PG&E WHOLE HOUSE PROGRAM

Summary of Marketing, Targeting and Behavior Change Research

Update: July 2014

Calmac Study ID: PGE0302.07

Opinion **Dynamics**

research into action inc

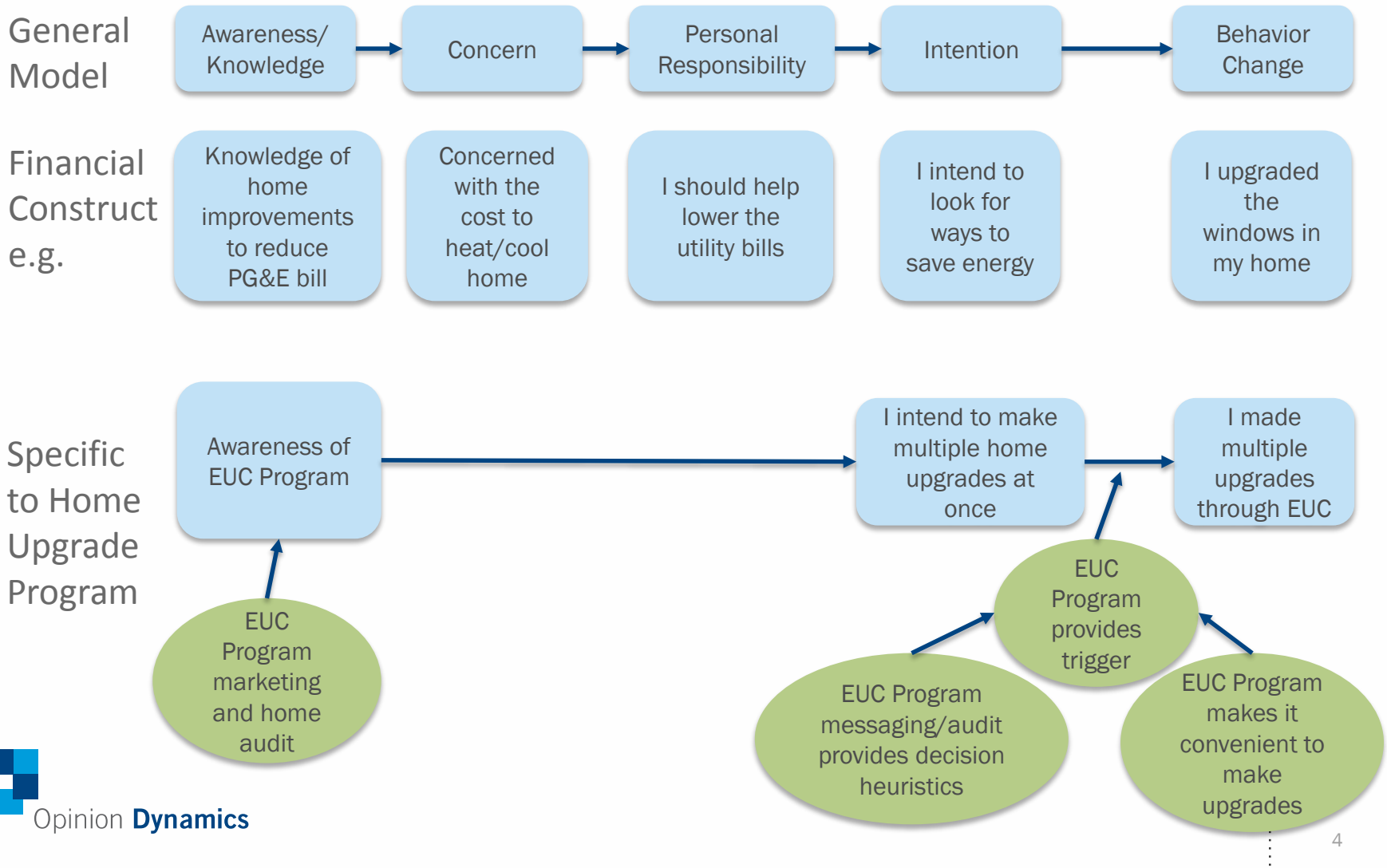
EUC Home Upgrade Program Description

- Offers incentives to homeowners who complete multiple energy-saving home improvements in one integrated effort.
- These incentives reward customers for addressing home energy efficiency needs holistically instead of piece by piece.
- The house must be able to save at least 10% of its baseline energy use. Determined through energy modeling.
- The program was rolled out as a pilot in August 2010, with a large amount of ARRA-funded marketing through local governments and regional organizations.
- PG&E's marketing has largely focused on one-on-one, face-to-face opportunities with customers such as community events and supporting contractors' face-to-face marketing tactics.
- The messaging to date has included information around the incentives, the ability of the program to lower energy bills, home comfort, helping the environment, and support by qualified contractors.

Explored customer characteristics that predict participation and savings potential

Research Questions	Participant Surveys (n=237)	Drop-Out Surveys (n=150)	Gen Pop Surveys (n=264)	Bill History Analysis (n=912)	Predictor Analysis (n=912)
Who is participating and why?	X			X	x
What percentage of the non-participant population could be a target, and with what offerings?			X		
What messages will resonate with targeted homeowners?	X	X	X		
Why do some customers start the process, but drop out?		X			
Why do some households increase energy use after retrofit?	X				
Who is saving, and what are the drivers of savings?	X			X	X

Behavior Change Model provided the basis for analysis



A Note on This Research Effort

This research effort was designed and executed to support the Whole House Program marketing and targeting efforts. The core goal of the research was to develop recommendations that will allow the program marketing team to better tailor and target customers.

This research effort did not attempt to evaluate overall net program impacts.

Who is Participating?

Higher Income: 70% earn $75K or more (compared to 35% Northern CA general population)

Educated: 78% graduated college (compared to 33% in the Northern CA general population)

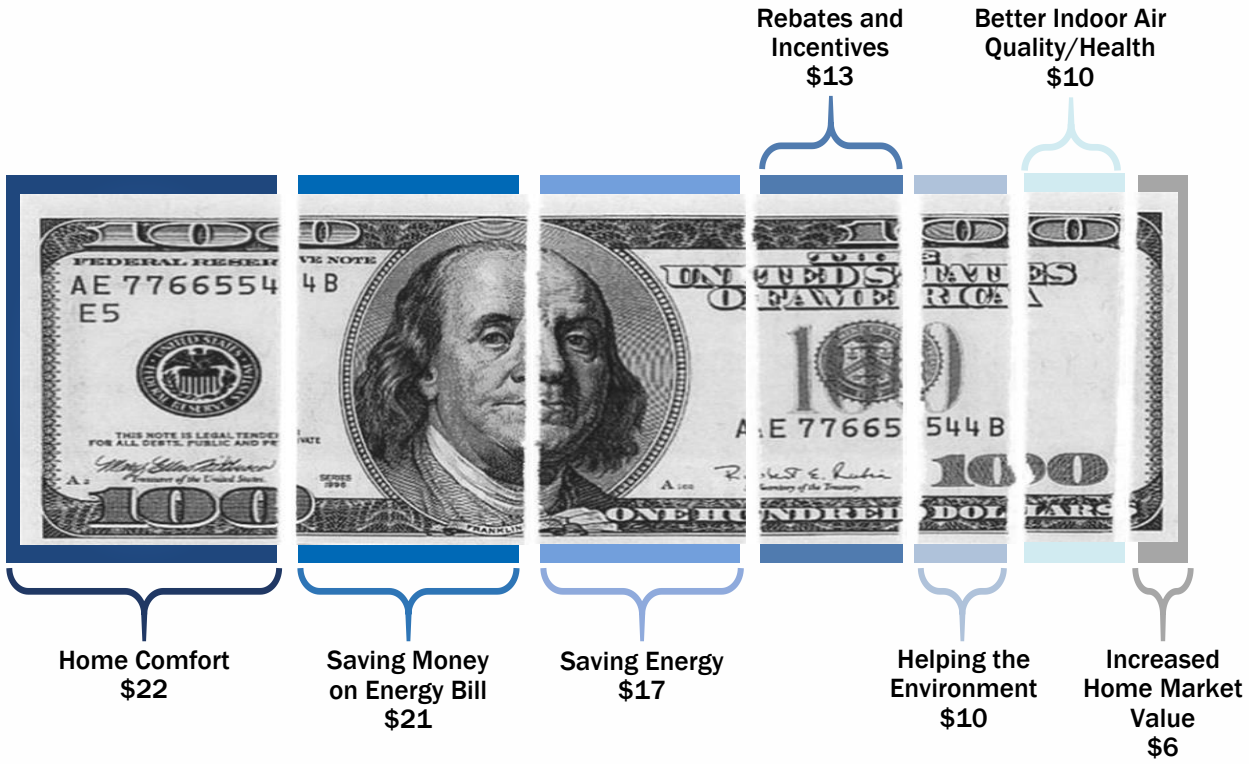
Older homes: new homes may already have the types of measures incented by the program

