SOUTHERN CALIFORNIA EDISON®

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The Multifaceted Dynamics of High Usage among CARE Customers in 2015:

Factors Affecting Levels of Energy Use in Income Qualified Households

Southern California Edison

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Agenda

1. Introduction to SCE & the CARE Program
2. The CARE High Usage Program
3. Factors Affecting Propensity for High Usage Among CARE Customers and Implications of Findings
4. Future Prospects & Conclusions
5. Questions

Introduction to Southern California Edison

- **One of the nation's largest electric utilities:**
  - Nearly 14 million residents in service territory
  - Approximately 5 million customer accounts
  - 50,000 square-mile service area
- **Substantial Presence of Low Income Population**
  - Approximately 1/3 of residents estimated to be "low-income"

The CARE Program

California Alternate Rates for Energy (CARE) offers income-qualified customers struggling to make ends meet a **discount of approximately 30%** on their monthly electric bills.

SCE has **1.3 Million CARE Households** in it's service territory and administers $385 Million in CARE bill discounts. **Average CARE discount is $24 per month** ($291 per year).

State legislated program, since 1989, with eligibility **self declared** every two years.

Two Ways to Qualify for CARE

1. **Participation in an eligible public assistance program (e.g. LIHEAP and WIC)**
2. **Meet income guideline qualifications (approximately 200% of federal poverty income guidelines)**

Maximum Household Income Effective June 1, 2015	
Number of Persons in Household	**Total Combined Annual Income**
1 - 2	Up to $32,040
3	Up to $40,320
4	Up to $48,600
Each additional person	$8,320

The CARE High Usage Program

CARE High Usage: An Overview

1. **Identifies low income customers with the highest energy usage in each region.**
2. **Notifies them of their usage and ways SCE can help**
3. **Promotes program integrity by ensuring only income eligible customers are enrolled.**
4. **Disallows CARE discount for continued high usage.**
5. **Gives customers an opportunity to explain their usage**

CARE High Usage Levels

USAGE	PERCENTAGE of BASELINE	AVERAGE CARE DISCOUNT
High-Low	From **400% up to 600%** of baseline in one month	$148/month $1,771/year
High-High	**At least 600%** of baseline in one month	$304/month $3,646/year

- **Baseline Allocation is a set amount of kilowatt hours of energy (kWh) for basic services such as lighting, cooking, heating, and refrigeration.**
- **Baseline Allocation depends on region (climate), season (winter or summer), and source of energy (e.g. electricity only).**

CARE High Usage Process for Customers

To continue receiving the CARE discount high usage customers must:

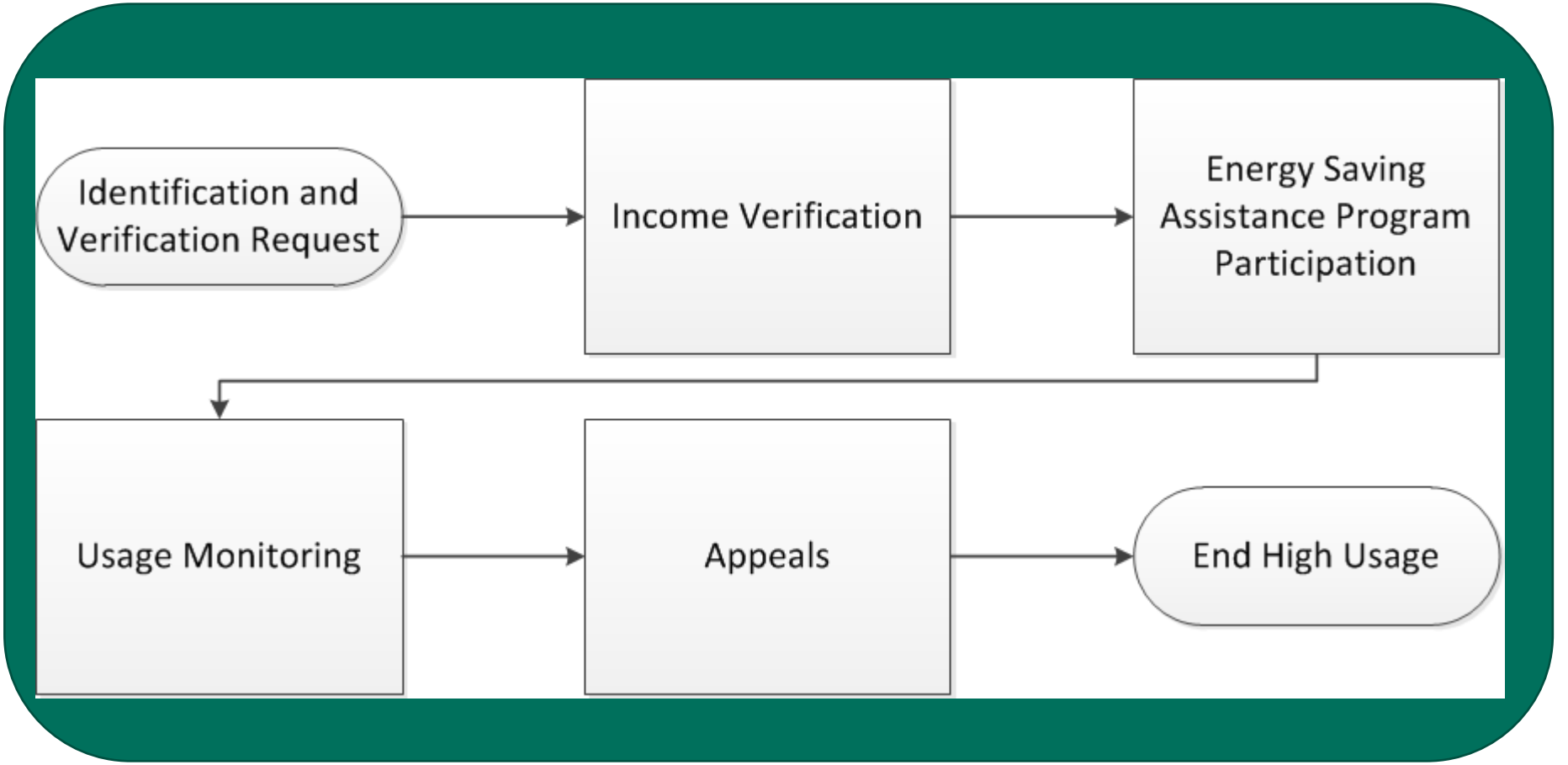
- Income verify with most recent IRS tax transcript
- Participate in the Energy Savings Assistance Program
- Keep usage below 600% of Baseline

Failure to comply in any of the requirements:

- Will result in customer being removed from the CARE program and barred for 24 months.
- **Appeals Process:**

  Customer may appeal usage as Basic, Necessary and Legitimate (e.g. Medical Equipment, Water Wells).

Overview of CARE High Usage Process



Identification and Verification Request

7% of all CARE customers are selected for income verification annually

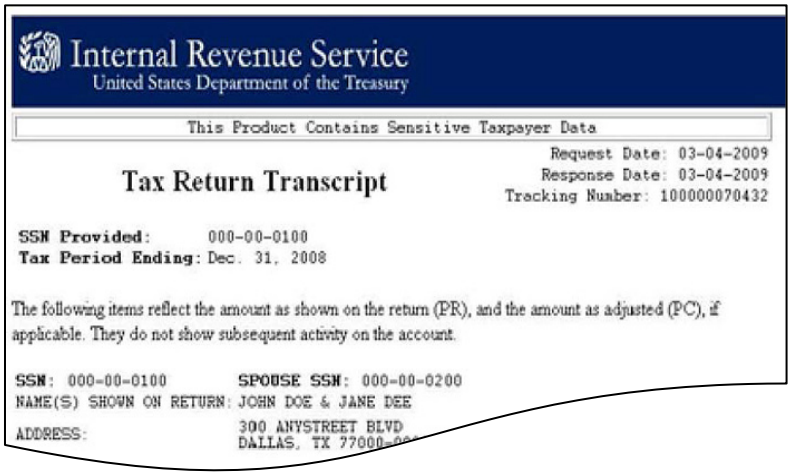
Customer Analytics & Insights Team identifies accounts to be income verified:

- High Usage (usage ≥400% of baseline)-
Disproportionate Stratified Random Sample (DSRS) for non-high usage

High usage verifications are given priority over non-high usage DSRS customers.

High Usage Income Verification

- **Federal Tax Transcript must be provided for each adult member of the household**
  - **(Or other approved documentation e.g. Transcript of Non-Filing from IRS or Affidavit of Zero Income)**
- **Categorical documentation not accepted**



Internal Revenue Service
United States Department of the Treasury

This Product Contains Sensitive Taxpayer Data

Tax Return Transcript

Request Date: 03-04-2009
Response Date: 03-04-2009
Tracking Number: 100000070432

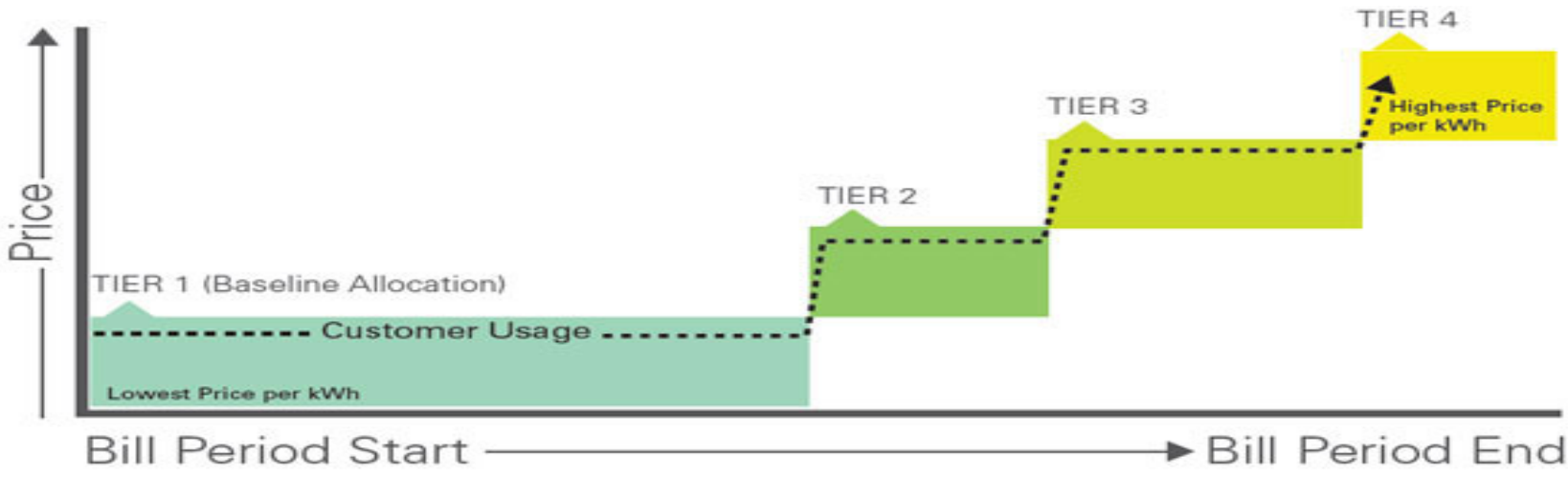
SSN Provided: 000-00-0100
Tax Period Ending: Dec. 31, 2008

The following items reflect the amount as shown on the return (PR), and the amount as adjusted (PC), if applicable. They do not show subsequent activity on the account.

