



Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451



Ameren Illinois Company Low Income Needs Assessment

Final Report

Final
June 1, 2022



Table of Contents

1. Executive Summary	1
2. Introduction	8
2.1 Report Organization.....	9
3. Methods.....	10
3.1 General Population Survey.....	10
3.2 Calculation of Energy Burden	11
3.3 Analysis of Customer Preferences.....	11
4. Detailed Findings	13
4.1 Housing Characteristics	13
4.2 Energy Burden and Energy-Related Needs	17
4.3 Economic Hardship	26
4.4 Health, Comfort, and Safety.....	30
4.5 Barriers to Participation in the IQ Initiative	36
4.6 Engagement Strategies.....	39
5. Conclusions and Recommendations	42
Appendix A. Survey Instrument.....	48
Appendix B. Energy Burden Methods and Regression Results	67
Appendix C. Economic and Health Hardship Methods.....	72
Appendix D. MaxDiff Methods.....	73

Table of Figures

Figure 1. Average Energy Burden, by Core Segment.....	2
Figure 2. Housing Type.....	13
Figure 3. Homeownership Status	14
Figure 4. Fuel Use.....	14
Figure 5. Housing Vintage	15
Figure 6. Housing Size.....	16
Figure 7. Primary Heating Equipment	16
Figure 8. Primary Cooling Equipment.....	17
Figure 9. Average Total 2020 Household Energy Costs	18
Figure 10. Average Total 2020 Household Energy Costs by Fuels Used in Home	18
Figure 11. Average Total 2020 Household Energy Costs per Bedroom by Fuel Use in Home	19
Figure 12. Average Energy Burden, by Core Segment	20
Figure 13. Average Energy Burden, by Housing Vintage.....	21
Figure 14. Average Energy Burden, by Primary Heating and Cooling Sources.....	21
Figure 15. Average Energy Burden, by Demographic Groups.....	22
Figure 16. Average Energy Burden, by Public Assistance Received	23
Figure 17. Average Modified Energy Burden, by Public Assistance Received.....	23
Figure 18. Average Energy Burden, by Employment Status	24
Figure 19. Awareness of LIHEAP/PIPP, by Homeownership Status	25
Figure 20. Participation in LIHEAP/PIPP, by Homeownership Status	25
Figure 21. Average Economic Hardship Score	26
Figure 22. Difficulty Paying Bills by Income Status	27
Figure 23. Difficulty Paying Bills by Housing Type	28
Figure 24. Difficulty Paying Bills by Home Ownership Status.....	29
Figure 25. COVID-19 Impacts to Household Financial Situation.....	30
Figure 26. Customers with a Household Member with a Major Medical Condition or Disability	30
Figure 27. Average Health Hardship Score.....	31
Figure 28. Frequency of In-Home Health, Comfort, and Safety Hazards by Income Status.....	32
Figure 29. Frequency of In-Home Health, Comfort, and Safety Hazards by Homeownership Status.....	33
Figure 30. Frequency of In-Home Health, Comfort, and Safety Hazards by Housing Type.....	34

Figure 31. Infiltration Issues by Income Status.....	35
Figure 32. Infiltration Issues by Housing Type.....	35
Figure 33. Infiltration Issues by Homeownership Status.....	36
Figure 34. General Awareness of AIC Energy Efficiency Programs.....	36
Figure 35. Participated in Any AIC Energy Efficiency Program.....	37
Figure 36. Awareness of AIC Online Marketplace.....	37
Figure 37. Made Purchase on AIC Online Marketplace.....	38
Figure 38. Home Internet Access.....	38
Figure 39. Overall AIC Satisfaction.....	39
Figure 40. Preferred AIC Communications Methods.....	40
Figure 41. Top Preferred Source of Information When Seeking Help to Reduce Energy Bills.....	41
Figure 42. Example MaxDiff Screen.....	74

Table of Equations

Equation 1. Customer Energy Burden.....	11
Equation 2. Modified Energy Burden	11
Equation 3. Customer Energy Burden.....	67
Equation 4. Modified Energy Burden	68
Equation 5. Housing Benefits	68
Equation 6. Food Benefits	69
Equation 7. Medical Benefits.....	70
Equation 8. Financial Benefits.....	70

1. Executive Summary

This report provides the results of the Low Income Need Assessment (LINA) conducted on behalf of Ameren Illinois Company (AIC) by Opinion Dynamics in 2021. For nearly a decade, AIC has provided in-home audit, weatherization, and HVAC upgrade services to income qualified (IQ) customers, including low income and moderate income households.¹ Alongside the IQ Initiative, AIC launched the Market Development Initiative (MDI) in 2018 to promote new economic and energy efficiency opportunities for local and diverse individuals and businesses, with a special focus on diverse and economically challenged communities (referred to as "Empower Communities"). Looking ahead to the 2022–2025 energy efficiency plan, AIC plans to redouble its focus on delivering equitable access to energy efficiency opportunities to disadvantaged communities. In preparation for this new era, AIC commissioned the LINA study to (1) characterize the residential IQ market segment, including key indicators related to energy burden², economic hardship, and health, comfort, and safety (HCS); (2) refine its definition of Empower Communities (beyond income and racial/ethnic diversity) by identifying key sub-segments with relatively high need for support; and (3) enhance outreach efforts by identifying preferred channels and credible messengers for reaching IQ and other underserved customers.

