

Myths of Low-Income Energy Efficiency Programs: Implications for Outreach

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ABSTRACT

Low-income energy efficiency programs provide financially vulnerable utility customers with important energy savings. To date, low-income programs have faced challenges in driving participation -- fueling myths that suggest low-income populations are difficult to reach. This paper explores these myths in turn.

At a time when low-income assistance funds are shrinking and needs are growing, it is more important than ever to serve low-income populations with effective programs. This paper will examine data from all households in the service territory of Opower's utility partners including energy usage data, customer survey data, and program participation data where available, as well as industry research, to show that low-income populations are diverse in their consumption and demographic characteristics. Additionally, while participation can be difficult to achieve, low-income households can participate and save at levels commensurate with general populations once engaged.

By employing nuanced messaging, utilities can empower low-income populations to become efficient consumers. This win-win provides both energy efficiency and monetary benefits (e.g., avoided subsidization costs) to the utility, while reducing the bills for low-income populations. Doing so creates positive outcomes for utilities, ratepayers, and the system as a whole.

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 (O'Dwyer 2013b; CRSR 2013).² 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 (LIHEAP 2014).³ Yet the needs of low-income families are growing. Over 10.4 million American families have income below 200% of the Federal Poverty

¹ For energy efficiency, low-income populations are usually defined statewide as a percentage of the federal poverty level. In California and Maryland, for example, households with income less than or equal to 200% of the federal poverty level are designated low-income.

² LIHEAP reached 21% (7.4 million) of the estimated 35 million eligible households in 2009, the most recent period for which eligibility data is available, as reported in the July 2013 Congressional Research Service Report, "LIHEAP: Program and Funding," p. 8. Available at: <http://neada.org/wp-content/uploads/2013/08/CRSLIHEAPProgramRL318651.pdf>

³ The number of households eligible for assistance continues to exceed available LIHEAP funding. On March 4, 2014, President Obama requested \$2.8 billion for LIHEAP in FY2015 — a dramatic reduction from last year's appropriation of \$3.4 billion.

Level, a figure that has steadily increased from 28% of working families in 2007 to 32% in 2011 (WFPF 2013). 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 (NEADA 2013). 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 (Opower 2010). 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 (Blinder and Zandi 2010). Further, pursuing efficiency in the low-income sector reduces the incidence of unpaid bills and the cross-subsidization burden for all ratepayers (IEA 2011).

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, as well as industry research, in partnering with utilities to serve the low-income population.

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 (O'Dwyer 2013a).

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 five residents) compared to other households (Gaffney 2006a). A review of territory-wide data from eight of Opower's utility partners that reported 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).

