19%	11%	9%	6%
4	A loan repayable on your utility bills	22%	14%	11%	21%	16%	9%	7%
5	A low cost loan at a 6% interest rate and a rebate equal to 20% of the cost	23%	14%	10%	19%	15%	10%	9%

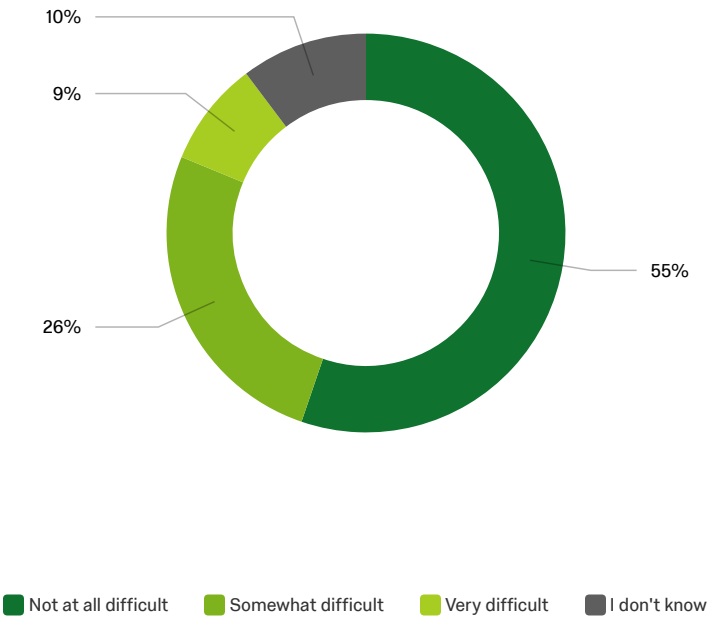
Showing Rows: 1 - 5 Of 5

Rent

#	Field	Not at all likely (1)	2	3	4	5	6	Very Likely (7)
1	A low cost loan at a 6% interest rate	40%	14%	12%	14%	10%	6%	3%
2	A rebate equal to 20% of the cost	24%	13%	12%	14%	20%	12%	5%
3	A loan repayable through your property tax	0%	0%	0%	0%	0%	0%	0%
4	A loan repayable on your utility bills	31%	11%	13%	14%	12%	14%	6%
5	A low cost loan at a 6% interest rate and a rebate equal to 20% of the cost	35%	13%	12%	16%	13%	8%	4%

Showing Rows: 1 - 5 Of 5

Q32 - In general, how difficult would it be for you to qualify for a loan of over $2,500 for making energy saving improvements?



#	Field	Own		Rent	
1	Not at all difficult	65%	203	34%	50
2	Somewhat difficult	21%	65	37%	54
3	Very difficult	5%	15	16%	24
4	I don't know	9%	28	13%	19
			311		147

Showing Rows: 1 - 5 Of 5

Q33 - How interested would you be in a program that provides you with:

Own

#	Field	Extremely interested	Very interested	Moderately interested	Slightly interested	Not interested at all	Total
1	Free access to an expert who can help you find the best ways to save energy	20% 63	28% 87	27% 84	15% 48	9% 29	311
2	Free introductory efficiency kits with two LEDs, a high efficiency showerhead, and two high efficiency faucet aerators	26% 80	25% 79	25% 79	13% 40	11% 33	311
3	Monthly rewards if you save energy	29% 89	30% 94	25% 77	10% 30	7% 21	311
4	Help putting together a plan that will save you on energy bills over the next five years.	18% 57	27% 85	28% 87	15% 46	12% 36	311
5	Incentives for "Do It Yourself" efficiency improvements	19% 58	28% 87	29% 90	12% 37	13% 39	311
6	Low-cost efficiency assessment to provide fixed price solution with "Good, Better, Best" options	16% 51	25% 77	32% 99	15% 47	12% 37	311
7	Low-interest rate financing	14% 44	22% 67	26% 81	15% 48	23% 71	311

Showing Rows: 1 - 7 Of 7

Rent

#	Field	Extremely interested	Very interested	Moderately interested	Slightly interested	Not interested at all	Total
1	Free access to an expert who can help you find the best ways to save energy	20% 30	22% 32	32% 47	16% 24	10% 14	147
2	Free introductory efficiency kits with two LEDs, a high efficiency showerhead, and two high efficiency faucet aerators	30% 44	26% 38	25% 37	11% 16	8% 12	147
3	Monthly rewards if you save energy	24% 36	31% 45	21% 31	17% 25	7% 10	147
4	Help putting together a plan that will save you on energy bills over the next five years.	20% 29	23% 34	29% 43	15% 22	13% 19	147
5	Incentives for "Do It Yourself" efficiency improvements	16% 24	27% 39	22% 33	18% 26	17% 25	147
6	Low-cost efficiency assessment to provide fixed price solution with "Good, Better, Best" options	13% 19	24% 36	31% 46	16% 24	15% 22	147
7	Low-interest rate financing	12% 18	21% 31	25% 37	18% 27	23% 34	147