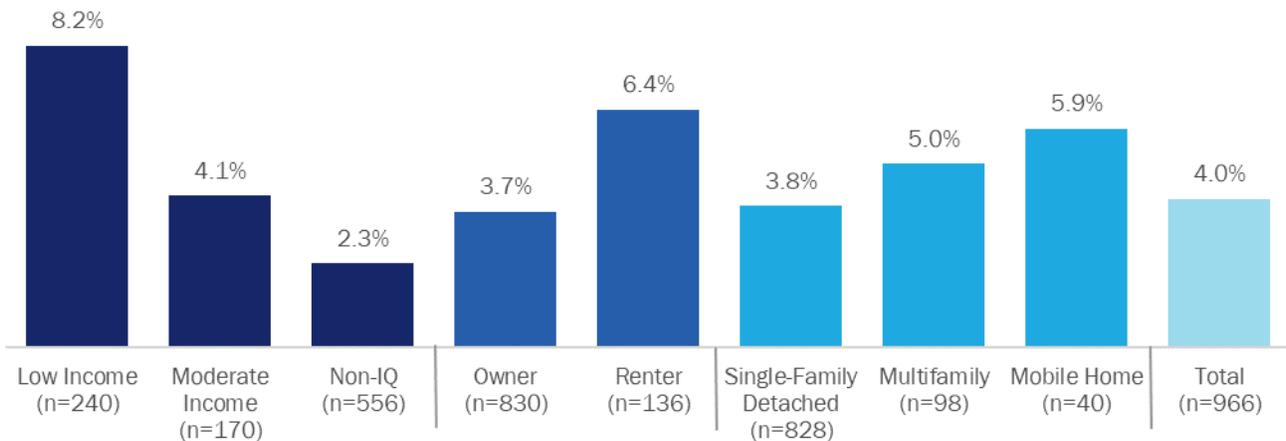
To accomplish these goals, Opinion Dynamics conducted a general population survey with a representative sample of over 1,300 AIC residential customers, with an even mixture of IQ and non-IQ customers. We analyzed survey results overall and by customer segment based on income; homeownership status (i.e., owners versus renters); housing type; and a variety of other demographic characteristics (e.g., race and education). The survey also included a "MaxDiff" exercise that required respondents to choose which sources they would be most likely and least likely to go to for help when looking to find ways to reduce their monthly energy bills. We used these results to conduct "first-choice simulations" that expose what proportion of customers would pursue each information source as their first option.

Overall, this study shows that there is still significant potential for AIC to help alleviate energy burden among their most vulnerable customers. IQ customers, unsurprisingly, continue to experience greater financial hardship and energy burden than non-IQ customers, as they disproportionately live in older, inefficient homes with infiltration problems and outdated and inefficient HVAC technologies. This study also revealed specific groups of vulnerable, and often historically marginalized customers: mobile/manufactured homes, renters in multifamily units, alternative fuel users, and a number of historically marginalized demographic groups like Black or disabled customers. There are clear opportunities to target these types of customers specifically through AIC programming in the next portfolio cycle: they face greater energy burdens and/or energy costs, and IQ customers within these groups are particularly vulnerable.

¹ We use the term "IQ" when referring to both low and moderate income customers together as group, especially when comparing to non-IQ customers. We otherwise refer to low or moderate income customers separately when there are important differences between them; or if a finding only applies to one group. Low income customers are defined as households with incomes that are 200% or less of the federal poverty line (FPL), by household size. Moderate income customers are defined as households with incomes that are 201% to 300% of the FPL, by household size.

² Energy burden is the percentage of annual household income that energy bills represent.

Figure 1. Average Energy Burden, by Core Segment



AIC’s 2022–2025 IQ Initiative is generally set up well to address the energy-related needs of its IQ customers, as well as many of the priority subgroups we identified, but we did find opportunities for incremental improvement. The Initiative already provides most of the HVAC and weatherization upgrades that IQ customers might need, at no-cost or a heavy discount, but the Initiative could potentially add a few more measures, especially in multifamily units, to address sources of high energy burden and infiltration issues. Further, AIC has already taken a big step by establishing a metric for prioritizing additional outreach and offerings to underserved communities: the Empower Communities index. Our results suggest that the current index, which assigns higher priority to communities with greater proportions of IQ and/or non-White customers, is fundamentally sound but AIC could expand it to better reach additional high need groups.

HCS represents perhaps the area of greatest misalignment between IQ customer needs and Initiative design, which is historically rooted in state and federal policy limitations around the use of AIC energy efficiency and Illinois Home Weatherization Assistance Program (IHWAP) funds. HCS hazards continue to be a major issue for IQ customers, most commonly thermal comfort issues stemming from poor weatherization, major infiltration issues, and inefficient HVAC systems. A significant minority of IQ customers, particularly low income customers more so than moderate income customers, also frequently experience mold/moisture and pest issues. State and federal policy around the use of energy efficiency and weatherization funds, however, have historically made it extremely difficult for utilities or community action agencies (CAAs) to fully address these issues, resulting in Initiative project deferment for some of AIC’s most vulnerable customers. However, the Climate and Equitable Jobs Act (CEJA), with its new directives for utilities to address HCS needs alongside energy upgrades, establishes a new paradigm around HCS and potentially creates an opportunity to address this critical gap for the IQ population.³ AIC is in the process of developing plans to further address HCS needs in the PY2022 Implementation Plan.

Even as AIC has steadily improved, and continues to improve, the design of the IQ Initiative, major barriers to participation remain. Awareness is the biggest barrier to participation in AIC energy efficiency offerings across all AIC residential customers, but low income customers (compared to moderate income or non-IQ customers) are particularly unaware, making extensive, compelling, and culturally relevant marketing, education, and outreach (ME&O) a critical part of the solution. In this regard, we found that IQ customers are not especially different than non-IQ customers in terms of their preferred communication methods and information sources.

³ Opinion Dynamics currently has a non-energy impacts study in progress (final results expected Q2 2023) quantifying the financial benefits of HCS improvements for IQ customers from the Initiative.