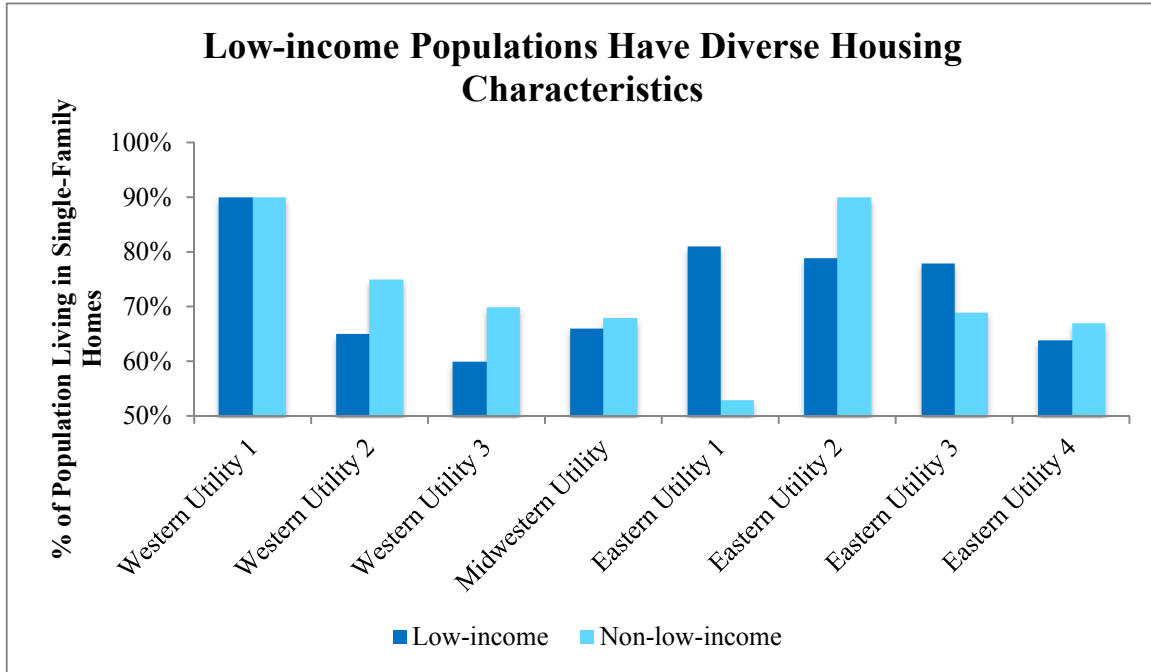


Figure 1. Comparison of low-income and non-low-income populations living in single-family homes. *Source:* Territory-wide data from Opower utility partners.

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 seven Opower utility partners –for which territory-wide 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 high-income home ownership). Perhaps surprisingly, low-income populations demonstrated ownership levels above 70% in four of the seven instances (see Figure 2).

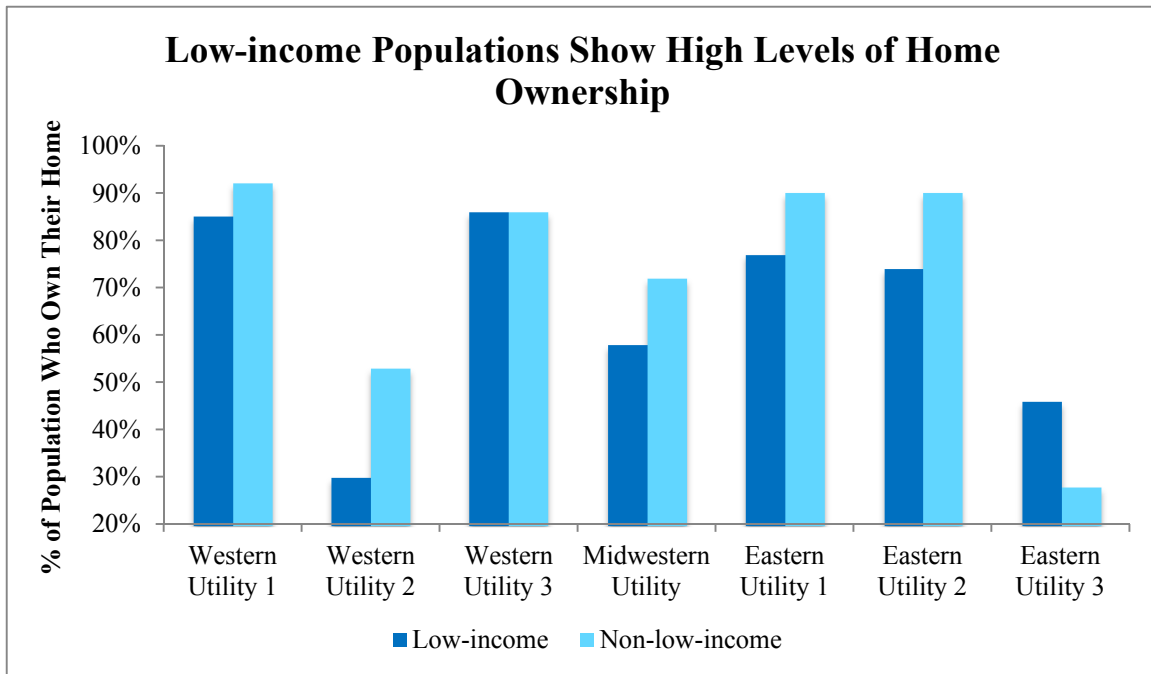


Figure 2. Comparison of populations who own their home. *Source: Territory-wide data from Opower utility partners.*

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 (Evergreen Economics, 2013b).⁴ Given such a heterogeneous group, utilities must ensure outreach initiatives are targeted and segmented to foster maximum engagement on efficiency opportunities.