Showing Rows: 1 - 7 Of 7

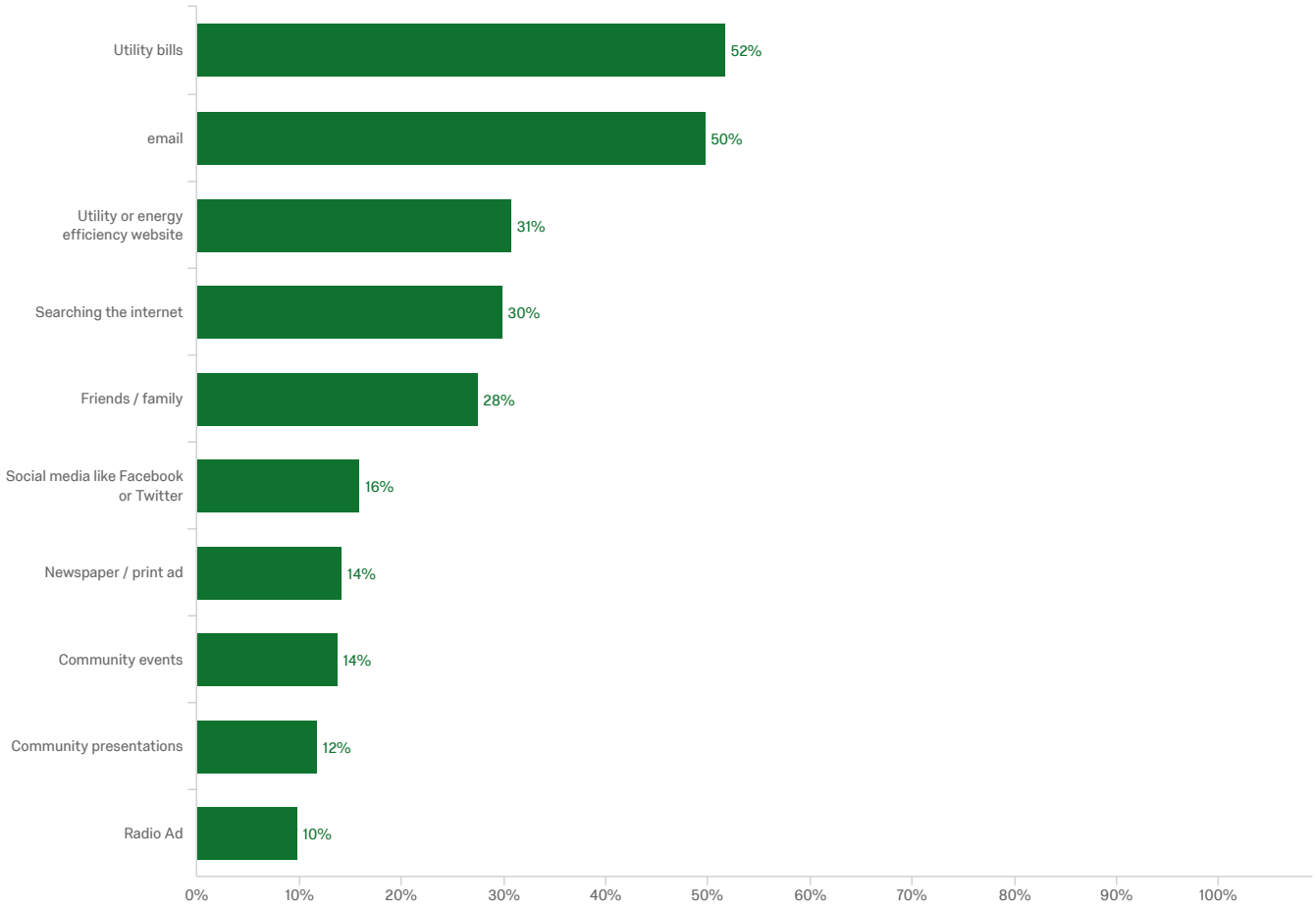
Q34 - Within the past five years, did you participate in a program that installed free items in your home? These items could be LED light bulbs, showerheads, faucet aerators, a power strip, or a smart thermostat.