Both groups have varying preferences between e-mail and paper communications, with a slight edge to paper promotions. Most customers naturally think of AIC as the go-to resource for their energy bill related needs first, but there is still an important role for community partners as an effective strategy for meeting customers where they already are going for support in general; and driving awareness of AIC's offerings by layering them on top of the community partners' other support services.

Based on this research, we offer the following key findings and recommendations for AIC efforts targeted at IQ customers going into the 2022–2025 cycle.

- **Finding 1:** Customers who use alternative fuels, especially propane users (who spent \$2,900 on average in 2020 energy bills), tend to have significantly higher annual energy costs than those who use natural gas (\$2,000) or electricity only (\$1,575). While alternative fuel users are a small minority of AIC customers overall (7% use propane and 2% use wood or wood pellets), it is possible that there are communities in AIC service territory where alternative fuel usage is more common. Alternative fuel users are more often moderate income or non-IQ, but there may also be pockets of low income alternative fuel users.
 - **Recommendation:** Conduct research to identify target communities with higher incidence of alternative fuel usage, especially pockets with many IQ alternative fuel users. AIC is already planning a targeted electrification offering for IQ and non-IQ alternative fuels users, and Opinion Dynamics will propose a fuel segmentation study as part of the 2022 evaluation cycle to support this effort.
- **Finding 2:** Low income customers have much higher average energy burden (8.2%) compared to any other income group (4.1% for moderate income; 2.3% for non-IQ). Although they may also struggle to pay a range of other bills (e.g., automobile expenses, housing payments, groceries, and other bills), they are most likely to cite AIC bills as something they struggled to pay. This finding may reflect prioritization of a hierarchical order of needs in modern life: after paying for rent and other living necessities, low income households may have little money left over for energy bills.
- **Finding 3:** Mobile homes have a much higher energy burden on average (5.9%) compared to single-family (3.8%) or multifamily (5.0%) homes. Mobile homes are particularly problematic from an energy burden perspective, as their inhabitants have some of the lowest average incomes and yet some of the highest average annual energy costs despite being some of the smallest dwelling structures.
 - **Recommendation:** Continue efforts to develop and implement a targeted offering for mobile/manufactured homes. AIC already plans to implement a mobile/manufactured home weatherization offering in the next cycle, as either a separate pilot or an offering within one of the Residential Program initiatives.
 - **Recommendation:** Conduct additional research to further understand the energy upgrade and HCS needs of mobile/manufactured homes specifically. This study collected high level information about primary heating and cooling information, as well as potential weatherization and HCS issues. Given the unique technological situations associated with mobile homes, however, further research dedicated to this customer segment is needed. Although not focused exclusively on IQ customers, Opinion Dynamics will propose a mobile/manufactured home study as part of the 2022 evaluation cycle and work with AIC to determine which inputs would best support their planned offering.
- **Finding 4:** The majority of renters are low income households; renters predominately reside in multifamily units and have a higher energy burden on average (6.4%) than homeowners (3.7%). Renters also have higher incidences of HCS issues compared to homeowners. Renter energy burden is primarily driven by lower incomes, as renters and multifamily properties have significantly lower

energy costs than other customer types. Renters face a multitude of barriers that prevent their participation in IQ offerings: lack of discretionary income and the authority to make major changes to their homes, high levels of transiency, and particularly low awareness of AIC energy efficiency offerings.

- **Recommendation:** Consider opportunities through the IQ Multifamily channel of the IQ Initiative to further incentivize landlords and property managers to make energy and comfort-related upgrades to their renters' units; and educate tenants on how to do more, within the limits of their rental situation, to save energy. One strategy other programs have used is a tiered incentive system that provides higher incentives to landlords for measures that directly impact tenant energy bills.⁴ Further, the Springfield Urban League, an AIC MDI partner, recently completed a survey with landlords and tenants and found that using targeted ME&O (e.g., local community events) to raise awareness of AIC's energy efficiency offerings amongst landlords and tenants and educating tenants on low- to no-cost behavior changes to reduce their energy use may also be part of the solution.⁵ Opinion Dynamics could also conduct additional secondary research or primary research with other utilities to identify a more comprehensive overview of the latest thinking on ways to overcome the classic renter-owner divide.
- **Finding 5:** Many historically marginalized demographic groups face disproportionately higher energy burdens. The following groups have significantly higher energy burdens than the average AIC residential customer (4.0%): Black customers (6.0%) and other non-White racial groups (5.6%); those with household members with major medical conditions or disabilities (5.4%); heads of households lacking a bachelor's degree (5.0%); non-retired unemployed households (8.2%); and single-mother households (7.1%).
 - **Recommendation:** The Empower Communities index should continue to prioritize communities with higher proportions of non-White and IQ customers. AIC should also expand the Empower Communities definition, however, to prioritize communities with higher proportions of customers with major medical conditions or disabilities, a lack of college education, are unemployed and looking for work, and either single-mother or (more generally) single-parent households. The Champaign County Regional Planning Commission (CCRPC), one of AIC's MDI partners, uses a Census and Demographics Tool to create the Empower Communities index, by zip code. AIC should work with the CCRPC to identify and included available census data related to these additional demographics.
- **Finding 6:** Customers who receive some type of public assistance have higher average energy burden compared to those who do not, even after accounting for the benefits of that assistance (measured as "modified energy burden"). Particularly, those who received energy bill payment assistance continue to struggle: LIHEAP recipients have the modified energy burdens of 7.1% compared to 3.3% for those who do not receive public benefits. Relatedly, less than two-thirds of LIHEAP-eligible customers are aware of the program. While many of the challenges these customers face are out of AIC's control, this finding suggests that there is a need to drive greater awareness of LIHEAP and, regardless, bill payment assistance is not enough to fully address energy burden. Further support reducing energy costs through energy efficiency upgrades could help.
 - **Recommendation:** Develop a ME&O campaign dedicated to raising awareness of LIHEAP that targets those who may qualify. Additionally, consider establishing an in-kind partnership (i.e., provide AIC-branded or co-branded marketing collateral) with community organizations that

⁴ California's Low Income Weatherization Program for Multifamily Properties (LIWP-MF) uses this approach. Source: American Council for an Energy-Efficient Economy (ACEEE). 2019. *Closing the Gap in Energy Efficiency Programs for Affordable Multifamily Housing*. <https://www.aceee.org/sites/default/files/publications/researchreports/u1903.pdf>.