Limited structural or financial constraints: participants do not face obstacles related to the structure or age of their home and express low financial constraints

Northern California General Population Demographics Source: 2012 Census Data

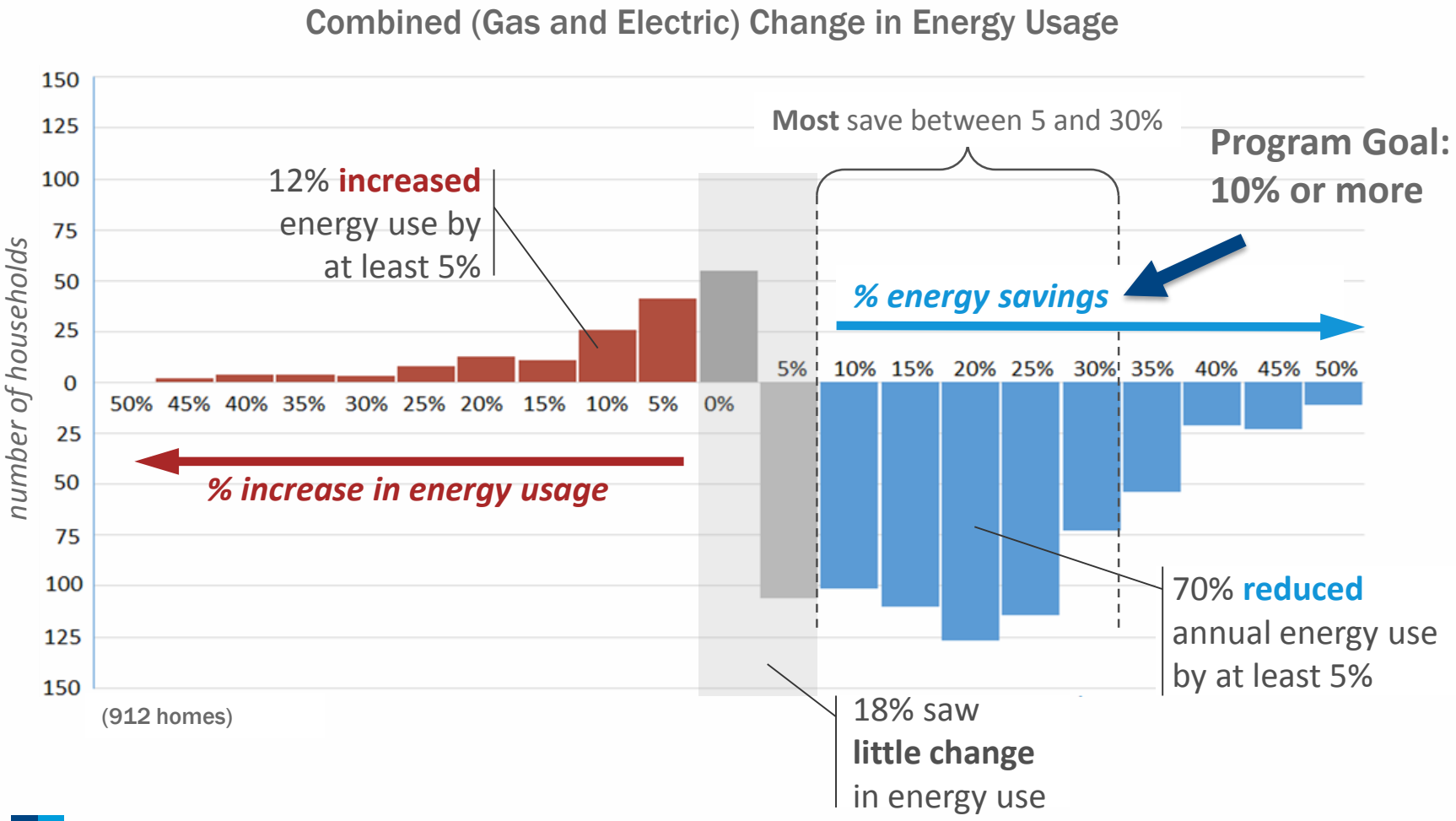
Why Are Customers Participating?

Participants value comfort, saving money and reducing energy usage



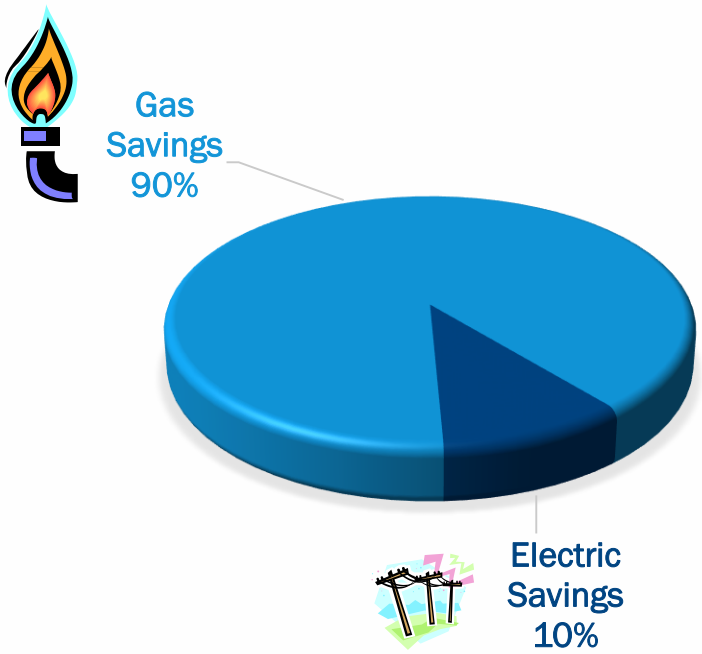
"Considering the cost of your recent retrofit and these main benefits that you experienced, if you were to express the value of each of these benefits by distributing 100 dollars across your list – how much out of 100 dollars would you pay for…?"

