

Unlocking Energy Efficiency for Low-Income Utility Customers

Four Key Lessons from Real-World Program Experience

The Opportunity for Low-Income Energy Efficiency

Energy service professionals, including utility portfolio managers, consumer advocates, and community-based organizations, continue to face challenges in serving the needs of low-income populations.¹ Enrollment rates and investment levels in low-income energy efficiency and assistance programs remain low. The Low Income Home Energy Assistance Program (LIHEAP), for example, reaches fewer than 25% of eligible households.^{2,3} And declining funding from the American Recovery and Reinvestment Act (ARRA) as well as from LIHEAP further compound the problem, with LIHEAP block grant funding alone having decreased 35% since 2010.^{4,5}

Yet the needs of low-income families are growing. Over 10.4 million American families have income below 200% of the Federal Poverty Level, a figure that has steadily increased from 28% of working families in 2007 to 32% in 2011.⁶ At the same time, the total number of households receiving LIHEAP assistance has declined by 17% between 2010 and 2013, from about 8.1 million to 6.7 million.⁷ In this environment of decreasing funding and increasing need, it is critical to maximize the value of every available dollar.

Energy efficiency presents a promising opportunity for low-income households. Compared to average households, low-income households are less likely to have compact fluorescent bulbs and low-flow showerheads, but 25% more likely to have energy-intensive space heaters and 50% more likely to rely on window air conditioning units.⁸ Moreover, economists have found that each dollar of LIHEAP funding generated \$1.13 in economic activity, suggesting important co-benefits of investing in low-income energy efficiency initiatives.⁹ Further, pursuing efficiency in the low-income sector reduces the incidence of unpaid bills and the the cross-subsidization burden for all ratepayers.¹⁰

With so much to gain, how can we optimize low-income energy efficiency programs to maximize the benefits for financially vulnerable citizens, as well as program implementers and the broader population of ratepayers? This paper shares four important lessons for engaging low-income customers based on Opower's experience in partnering with utilities to serve the low-income population.

“The U.S. Low Income Home Energy Assistance Program reaches fewer than 25% of eligible households.”

“Low-income households exhibit diverse and arguably surprising housing characteristics and demographics. Home ownership rates were 70% or higher at 4 of 7 utilities studied.”

Lesson #1: Low-Income Populations are Not Uniform

Low-income households exhibit diverse housing characteristics and demographics, suggesting that tailored and personalized outreach stands to be more effective than a uniform, one-size-fits-all approach.¹¹

The number of occupants per home, housing type (i.e., single vs. multi-family), and home ownership significantly impact energy usage patterns. It is commonly assumed that low-income households are more likely to live in multi-family dwellings, rent, or live with many family members. Yet recent findings question the validity of these assumptions and suggest that low-income households do not exhibit uniform characteristics.

Among low-income utility customers, there is surprising diversity in the number of occupants per home as well as housing type across utilities and states. A 2006 California study found low-income households were more likely to be either very small (i.e., a single resident) or very large (i.e., more than 5 residents) compared to other households.¹² A review of data from eight of Opower’s utility partners that reported territory-wide information on housing type also reveals a large degree of variability in the percentage of low-income households living in single-family homes. In almost half of the programs, the percentage of low-income customers living in single-family homes was equal to or greater than that of non-low-income populations (see Figure 1).