⁵ Springfield Urban League. 2021. *Ameren Landlord and Tenant Research Report*. <https://amerenillinoisavings.com/wp-content/uploads/2021/07/PY21-MARCH-2021-MDI-Research-Booklet-FINAL-Rev03.pdf>

promote LIHEAP or connect their clients with other social services, such as welfare or food and housing assistance.

- **Recommendation:** Include receipt of public assistance as another prioritization criteria for the Empower Communities index.
- **Finding 7:** Customers conditioning their homes with portable/window air conditioners and baseboard heat have the highest average energy burdens across all primary heating and cooling sources; 6.4% and 5.5%, respectively. AIC's 2022–2025 energy efficiency plan currently includes window air conditioner replacements for the IQ Single Family channels, but not for the IQ Multifamily channel. Portable/window air conditioner and baseboard heat is especially common in multifamily homes. These findings suggest that these notoriously inefficient heating and cooling technologies, which are disproportionately found in low income and multifamily homes, are more expensive to operate than more efficient HVAC systems, thereby exacerbating energy burdens for these disadvantaged groups. However, these are by no means the only causes of energy burden in these homes. As such, addressing these measures is only part of the solution. Rather, whole home approaches will be critical to significant energy burden remediation.
 - **Recommendation:** Consider adding portable/window air conditioner replacement to the list of eligible measures for the IQ Multifamily channel, particularly in tenant units. AIC could either replace old units with ENERGY STAR® units; or, if not cost-prohibitive, could go further and install ductless heat pumps.⁶ Ductless heat pumps, which are an eligible measure though the IQ Multifamily channel, could also be a solution if specifically used in cases where customers have both a window air conditioner and baseboard heating, which each drive higher energy burdens.
- **Finding 8:** IQ customers are more likely than non-IQ customers to experience HCS concerns stemming from the quality of their home, most commonly with building shell issues. Customers in multifamily homes mentioned window infiltration issues nearly twice as often as single-family detached home dwellers; 27% versus 16%.
 - **Recommendation:** Explore opportunities to further identify and address window infiltration issues through the IQ Initiative, especially the IQ Multifamily channel. For example, work with implementation partners to ensure windows are fully examined during assessments; add window replacement as a potential option for resolving issues; and set up a specific process to determine whether lower cost improvements (e.g., weatherstripping or caulking and sealing) are sufficient, or if window replacement is truly needed. Given the historical cost-effectiveness challenges with window replacement, establish clear criteria for full window replacement.
- **Finding 9:** IQ customers were considerably more likely to have mold/moisture or pest problems (about one-third and one-quarter respectively); and some IQ customers appear to have severe issues that may cause project deferment and, as such, create barriers to IQ Initiative participation.
 - **Recommendation:** As AIC determines whether and how it must adjust IQ Initiative operations to comply with CEJA's HCS directives to utilities, consider whether rule changes are possible around mold, mildew, fungus, moisture, or pest remediation to avoid project deferment. AIC should also coordinate with CAAs on this issue, as they face similar rules and restrictions when using IHWAP funding.
- **Finding 10:** IQ and non-IQ customers have similar communication preferences. Across all survey respondents, direct mail (57%) and e-mail (42%) were the most preferred methods, followed by text

⁶ The ENERGY STAR® name and mark are registered trademarks owned by the US EPA.

message alerts (15%). Very few customers preferred online or social media advertisement (about 1% each).

- **Recommendation:** Continue to include e-mail outreach as part of ME&O strategies but focus more on direct mail or paper collateral as much as possible and consider opportunities to expand the use of text message alerts. Our 2021 process research pertaining to two IQ Initiative offerings, Smart Savers⁷ and Safe and Virtual Energy Efficiency (SAVE) Kits⁸, has shown that multiple touchpoints through a variety of channels (e.g., a mix e-mail, paper, phone, and texts) may be necessary to reliably reach customers with information on additional offerings available to them. The paper collateral contained with the SAVE Kits, however, was much more effective than the other strategies (e-mail and phone calls) at driving interest and intention to participate in the IQ Initiative and other AIC offerings.
- **Finding 11:** Both IQ and non-IQ customers are most likely to consult established AIC resources first for assistance with reducing their energy bill: more than half would first go to the AIC website or call the AIC customer service line (39% and 20%, respectively). However, notable minorities of customers would first use internet searches (16%) or visit their local hardware or home improvement store (8%) instead. Very few customers would first turn to social service agencies or community organizations for information on ways to reduce their energy bill. While most customers do not think to consult these community organizations for energy bill assistance, our 2018 LINA concluded that community organizations (particularly faith-based organizations [FBOs] such as churches, temples, mosques, or religion-based non-profits) are the most trusted resources of information in general in low income communities within AIC service territory.
- **Recommendation:** Continue relying on the AIC website and call centers (either the general phone line or the Home Energy Specialists team⁹) as a critical information resource for AIC customers to learn more about ways to reduce their energy bill. Additionally, consider ways that the AIC website or the Home Energy Specialists team could connect customers with services from community partners or other critical social services.
- **Recommendation:** Consider additional investments in search engine marketing, and potentially in-store promotions (e.g., signage or booths) at local hardware or home improvement stores. If standard search engine marketing methods (i.e., pay-per-click ads) prove to be cost prohibitive, narrow the focus to search engine optimization; this is the most cost-effective component of search engine marketing and would make AIC more visible in search engine results for the 16% of customers that rely on broader internet searches.
- **Recommendation:** AIC should continue their focus on building community partnerships through the MDI for use in conducting marketing and outreach to target customer groups.
- **Recommendation:** Consider an ME&O strategy specific to FBOs, particularly those in Empower Communities. AIC recently piloted an FBO retrofit offering in late 2021 and otherwise serves FBOs through other Business Program initiatives. AIC could consider asking previous FBO participants to partner with them in an ME&O effort. For instance, pastors whose churches participated in an AIC offering and had a positive experience might be willing to act as ambassadors: tell their churchgoers about AIC's offerings (for both residents and businesses) and about their own

