



DRIVING TRANSFORMATION

Behavior, Energy & Climate Change (BECC) / November 12-15, 2023 / Sacramento, CA

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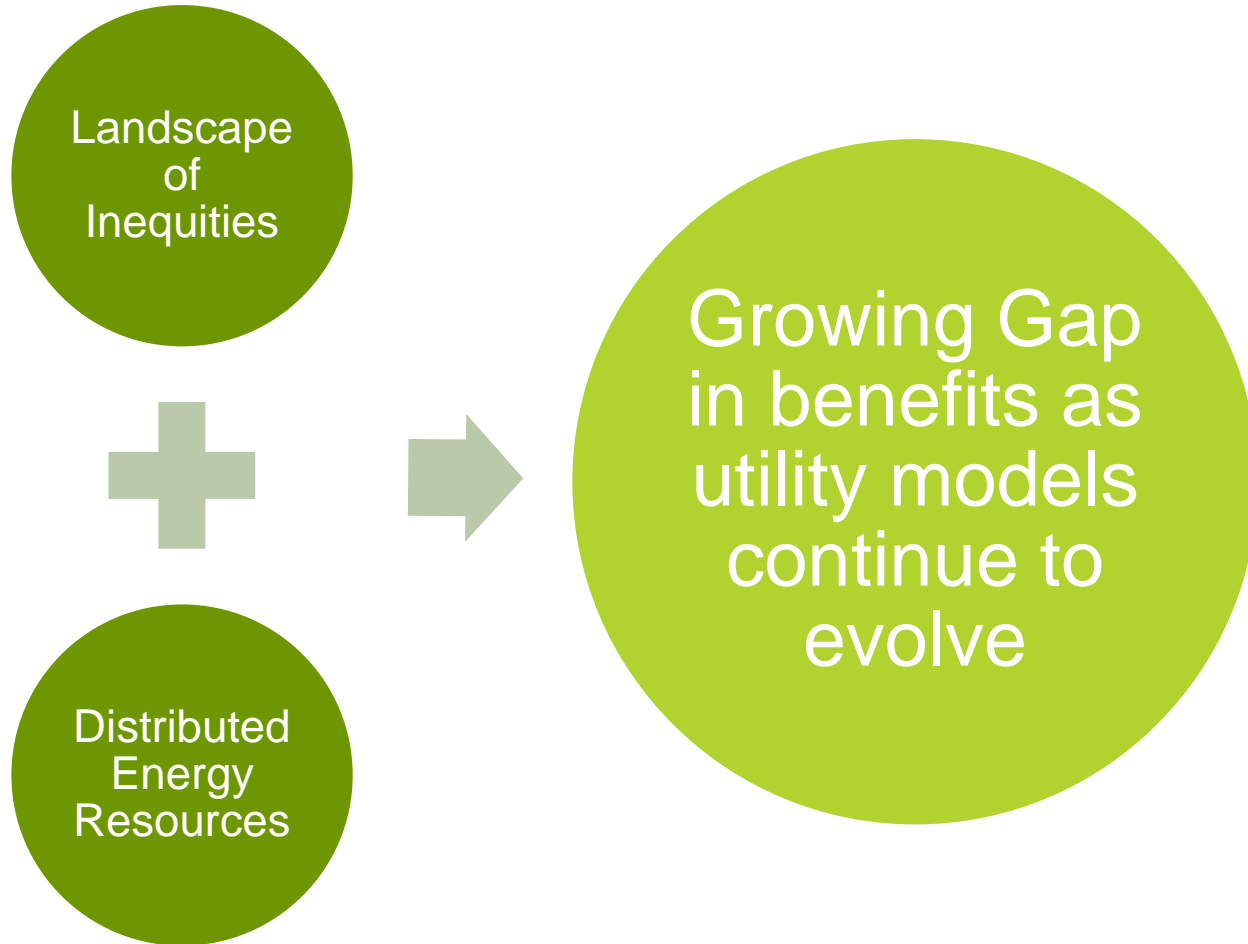
A More Equitable Distribution of Distributed Energy Resources

November 14, 2023

Karen Ehrhardt-Martinez | Director, Customer Insights and Behavioral Science @ ICF

Convened by:

DERs and the Equity Gap



Impact on access to clean, affordable, and reliable energy resources for all customers?



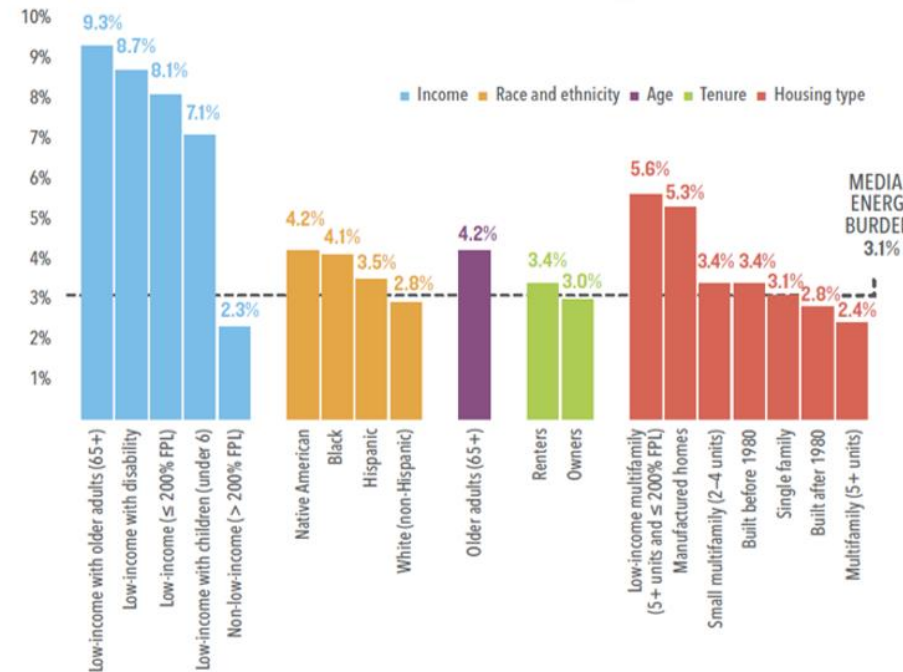


National Energy Burdens

Burden ratio*	Risk factors
2.6	• Low income
1.4	• Seniors
1.4	• Native American
1.3	• Black
1.1	• Hispanic
1.1	• Renters
1.8	• L.I. multi-family
1.7	• Manufactured homes
1.1	• Small multi-family
1.1	• Built before 1980