SSN: 000-00-0100 **SPOUSE SSN:** 000-00-0200
NAME(S) SHOWN ON RETURN: JOHN DOE & JANE DEE
ADDRESS: 300 ANYSTREET BLVD
DALLAS, TX 77000-

Usage Monitoring

- **SCE will monitor the customers account for 24 months (after 90 day grace period) to ensure usage remains below 600% of baseline.**
- **If usage exceeds 600% (after their grace period) customer will be removed from CARE and will be barred for 24 months.**



Appeals

- **Written Appeal demonstrating usage as "necessary, basic and legitimate household energy usage."**
- **Decision by SCE Appeal Review Board (cross functional/departmental team)**
  - **If approved, the customer will be placed back on CARE, is exempt from Usage Monitoring for 24 months and may be credited for their time of the program.**
  - **If denied, customer is offered opportunity to appeal with the Energy Division (ED) of the California Public Utility Commission (CPUC).**

Notable Cases

- **Medical Needs**
- **Electric Vehicles**
- **Home Businesses**
- **Space Heaters**
- **Well Pumps**
- **Large Households**

Factors Affecting Propensity for High, High-High, and High-Low Usage

Data Sources

- CARE customers issued request for eligibility verification in calendar year 2015
- Acxiom appends to SCE residential customer database on socioeconomic, demographic and home infrastructure variables and SCE data on CA climate zones

Theoretical Framework of Analysis

HOUSEHOLD SOCIOECONOMIC

- Education
- Marital Status
- Household Income
- Household Size
- Length of Residence in Home
- Home Ownership & Household Arrangement

HOME INFRASTRUCTURE

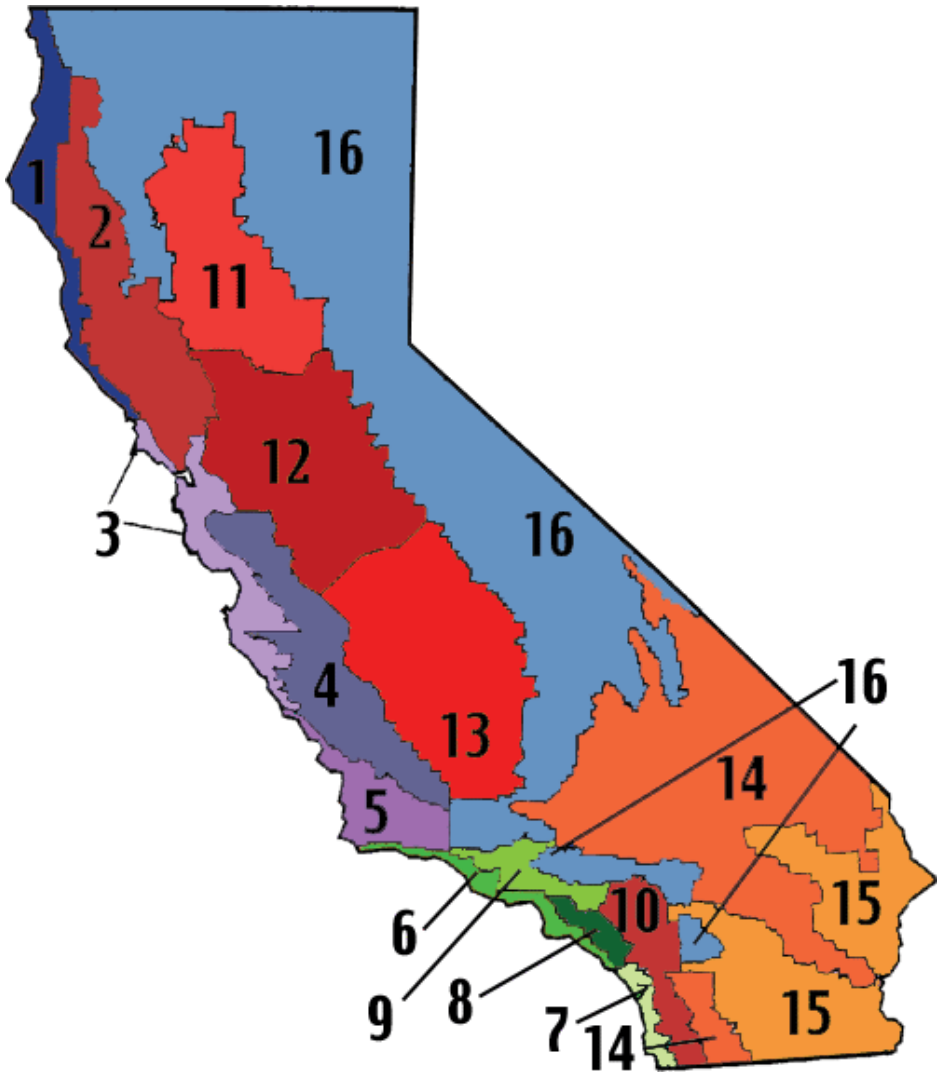
- Square Footage
- Cooling and Heating Systems