#	Field	Own		Rent	
1	Yes	18%	57	18%	26
2	No	79%	245	79%	116
3	I don't remember	3%	9	3%	5
			311		147

Showing Rows: 1 - 4 Of 4

Q35 - How would you prefer to be reached regarding energy efficiency programs?

(choose all that apply)

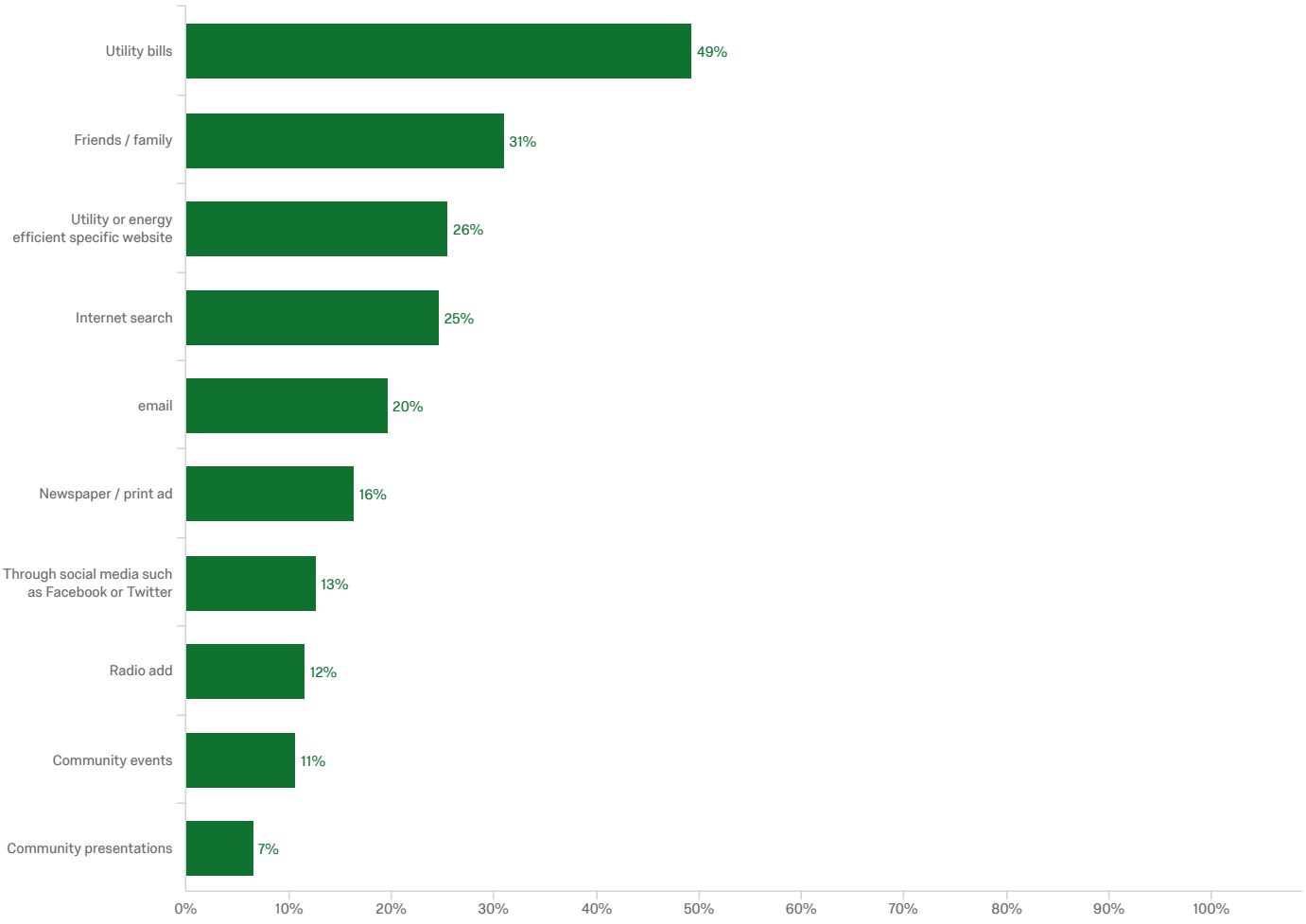


#	Field	Own		Rent	
1	email	20%	157	20%	71
2	Social media like Facebook or Twitter	6%	49	7%	24
3	Radio Ad	4%	32	4%	13
4	Newspaper / print ad	6%	52	4%	13
5	Community events	5%	41	6%	22
6	Community presentations	4%	35	5%	19
7	Utility bills	20%	159	21%	78
8	Friends / family	10%	81	12%	45
9	Searching the internet	12%	96	11%	41