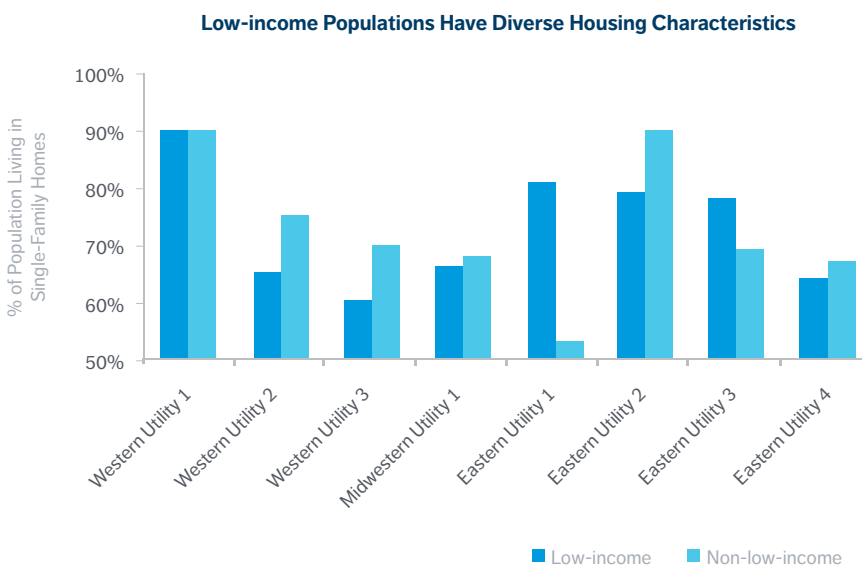


FIGURE 1: COMPARISON OF LOW-INCOME AND NON-LOW-INCOME POPULATIONS LIVING IN SINGLE-FAMILY HOMES

The level of low-income home ownership is also highly variable. Some might expect low-income populations to exhibit significantly lower levels of home ownership than non-low-income populations. Yet a review of the seven Opower utility partners — for which territory-wide home ownership data is available — shows the average gap between the two groups is not as large as one might imagine; the gap varies widely by utility (and, in one case, the rate of low-income home ownership actually exceeds the rate of non-low-income home ownership). Perhaps surprisingly, low-income populations demonstrated ownership levels above 70% in four of the seven instances (see Figure 2).

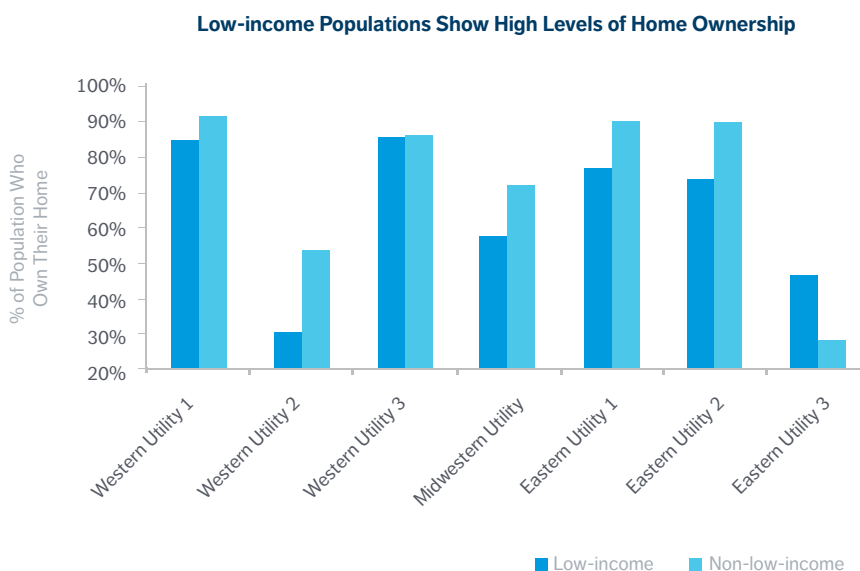


FIGURE 2: COMPARISON OF POPULATIONS WHO OWN THEIR HOME

Low-income households exhibit diversity beyond the categories of housing type and ownership. They may be urban, suburban, or rural; they may be large families, or a single elderly resident subsisting on limited Social Security income. Their language of choice may be English, Spanish, Cantonese, or Tagalog.¹³ Given such a heterogeneous group, utilities must ensure outreach initiatives are targeted and segmented to foster maximum engagement on efficiency opportunities.

“For some utilities, low-income households consume more energy than their higher-income counterparts.”

Lesson #2: Low Income Does Not Always Imply Low Consumption

Low-income households are similarly diverse in their energy usage profiles. One might assume that low-income households are typically smaller than other households and, therefore, use less energy. However, Opower data from seven programs indicates low-income populations have varying consumption patterns and, in some cases, even exhibit greater energy use than their higher-income counterparts (see Figure 3).