*Energy burden relative to median score

National energy burdens by subgroup compared to national energy burden



Source: ACEEE 2020

Additional HH Variables

- H.S. Education
- Non-Native English

Living in Communities with high

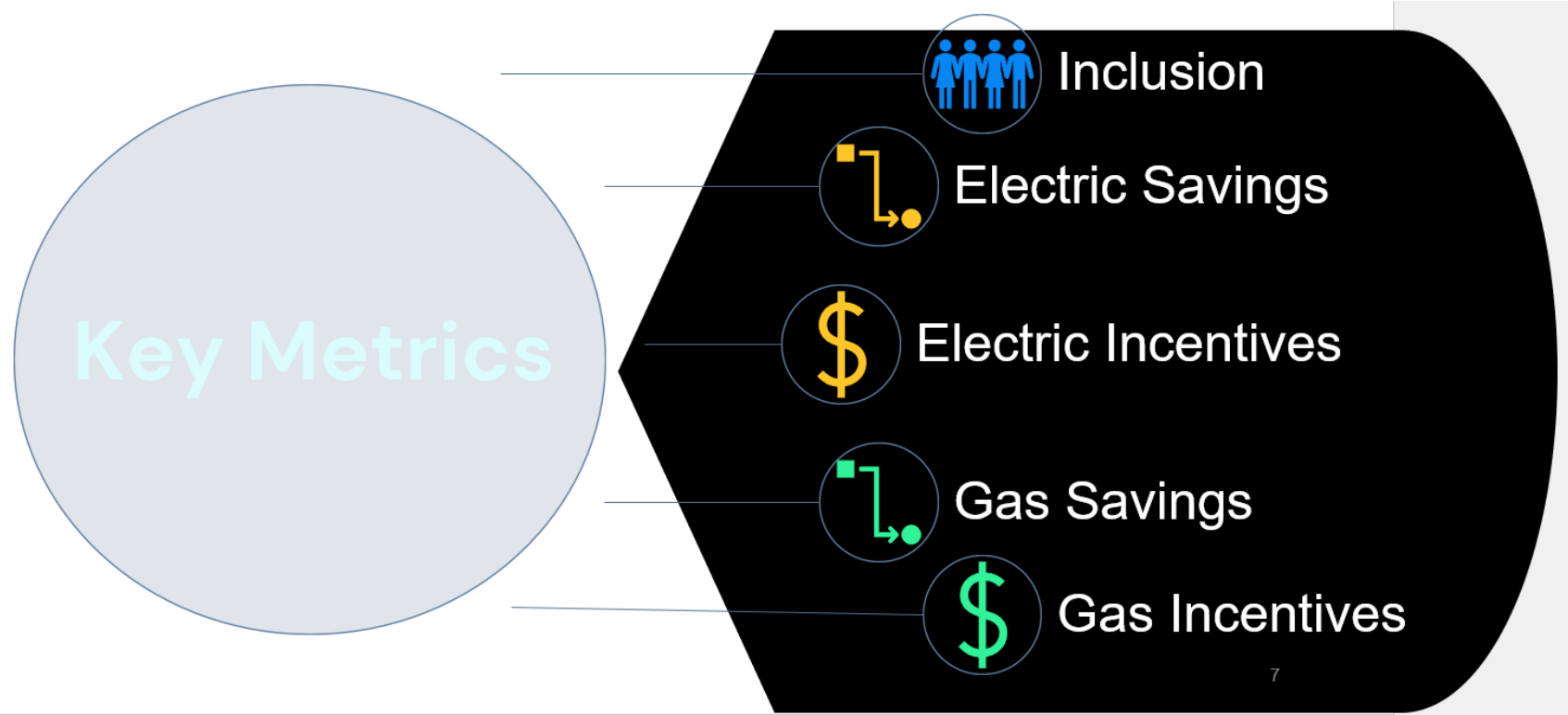
- Health Burden
- Social Vulnerability
- Environmental Justice

And low

- Workforce dvpt



Utility Programs: Who is Benefiting and Who Isn't?



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Utility Programs: Who is Benefiting and Who Isn't?

Portfolio-Level Inclusion Score =

$$\left[\frac{\text{Proportion of program participants in a segment}}{\text{Proportion of the customer base in that segment}} \right] \times \left[\frac{\text{Total program participation}}{\text{Total number of participants across the portfolio}} \right]$$

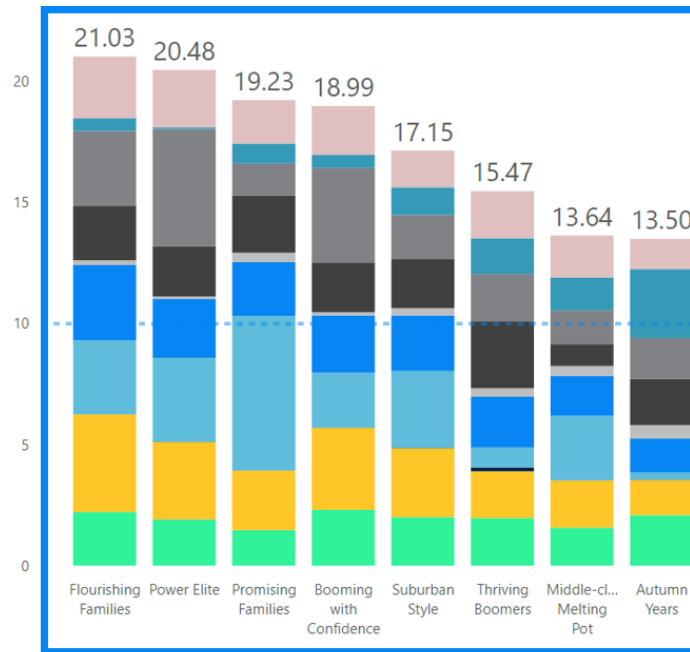
Portfolio-level Inclusion Score: The sum of weighted program inclusion scores gives visibility of inclusion across the portfolio, with parity being a total inclusion score of 1



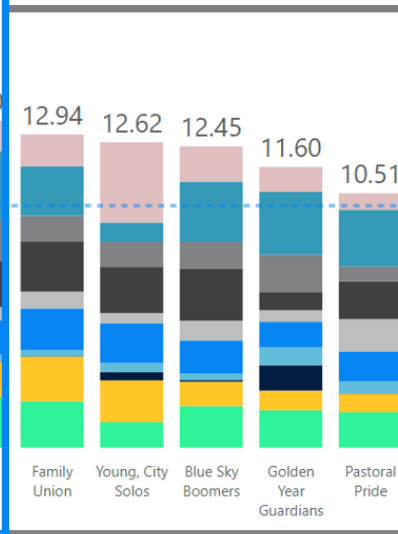
Utility Programs: Who is Benefiting and Who Isn't?

Advantaged Segments

20%

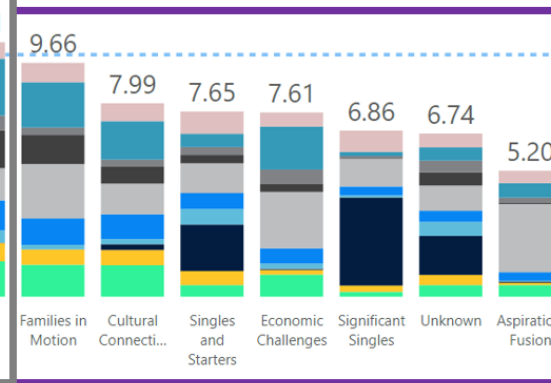


Middle Status Segments



Disadvantaged Segments

65%



→ Summary- Segments inclusion score across programs

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Utility Programs: Who is Benefiting and Who Isn't?

At the **portfolio-level**, customers with smaller energy burdens are more likely to participate and receive a greater share of energy savings benefits.