GEOGRAPHY

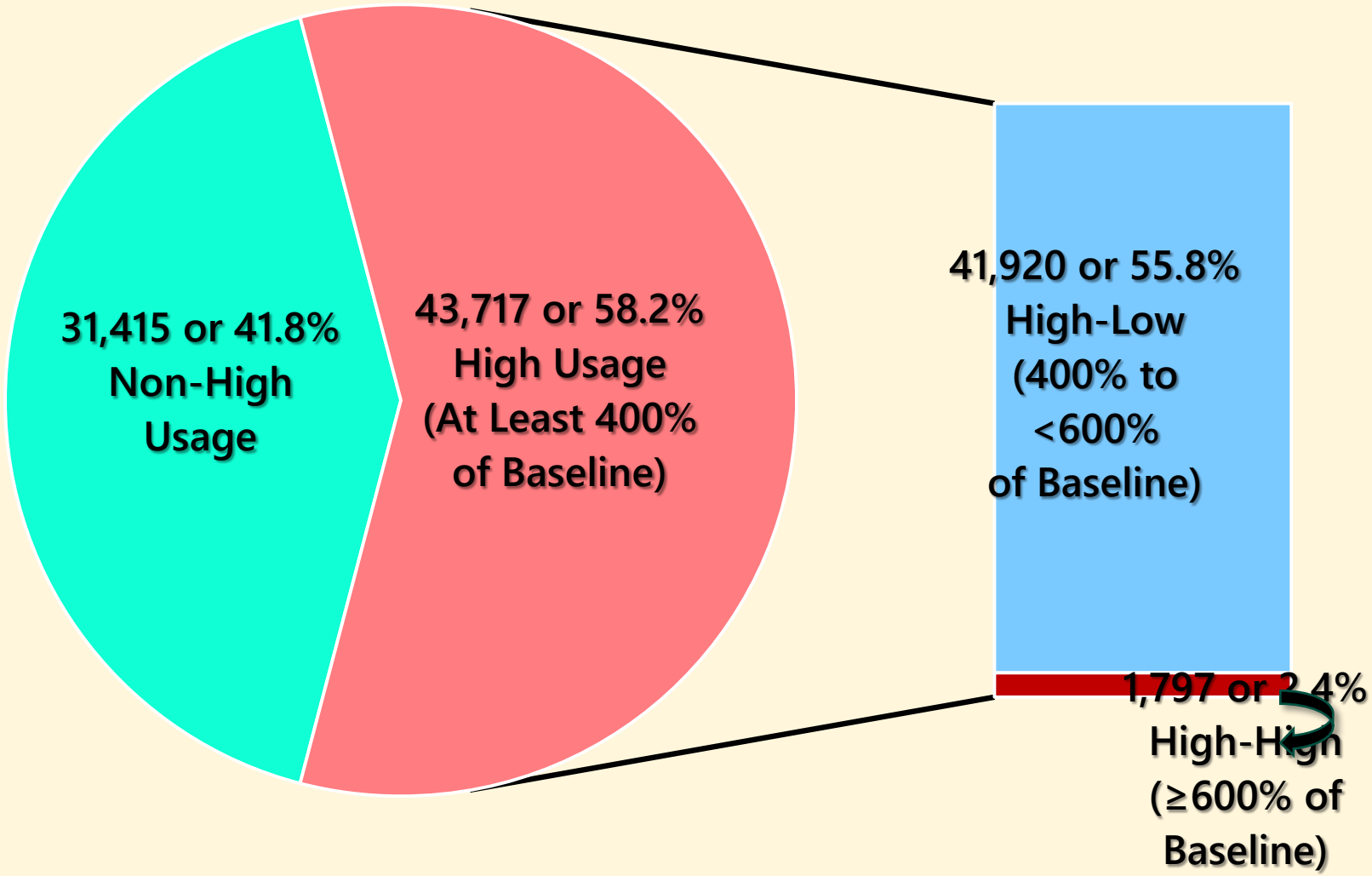
- Climate Zone

PROPENSITY for USAGE at HIGH, HIGH-HIGH, and HIGH-LOW LEVELS

California Climate Zones



2015 Issued Verifications (n=75,132)

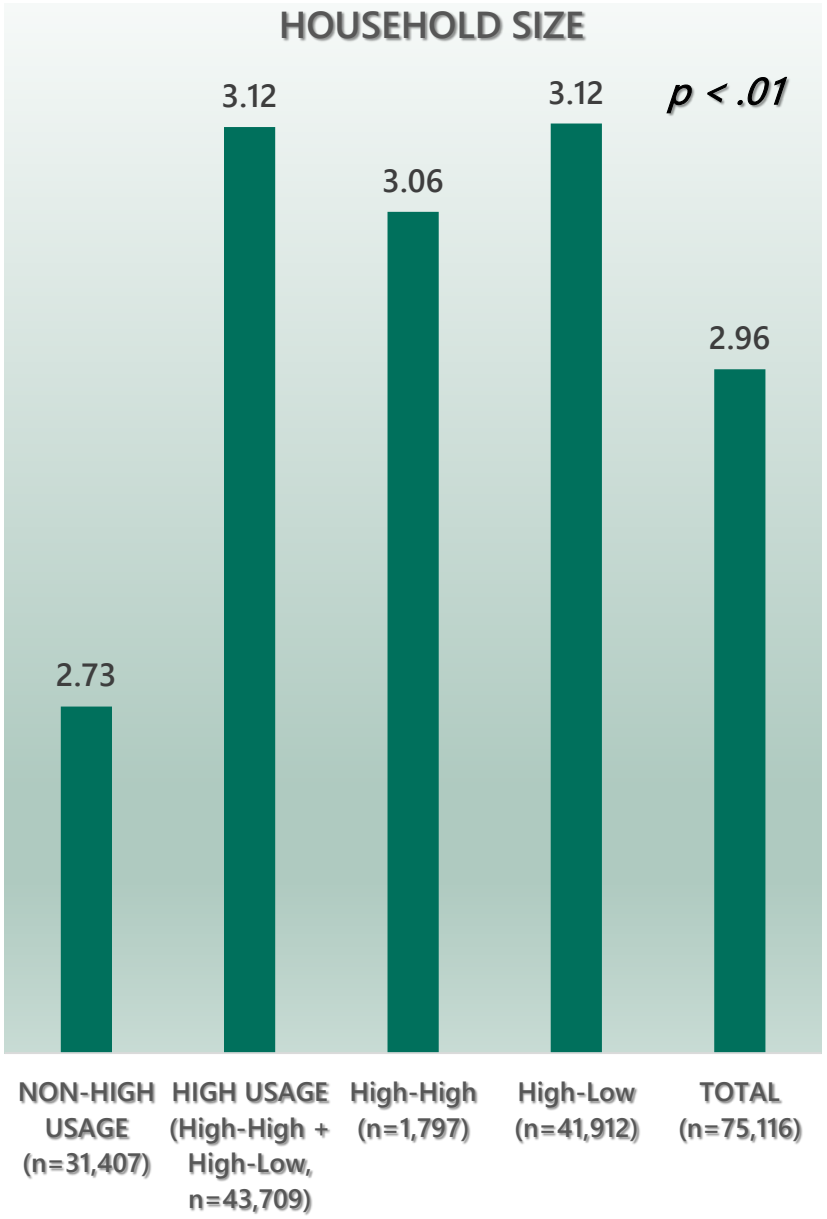


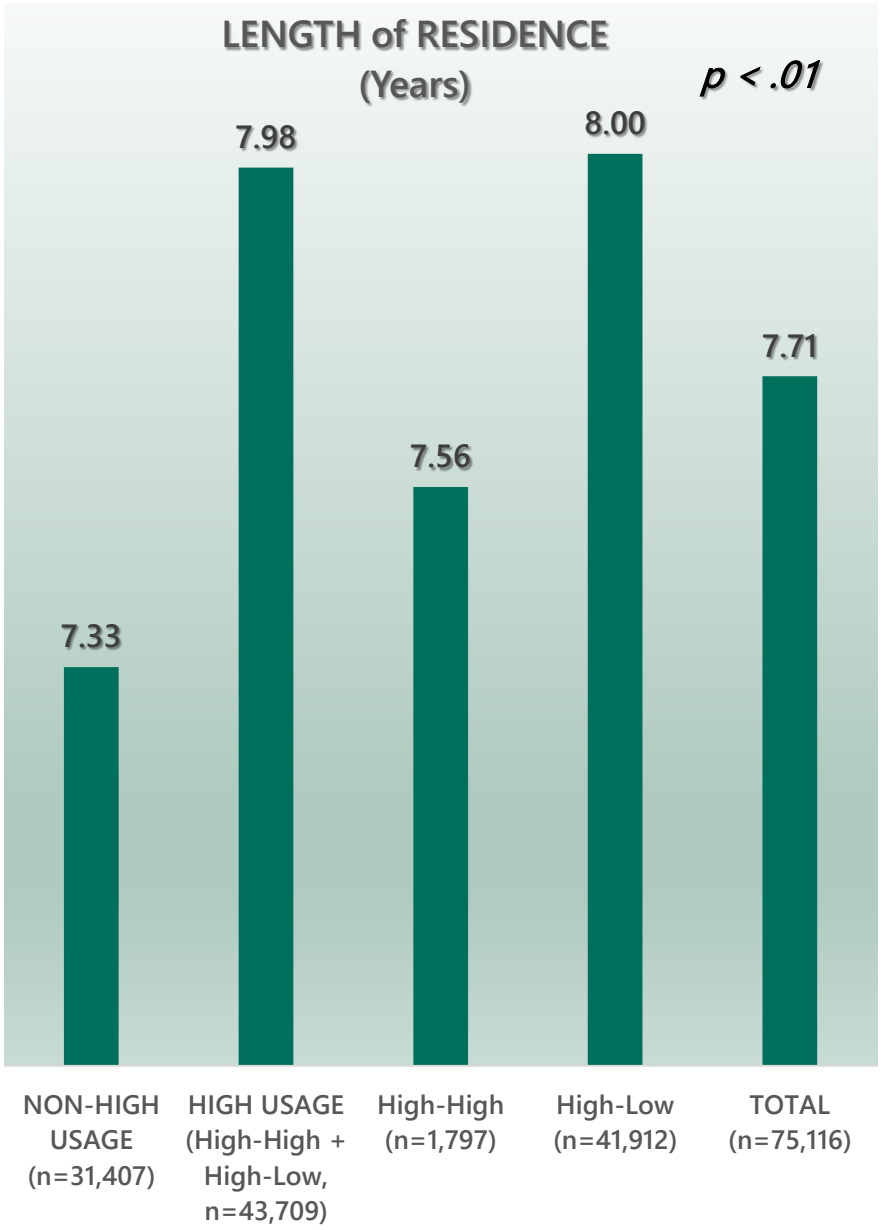
Bivariate Analysis: Means Comparison (t-/F-tests) & Chi-Square Tests

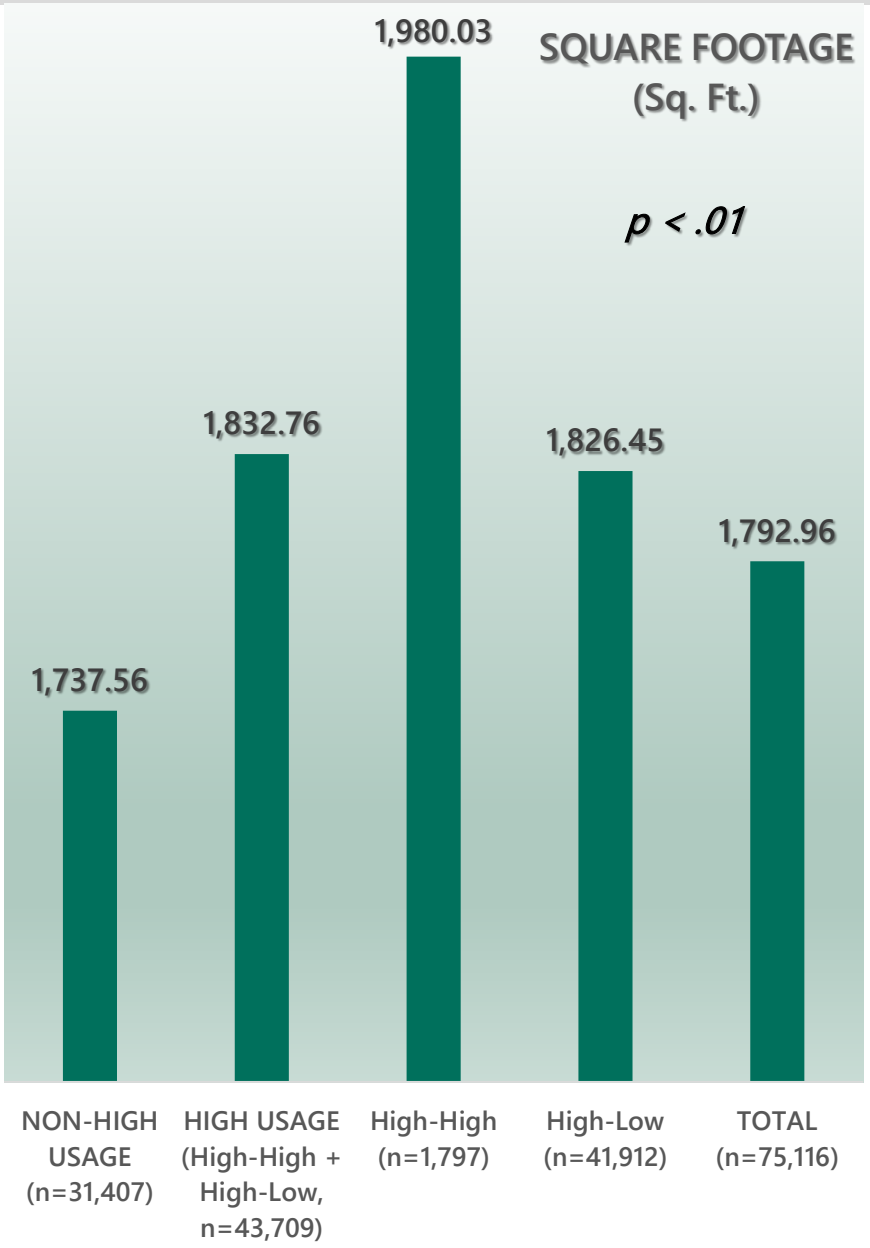
Example:

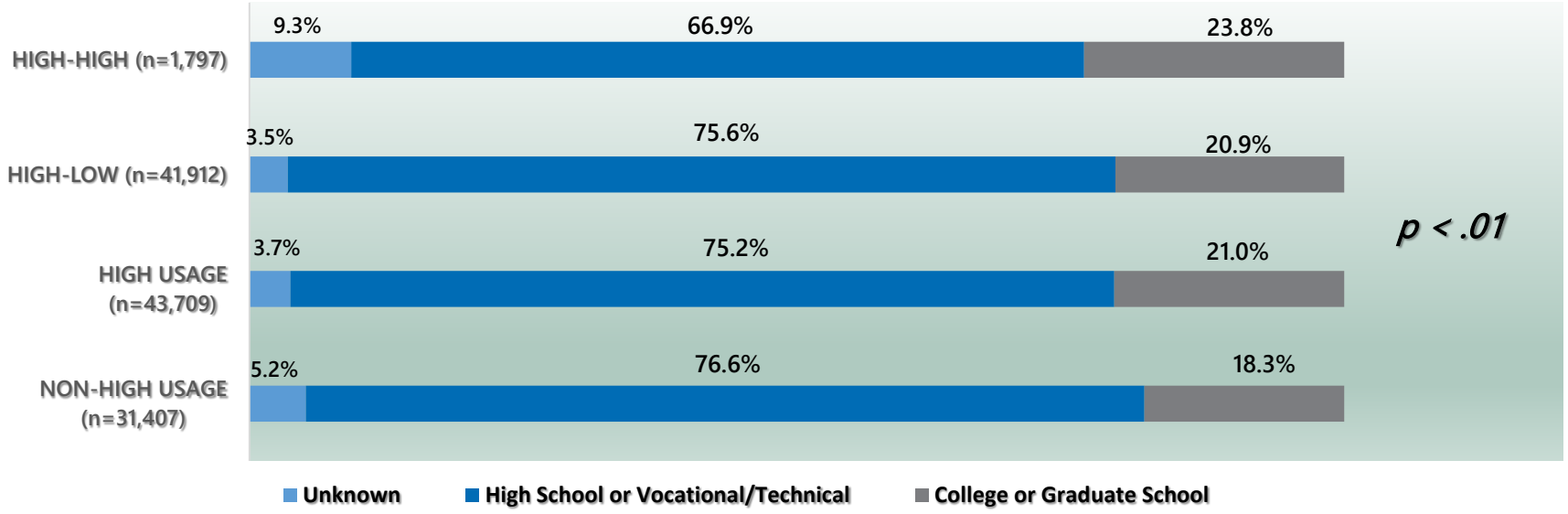
Household Income → **Propensity for High Usage, High-High Usage, High-Low Usage**


HOUSEHOLD INCOME ($)
$46,344.17
$61,928.21
$67,915.97
$61,671.48
$55,412.31
p < .01
NON-HIGH USAGE (n=31,407)
HIGH USAGE (High-High + High-Low, n=43,709)
High-High (n=1,797)
High-Low (n=41,912)
TOTAL (n=75,116)