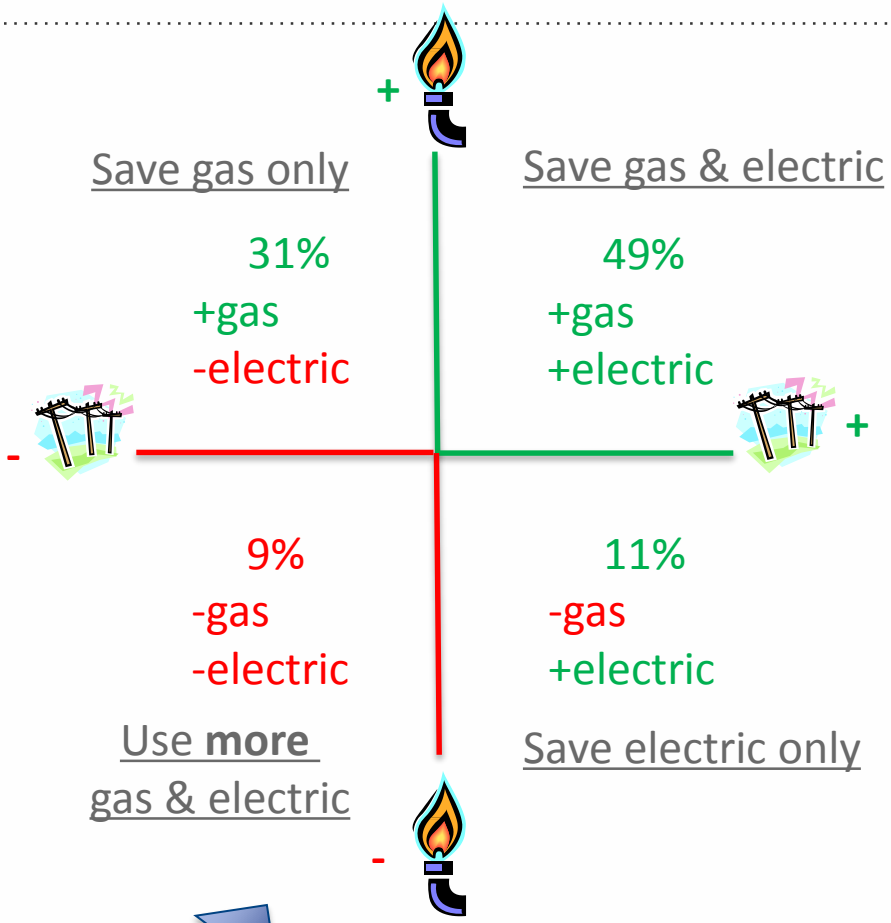
How Many Households are Saving, and How Much?



Opinion Dynamics

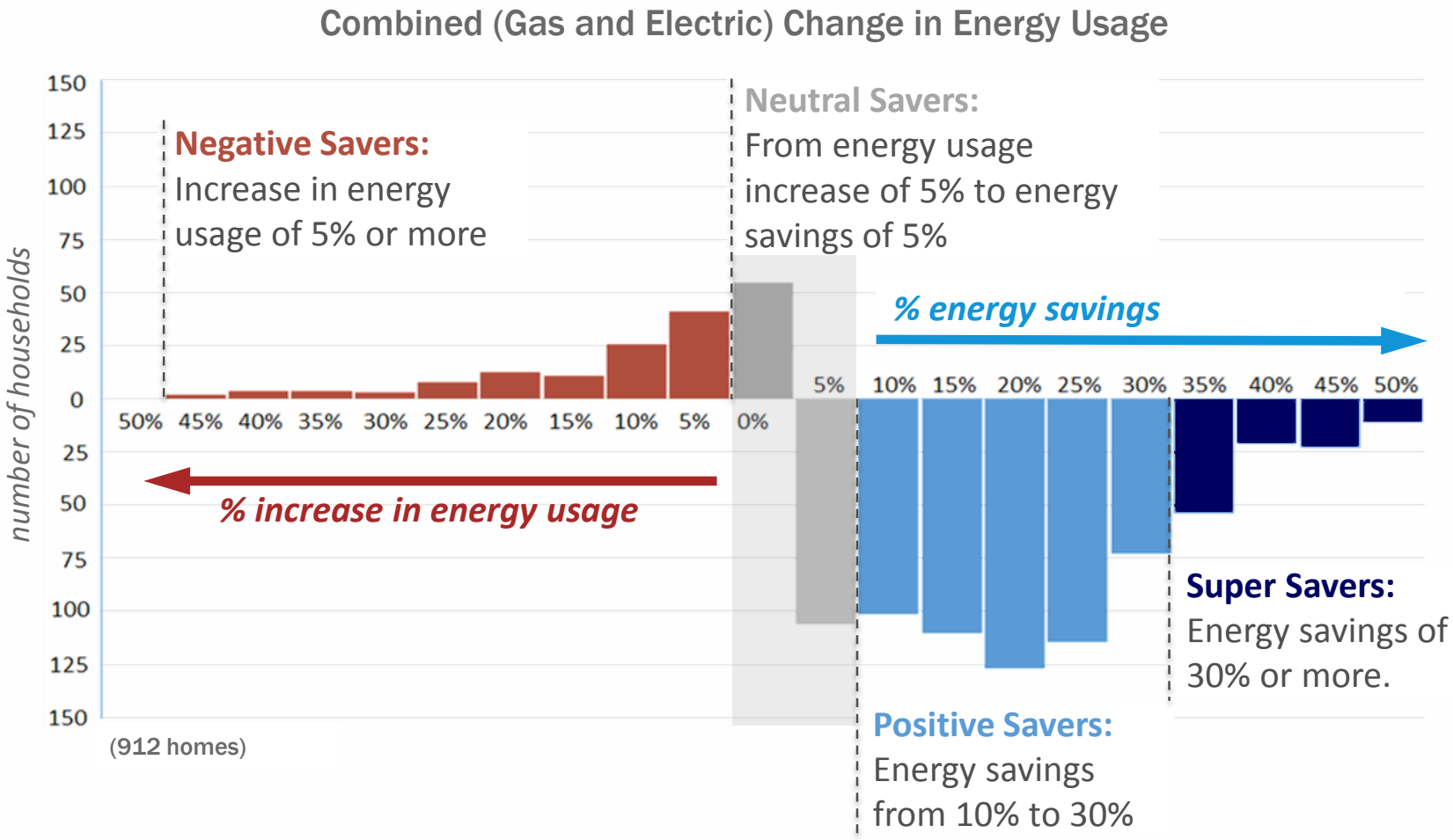
Gas is driving overall savings





Little correlation between gas and electric savings

How do we classify the savers?



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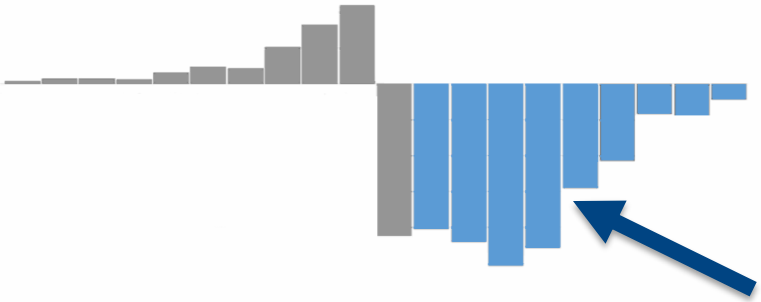
What Are The Drivers of Savings?