10	Utility or energy efficiency website	13%	103	10%	38
			805		364

Showing Rows: 1 - 11 Of 11

Q36 - How have you learned about energy efficiency programs in the past? (choose all that apply)



#	Field	Own		Rent	
1	Friends / family	14%	96	16%	46
2	Through social media such as Facebook or Twitter	6%	43	5%	15
3	Internet search	11%	74	14%	39
4	Utility or energy efficient specific website	12%	82	12%	35
5	Utility bills	24%	158	24%	68
6	email	10%	64	9%	26
7	Radio add	6%	40	5%	13
8	Newspaper / print ad	9%	57	6%	18
9	Community events	5%	33	6%	16

10	Community presentations	3%	22	3%	8
			669		284

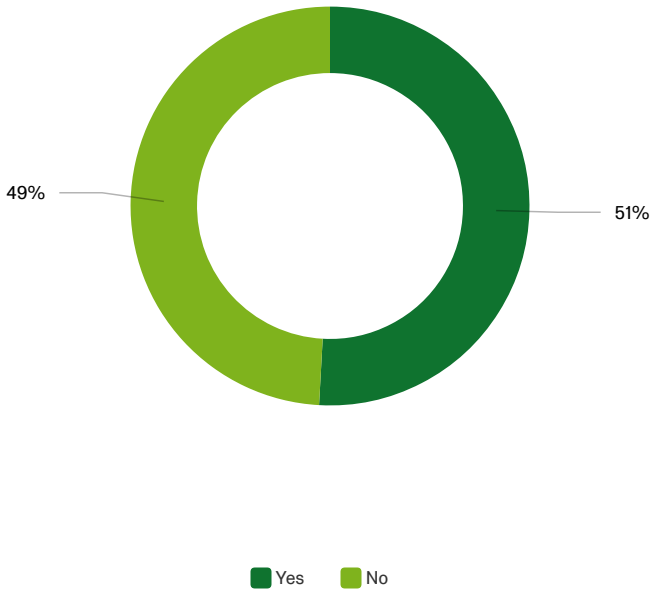
Showing Rows: 1 - 11 Of 11

Q39 - About when was your home built?

#	Field	Own		Rent	
1	Before 1960 (over 58 years old)	23%	72	31%	45
2	1960 to 1979 (39 to 58 years old)	28%	88	21%	31
3	1980 to 2004 (14 to 38 years old)	35%	108	24%	35
4	2005 or later (13 years or less)	12%	37	8%	12
5	I don't know	2%	6	16%	24
			311		147

Showing Rows: 1 - 6 Of 6

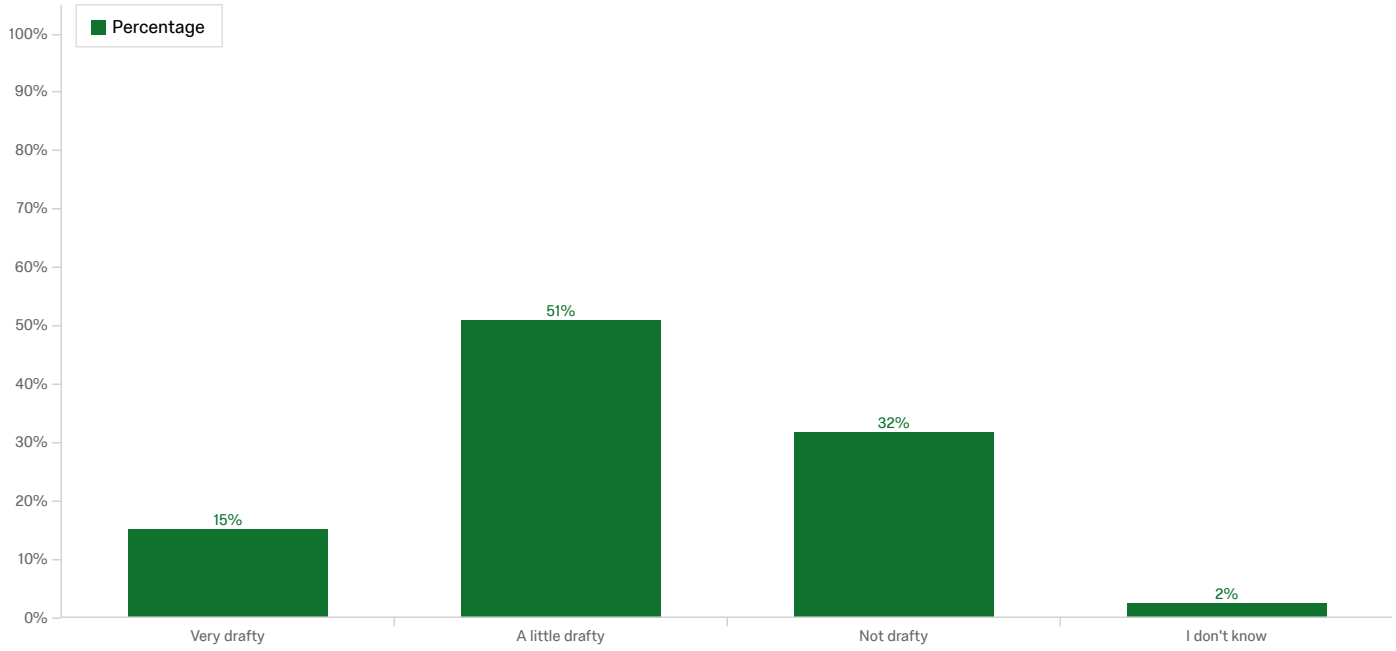
Q41 - Does your home have a lawn that you water?