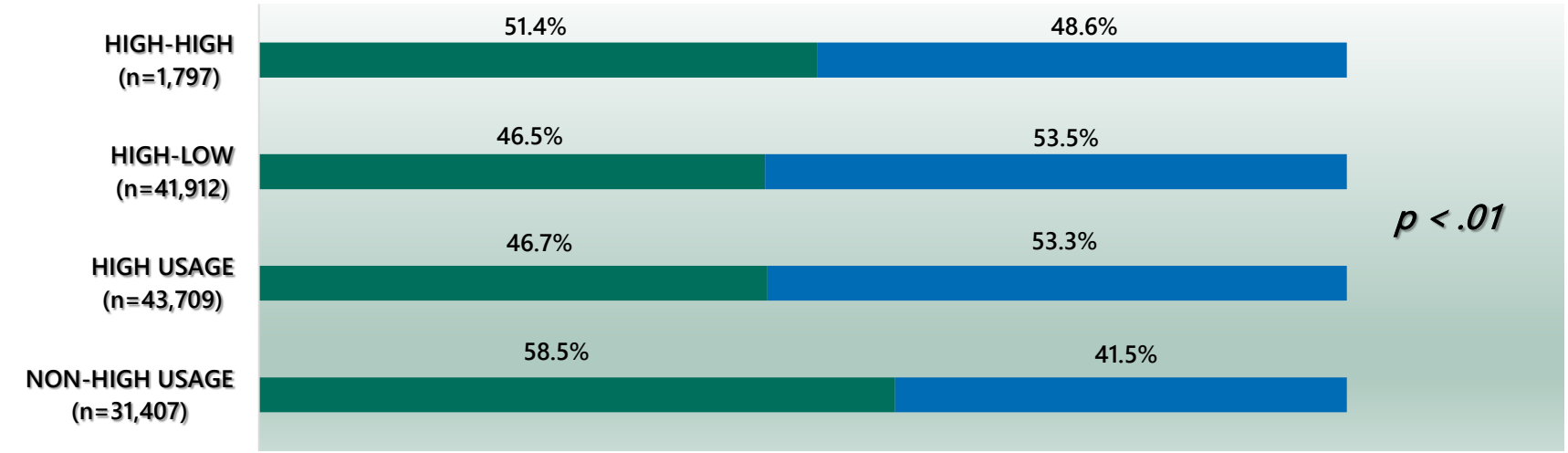

HOUSEHOLD SIZE
2.73
3.12
3.06
3.12
2.96
p < .01
NON-HIGH USAGE (n=31,407)
HIGH USAGE (High-High + High-Low, n=43,709)
High-High (n=1,797)
High-Low (n=41,912)
TOTAL (n=75,116)


LENGTH of RESIDENCE
(Years)
p < .01
7.33
7.98
7.56
8.00
7.71
NON-HIGH USAGE (n=31,407)
HIGH USAGE (High-High + High-Low, n=43,709)
High-High (n=1,797)
High-Low (n=41,912)
TOTAL (n=75,116)

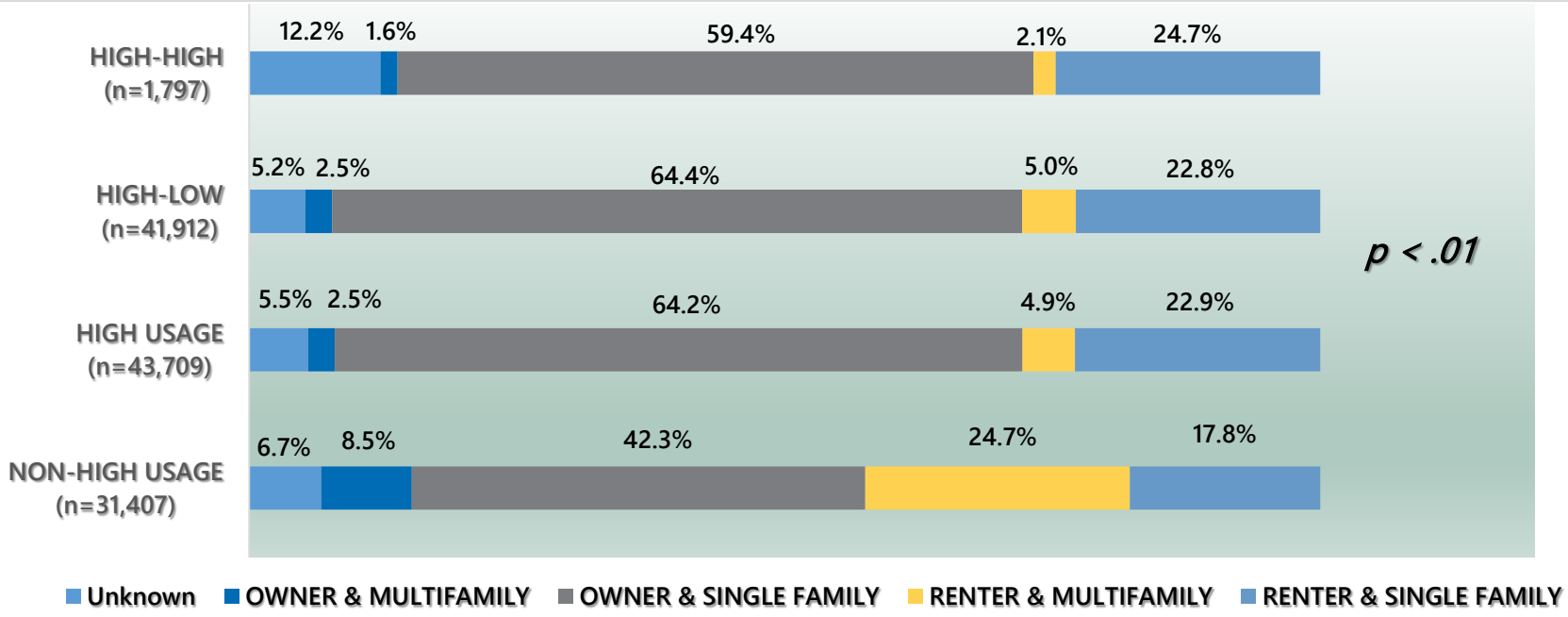

SQUARE FOOTAGE
(Sq. Ft.)
p < .01
1,737.56
1,832.76
1,980.03
1,826.45
1,792.96
NON-HIGH USAGE (n=31,407)
HIGH USAGE (High-High + High-Low, n=43,709)
High-High (n=1,797)
High-Low (n=41,912)
TOTAL (n=75,116)