⁷ Opinion Dynamics. (2021). *Ameren Illinois Company Smart Savers Process Evaluation*. <https://ilsag.s3.amazonaws.com/AIC-Smart-Savers-Process-Evaluation-Memo-FINAL-2021-12-13.pdf>.

⁸ Opinion Dynamics. (2021). *Ameren Illinois Company Income Qualified Initiative 2021 Participant Survey Results*. <https://ilsag.s3.amazonaws.com/AIC-Income-Qualified-Initiative-Participant-Survey-Results-Memo-FINAL-2022-02-01.pdf>

⁹ The Home Energy Specialists team is the IQ Initiative's dedicated call center that provides support to customers with the Initiative application and throughout the participation process.

experiences participating; and then potentially hand out informational materials or invite an AIC representative to speak after a sermon.

- **Finding 12:** While not the core purpose of this study, our survey collected useful datapoints on over 1,300 customers' homes, such as housing type, fuel type, and primary heating and cooling systems. These data may be useful for vetting IL-TRM assumptions about IQ and non-IQ homes when specific customer information is unknown (e.g., for some types of energy efficiency kits).
- **Recommendation:** As part of the 2022 IL-TRM V11.0 update process, Opinion Dynamics is conducting a review of existing available data that can help improve characterization of energy savings measures in IQ homes. Our primary expected data source is existing program tracking databases, which have collected a rich set of data with respect to HVAC efficiency and building shell efficiency that can be mined for these purposes, but we plan to supplement these data where relevant with data collected in this study. We will provide one or more IL-TRM workpapers summarizing our findings and recommending potential changes to the IL-TRM's characterization of measures.

2. Introduction

For nearly a decade, Ameren Illinois Company (AIC) has provided in-home audit, weatherization, and HVAC upgrade services to income qualified (IQ) customers, including low income and moderate-income households. In 2018, in response to state legislation (the Future Energy Jobs Act; FEJA) and AIC's own corporate prioritization of its IQ customers, AIC significantly expanded its IQ-focused programming through the launch of the Income Qualified (IQ) Initiative. Through the new Initiative, AIC not only expanded funding for the core (i.e., audit, weatherization, and HVAC) offering, but also added an entirely new channel for low income customers that blended AIC and Illinois Home Weatherization Assistance Program (IHWAP) funding to provide more energy upgrades to more customers, and provide more, albeit limited, home repair and health and safety remediation.

Alongside the IQ Initiative, AIC launched the Market Development Initiative (MDI) in 2018 to promote new economic and energy efficiency opportunities for diverse and local individuals and businesses, with a special focus on diverse and economically challenged communities (referred to as "Empower Communities"). One of the key goals of AIC's Market Development Action Plan (MDAP) is to increase awareness of and participation in the IQ Initiative through supplemental no-cost energy efficiency offerings, such as free kits of energy efficiency products; marketing, education, and outreach (ME&O) campaigns; and partnerships with local leaders, non-profits, and other community organizations.

As AIC embarks on the next plan cycle, the company is redoubling its focus on delivering equitable access to energy efficiency opportunities to disadvantaged communities. AIC's approved 2022–2025 Energy Efficiency and Demand Response Plan includes approximately \$30 million per year in funding for the IQ Initiative, compared to approximately \$20 million per year in the 2018–2021 Plan, making IQ the single largest Initiative in AIC's portfolio in terms of funding.^{10,11} Further, the Illinois General Assembly passed the Clean and Equitable Jobs Act (CEJA) in September 2021, which provides increased funding and sets new goals for utilities to expand beneficial electrification and energy efficiency investments in disadvantaged communities; and specifically includes a requirement for utilities to address health and safety improvements in low income households and multifamily buildings alongside energy efficiency upgrades.

In preparation for this new era, AIC commissioned the Low Income Needs Assessment (LINA) to (1) characterize the residential IQ market segment, including key indicators related to energy burden, economic hardship, and health, comfort, and safety (HCS); (2) refine its definition of Empower Communities (beyond income and racial/ethnic diversity)¹² by identifying key sub-segments with relatively high need for support; and (3) enhance outreach efforts by identifying preferred channels and credible messengers for reaching IQ and other underserved customers.

The specific goals of the LINA are as follows:

- Identify key sub-segments of the IQ population with particularly high levels of energy burden and economic hardship to enhance AIC's definition of Empowered Communities and help prioritize MDI efforts

¹⁰ Ameren Illinois Company Electric and Gas Energy Efficiency and Demand Response Plan 2022-2025, Appendix H. March 1, 2021. Accessed at: <https://www.icc.illinois.gov/docket/P2021-0158/documents/308480/files/537743.pdf>

¹¹ Note that AIC is in progress of making revisions to the 2022-2025 Plan as a result of CEJA, which may adjust expected budgets.

¹² AIC defines Empower Communities at the zip code level using an index that prioritizes communities with higher percentages of IQ and/or non-White households.