#	Field	Own		Rent	
1	Yes	58%	179	37%	54
2	No	42%	132	63%	93
			311		147

Showing Rows: 1 - 3 Of 3

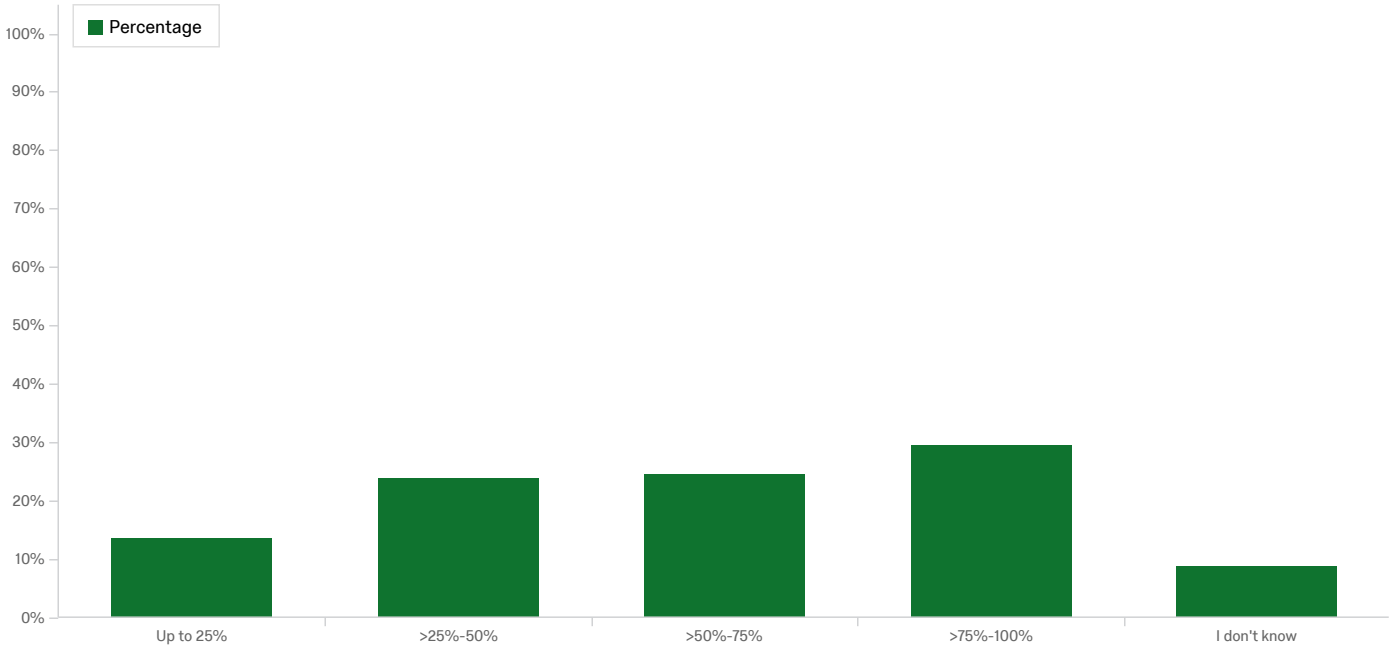
Q42 - How "drafty" (cold air getting into your home) is your home?