Positive Savers are more likely to have:

- Incomes of higher than $125K.
- Been PG&E customers for 15+ years.
- Lower home values (i.e., between $200K and $500K).
- Low or medium total gas bill amounts
- Homes in cooler climate zones
- Homes built before 1980
- Homes greater than 1,500 square feet

Super Savers are more likely to:

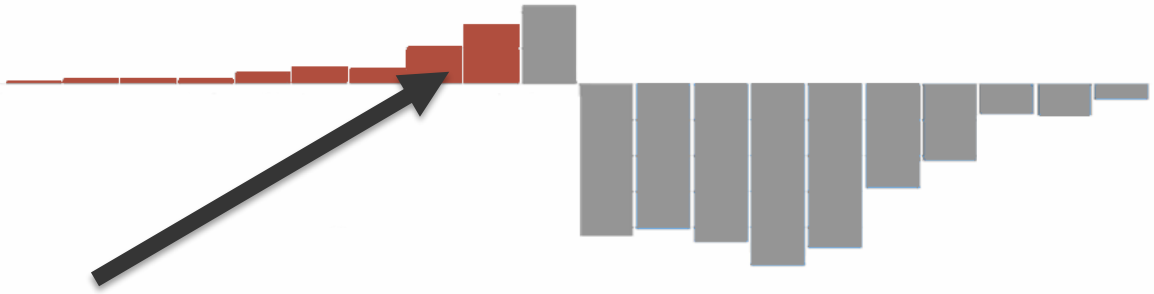
- Live in older homes (mean age of construction 1953)
- Have higher baseline gas usage

Super Savers generally **do not:**

- Increase occupancy after retrofit
- Set thermostat up in winter and down in summer

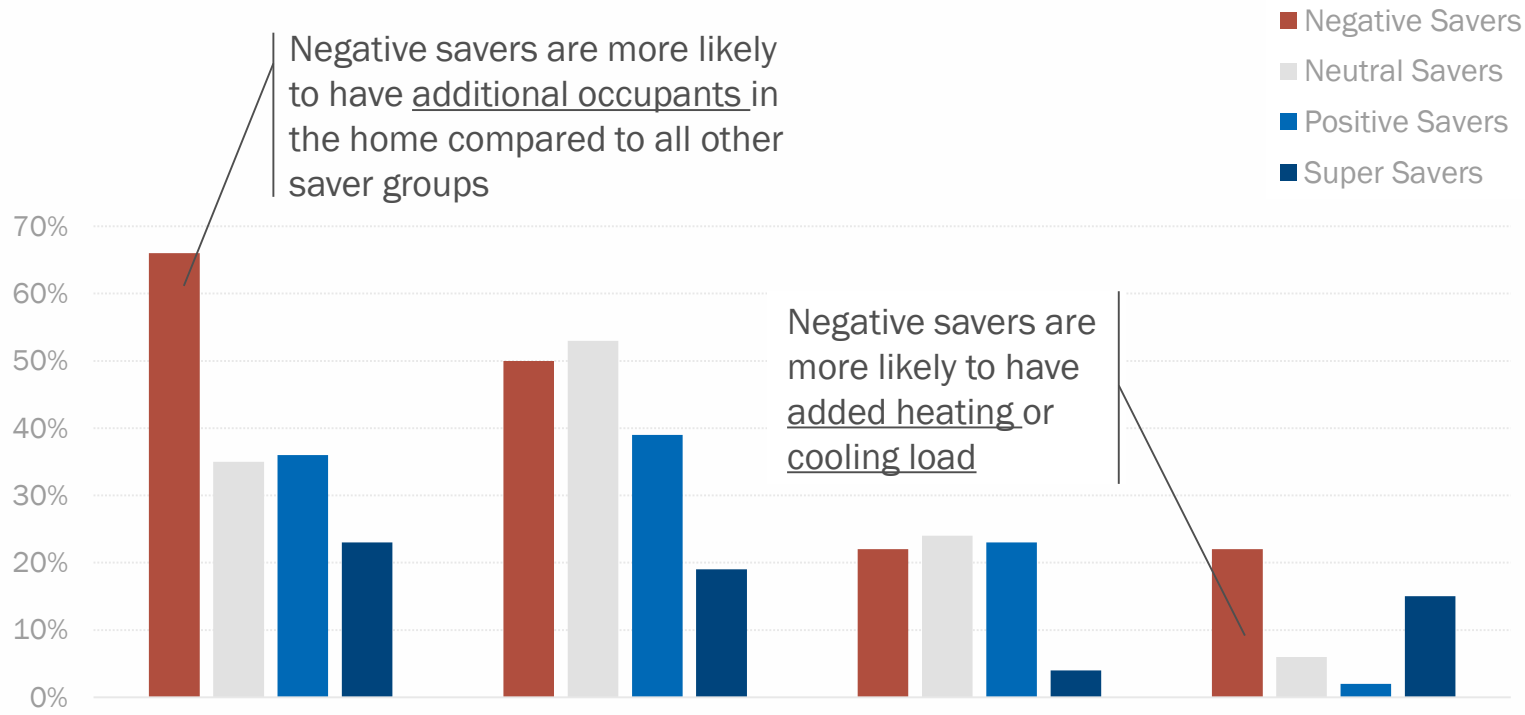
Super Savers are less concerned with paying energy bills than other groups are

What Distinguishes Negative Savers?



- 2/3 of **Negative Savers** experienced a change in occupancy (retirement, new baby, or a person moving into the home)
- 60% of **Negative Savers** reported deliberately using more heating and cooling
- **Negative Savers** tend to have:
  - Higher baseline usage
  - Smaller projects (as measured by rebate size)
- **Negative Savers** are more concerned with comfort than other saver groups

Why Do Some Participants Increase Energy Use?



- New house/recently moved in
- Recently retired
- More people moving in
- Added a child/expecting child

- Set heating to higher temp
- Uses heating more often

- Set cooling to lower temp
- Uses cooling more often

- Added central heat
- Added central A/C
- Added square footage

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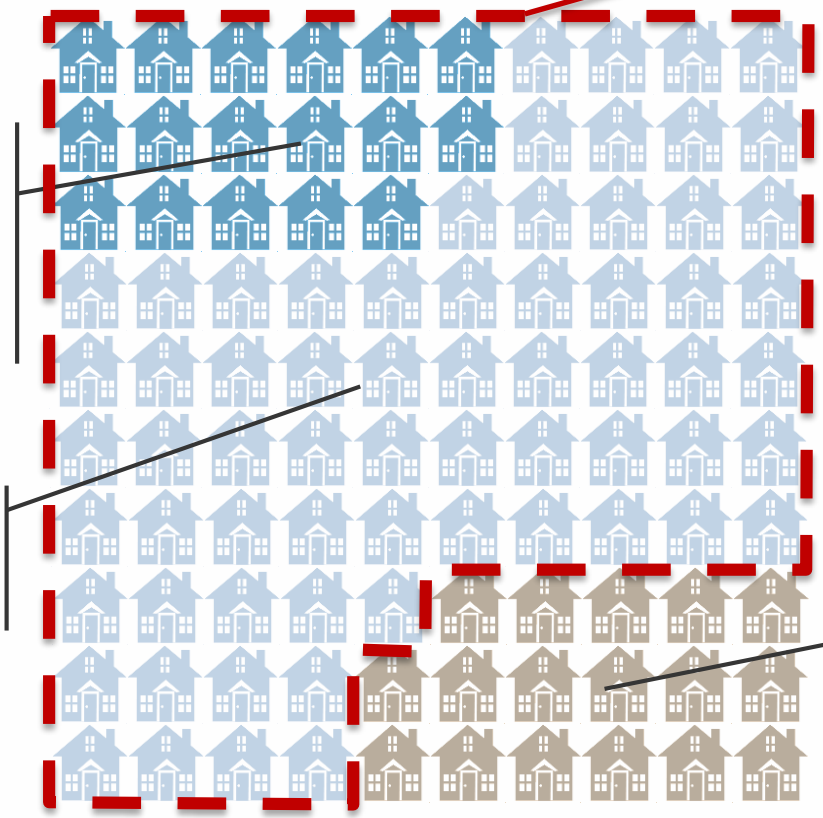
Implications of Negative Saver Findings

- Occupancy Changes*
  - People who plan to add occupants or (stay) be at home more often – will be more inclined to invest in the retrofit program (may be the ones most interested in the program)
- Added Load*
  - Consciously change their temperature settings – therefore voiding the baseline conditions for the energy savings projection (Baseline conditions should also be considered in impact evaluation methods)
- Behavior Changes/Take Back
  - Driven by desire for home comfort
  - Program design elements could discourage take back, e.g. incentive structure, customer education

***Allowance for this "out-of-plan" behavior change should be factored into impact evaluations – i.e. exclude or adjust these cases of increased energy usage from occupancy or load increase!**

What Percentage of the Non-Participant Population Could be a Target?