Energy Burden Quintile	Inclusion		Savings		Incentive	
	Inclusion Score Electric	Inclusion Score Gas	Savings Benefit Score Electric	Savings Benefit Score Gas	Incentive Benefit Score Electric	Incentive Benefit Score Gas
1	Dark Blue	Dark Blue	Grey	Dark Blue	Grey	Grey
2	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Grey	Grey
3	Dark Blue	Grey	Dark Blue	Grey	Grey	Grey
4	Grey	Grey	Dark Blue	Grey	Dark Blue	Dark Blue
5	Grey	Grey	Grey	Grey	Dark Blue	Dark Blue

Above Parity

Below Parity

In contrast – customers with larger energy burdens receive a disproportionately high share of both electric and gas incentive benefits.



Utility Programs: Who is Benefiting and Who Isn't?

For the I.Q. Program, customers with larger energy burdens are more likely to participate and receive a greater share of energy savings and incentives benefits.

Above Parity

Below Parity

Energy Burden Quintile	Inclusion		Savings		Incentive	
	Inclusion Score Electric	Inclusion Score Gas	Savings Benefits Score Electric	Savings Benefits Score Gas	Incentive Benefits Score Electric	Incentive Benefits Score Gas
1						
2						
3						
4						
5						



Utility Programs: Who is Benefiting and Who Isn't?



Systematic disparities in program participation are common across utilities



Utilities often lack information about a large proportion of their customer base

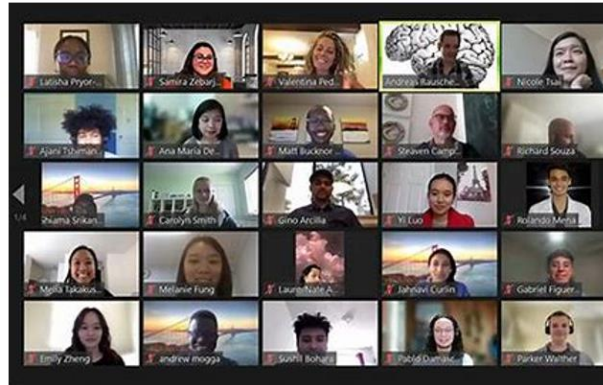


Utility Programs: Who is Benefiting and Who Isn't?



Under-served customer segments typically comprise **50-70%** of the customer base

The segments of customers that are systematically under-represented represent a large number of customers.



Utility Programs: Who is Benefiting and Who Isn't?



Most utility programs are **overserving advantaged customers**



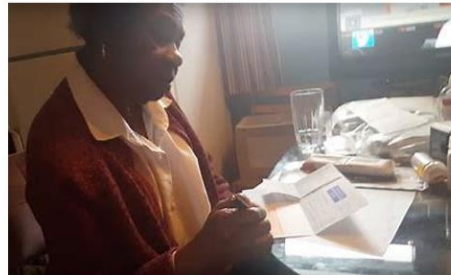
Few utility programs successfully serve low-income, disadvantaged, and hard-to-reach customers on par with their representation in the customer base



Utility Programs: Who is Benefiting and Who Isn't?



Low-income customers and those with the **highest energy burdens** are most likely to be underserved by programs



Customers with the **lowest energy burdens** tend to participate in programs at a disproportionately high rate



Energy Spending



Household Income



Total Energy Burden



Utility Programs: Who is Benefiting and Who Isn't?

➤ **Renters** are some of the most underserved by utility programs



Rural households also tend to have lower rates of program participation



The Value of a Proactive, Intentional, Multi-pronged Approach

Bringing more equity to DER programs will require

1. A multi-faceted program design that includes:
 - Traditional participation models
 - Proactive targeting
 - Community focused designs
2. A more intentional use of funding to reach a larger proportion of customers who will not otherwise participate.



Segmentation within the I.Q. Population

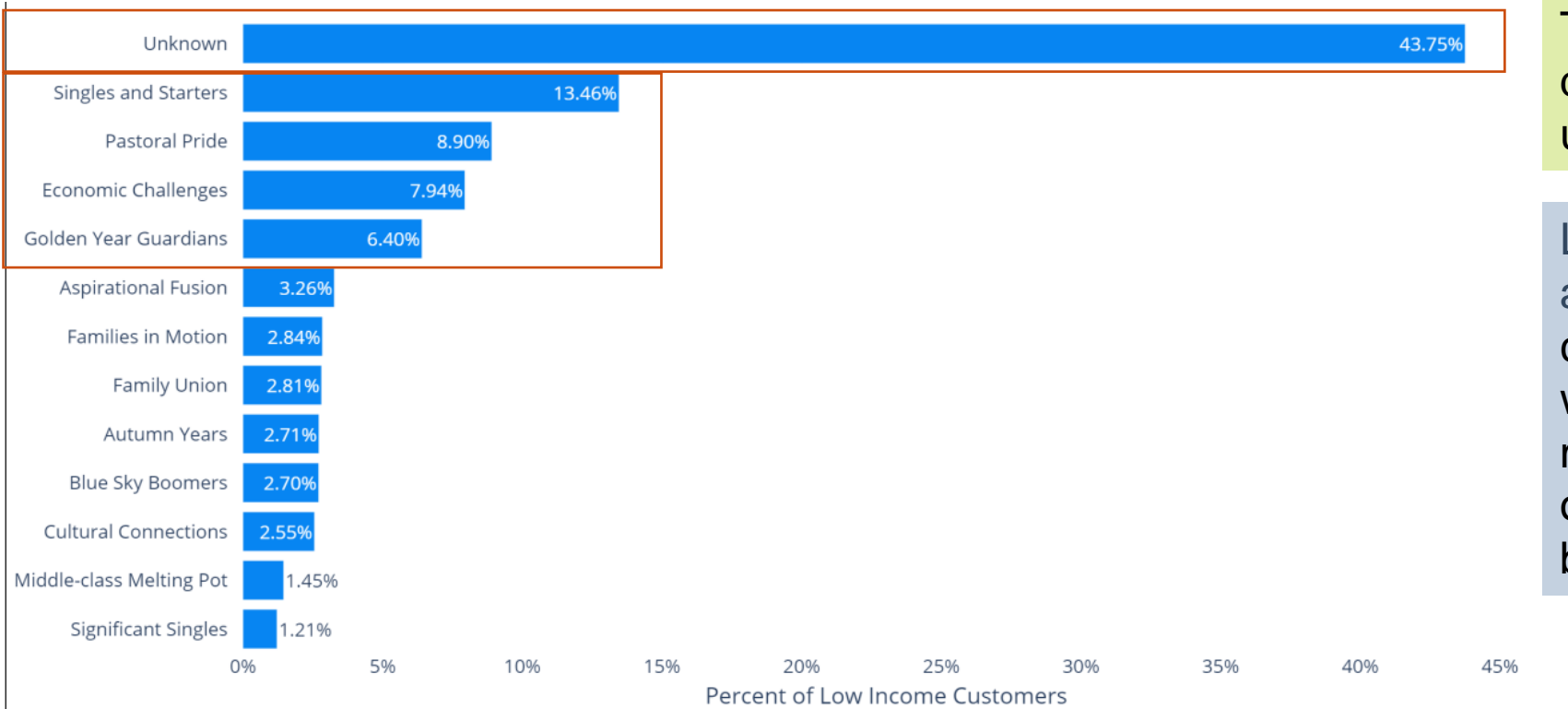
It is helpful to:

- Acknowledge that low-income customers are not homogenous.
- Recognize the diversity within the I.Q. population.
- Identify the indicators/measures of household and community vulnerability (i.e., arrears, energy burden, etc.)
- Determine a strategy for proactively targeting and connecting with households who can benefit the most.