- Understand the unique building characteristics and energy-related needs of IQ customers, as opposed to non-IQ customers, to inform the future of IQ Initiative design and measure mix
- Understand critical HCS needs of IQ customers
- Identify potential new engagement approaches for the MDI and IQ Initiative to serve IQ customers and key sub-segments:
 - Understand the key barriers that limit the involvement of IQ customers and particular sub-segments in AIC's IQ Initiative
 - Determine what customer engagement approaches are most appropriate for IQ customers and key sub-segments
 - Assess how high of a priority lowering utility bills is compared to other household bills and priorities (energy-related or non-energy related) and identify potential strategies to provide energy efficiency upgrades in tandem with support for higher priority needs

2.1 Report Organization

The remainder of this report is organized in three sections. First, the Methods section provides a high-level overview of the study methodology. Next, the Detailed Findings section provides detailed survey results and analysis by topic. Next, the Conclusions and Recommendations section triangulates the findings into comprehensive conclusions, as well as resulting evidence-based recommendations for improving AIC's IQ offerings. Finally, we provide several appendices with additional details on the study methodology.

3. Methods

Opinion Dynamics conducted a general population survey with a representative sample of over 1,300 AIC residential customers, comprised of an even mixture of IQ and non-IQ customers (681 and 678, respectively) to address the research objectives of interest in this study. Below, we describe the fielding approach for the survey, our sampling strategy, and analysis methods. The survey instrument is available in Appendix A.

3.1 General Population Survey

Survey Fielding

We used a mixed mode fielding approach that included both mail-push-to-web, email invitations, and call-in options. Respondents with emails in AIC customer records received email invitations to complete the online survey and customers without email addresses on file received mail invitations to the same online survey. Both outreach modes included a toll-free phone number for respondents who wished to take the survey over the phone with a live agent. The emails included a unique link for each respondent. The mailed survey invitations contained a web address and a unique personal identification number (PIN) that the respondent entered online (or provided to the telephone interviewer to identify their associated sample record), which prevented customers from completing the survey more than once and allowed us to track survey completion. To encourage participation, customers received a \$10 incentive for completing the survey. Survey fielding took place in September and October 2021.

Sampling, Weighting, and Survey Completes

Our analysis of census data suggests that about half of AIC's customers are estimated to qualify for the IQ Initiative. Resultantly, we used a simple random sampling approach. The percentage of IQ respondents captured by the survey reflects our estimates of the incidence of IQ customers in the AIC service territory, and as such, the responses to the survey should be reasonably representative of the AIC residential population. Since we received disproportionately more survey responses from customers with emails on file (relative to their incidence in the AIC residential population), we used analysis weights to correct for their overrepresentation in the survey data. These weights ensure results are generalizable to the AIC residential population. These weights are helpful as there can be demographic biases associated with a given mode (for example, those with emails on file tend to be younger and, if left unchecked, overrepresentation of this group could skew results).

Table 1 provides an overview of our sample and completed surveys by “core” segments, which serve as the primary groups of analysis for this study. Throughout this report, we present findings by these segments when significant differences are observed. If a given core segment is not mentioned, then there was no statistically discernible difference in that item for comparable groups.

Table 1. Survey Completes by Segment

Segment	Completed Surveys		
	Unweighted Count	Unweighted %	Weighted %
Income Segment^a			
Income Qualified: Low Income	441	33%	31%
Income Qualified: Moderate Income	237	17%	17%
Non-Income Qualified	681	50%	52%

Segment	Completed Surveys		
	Unweighted Count	Unweighted %	Weighted %
Homeownership Segment			
Owner	1,049	77%	80%
Renter	310	23%	20%
Housing Type Segment			
Single-family Detached	1,086	80%	81%
Multifamily (incl. single-family attached)	206	15%	14%
Mobile Home	67	5%	5%
Total	1,359	100%	100%

^a Low income customers are households at 200% or lower of the Federal Poverty Level (FPL). Moderate income customers are households at 201% to 300% of FPL.

3.2 Calculation of Energy Burden

Energy burden is a measure of economic hardship and is central to the objectives of this study. The standard calculation of “customer energy burden” is the sum of each customer’s household energy bills during a given year divided by their household income for that year, notated as:

Equation 1. Customer Energy Burden

$$\text{Customer Energy Burden} = \frac{\text{Annual Household Energy Bills}}{\text{Annual Household Income}}$$

A weighted average of individual customer energy burden results represents the overall average energy burden metric for any given analysis group (e.g., average low income customer energy burden).

3.2.1 Modified Energy Burden

A potential shortcoming of the energy burden metric is that it does not account for the value of public assistance benefits that qualified customers receive. Customers receiving public benefits likely have a lower energy burden than reflected by the simple energy burden metric since public benefits enable customers to use more of their disposable income toward affording basic needs than would be the case without public benefits.

The value of public benefits is included in the modified energy burden metric, notated as follows:

Equation 2. Modified Energy Burden

$$\text{Modified Energy Burden} = \frac{\text{Annual Household Energy Bills}}{\text{Annual Household Income} + \text{Value of Public Benefits Received}}$$

Additional details on energy burden and modified energy burden are provided in Appendix B.

3.3 Analysis of Customer Preferences

In addition to standard format questions, the survey included a “MaxDiff” exercise that required respondents to choose which sources they would be most likely and least likely to go to for help when looking to find ways

to reduce their monthly energy bills. We used these results to conduct “first-choice simulations” that expose what proportion of customers would pursue each information source as their first option. We include additional descriptions of these methods in Appendix D.