The target population is the 83% of PG&E homeowners who have either full intent or limited intent to make upgrades on their home.



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What Do Customers Intend To Do?

- Approximately one fifth of customers plan to install insulation, or upgrade their windows, or HVAC equipment to ENERGY STAR models. There is also (less) interest in Air Sealing and Duct Sealing & Insulation (combined). These measures represent a combination of items available from the Basic and Advanced program packages.

Interest in measures available from Whole House program:

Attic ,Wall, Ceiling Insulation

21%

Upgrade Heating, Cooling Equipment to Energy Star

20%

Upgrade Windows, Doors, or Skylights

20%

Air Sealing

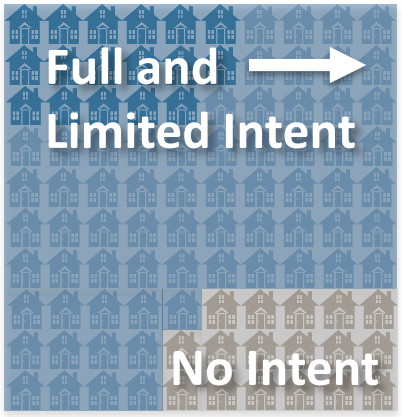
13%

Duct Sealing & Insulation

12%

Opinion Dynamics

What Messages Will Resonate with Targeted Homeowners?



Customers with Full and Limited Intent are more likely to:

Be motivated by comfort. Those motivated are more likely:

- To be older (55 years or older)
- To have lower incomes (less than $75,000)
- To be less educated

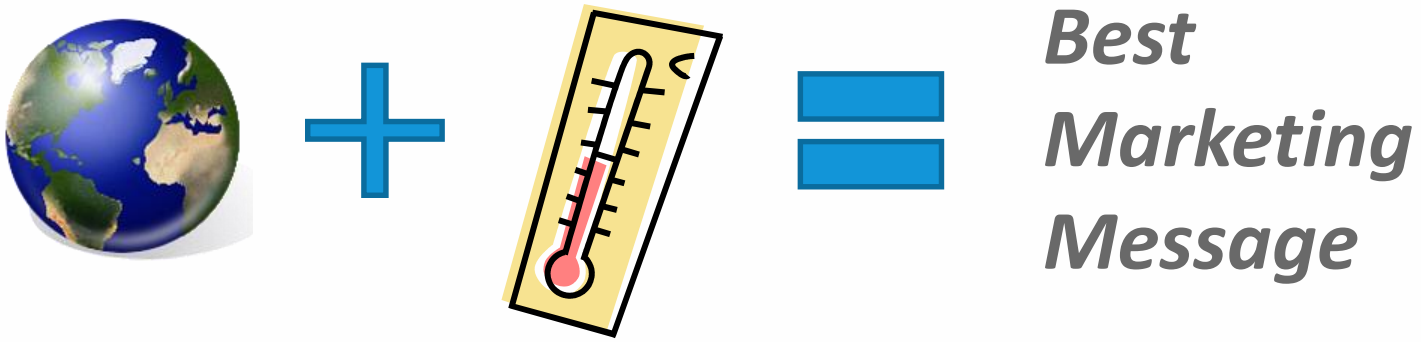
Feel concern and responsibility for household finances. Those motivated by messaging around "savings" and "costs" are more likely to:

- Be Caucasian
- Have lower incomes (less than $75,000)

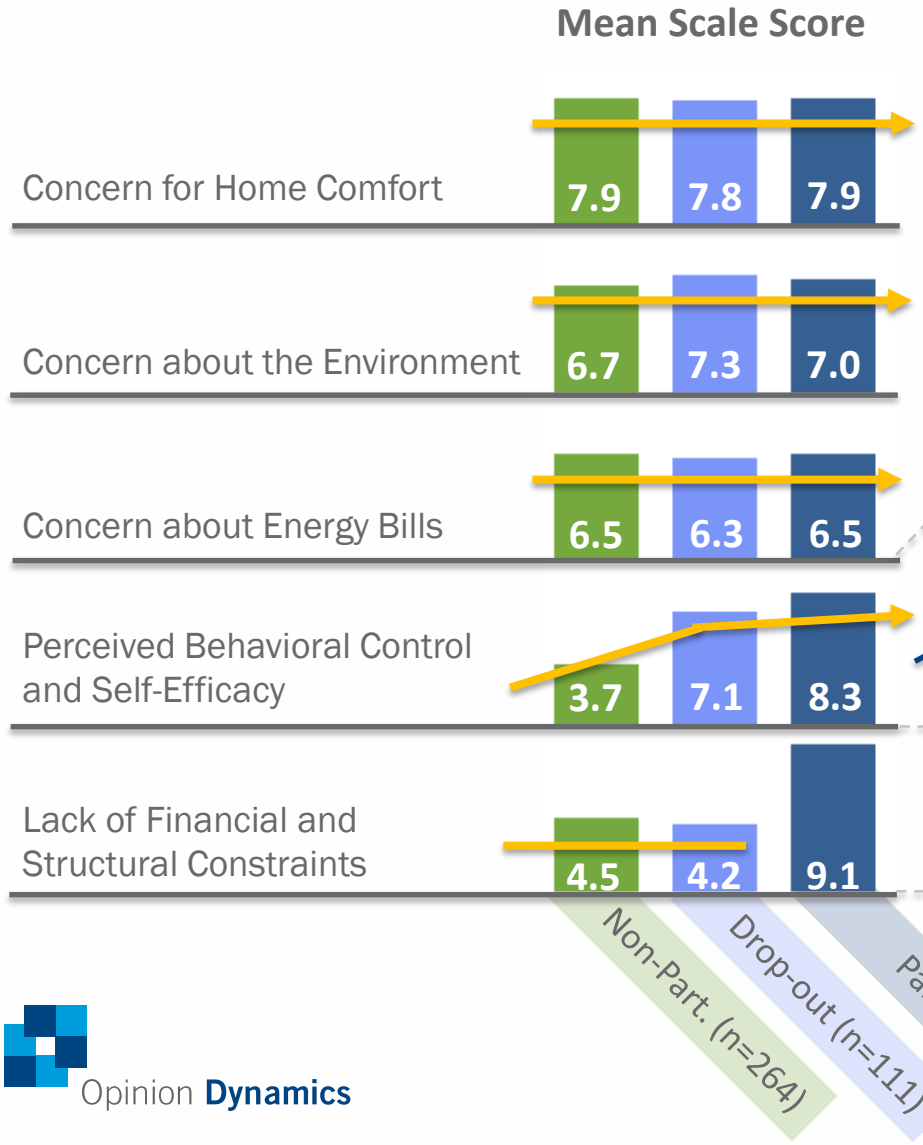
Generally, the environment is a less important motivator than comfort or finances

What Messages Will Resonate with Targeted Homeowners?

- Comfort and finances are the most important motivators when looking at each issue individually. However, when evaluating more than one motivation at a time, the combination of **comfort** and **environmental concerns** predicted a great deal:
  - level of intent
  - program engagement (at least registering on the website)
  - program completion
- Other combinations did not predict more beyond what the individual motivations did



Why Do Some Customers Start the Process but Drop Out?



- Concern for home comfort and the environment are high across all groups. Concern about energy bills is consistent among customer types – but lower in profile.