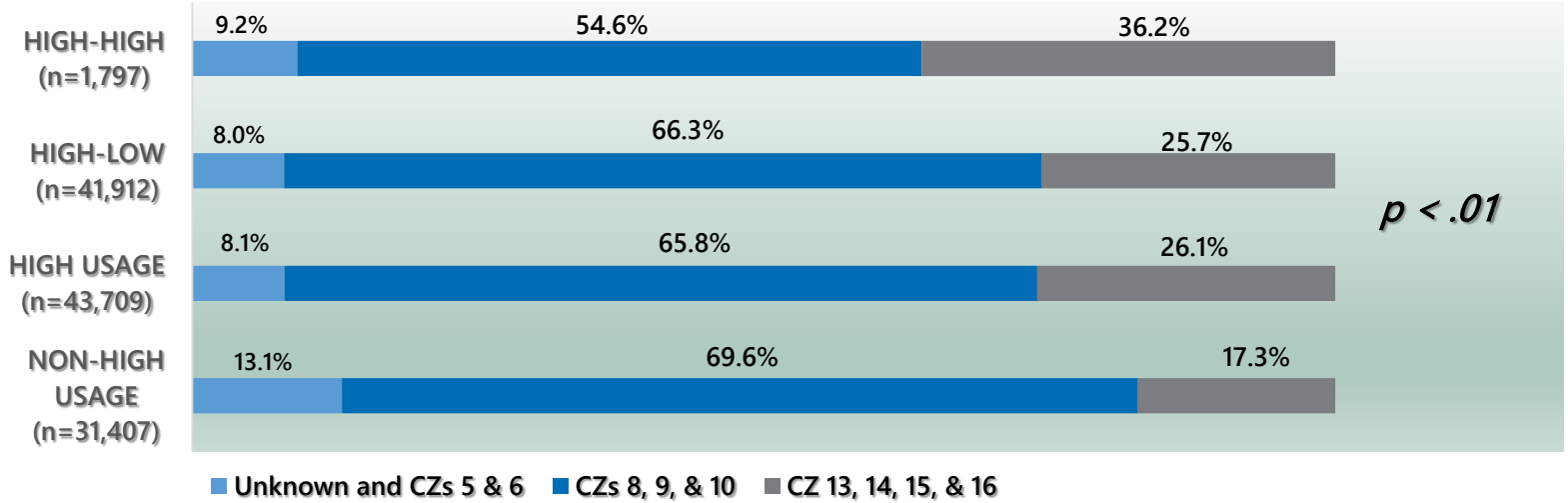
EDUCATION



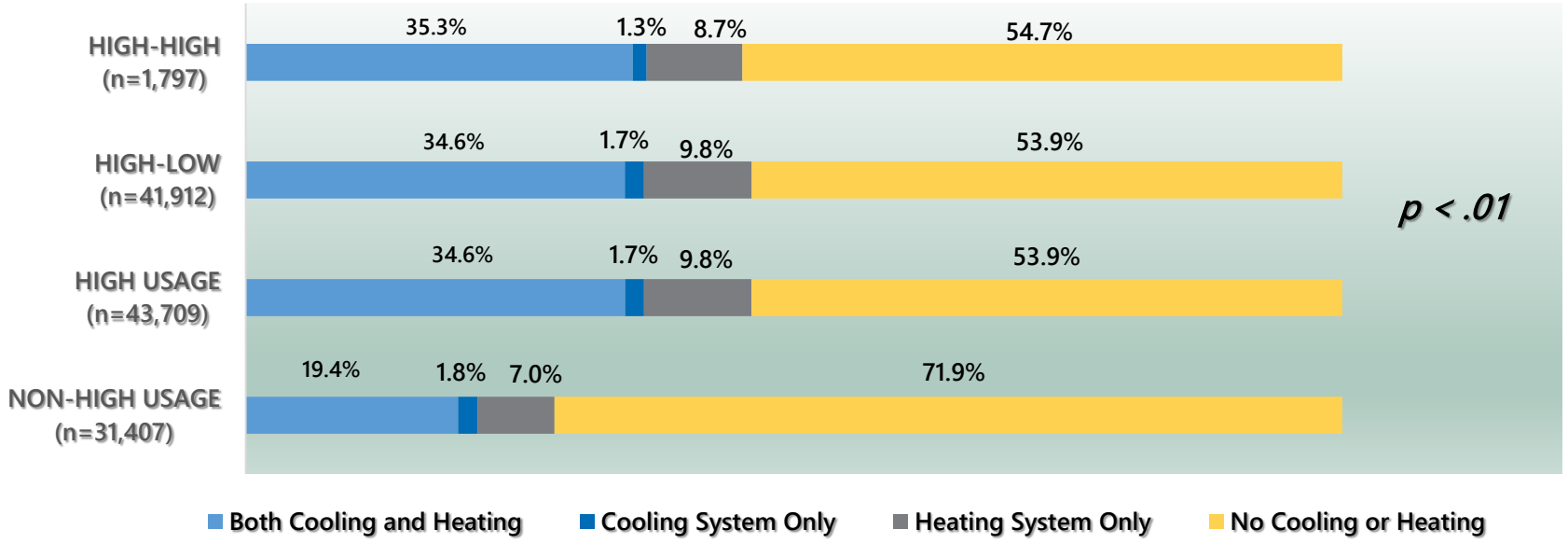
MARITAL STATUS



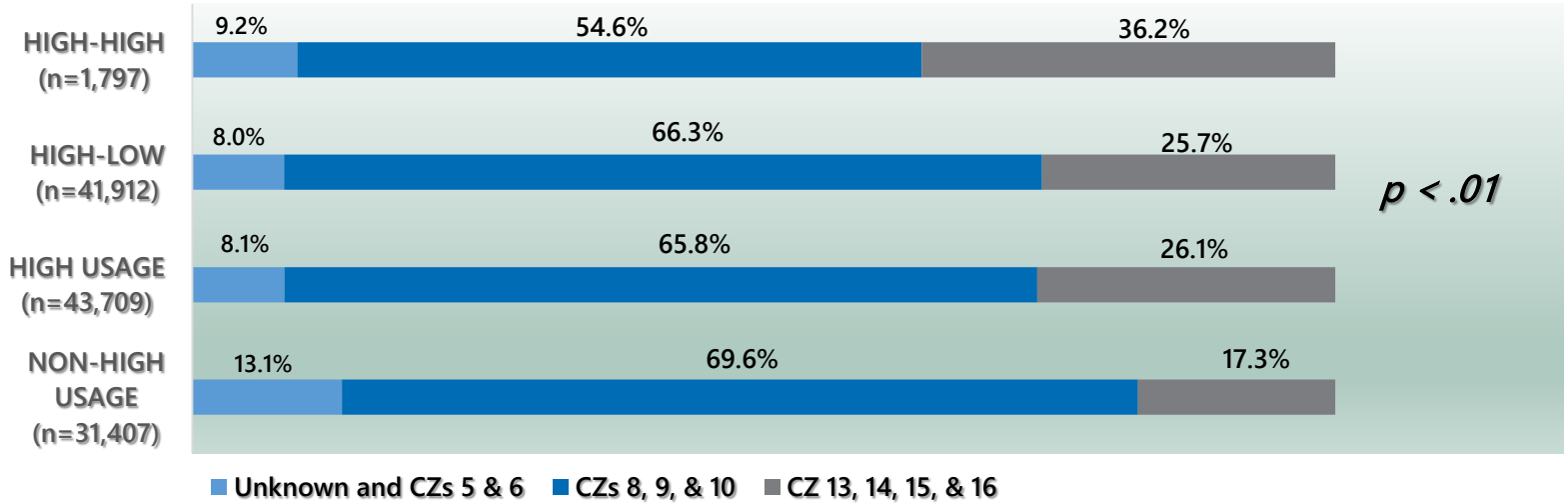
HOME OWNERSHIP and HOUSEHOLD ARRANGEMENT



CLIMATE ZONE



COOLING & HEATING SYSTEMS



CLIMATE ZONE

Bivariate Findings

High Usage is significantly associated with:

- Higher Household Income
- Larger Household Sizes
- Longer Residence in Home
- Larger Square Footage
- Higher Education (i.e. College &/or Graduate School)
- Being Married
- Having Both Cooling and Heating OR Heating Only
- Being Single Family Regardless of Home Ownership
- Living in Climate Zones 13, 14, 15, and 16

Multivariate Analysis: Binary Logit Regression

Example:

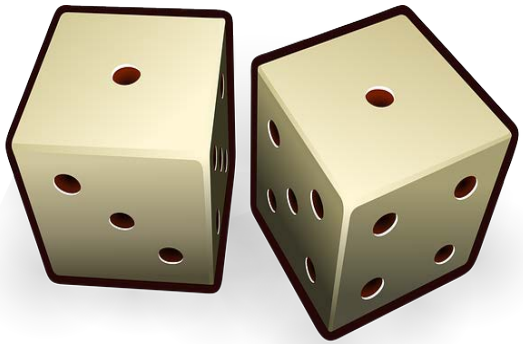
Square Footage

Household Size

Climate Zone

Propensity for High Usage, High-High Usage, and High-Low Usage

Multivariate Analysis: Binary Logistic Regression



probability of a "1" at observation *i*

$$p_i = \frac{1}{1 + e^{-\sum_{j=0}^{M} \beta_j x_{ij}}}$$

i = 1...N (number of observations)
j = 1...M (number of ind. variables)

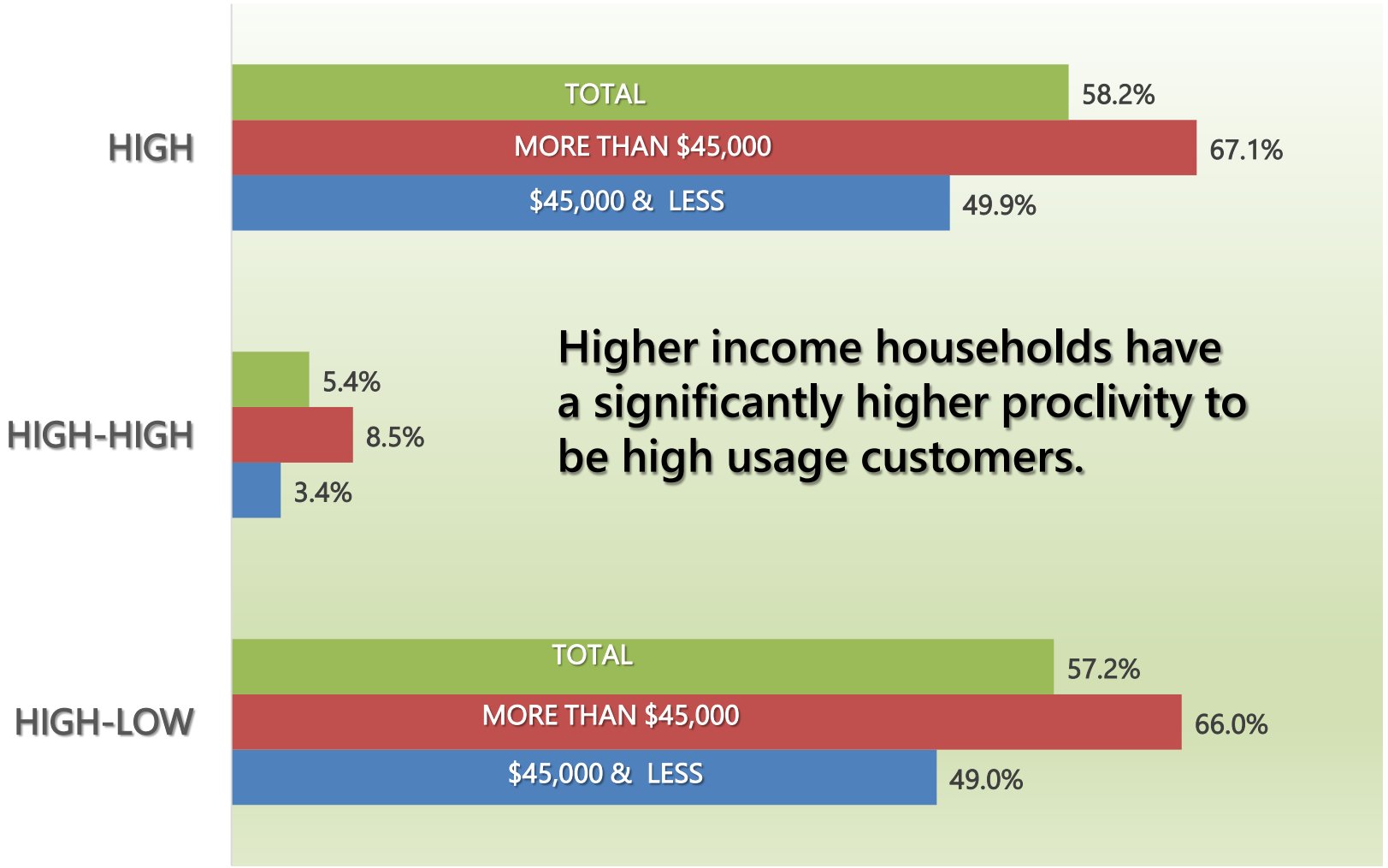
the j'th variable at observation *i*

natural log

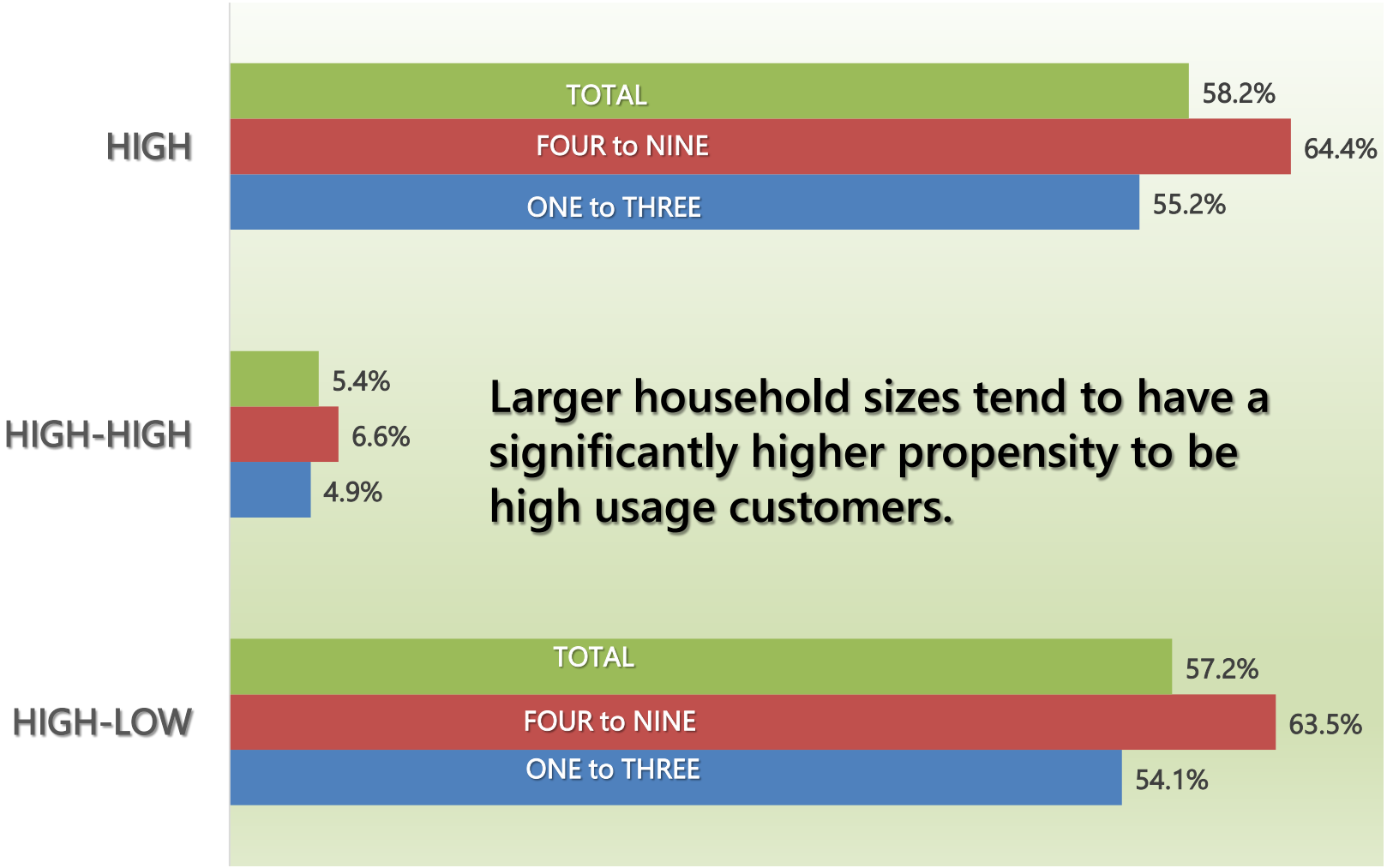
regression coefficients

Allows Estimation of Probability of Being High, or High-High, or High-Low Usage By Characteristic of CARE Customer