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).

⁴ English, Spanish, Cantonese, and Tagalog represent the four most common language preferences among California IOU low-income customers, as reported in Evergreen Economics, December 2013c, "Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs Volume 3: Technical Appendix," pp. 7–33. Available at: <http://www.energydataweb.com/cpucFiles/pdaDocs/1016/ESA CARE LI Needs Assessment Final Report - Volume 1 - 12-16-13.pdf>

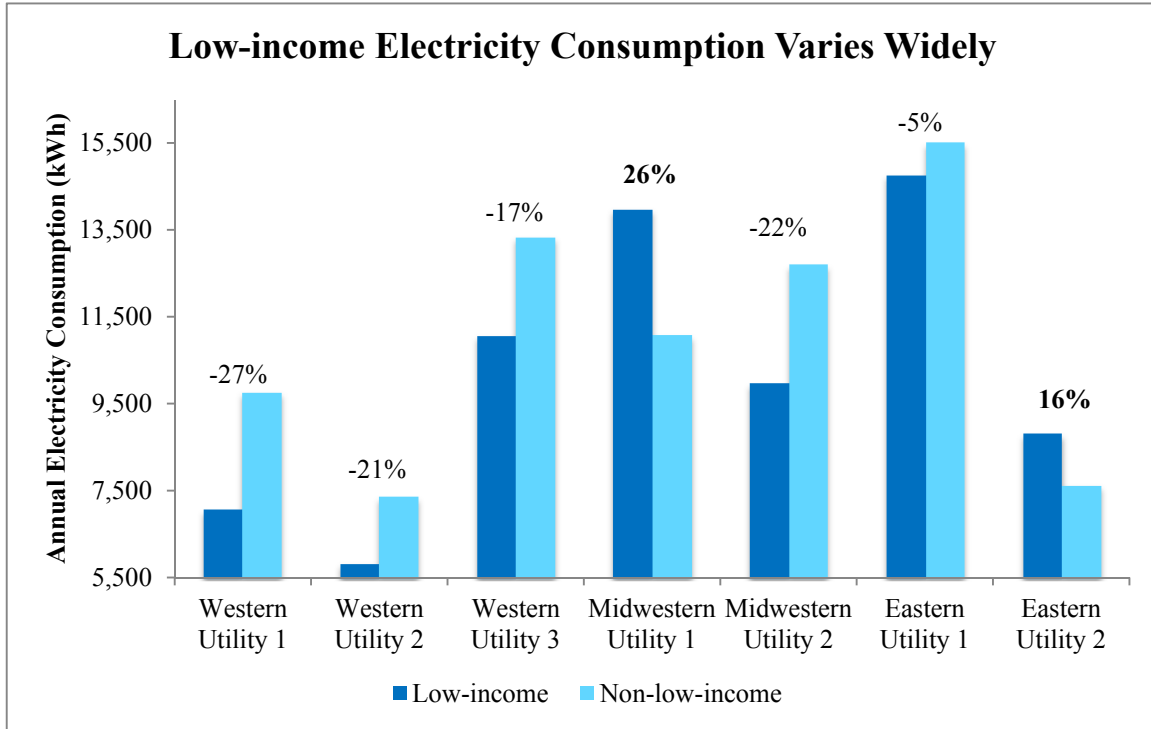


Figure 3. Comparison of annual usage for low-income and non-low-income households. *Source:* Territory-wide data from Opower utility partners. Note: Percentages indicate difference between low-income and non-low-income populations.

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 two potential explanations for this finding.