4. Detailed Findings

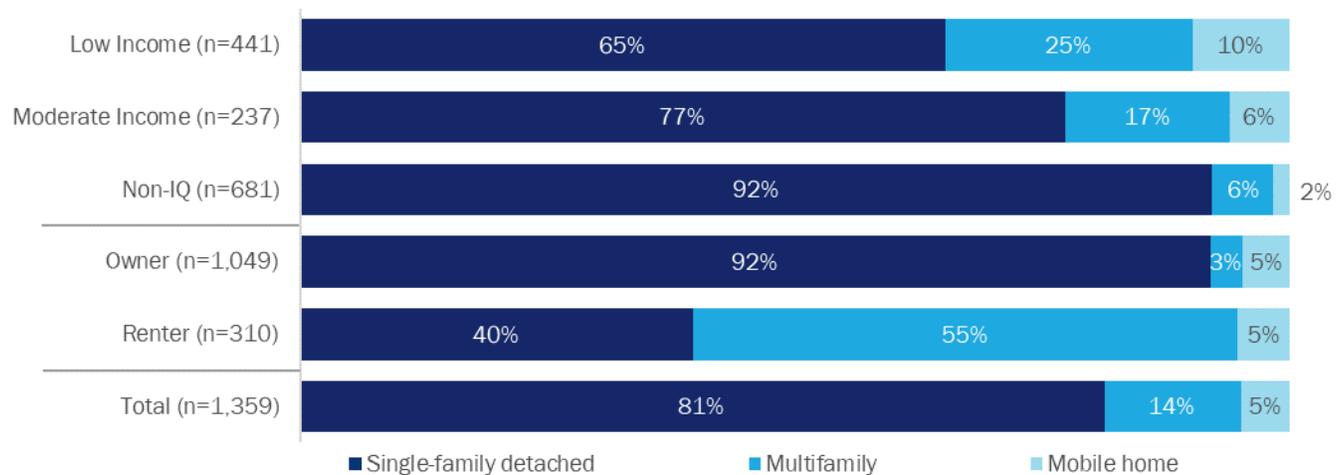
This chapter summarizes detailed findings from the study. While this chapter provides a comprehensive analysis of survey results, not all of the insights gleaned from the data directly informed our recommendations. Chapter 5 highlights the most important results from the study, our conclusions, and recommendations for AIC.

4.1 Housing Characteristics

Although most IQ customers live in single-family detached homes and own their home, they are more likely to be renters or live in multifamily and mobile homes compared to non-IQ customers.

Other than one notable exception, the majority of customers in every core customer segment reside in single-family detached dwellings (Figure 2). Renters on the other hand, are most likely to live in multifamily homes. Across all segments, mobile homes are considerably less common. Housing type is strongly correlated with income status: the lower a household’s income, the greater the likelihood they reside in a multifamily dwelling and the lesser likelihood they live in a single-family detached home. Non-IQ customers are also significantly less likely to live in a mobile home compared to both low and moderate income customers.

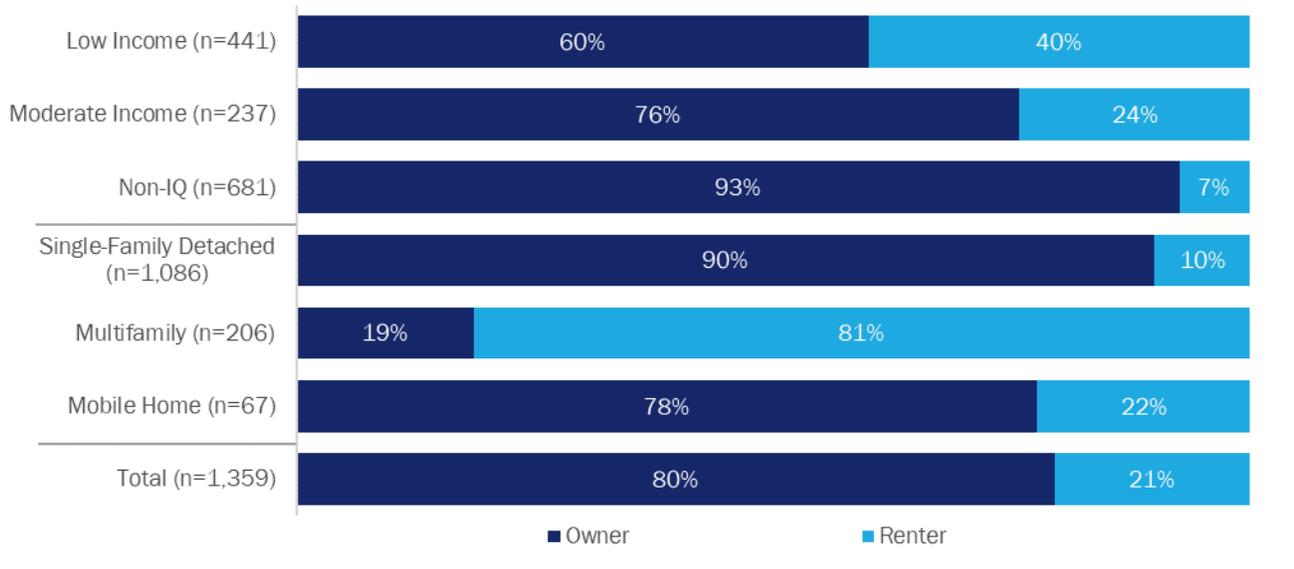
Figure 2. Housing Type



Most low income customers own their home, but renters are much more likely to be IQ compared to homeowners.

Homeownership status mirrors housing type trends: other than multifamily residents, the majority of customers in all core customer segments own their home, with homeownership demonstrating a positive correlation with income status (the greater the income, the greater the homeownership rate; Figure 3).