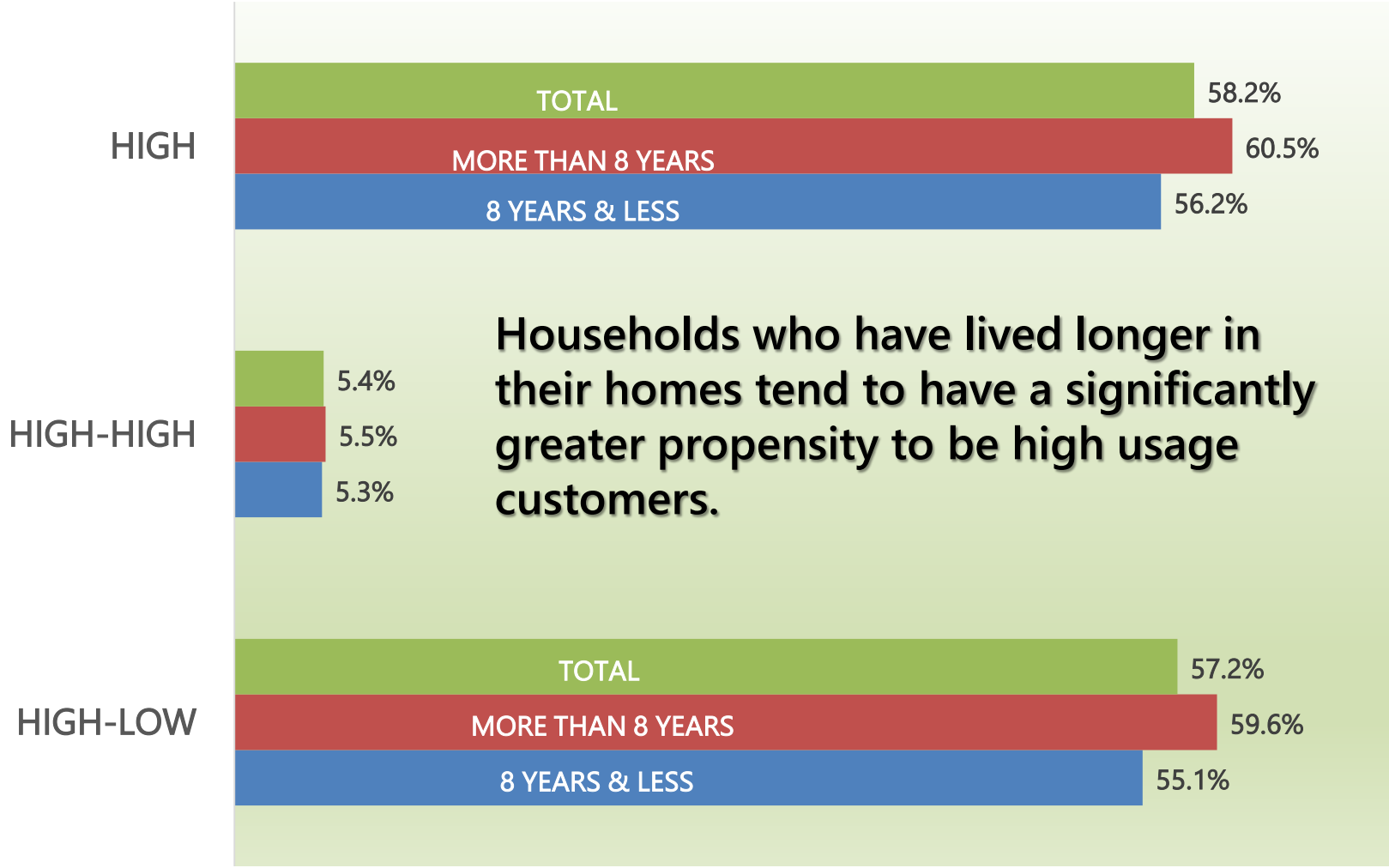
HOUSEHOLD INCOME



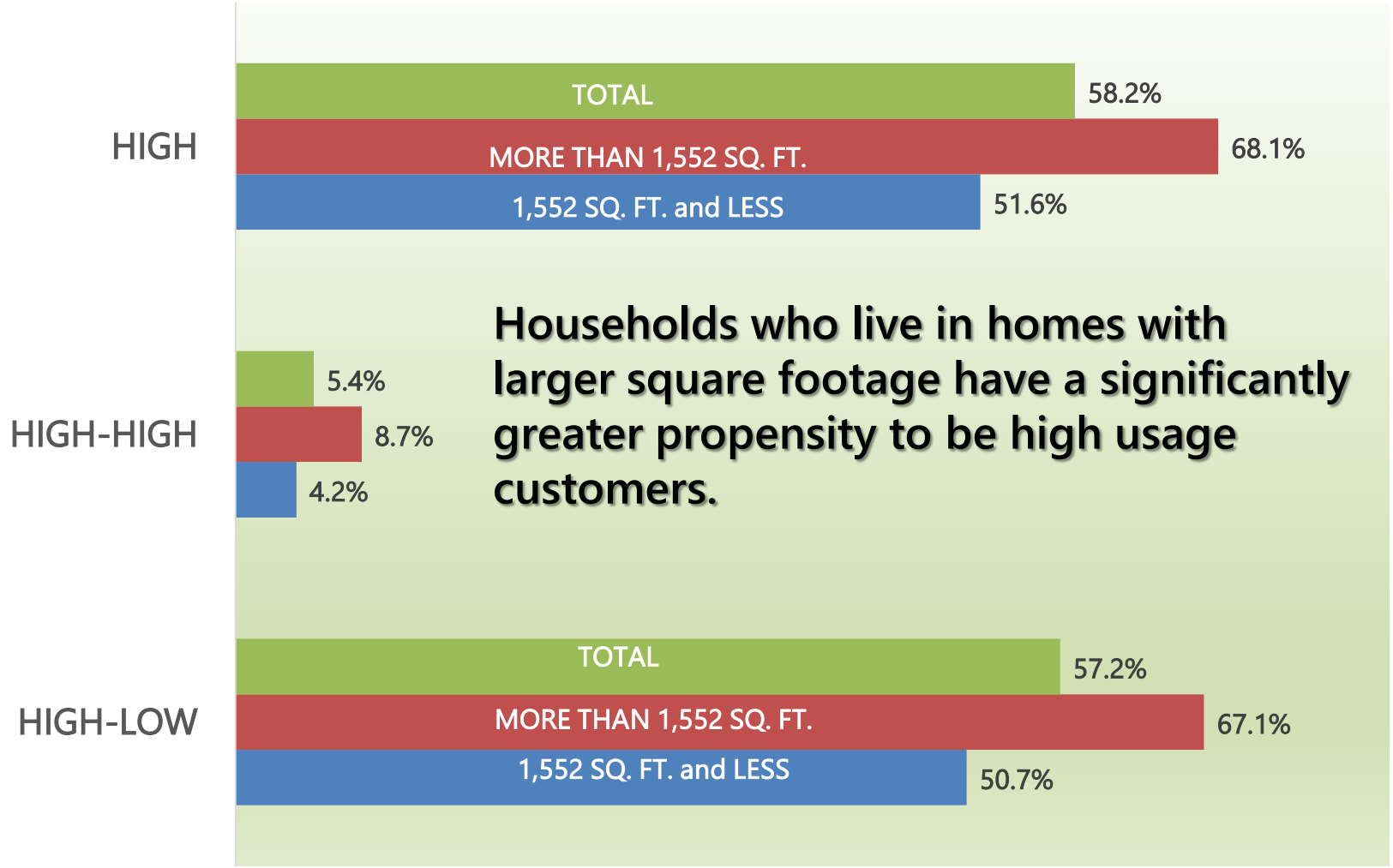
HOUSEHOLD SIZE



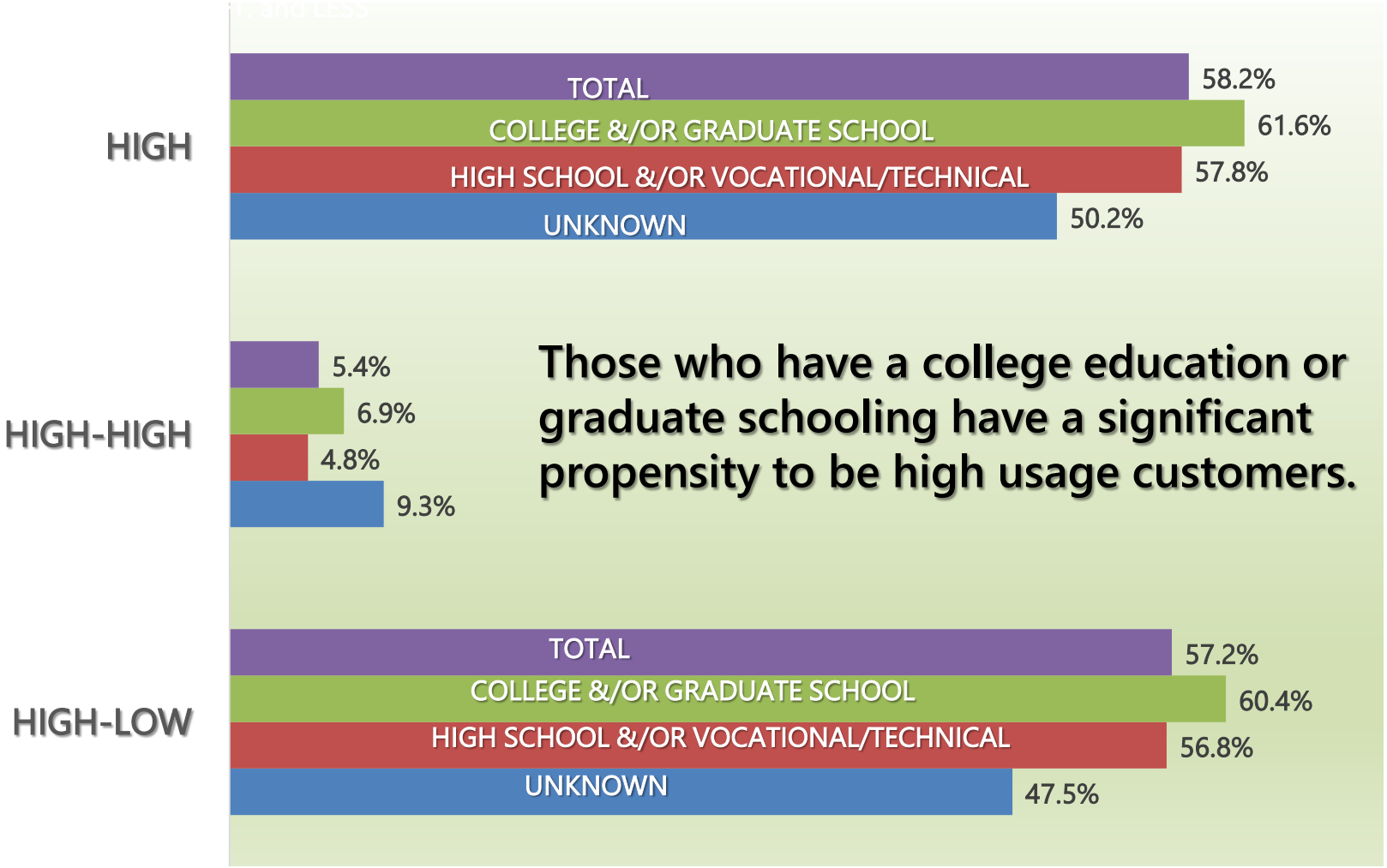
LENGTH of RESIDENCE



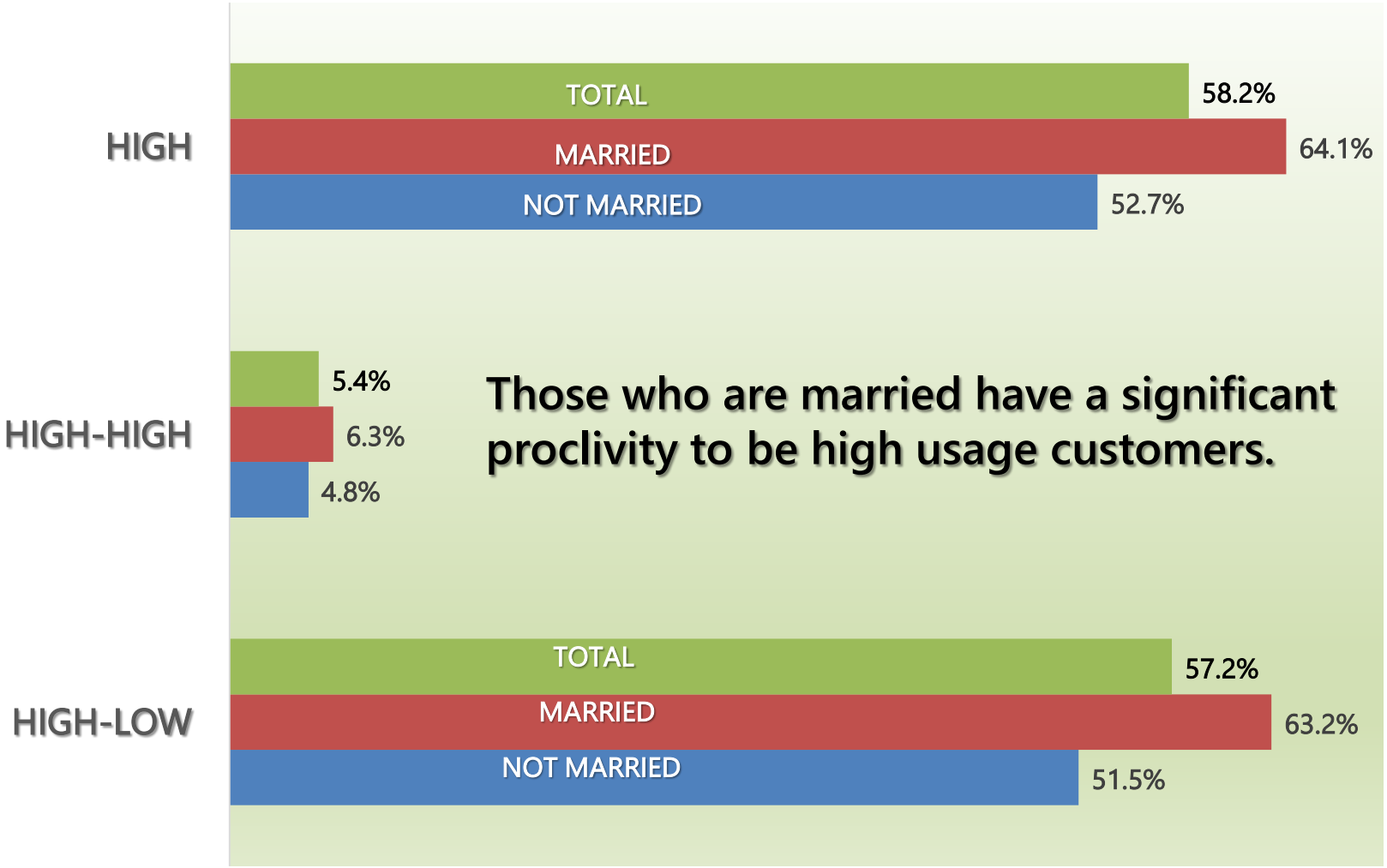
SQUARE FOOTAGE



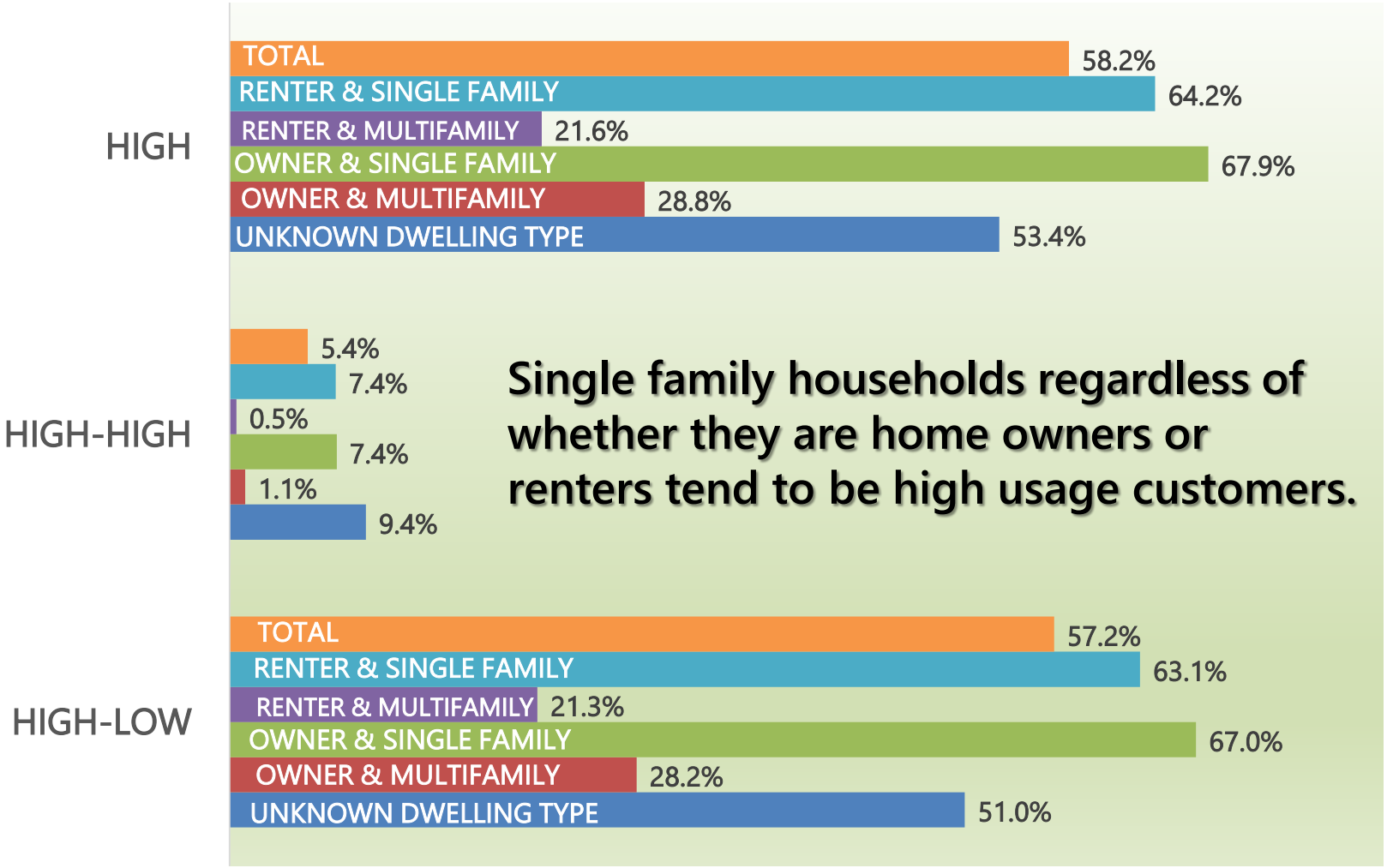
EDUCATION


HIGH
TOTAL
58.2%
COLLEGE &/OR GRADUATE SCHOOL
61.6%
HIGH SCHOOL &/OR VOCATIONAL/TECHNICAL
57.8%
UNKNOWN
50.2%
HIGH-HIGH
5.4%
6.9%
4.8%
9.3%
Those who have a college education or graduate schooling have a significant propensity to be high usage customers.
HIGH-LOW
TOTAL
57.2%
COLLEGE &/OR GRADUATE SCHOOL
60.4%
HIGH SCHOOL &/OR VOCATIONAL/TECHNICAL
56.8%
UNKNOWN
47.5%