- Low perceived Behavioral Control and Self-Efficacy are a barrier to initially and fully engaging with the program.
- *Customers need help to understand how they can save energy !*

- Financial and Structural Constraints are a barrier to fully participating in the program *Customers need Financing help !*

Financial = can't afford upfront cost
Structural = home doesn't qualify for the program

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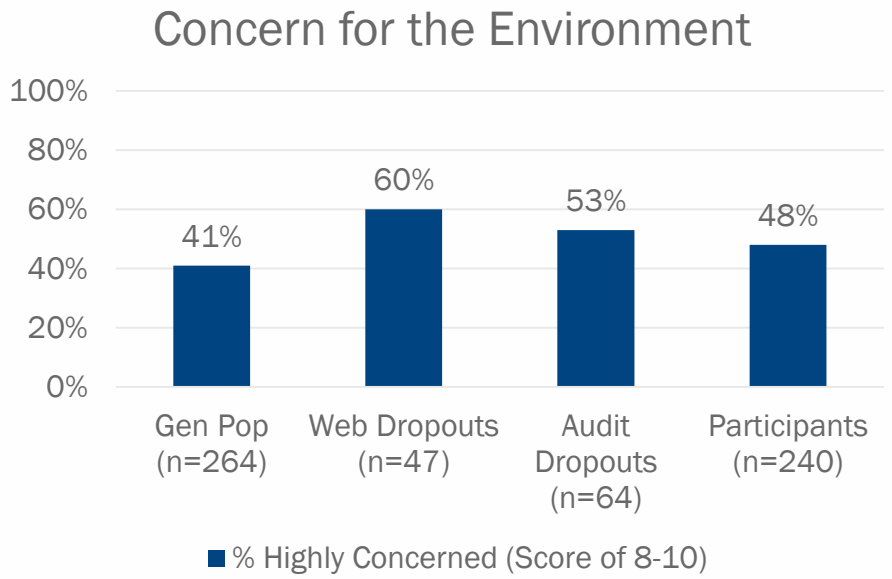
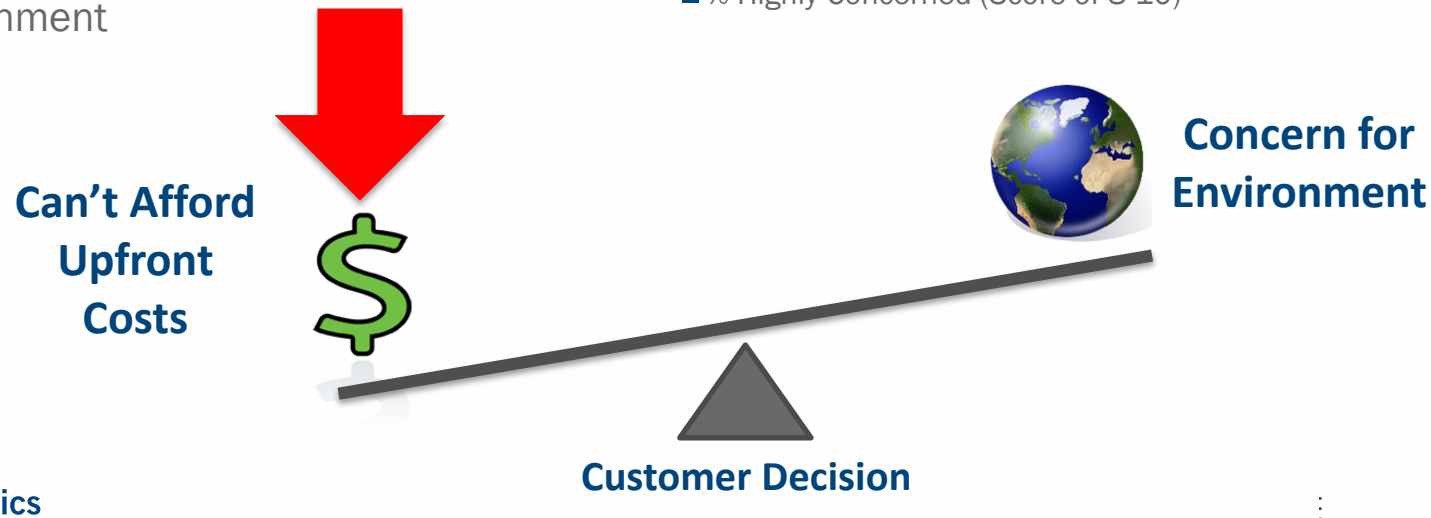
What Do We Know About These Drop-outs?

- Environmental concern is an important motivator, it is not sufficient to get customers through the program
  - a higher proportion of drop-outs are very concerned about the environment compared to participants.
- Likely the realities of upgrade costs screen out those mostly motivated by the environment

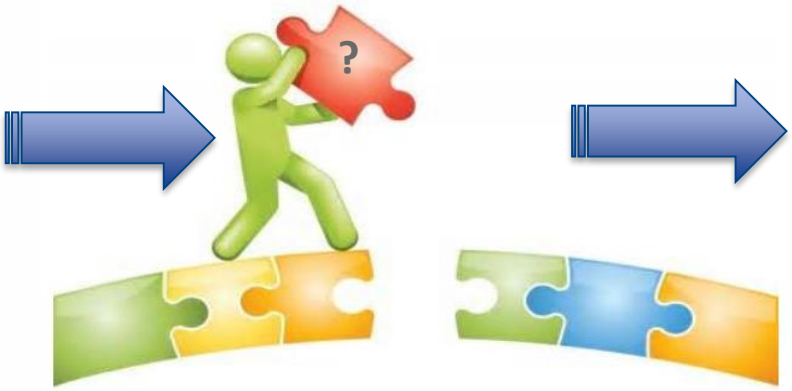




How can PG&E use this research to increase energy savings?

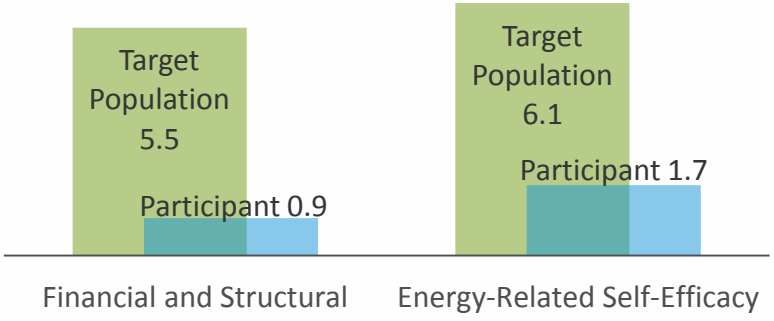
Path to participation is blocked by constraints and self-efficacy

Intend to Install Whole House Upgrades



Actually Make the Upgrades – Participate in EUC Program

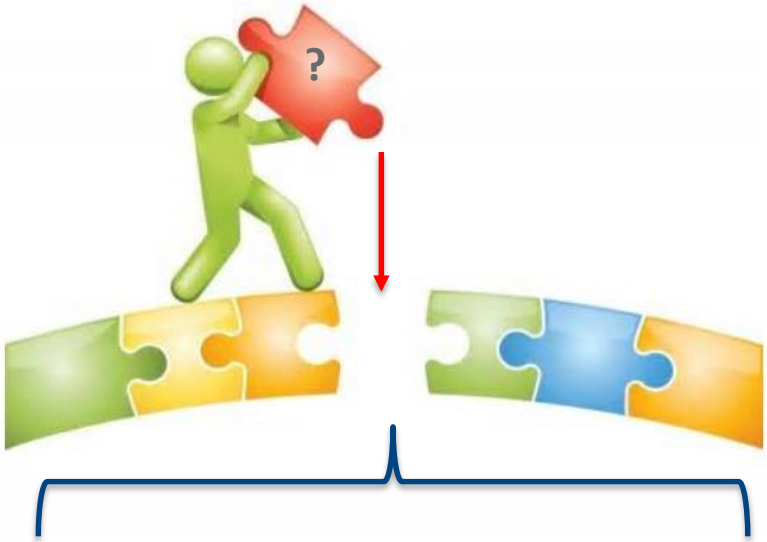
Customers with intent have higher constraints & lack self-efficacy