Segmentation within the I.Q. Population

Distribution of MOSAIC Segments for Low Income Customers



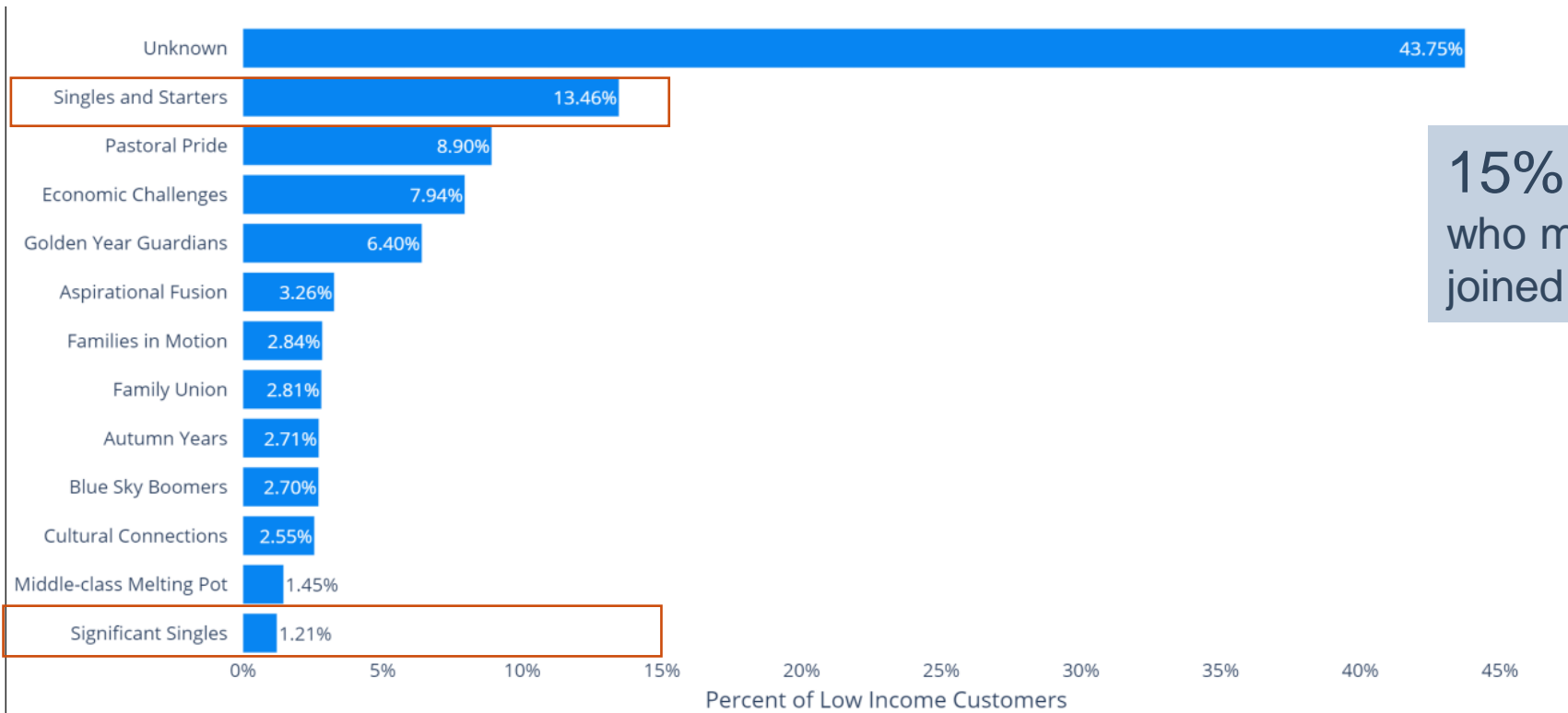
Need More/Better Data:
There is a lot of missing data when trying to understand customers.

Low-Income Customers are Diverse: Customers characteristics vary widely as do their motivations, opportunities, and the barriers they face.