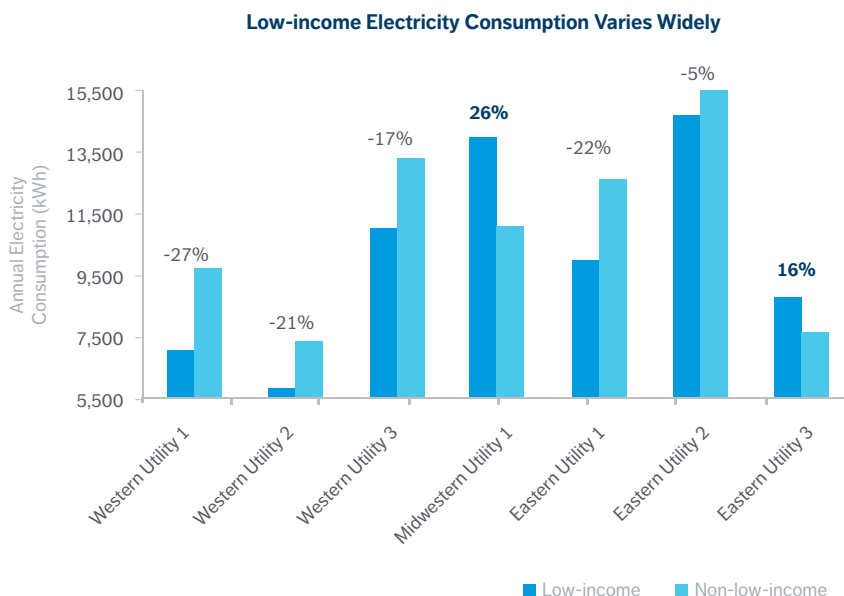


FIGURE 3: COMPARISON OF ANNUAL USAGE FOR LOW-INCOME AND NON-LOW-INCOME HOUSEHOLDS

Note: Percentages indicate difference between low-income and non-low-income populations

In one large Midwestern deployment, low-income customers consume almost 26% more per year than their general population counterparts. Conversely, low-income customers in a Western deployment consume 27% less. Examining geographical trends, relatively high low-income usage appears to be concentrated in the East and Midwest. Differences in housing stock and reliance on energy-intensive heating and cooling units in low-income homes in those areas provide potential explanations for this finding.¹⁴

Other industry findings corroborate the variability in consumption patterns across income groups. For example, California’s Low-Income Needs Assessment Report found a lack of uniformity across income groups among California investor-owned utilities (see Figure 4).¹⁵

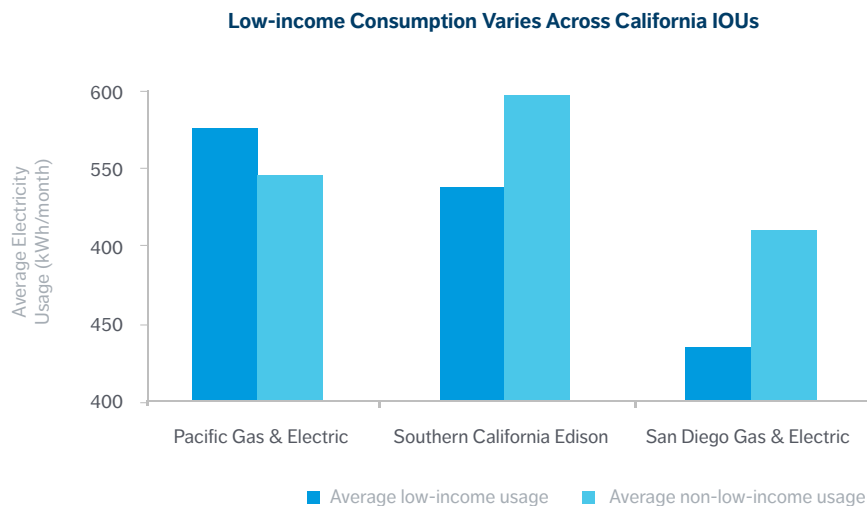


FIGURE 4: COMPARISON OF LOW-INCOME AND NON-LOW-INCOME CONSUMPTION ACROSS THREE CALIFORNIA INVESTOR-OWNED UTILITIES

Differences in income-related consumption patterns have also been demonstrated within a utility's own service territory, as reported in a study of NV Energy's low-income customers.¹⁶ Low-income customers living in single-family homes in the utility's Northern subsidiary consumed more than non-low-income customers, while the reverse was true in the Southern subsidiary.

Significant heterogeneity in consumption is still another reason why utilities should provide targeted and segmented messaging in order to drive increased participation in energy efficiency programs.¹⁷

Lesson #3: Low-Income Customers Can Engage at Meaningful Levels

Participation levels in low-income energy efficiency programs leave ample room for improvement: an ACEEE survey of exemplary low-income programs in 2005 yielded 24 programs with an average participation rate of just 2.6%, and a median participation rate of 1%.¹⁸ As such, only a portion of the income-eligible population benefits from efficiency programs.