Opinion Dynamics

Fill the gap to participation with a marketing strategy

Intend to Install Whole House Upgrades



Actually Make the Upgrades – Participate in EUC Program

Marketing Strategy Built On:

1. Why Customers Participate and Why They Don't (Promotion)
2. What Upgrades Customers Intend to Make (Product)
3. How to Find Intent Customers (Place)

Promotion: Address Constraints in Messaging and Design, Lead with Home Comfort - But Add Environment as a Combined Message

- Financial constraints are the largest reason for not being able to take action.
  - ✓ Recommendation: *Make customers aware of financial support (incentives and financing).*

- Self-efficacy and perceived behavioral control related to saving energy are lower amongst intent customers.
  - ✓ Recommendation: *Communicate that the program is easy and anyone can do it. Include instructions or testimonials about how participating customers accomplished it.*

- Individually, comfort is the dominant motivator, but the combination of comfort and environment was the greatest predictor of level of intent, program engagement, and program completion.
  - ✓ Recommendation: *Emphasize comfort and the environment in program messaging.*

Product: Consider New Potential Measure Bundles

- One fifth of customers plan to install insulation, upgrade their windows, or upgrade their HVAC equipment to ENERGY STAR models which represent a combination of items from the current Basic and Advanced program packages. The limited intent population might be upsold to do all of the measures in a bundle, if bundling provides an extra motivator.

✓ Recommendation: *Offer one or both of the following bundles in the basic path if they meet savings needs. Additionally, if the program is interested in encouraging the uptake of air sealing as a measure, staff could consider including it in one of the bundles.*

Bundle 1	Bundle 2
• Attic, wall or floor insulation • Duct sealing and insulation • HVAC system upgrades	• Attic, wall or floor insulation • Duct sealing and insulation • ENERGY STAR appliances

Place: Score and Micro-target Customers

- Targeting potential high savers would help to increase savings (and average savings per home) in the future. Our analysis found 13 available indicators that are related to savings.

• Climate zone	• Electronic bill payment
• Home age	• Length of residence
• Home size	• Number of people in the home
• Program participation count	• Ethnicity
• Gas bill category	• Longitude
• Electric bill amount	• CARE scoring
• Electric opportunities (as identified by Targetbase)	

✓ Recommendation: *Using a minimum of these 13 key variables, score all customers (scores indicate likelihood to save) and target marketing efforts to them*

ADDITIONAL SLIDES

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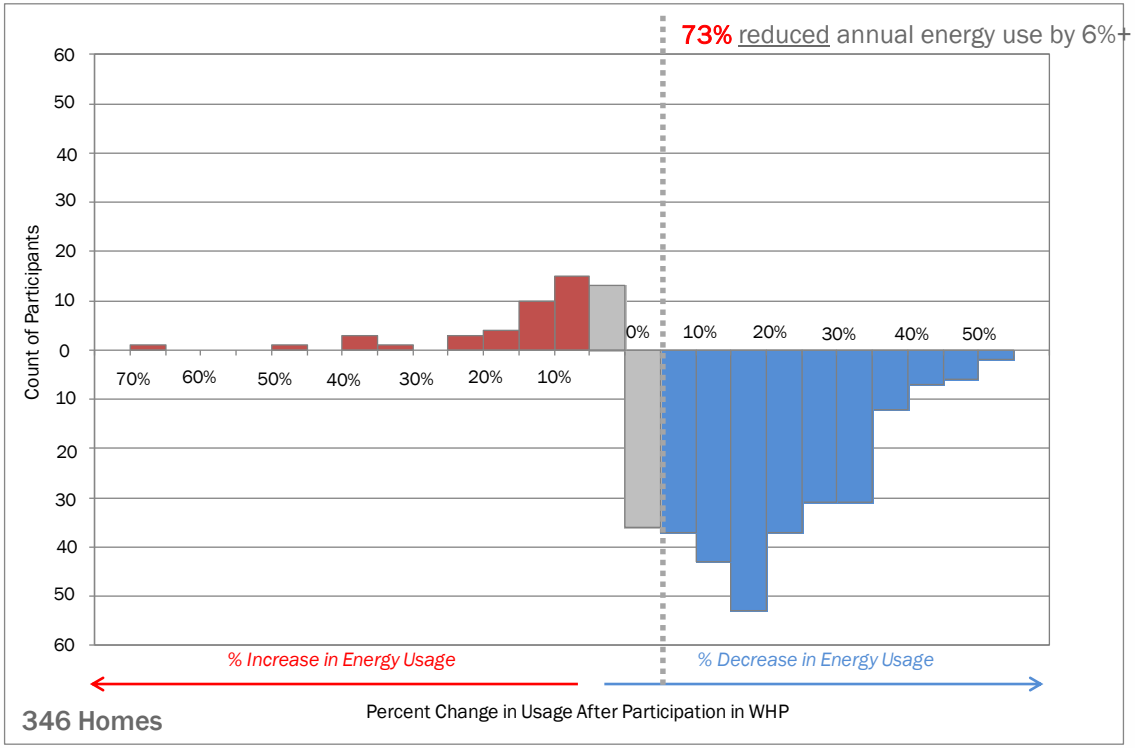
At the site level, three-quarters of program participants achieved energy reduction of 6% and higher. Some participants (10%), however, increased usage by 6% or more

Analysis of Combined (Gas and Electric) Changes in Energy Usage

- Site level energy savings estimates vary across participants, with most showing considerable savings, some seeing little change, and some increasing energy consumption after participation
  - 73% saw energy savings of 6% or higher (blue bars in the graphic below)
  - 16% saw little change to their energy usage (gray bars in the graphic below)
  - 10% saw increase in energy usage of 6% or higher (red bars in the graphic below)