#	Field	Own		Rent	
1	Very drafty	12%	38	21%	31
2	A little drafty	49%	151	56%	82
3	Not drafty	36%	113	22%	32
4	I don't know	3%	9	1%	2
			311		147

Showing Rows: 1 - 5 Of 5

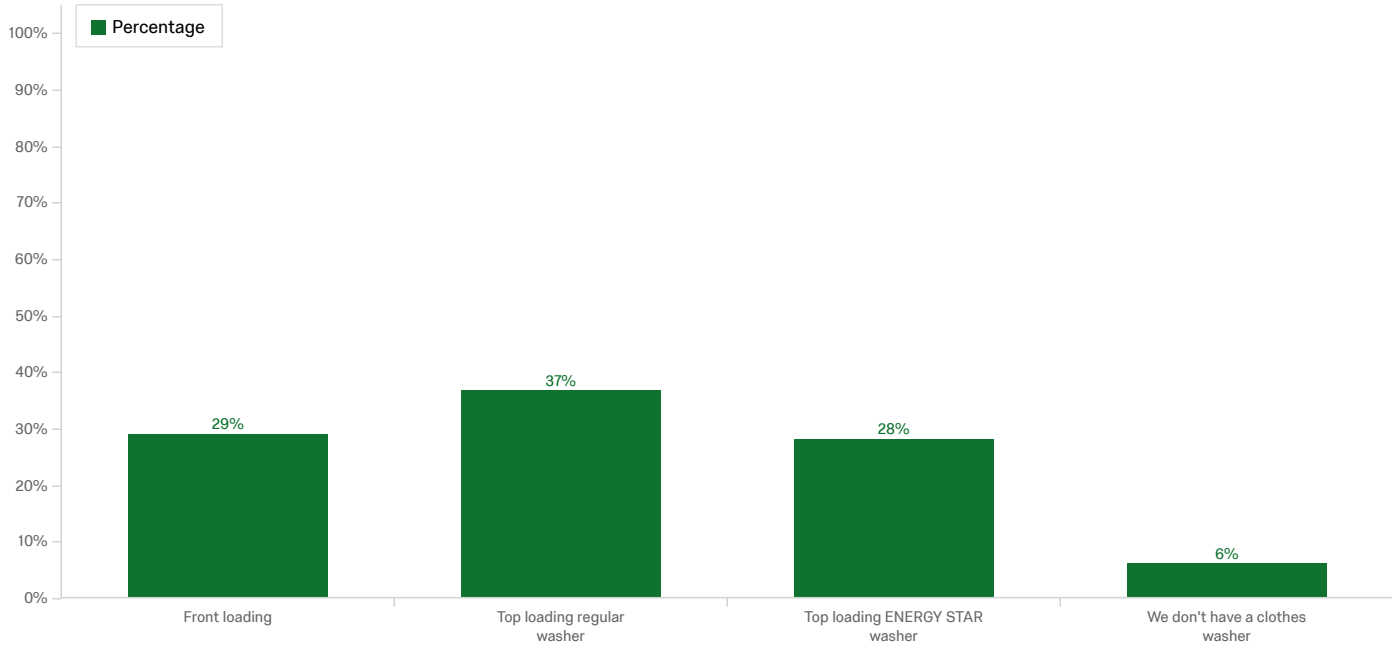
Q43 - When you think about all the lights in your home, about what percent are efficient bulbs, that is, CFLs or LEDs?



#	Field	Own		Rent	
1	Up to 25%	13%	40	15%	22
2	>25%-50%	24%	75	23%	34
3	>50%-75%	26%	81	21%	31
4	>75%-100%	32%	100	24%	35
5	I don't know	5%	15	17%	25
			311		147