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):

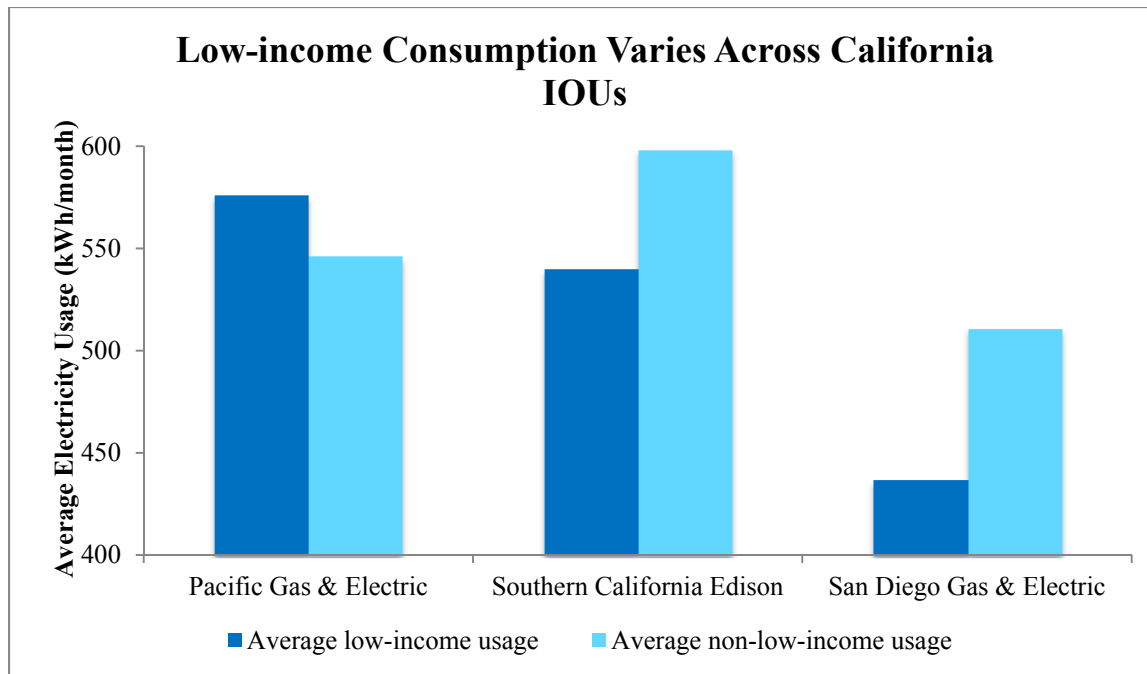


Figure 4. Comparison of low-income and non-low-income consumption across three California investor-owned utilities. *Source:* Evergreen Economics 2013a.

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 (Tetra Tech 2012a). 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 (Winn 2013).

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% (Kushler, York, and Witte 2005a). 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 (Gaffney, 2006b). 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 (Tetra Tech 2012b). 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 utility-administered rate assistance (Evergreen Economics 2013b). While 59% 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 (CPUC 2011). 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 efficiency programs once aware (Tetra Tech 2012b). 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 both installed-measure upgrades as well as behavioral actions once educated on efficiency opportunities (see Figure 5) (Navigant 2012a). 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 (Navigant 2012b).