Segmentation within the I.Q. Population

Distribution of MOSAIC Segments for Low Income Customers

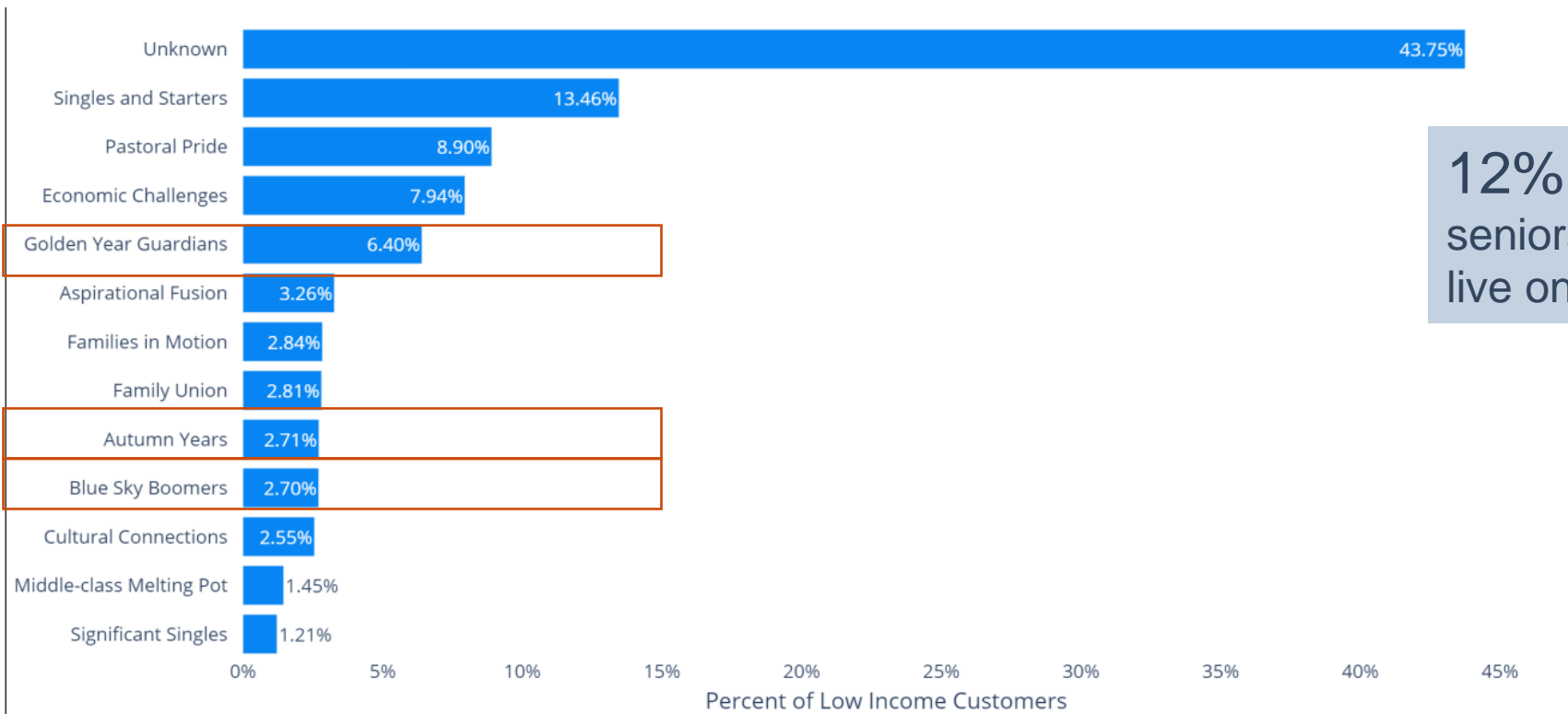


15% represent singles who may have recently joined the workforce



Segmentation within the I.Q. Population

Distribution of MOSAIC Segments for Low Income Customers

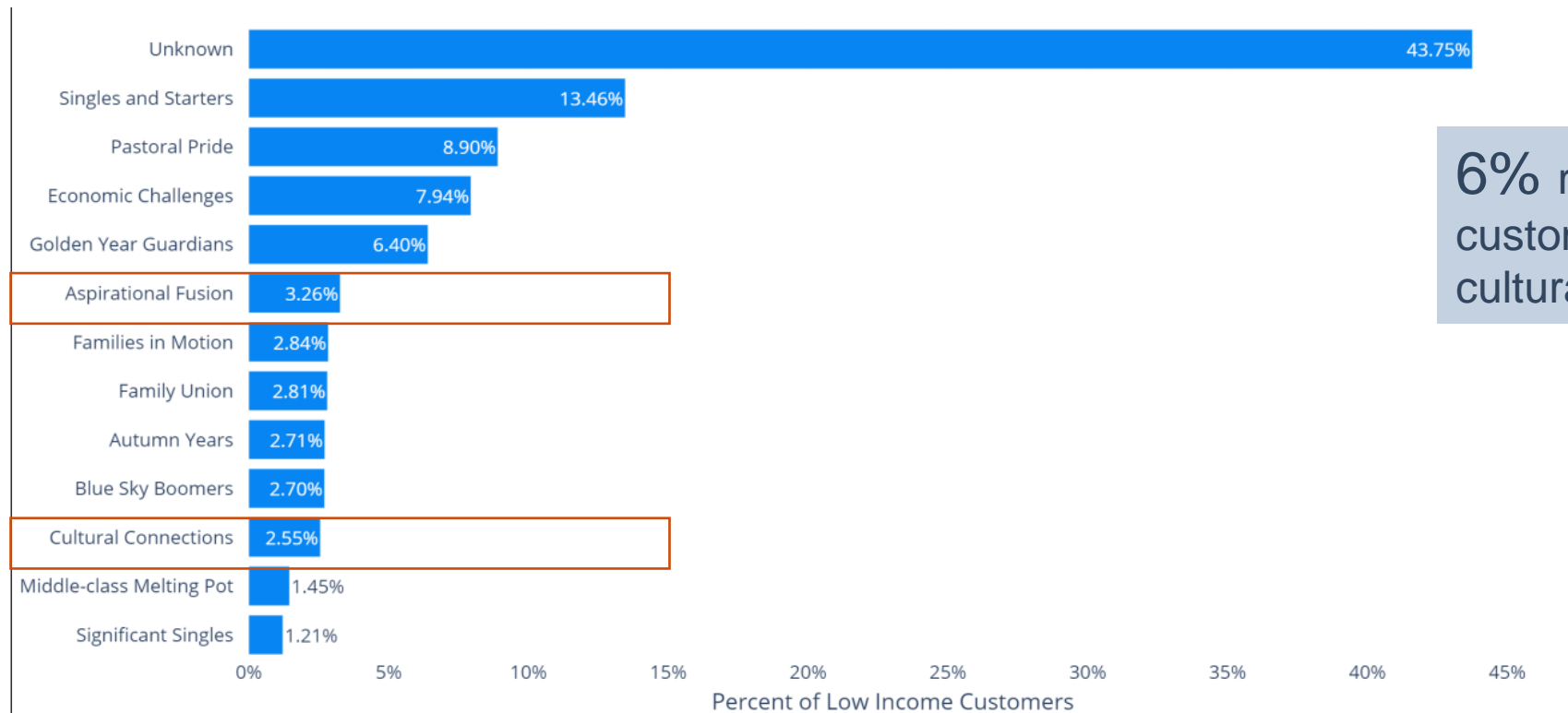


12% represent seniors who are likely to live on fixed incomes



Segmentation within the I.Q. Population

Distribution of MOSAIC Segments for Low Income Customers