Driving awareness of low-income efficiency programs has proven to be a difficult process in itself. In California, for example, poor awareness of low-income programs is an impediment to higher participation.¹⁹ The previously referenced study of NV Energy's low-income population also supports this finding, showing that low-income customers were generally less aware of efficiency programs compared to general populations.²⁰ And, although communications on efficiency programs typically follow enrollment in rate assistance programs, a 2013 study found that 59% of California's income-eligible households participated in efficiency programs despite 95% receiving rate assistance.²¹ While 59%

“The average participation rate for programs designated exemplary by ACEEE was 2.6%. Auto-enroll approaches can overcome this scale limitation by spurring broad engagement.”

is a laudable achievement, California must make significant progress in order to reach its goal of 100% of eligible low-income customers receiving all cost-effective efficiency measures by 2020.²² These findings suggest that there is room for efficiency initiatives — even in states that aggressively pursue low-income assistance like California — to drive even greater participation through improved program strategies and tactics

While driving awareness of efficiency programs has proven difficult, there is evidence to suggest that low-income customers are eager to participate in programs once aware.²³ Navigant’s evaluation of Progress Energy Carolinas’ Residential Energy Benchmarking Program indicates that low-income customers are more likely to undertake efficiency actions in the form of installed-measure upgrades once educated on efficiency opportunities (see Figure 5).²⁴ For this study, installed-measure upgrades (called “equipment-based actions” in the Navigant evaluation) were defined as installation of fans, heat pumps, or light bulbs, as well as insulating doors and attics. Behavioral actions were defined as adjusting thermostat settings, lowering water heater temperature, and turning off lights.²⁵

Low-income Populations are Likely to Make Installed-measure Upgrades

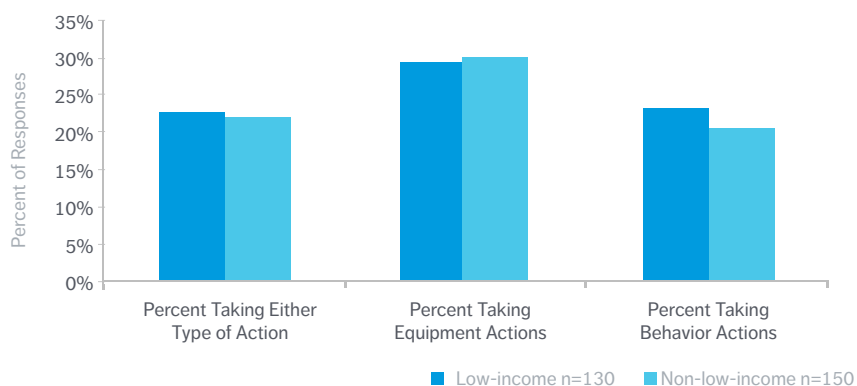


FIGURE 5: LOW-INCOME VS. NON-LOW-INCOME PARTICIPANT ACTION TYPES TAKEN PER NAVIGANT EVALUATION OF PROGRESS ENERGY CAROLINAS REGION RESIDENTIAL ENERGY BENCHMARKING PROGRAM

Source: Navigant Analysis

The study of NV Energy’s low-income population underscores this conclusion. While low-income customers were generally less aware of efficiency programs compared to general populations, once they became aware, they were more likely to participate.²⁶

While the evidence above indicates low-income customers are willing to participate in efficiency programs once aware, ensuring high levels of participation still represents a hurdle. One possible explanation for low levels of participation is the burden associated with enrollment and participation. In particular, low-income households may be particularly time-constrained. While opt-in programs do achieve some participation, auto-enroll programs drive the highest levels of initial participation by merging two otherwise distinct

steps of awareness and participation.

Evidence suggests that, when programs are offered on an auto-enroll basis as opposed to an opt-in basis, thereby precluding the need to actively enroll in an efficiency program, savings levels rival those of general populations.²⁷ Data from Opower auto-enroll programs supports this conclusion. Internal analyses of Home Energy Report programs deployed at four IOUs found that low-income customers generated savings commensurate with non-low-income customers (see Figure 6).