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

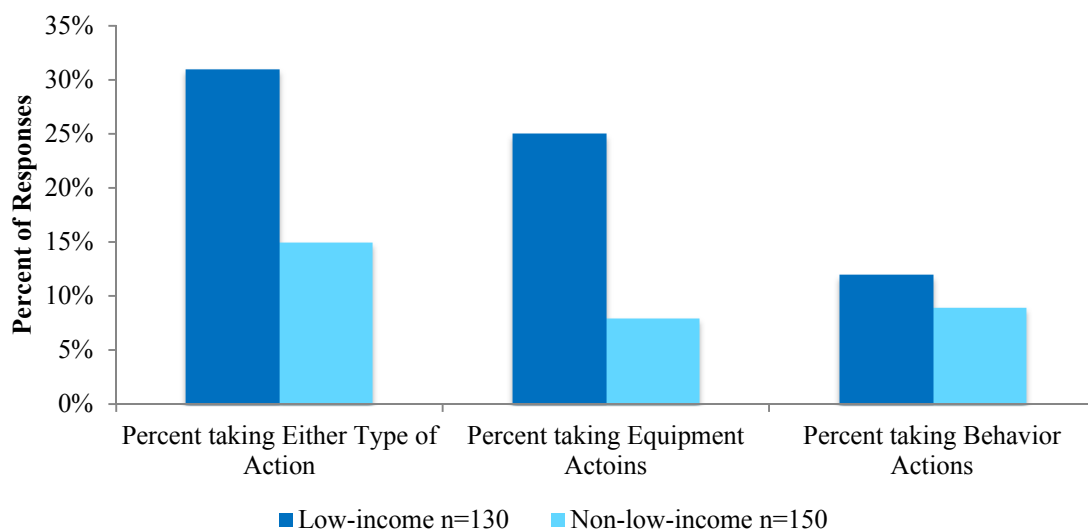


Figure 5. Low-income vs. non-low-income participant action types taken per Navigant evaluation of Progress Energy Carolinas Region Residential Energy Benchmarking Program. *Source:* Navigant 2012a.

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, the study found that low-income populations were more likely to participate once they became aware of the available programs (Tetra Tech 2012b).

Though the evidence above indicates low-income populations 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 the 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, precluding the need to actively enroll in an efficiency program, savings levels rival those of general populations (NCLC 2013a). Data from Opower auto-enroll programs supports this conclusion. Internal analyses of Home Energy Report programs deployed at four investor-owned utilities found that low-income customers generated savings commensurate with non-low-income customers (see Figure 6).

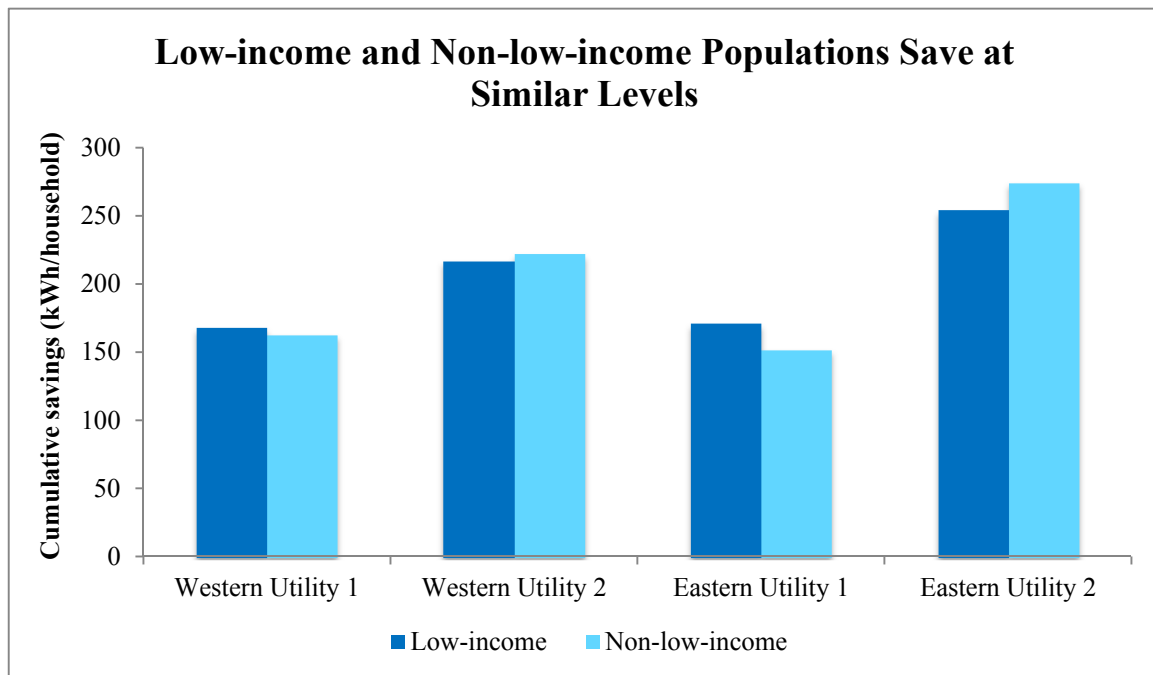


Figure 6. Comparison of low-income and non-low-income savings from Home Energy Report programs. *Source:* Territory-wide data from Opower utility partners.