6% represent customers with diverse cultural backgrounds

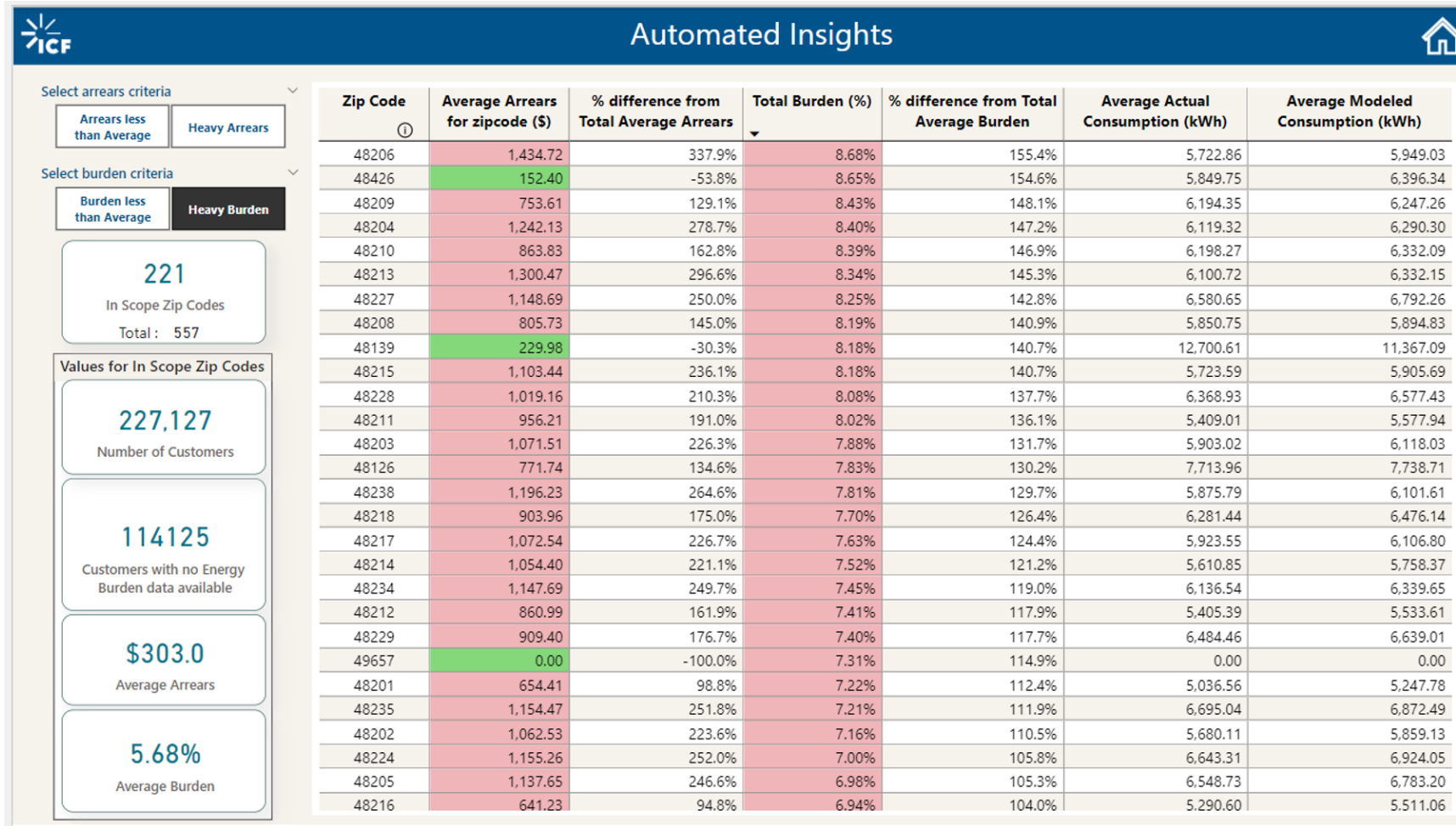


Targeting within the I.Q. Population

How can utilities be more **proactive** and **intentional** in reaching customers with the greatest needs?



Targeting Communities & Households



Proactively Target with more sophisticated data, analysis, and dashboards

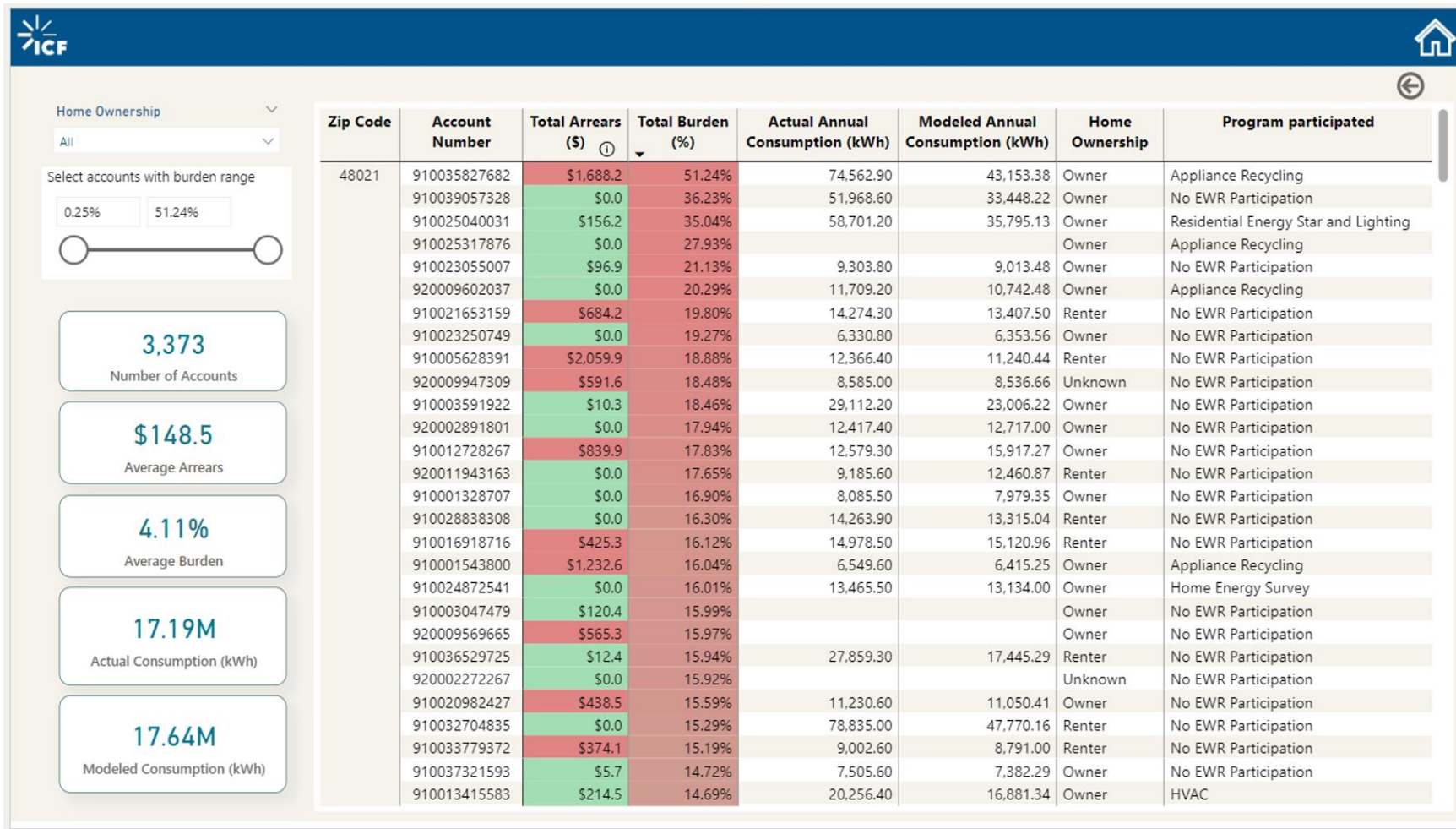
Step 1: Identify priority communities

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Targeting Communities & Households