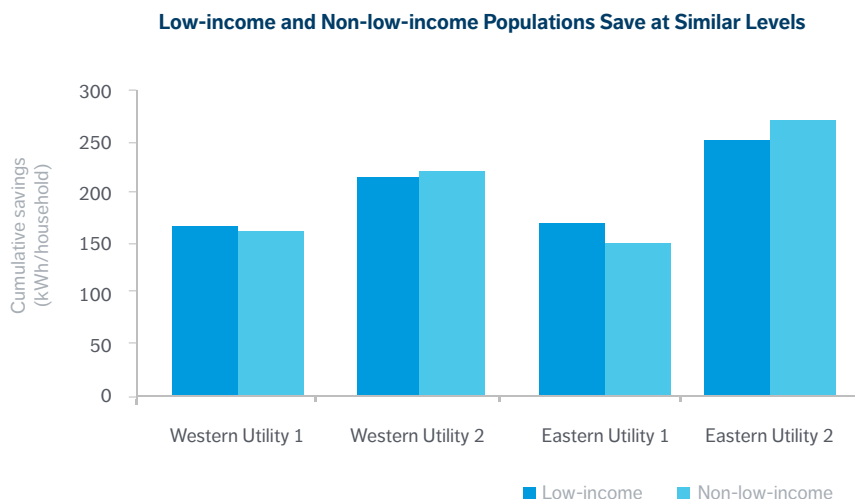


FIGURE 6: COMPARISON OF LOW-INCOME AND NON-LOW-INCOME SAVINGS FROM HOME ENERGY REPORT PROGRAMS

These findings are promising for utilities as they seek to enroll low-income customers in efficiency programs, particularly in light of the participation levels driven by auto-enroll programs. Opower data and industry research alike indicate that focused outreach can overcome the hurdle of low program awareness to increase participation levels in, and the success of, low-income energy efficiency initiatives. Overcoming the awareness gap offers a significant opportunity to gain bill and energy savings.

Lesson #4: Low-Income Efficiency Programs Can be Cost-Effective

As low-income efficiency programs deliver significant non-energy benefits, they are not always held to the same criteria of cost-effectiveness as other programs.²⁸ Many states have less stringent cost-effectiveness thresholds for low-income efficiency programs than those for mainstream residential energy efficiency programs.²⁹

“A review of low-income programs filed by 86 utilities found that 54% were cost-effective.”

Relaxed cost-effectiveness thresholds enable a broad range of important low-income initiatives such as community outreach and customer education. However, it is still possible to deliver low-income programs in a cost-effective way.³⁰ In an ACEEE report of exemplary low-income programs, 37% of programs had Total Resource Cost test ratios (TRCs) greater than 1.0, which is commonly accepted as the cost-effective threshold.³¹ Furthermore, an analysis of low-income programs deployed by 86 utilities finds 54% of those programs were cost-effective.³²

Cost-benefit analysis of Opower deployments further demonstrates that low-income programs can deliver cost-effective savings. Opower Home Energy Report programs reaching low-income households, in which customers are auto-enrolled and receive feedback about their energy use, are run cost-effectively in most instances.³³ These programs can also drive participation in rate assistance and other efficiency initiatives, such as installed-measure programs, as demonstrated in the aforementioned Navigant report. This lifts the delivered value and effectiveness of a utility's entire low-income portfolio.

Conclusion: Implications for Low-Income Energy Efficiency

Fostering awareness and generating participation in low-income energy efficiency programs is a challenge. However, the ability of low-income customers to save energy at levels commensurate with general populations presents a significant opportunity. Employing thoughtful segmentation to reach low-income customers with targeted messaging based on their unique characteristics drives more effective programs, a fact acknowledged by low-income portfolio managers, academic studies, and impact evaluations.^{34, 35}

The benefits of driving low-income engagement extend beyond direct bill and energy savings.³⁶ Studies have found that low-income efficiency drives positive outcomes for the system as a whole in three important ways:³⁷

1. Low-income efficiency achieves cost-savings for the utility by reducing bad debt, arrearages, and the administrative costs of collection and service termination.
2. The efficiency and demand savings delivered by low-income programs reduce strain on the grid, which is particularly valuable during summer and winter peaks.
3. Since low-income rate subsidies are generally funded via tariff riders, high-performing efficiency programs reduce costs for all ratepayers.³⁸

Employing nuanced segmentation to deliver energy efficiency programs tailored to low-income customers' individual needs represents the next step in the development of effective low-income energy efficiency programs. By complementing crucial weatherization, rate assistance, and energy education initiatives with cost-effective programs, utilities can lift the value and effectiveness of low-income efficiency portfolios. Doing so produces positive outcomes for customers, utilities, and low-income stakeholders alike. When low-income customers save, everybody wins.

Endnotes

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