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

Low-income efficiency programs deliver significant non-energy benefits by focusing on a financially constrained population. As such they are not always held to the same cost-effectiveness criteria as other programs (Kushler, York, and Witte 2005b). Many states have less

stringent cost-effectiveness thresholds for low-income efficiency programs than those for mainstream residential energy efficiency programs.⁵

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 (Cadmus 2012). 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 (Kushler, York, and Witte 2005a). Furthermore, an analysis of low-income programs deployed by 86 utilities finds 54% of those programs were cost-effective (Opower 2014).

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.⁶ 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 (SGCC 2012; Peters et al. 2011).

The benefits of driving low-income engagement extend beyond direct bill and energy savings (NRDC 2014). Studies have found that low-income efficiency drives positive outcomes for the system as a whole in three important ways (NCLC 2013b):

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 (EPA 2011).

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-

⁵ California, for example, requires low-income efficiency programs to meet a reduced Modified Participant Cost Test and Utility Cost Test threshold of 0.25. California Public Utilities Commission Decision D.12-08-044, Ordering Paragraph 38, Aug 2012, "Decision on Large Investor-Owned Utilities' 2012-14 Energy Savings Assistance (ESA) (Formerly Referred to as Low-Income Energy Efficiency or LIEE and California Alternative Rates for Energy (CARE) Applications," p. 381. Available at: <http://www.liob.org/docs/ACF265.pdf>

⁶ For example, a program at a Southeast utility delivered savings at \$0.051 per kWh, less than the utility's avoided cost of \$0.056.

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.

References

- Blinder, A., and Zandi, M. Princeton University. July 2010. “How the Great Recession Was Brought to an End,” p. 16.
<http://www.princeton.edu/~blinder/End-of-Great-Recession.pdf>
- Cadmus (Cadmus Group, Inc.). 2012. “Pacific Power Washington Low-Income Weatherization Program Evaluation March 2009 – February 2011.”
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/WA_2012_LowIncome.pdf
- CPUC (California Public Utilities Commission). 2012. Decision D.12-08-044, Ordering Paragraph 38, *Decision on Large Investor-Owned Utilities’ 2012–14 Energy Savings Assistance (ESA) (Formerly Referred to as Low Income Energy Efficiency or LIEE and California Alternate Rates for Energy (CARE) Applications*.
<http://www.liob.org/docs/ACF265.pdf>
- . 2011. *California Energy Efficiency Strategic Plan*. Section 2, p. 23.
http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-9477-3363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf
- CRSR (Congressional Research Service Report). July 2013. *Congressional Research Service Report*, “LIHEAP: Program and Funding,” p. 8.
<http://neada.org/wp-content/uploads/2013/08/CRSLIHEAPProgramRL318651.pdf>
- Evergreen Economics, December 2013a. Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs Volume 1: Summary Report. P. 1–4.
http://www.calmac.org/publications/LINA_report_-_Volume_1_-_final.pdf
- Evergreen Economics, December 2013b. Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs Volume 1: Summary Report. P. 3–8 – 3–9
http://www.calmac.org/publications/LINA_report_-_Volume_1_-_final.pdf
- . 2013c. Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs Volume 3: Technical Appendix. P. 7–33
http://www.calmac.org/publications/LINA_report_-_Volume_3_-_final.pdf
- EPA (United States Environmental Protection Agency). 2011. “Energy Efficiency in Affordable Housing.” P. 2–4
http://epa.gov/statelocalclimate/documents/pdf/affordable_housing.pdf