Step 2:
Identify priority households

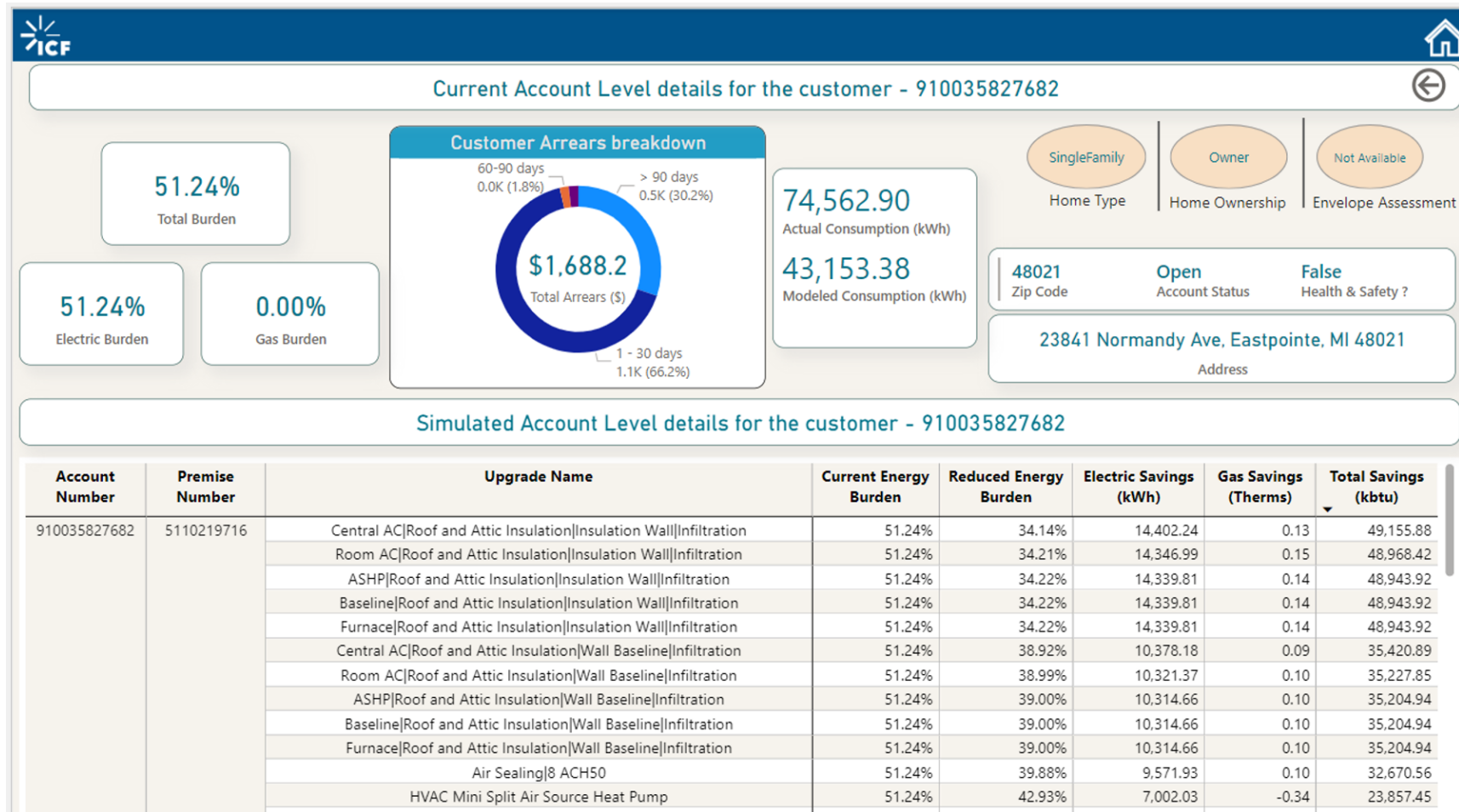


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Targeting Communities & Households

Step 3: Identify scale of energy savings opportunities from available mix of measures and impact on arrears and burden.



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Solving some of the most complex global challenges of our time.

How to More Effectively Reach Priority Customers and Shift Their Energy Use Behaviors

Be Intentional

Be Proactive

Be Curious

Be Personal

Be Collaborative

Use Behavioral Science

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Contact

[Karen Ehrhardt-Martinez](#) | Director, Customer Insights and Behavioral Science
Karen.Ehrhardt-Martinez@ICF.com

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Energy Insecurity & Energy Burden



Energy Insecurity – the inability to adequately meet basic household heating, cooling and energy needs over time.



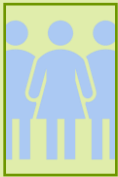
Household Energy Burden – the proportion of household income used to pay for energy and a key element contributing to a household's energy insecurity.

Energy insecurity—that is, the inability to adequately meet basic household heating, cooling, and energy needs over time (Hernández 2016)—is increasingly viewed as a major equity issue by policymakers, energy utilities, and clean energy and environmental justice advocates. This multidimensional problem reflects the confluence of three factors: inefficient housing and appliances, lack of access to economic resources, and coping strategies that may lead some residents to dangerously under-heat or under-cool their homes (Hernández, Aratani, and Jiang 2014).



Vulnerability Landscape: Household Characteristics

RACE/ETHNICITY



Nearly 1/2 of the population is comprised of **people of color** with about 11% of Census tracts having a 90%- 100% concentration of people of color, potentially resulting in greater energy inequities.

DISADVANTAGED GROUPS



More than 1/3 of households are categorized as belonging to disadvantaged MOSAIC segments though the number of disadvantaged households varies from community to community with large numbers in population centers.

LOW INCOME



Nearly 1/3 of the population lives in **low-income households**. In most Census tracts, 10% - 50% of households are low income. Low-income households are typically less likely to participate in market-rate energy-efficiency programs.

SENIORS



Approximately 1/7 people is a **senior** (over 64 years old). Seniors comprise 10%-20% of the population in over half the census tracts. Only 5.7% of Census tracts have high concentrations of seniors.

LESS THAN H.S. DEGREE



Approximately 1/8 adults over 24 years old have **less than a high school degree**, and more than half of the Census tracts are characterized as having educational limitations because more than 10% of adults haven't completed high school.

NON-ENGLISH SPEAKERS



Approximately 1/10 of residents live in **non-English speaking households**. There is also a small proportion of Census tracts where the majority of people live in non-English speaking households.



Vulnerability Landscape: Housing Characteristics

OLDER HOUSING



Forty-seven percent of houses were built before 1990 when building codes were more lax and energy efficiency standards were limited. Most communities have some older housing.

MULTIFAMILY HOUSING



Nearly one-fifth of households live in multi-family housing where residents generally have less direct control over the energy efficiency of their homes and face more challenges in accessing utility-run programs.

RENTERS



Approximately one in seven households are renters. The distribution of renters across Census tracts tends to range from 0% to 20% for most Census tracts although there is a small percent (3%) of census tracts where at least 40% of households are renters.



Vulnerability Landscape: Area-based Indicators

HEALTH BURDENED



Over 16 percent of households live in **health burdened areas**. Customers who live in these areas are more vulnerable because they are more likely to suffer from major health problems along with low household incomes.

WORKFORCE DEVELOPMENT BURDENED



Customers living in 20% of Census tracts live in an **environment with a high workforce development burden*** characterized by cross-cutting challenges of limited education and other income, employment, or language-related challenges.

ENERGY BURDENED



Almost fifteen percent of Census tracts in are identified as **Energy Burdened**. Some counties also have large numbers of households that experience higher energy burdens.