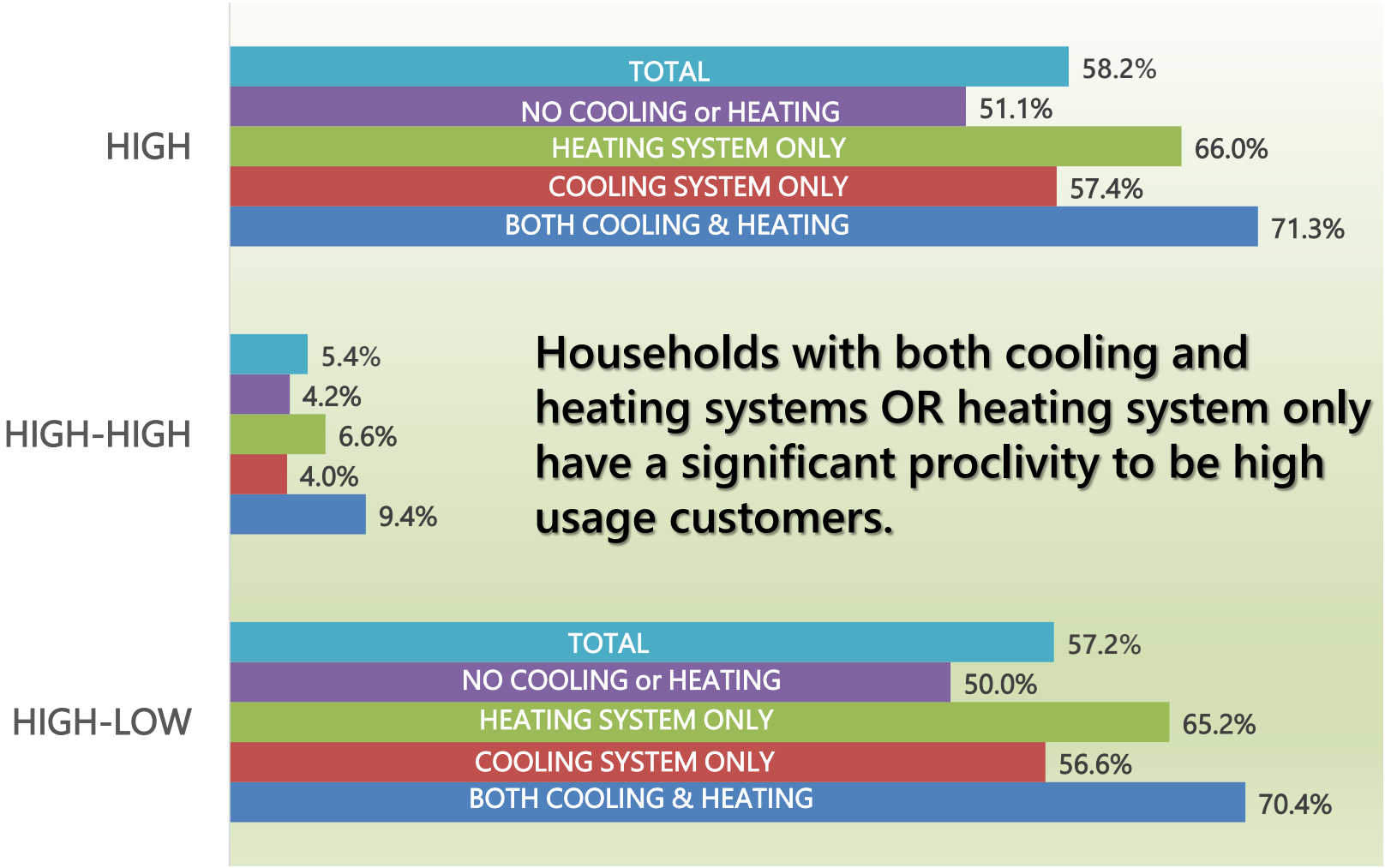
MARITAL STATUS



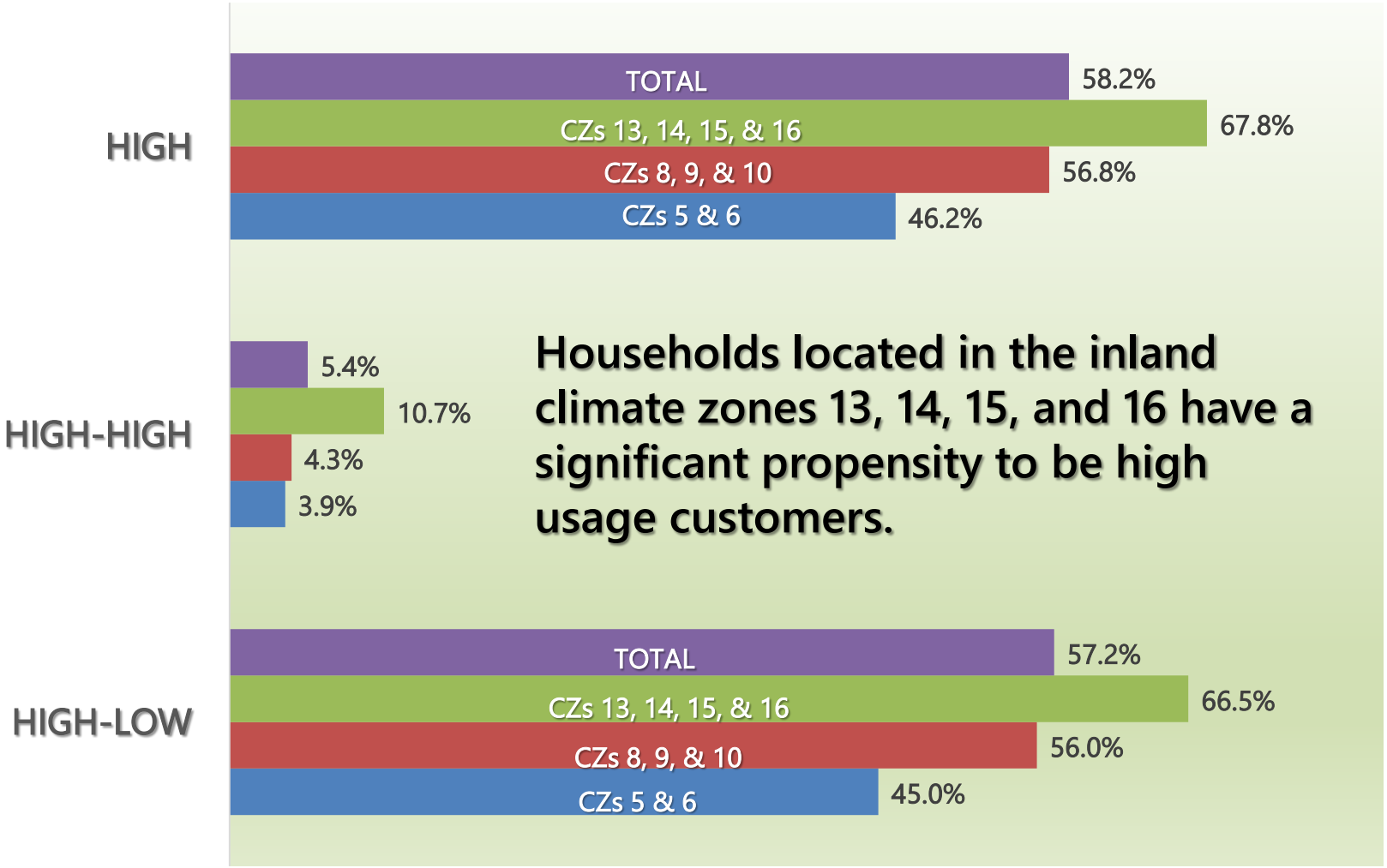
HOME OWNERSHIP & HOUSEHOLD ARRANGEMENTS



COOLING & HEATING SYSTEMS



CLIMATE ZONES



HIGH USAGE (At Least 400% of Baseline)

INCREASE

- Higher Household Income
- Bigger Household Size
- Larger Square Footage
- Being Married
- Having Both Cooling and Heating Systems OR Heating System Only
- Living in Climate Zones 8, 10, 13, 14, 15, and 16
- College &/or Graduate School Education
- High School or Vocational/ Technical Training

DECREASE

- Having Cooling System Only
- Multifamily Household Regardless of Being Home Owner or Renter

HIGH, HIGH-HIGH, & HIGH-LOW

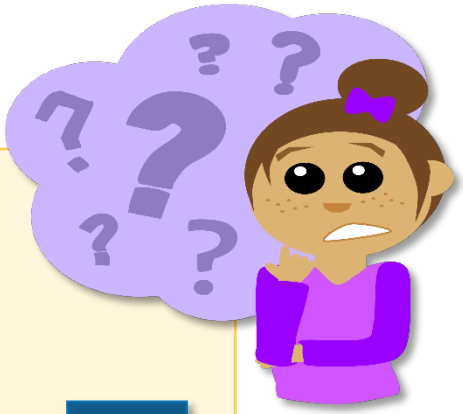
INCREASE

- Higher Household Income
- Bigger Household Size
- Larger Square Footage
- Having both Cooling and Heating Systems OR Heating System Only
- Living in Climate Zones 8, 14, 15, and 16

DECREASE

- Multifamily Regardless of Being a Home Owner or Renter

Implications of the Findings



What factors significantly influence the propensity towards high as well as high-high and high low usage among CARE customers?

A wide gamut of socioeconomic, demographic, home infrastructure, and geographic factors significantly shape the propensity of CARE customers towards high, high-high, and high-low usage.

More effective and responsive programs and policies ought to actively take into account these factors that significantly influence high usage.

Challenges in Implementation

- Veracity of self-reported information
- Absence of socioeconomic and demographic information on customers referred by external data sources
- Lack of information on relevant physical infrastructure factors
  - *e.g. Square footage, Year built, Number of floors, etc.*
- Highly dynamic nature of the CARE population
  - *People moving in and out of SCE territory*
- Seasonality of usage levels
- Point of reference or baseline used

Future Prospects

Next Level Analysis

Continue multivariate statistical analysis of predictors of CARE High Usage

- Over 90% of CARE HU customers are de-enrolled through the HU process.
- Understand which segments pass/fail/do not respond to eligibility verification and why

Create a more holistic view of low income, high usage customers

- Leverage available quantitative data
- Customer Appeals Testimony
- Focus Groups and Surveys with Low Income and High Usage population

Continuous Improvement

Program Offerings to High Usage, Low Income Customers

- Largest opportunity for Bill Reduction through kWh savings (Energy Savings Assistance Program)
- Increased awareness of Medical Baseline Program to aid those with medical conditions

Better Dialogue with Eligible Population

- Understanding necessary, basic, and legitimate household usage of high usage, low income homes
- Revision of Verification Documents

Conclusion

By better understanding the dynamics of high usage among CARE customers we can:

Verify eligibility and promote program integrity

- Estimated $5 million in subsidy saved in 2015.
- Subsidy savings are returned to ratepayers.

Help customers alleviate their energy burden through integrated offerings

- Energy Efficiency
- Energy Education

Develop customer profiles of High Usage

- Customized or Preemptive Offerings
- Continuous Improvements

Appendices

VARIABLES (1 of 3)

CHARACTERISTIC (n=75,116)	MEAN	MEDIAN
HOUSEHOLD INCOME	$ 55,412.31	$ 45,000.00
HOUSEHOLD SIZE	2.96	3.00
LENGTH of RESIDENCE (YEARS)	7.71	8.00
SQUARE FOOTAGE	1,792.9	1,552.0

VARIABLES (2 of 3)

CHARACTERISTIC (n=75,132)		%	#
EDUCATION	Unknown	4.4	3,268
	High School or Vocational/Technical	75.8	56,943
	College and/or Graduate School	19.9	14,921
HOME OWNERSHIP & HOUSEHOLD ARRANGEMENTS	Unknown	6.0	4,540
	Home Owner & Multifamily	5.0	3,729
	Home Owner & Single Family	55.1	41,368
	Renter & Multifamily	13.2	9,899
	Renter & Single Family	20.8	15,596
MARITAL STATUS	Not Married	51.7	38,806
	Married	48.3	36,326

VARIABLES (3 of 3)

CHARACTERISTIC (n=75,132)		%	#
COOLING & HEATING SYSTEMS	Both Cooling & Heating Systems	28.2	21,210
	With Cooling System Only	1.7	1,299
	With Heating System Only	8.6	6,486
	No Cooling or Heating System	61.4	46,137
CLIMATE ZONE	Climate Zones 5 & 6 and Unknown	10.2	7,645
	Climate Zones 8, 9, and 10	67.4	50,656
	Climate Zones 13, 14, 15, and 16	22.4	16,831

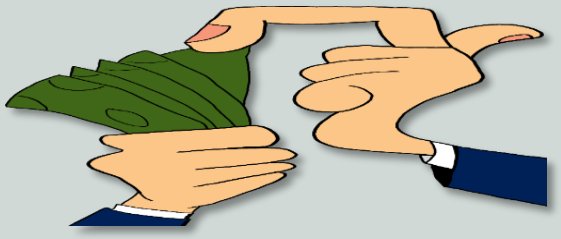
HIGH-HIGH USAGE (At Least 600% of Baseline)

INCREASE

- Higher Household Income
- Bigger Household Size
- Larger Square Footage
- Having both Cooling and Heating Systems OR Heating System Only
- Living in Climate Zones 8, 14, 15, 16

DECREASE

- Living in Climate Zone 9
- Multifamily Household Regardless of Being Home Owner or Renter
- Single Family & Home Owner



HIGH-LOW USAGE
(400 to less than 600% of Baseline)

INCREASE

- Higher Household Income
- Bigger Household Size
- Larger Square Footage
- Being Married
- Having both Cooling and Heating Systems OR Heating System Only
- Living Climate Zones 8, 10, 13, 14, 15, 16
- College &/or Graduate School Education
- High School or Vocational/ Technical Training

DECREASE

- Having Cooling System Only
- Multifamily Household Regardless of Being Home Owner or Renter