- Gaffney, K. KEMA Inc. 2006a. *ACEEE Summer Building Efficiency Study*. “Assessing the Needs of California’s Low-Income Population” P. 7–50.
http://aceee.org/files/proceedings/2006/data/papers/SS06_Panel7_Paper05.pdf
- , KEMA Inc. 2006b. *ACEEE Summer Building Efficiency Study*. “Assessing the Needs of California’s Low-Income Population.” P. 7–57.
http://aceee.org/files/proceedings/2006/data/papers/SS06_Panel7_Paper05.pdf
- IEA (International Energy Agency). 2011. Evaluating the Co-Benefits of Low-income Energy Efficiency Programs. P. 9.
http://www.iea.org/publications/freepublications/publication/low_income_energy_efficiency.pdf
- Analysis of programs found in: Kushler, M.; York, Dan; Witte, Patty, ACEEE. 2005a. Meeting Essential Needs: The Results of a National Search for Exemplary Utility-Funded Low-Income Energy Efficiency Programs.
<http://www.aceee.org/research-report/u053>
- , ACEEE. 2005b. “Meeting Essential Needs: The Results of a National Search for Exemplary Utility-Funded Low-Income Energy Efficiency Programs.” P. 6
<http://www.aceee.org/research-report/u053>
- LIHEAP (Low-income Home Energy Assistance Program). 2012. *2010–2014 funding tables*.
<http://www.acf.hhs.gov/programs/ocs/resource/liheap-funding-tables>
- NEADA (National Energy Assistance Director’s Association). 2013. Sequester Cuts 300,000 Poor Families from Low Income Home Energy Assistance Program.
<http://neada.org/sequester-cuts-300000-poor-families-from-low-income-home-energy-assistance-program/>
- NCLC (National Consumer Law Center). 2013a. “Helping Low-Income Utility Customers Manage Overdue Bills through Arrearage Management Programs (AMP).” P. 24.
http://www.nclc.org/images/pdf/energy_utility_telecom/consumer_protection_and_regulatory_issues/amp_report_final_sept13.pdf
- . 2013b. “Helping Low-Income Utility Customers Manage Overdue Bills through Arrearage Management Programs (AMP).” P. 1.
http://www.nclc.org/images/pdf/energy_utility_telecom/consumer_protection_and_regulatory_issues/amp_report_final_sept13.pdf
- Navigant (Navigant Consulting, Inc.). 2012. “Program Year 1 (2011–12) EM&V Report for the Residential Energy Efficiency Benchmarking Program.”
<http://dms.psc.sc.gov/pdf/matters/DED5D3CE-155D-141F-1D3D7AD1967BECD1.pdf>
- NRDC (Natural Resources Defense Council). “The Benefits of Energy Efficiency for California’s Low Income Households.” Accessed March 2, 2014.
http://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/NRDC_Fact_Sheet.pdf

- O'Dwyer, Cindy, DEFG. 2013a. "Engaging and Enrolling Low Income Consumers in Demand Side Management Programs."
<http://defgllc.com/publication/engaging-and-enrolling-low-income-consumers-in-demand-side-management-programs/>
- , DEFG. 2013b. "Energy Affordability, Debt and the Needs of Low Income Consumers: Three Industry Perspectives".
<http://defgllc.com/publication/energy-affordability-debt-the-needs-of-low-income-consumers-three-industry-perspectives/>
- Opower, 2010. Opower National Survey of Consumer Energy Use and Attitudes, October 2010.
- Opower, 2014. Opower analysis of 8,124 programs filed by 86 utilities, including 584 low-income programs.
- Peters, Jane; Crohn, Kara; Armstrong, April et. al., Research into Action, Inc. 2011. "Low-income Energy Efficiency Program 2009–10 Process Evaluation." P. 48–49.
http://www.liob.org/docs/LIEE_Process_Evaluation_Final_Report_061011.pdf
- SGCC (Smart Grid Consumer Collaborative). 2012. "Spotlight on Low Income Consumers Final Report." P. 7.
<http://smartgridcc.org/research/sgcc-research/sgccs-spotlight-on-low-income-consumers>
- Tetra Tech (Tetra Tech, Inc.). 2012a. "Final Report for the Research and Analysis of Energy Usage for NV Energy Low-income Customers." P. 4–29.
http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2005_THRU_PRESENT/2009-6/36086.pdf
- . 2012b. "Final Report for the Research and Analysis of Energy Usage for NV Energy Low-income Customers." P. 4–37.
http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2005_THRU_PRESENT/2009-6/36086.pdf
- Winn, Caroline. Intelligent Utility. 2013. Low-income Customers Want to Engage. December 2013.
<http://www.intelligentutility.com/magazine/article/337263/low-income-customers-want-engage>
- WFPF (The Working Poor Families Project). 2013. "Low-income Families: The Growing Economic Gap."
http://www.workingpoorfamilies.org/wp-content/uploads/2013/01/Winter-2012_2013-WFPF-Data-Brief.pdf