Showing Rows: 1 - 6 Of 6

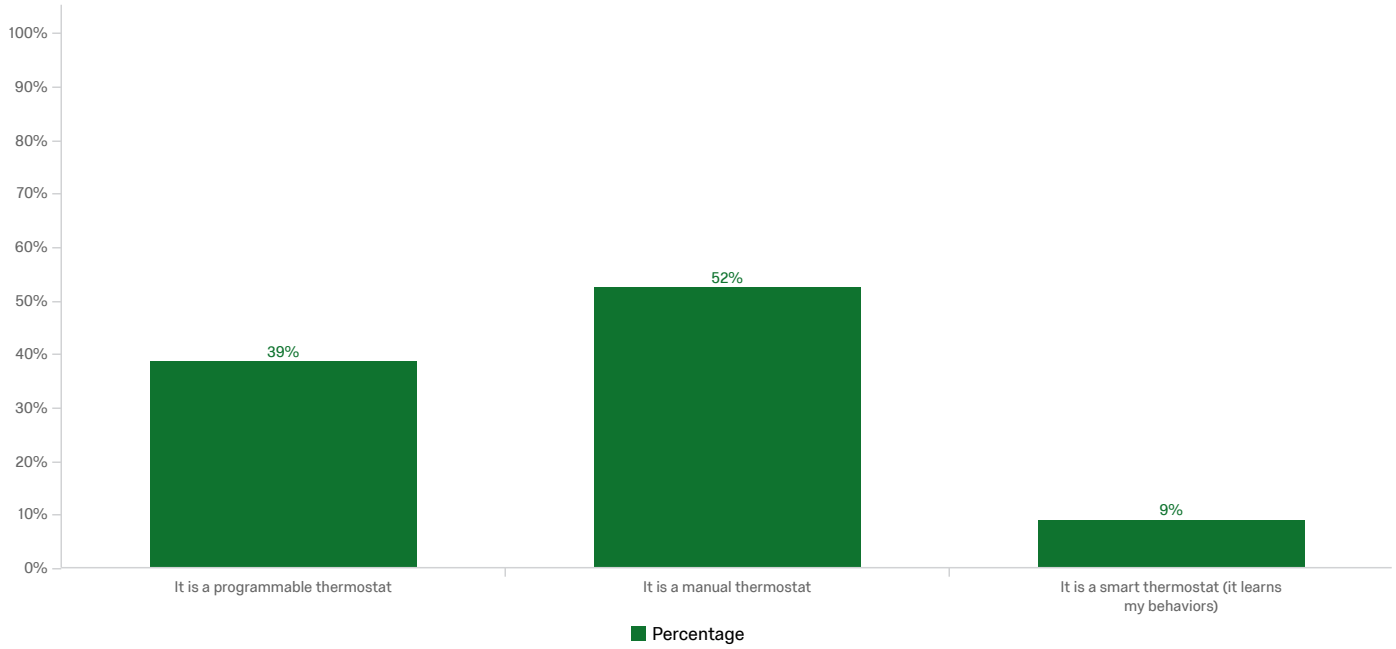
Q44 - What type of clothes washer is installed in your home?



#	Field	Own		Rent	
1	Front loading	33%	103	20%	30
2	Top loading regular washer	34%	107	41%	61
3	Top loading ENERGY STAR washer	31%	97	22%	32
4	We don't have a clothes washer	1%	4	16%	24
			311		147

Showing Rows: 1 - 5 Of 5

Q45 - What type of thermostat do you have for controlling the heater or air conditioner in your home?



#	Field	Own		Rent	
1	It is a programmable thermostat	45%	140	25%	37
2	It is a manual thermostat	43%	135	71%	105
3	It is a smart thermostat (it learns my behaviors)	12%	36	3%	5
			311		147