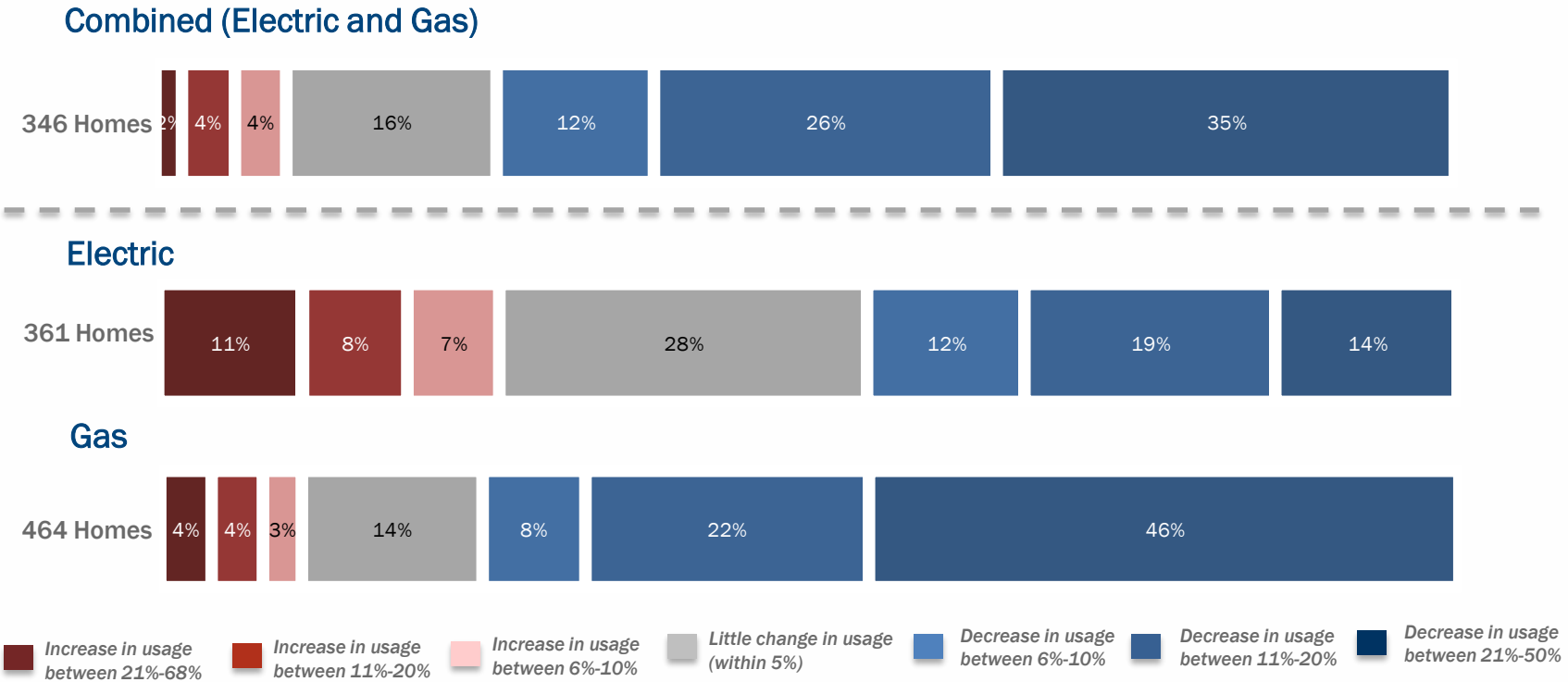


Opinion **Dynamics**

Note: Energy savings estimates were robust and consistent across all weather scenarios (see methodology slides in this presentation). We chose to present energy savings estimates evaluated at post-period weather conditions

Changes in energy usage vary by fuel type, with gas driving overall savings. On average, reduction in gas usage exceeds that on the electric side eight-fold

- Overall, close to one-half (45%) of participants saw electric savings of more than 5%, and three-quarters (76%) saw gas savings of more than 5%
- One-half of participants had high gas savings (21% and over) and is triple that on the electric side (46% vs. 14%)
- A much higher percentage of customers increased electric consumption post-program participation as compared to gas consumption (26% vs. 11%)

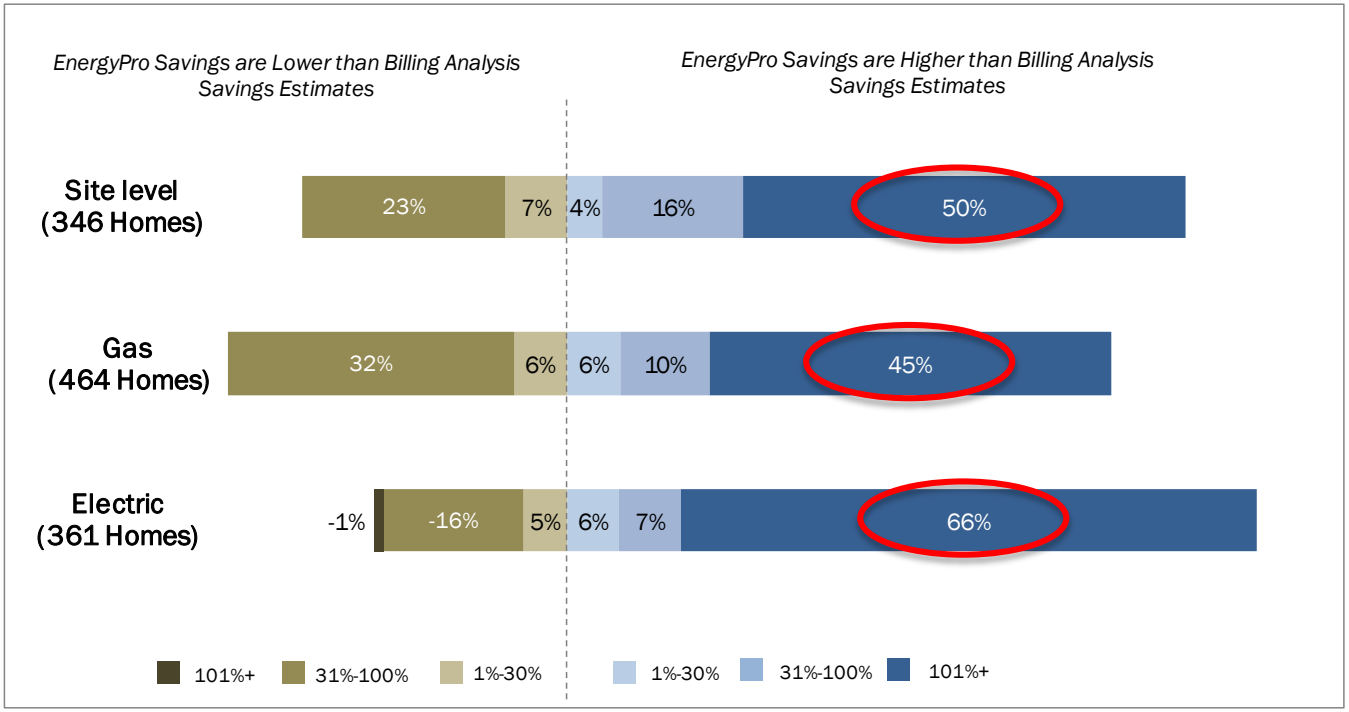


Opinion Dynamics

Note: Energy savings estimates were robust and consistent across all weather scenarios (see methodology slides in this presentation). We chose to present energy savings estimates evaluated at post-period weather conditions

As compared to the billing analysis results, EnergyPro overestimates savings considerably, especially on the electric side

- EnergyPro savings estimates are higher than billing analysis savings estimates for a large number of participants:
  - At the site level, EnergyPro overestimated savings for 50% of projects
  - On the gas side, EnergyPro overestimated savings for 45% of projects
  - On the electric side, EnergyPro overestimated savings for 66% of projects
- In cases where EnergyPro savings estimates are lower than the billing analysis savings estimates, the percent difference does not exceed 100% in the majority of cases – differences are moderate. In cases where EnergyPro savings are higher, the percent difference is over 100% in the majority of cases – differences are large



Note that site level analysis comparison only included accounts for which both electric and gas data were included in the pre-post regression analysis – customer had dual fuel service from PG&E

As compared to the billing analysis savings estimates, EnergyPro overestimated savings more than five-fold on the electrics side, nearly two-fold on the gas side and, and more than two-fold at the site level (gas and electric combined)

- On average, EnergyPro overestimated electric savings by 6,582 kbtu and gas savings by 10,079 kbtu. At the site level, EnergyPro savings estimates were higher than the billing analysis savings estimates by 16,791 on average.

ELECTRIC (361 Homes)				
	EnergyPro (kbtu)	Billing Analysis (kbtu)	Difference (kbtu)	Billing Analysis/EnergyPro
SUM Savings	2,898,527	522,376	2,376,151	18%
Average	8,029	1,447	6,582	
Variance	93,527,399	31,719,559	92,614,043	
Stdev	9,671	5,632	9,624	

GAS (464 Homes)				
	EnergyPro (kbtu)	Billing Analysis (kbtu)	Difference (kbtu)	Billing Analysis/EnergyPro
SUM Savings	10,889,149	6,212,707	4,676,442	57%
Average	23,468	13,389	10,079	
Variance	746,762,612	289,365,201	785,115,393	
Stdev	27,327	17,011	28,020	

SITE LEVEL (ELECTRIC AND GAS COMBINED) (346 Homes)				
	EnergyPro (kbtu)	Billing Analysis (kbtu)	Difference (kbtu)	Billing Analysis/EnergyPro
SUM Savings	10,923,865	5,114,352	5,809,513	47%
Average	31,572	14,781	16,791	
Variance	950,791,841	339,026,656	1,018,085,315	
Stdev	30,835	18,413	31,907	

Note that site level analysis comparison only included accounts for which both electric and gas data were included in the pre-post regression analysis