COMPOSITE BURDENED

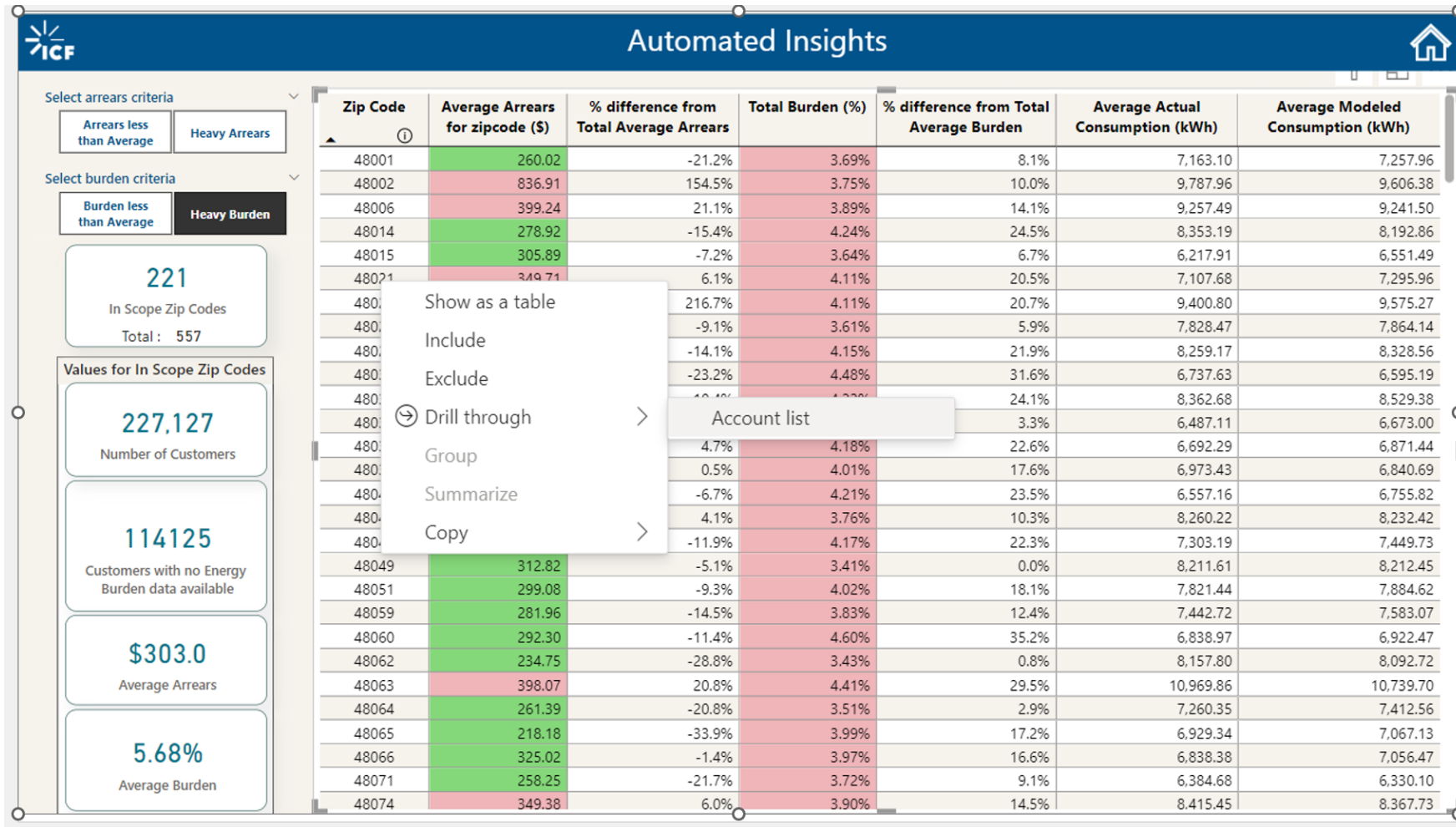


Looking across areas facing multiple burdens, approximately 7.6% of customers are in Census tracts that have **3 or more of the 4 burden types**:

- Health Burden
- Housing Burden**
- Workforce Development Burden
- Energy Burden



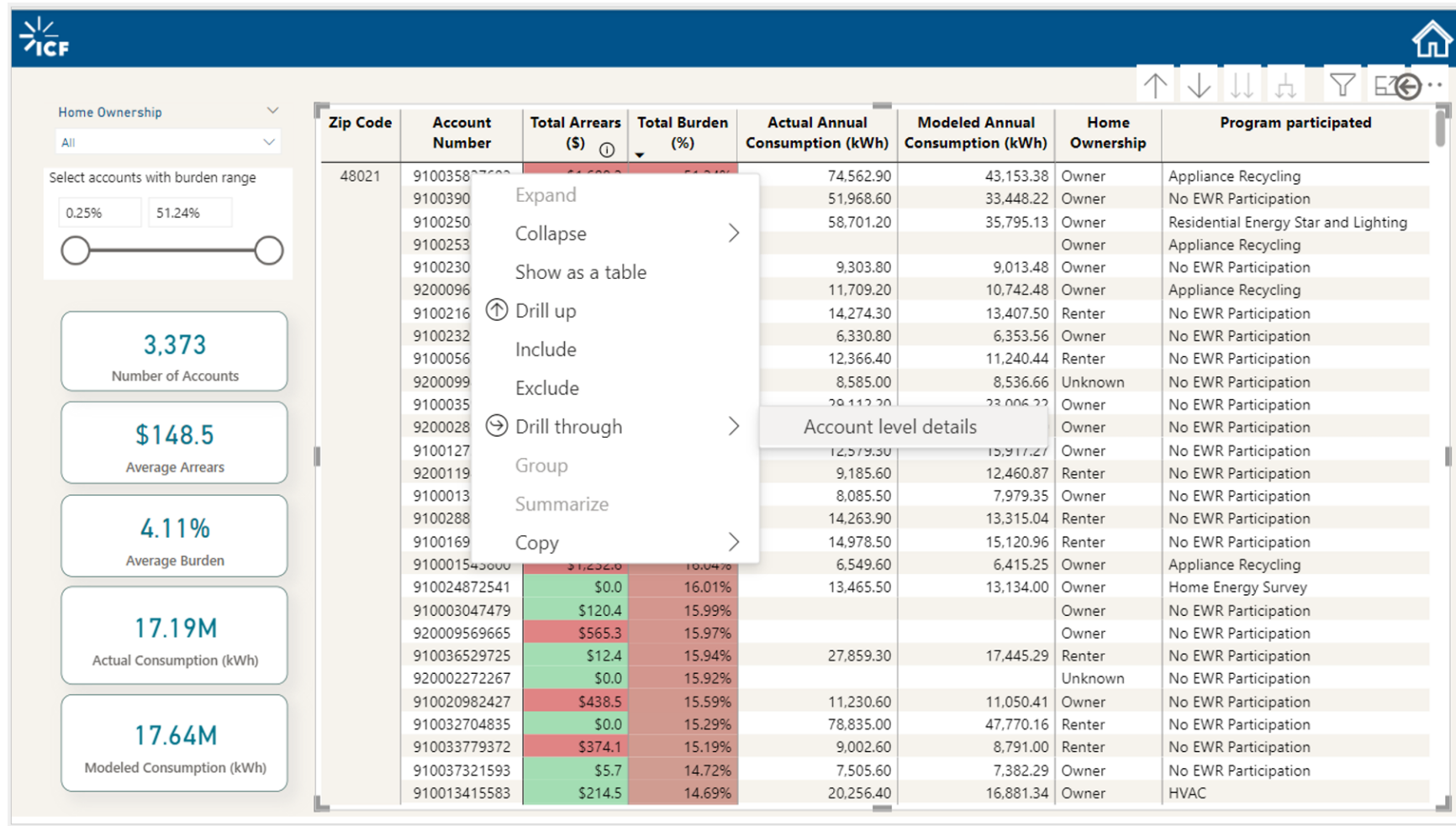
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