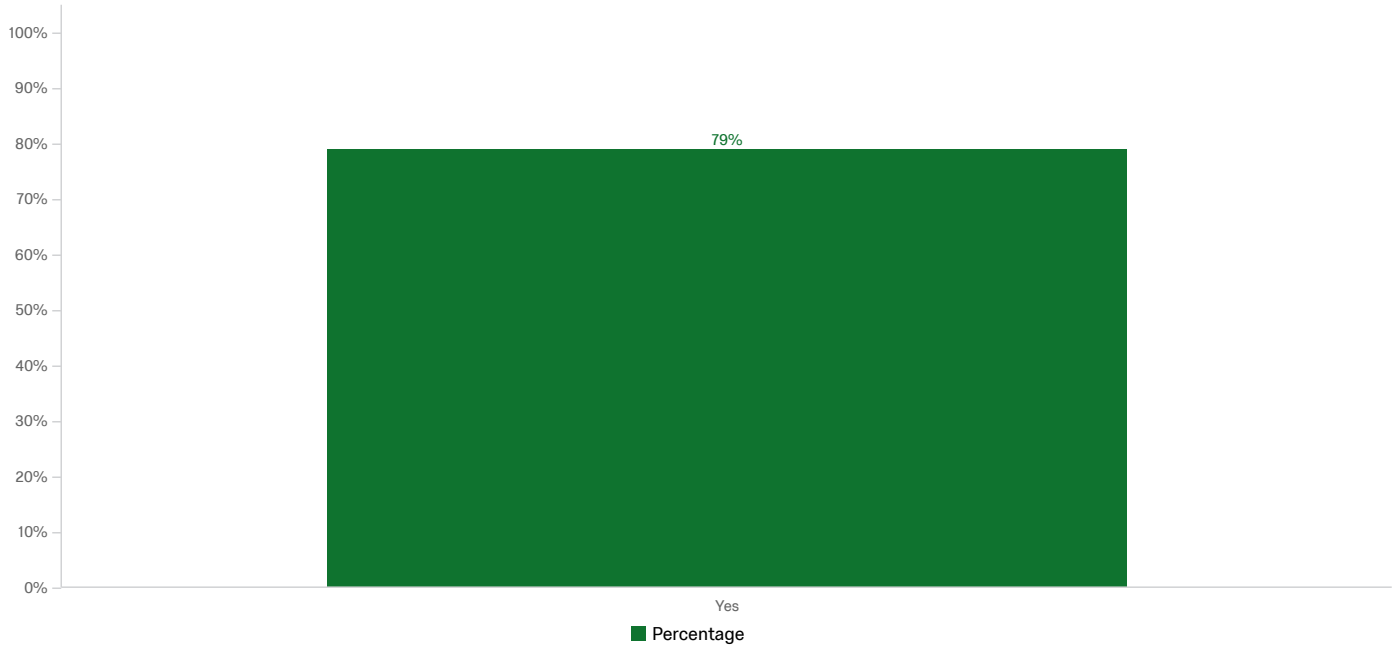
Showing Rows: 1 - 4 Of 4

Q46 - Can you adjust the thermostat setting from your phone?

#	Field	Own		Rent	
1	Yes	19%	60	13%	19
2	No	81%	251	87%	128
			311		147

Showing Rows: 1 - 3 Of 3

Q47 - Does your home have natural gas?



#	Field	Own		Rent	
1	Yes	84%	261	69%	101
2	No	16%	50	31%	46
			311		147

Showing Rows: 1 - 3 Of 3

Q48 - Who pays your energy bills?

#	Field	My household pays this bill	This bill is included in my rent	I don't know	Total
1	Electric Bill	82%	18%	0%	147
2	Gas Bill	85%	14%	1%	101

Showing Rows: 1 - 2 Of 2

Q50 - What is your ethnicity?

#	Field		Choice Count
1	White, not Hispanic	54%	247
2	Hispanic	10%	44
3	Black	3%	15
4	Asian	28%	129
5	Mix of two or more ethnicity's	4%	19
6	An ethnicity not listed here	1%	4
			458

Showing Rows: 1 - 7 Of 7

End of Report

Appendix F. Census Data on Household Vintage by Size and Income

We heard of interest regarding household vintage, size, and income level within the SFMI population. The table below provides the percentage of SFMI households for 1 to 5 and 6+ people in the household, for three income levels (labeled below the table), and by vintage.

Table 18. Vintage by HH Size and Income Range for SFMI (Percent of all Households)

	Household Size and SFMI Income Ranges																							
	1			1 Total	2			2 Total	3			3 Total	4			4 Total	5			5 Total	6+			6+ Total
Vintage	2A	2B	2C		2A	2B	2C		2A	2B	2C		2A	2B	2C		2A	2B	2C		2A	2B	2C	
1939 or earlier	1.7%	1.1%	0.7%	3.5%	1.9%	1.6%	1.4%	4.8%	0.8%	0.8%	0.7%	2.3%	0.6%	0.5%	0.5%	1.6%	0.3%	0.2%	0.2%	0.8%	0.3%	0.3%	0.2%	0.8%
1940 to 1959	2.5%	1.5%	0.8%	4.8%	3.5%	2.9%	2.3%	8.7%	1.6%	1.6%	1.5%	4.6%	1.3%	1.2%	1.3%	3.8%	0.8%	0.7%	0.6%	2.1%	0.6%	0.5%	0.5%	1.7%
1960 to 1979	2.9%	1.6%	1.2%	5.7%	4.5%	3.6%	3.1%	11.2%	2.2%	1.9%	1.8%	5.9%	1.6%	1.5%	1.8%	4.9%	0.9%	0.9%	0.8%	2.6%	0.8%	0.7%	0.5%	2.1%
1980 to 2005	2.1%	1.2%	0.9%	4.2%	3.1%	2.6%	2.4%	8.1%	1.6%	1.6%	1.6%	4.8%	1.2%	1.3%	1.5%	4.1%	0.7%	0.6%	0.7%	2.0%	0.5%	0.4%	0.4%	1.3%
2005 to 2015	0.2%	0.2%	0.1%	0.6%	0.4%	0.3%	0.4%	1.1%	0.3%	0.2%	0.3%	0.8%	0.2%	0.3%	0.3%	0.7%	0.1%	0.1%	0.1%	0.3%	0.1%	0.1%	0.1%	0.3%
Total	9%	6%	4%	19%	13%	11%	10%	34%	6%	6%	6%	18%	5%	5%	5%	15%	3%	3%	2%	8%	2%	2%	2%	6%

Income Ranges Labels

2A $48,000 to <$75,000

2B $75,000 to <$100,000

2C $100,000 to <$125,000