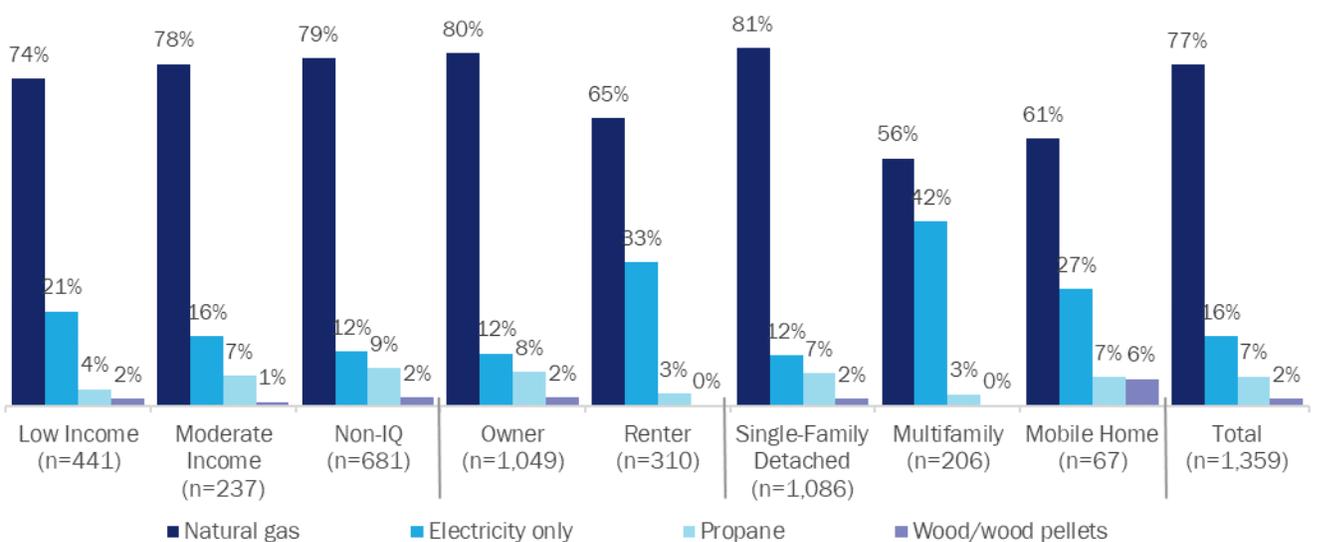
Figure 3. Homeownership Status



Although natural gas access is widespread, there are sizable minorities of electric-only multifamily and mobile homes.

Figure 4 exhibits the fuels used in AIC customer homes (with electricity being present at all homes). Natural gas use is prevalent across all core segments, with renters, mobile homes, and multifamily residents having the lowest penetration of natural gas. In lieu of natural gas, customers most commonly rely on electric appliances and heating sources; indoor alternative fuel use is rare. Although still relatively rare, non-IQ and moderate income customers more often use alternative fuels than low income customers.

Figure 4. Fuel Use



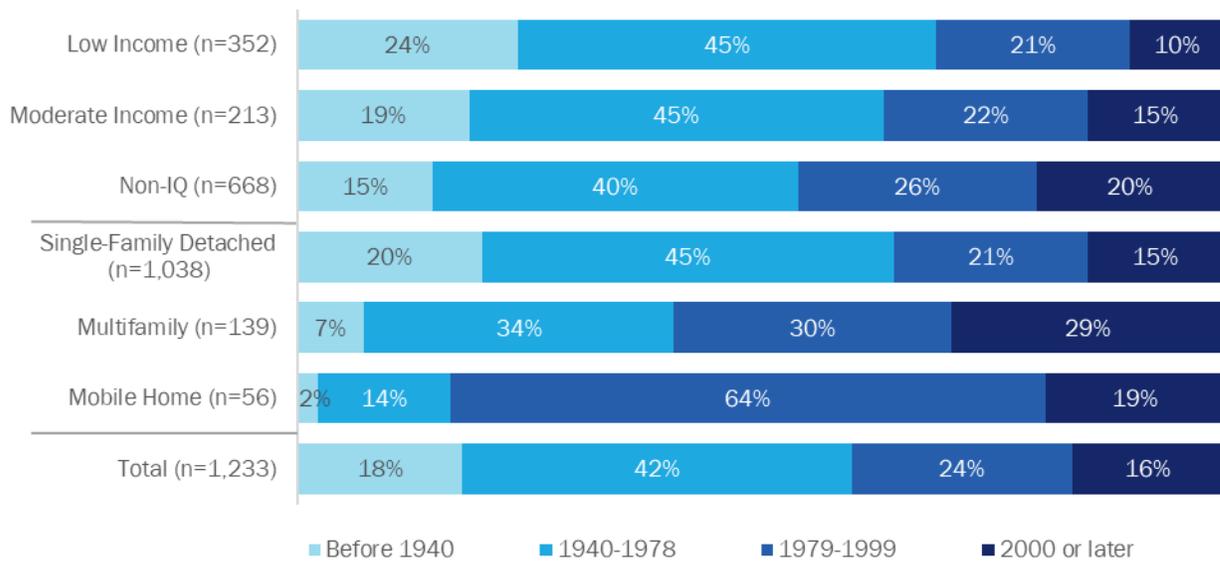
Survey question: Does your home use any of the following energy sources for heating, water heating, cooking, laundry, or other important household energy needs?

Note: Other than electricity only, categories are not mutually exclusive. Due to missing data (4% of all respondents), natural gas and electric-only item sample sizes are slightly smaller than those reported above. Alternative fuel use only included from customers who reported using propane or wood/wood pellets indoors for primary cooking, water heating, or space heating needs.

IQ customers are more likely to live in older homes and are less likely to live in newer homes than non-IQ customers. Multifamily and mobile homes tend to be newer housing stock.

The majority of AIC customers live in homes built in 1940 or later (Figure 5). Low income customers are significantly more likely to live in homes built before 1940 compared to non-IQ customers and non-IQ customers are in turn more likely to live in homes built in 2000 or later compared to low income customers. Vintage is also strongly differentiated by housing type, with single-family detached homes tending to be older than other housing types.

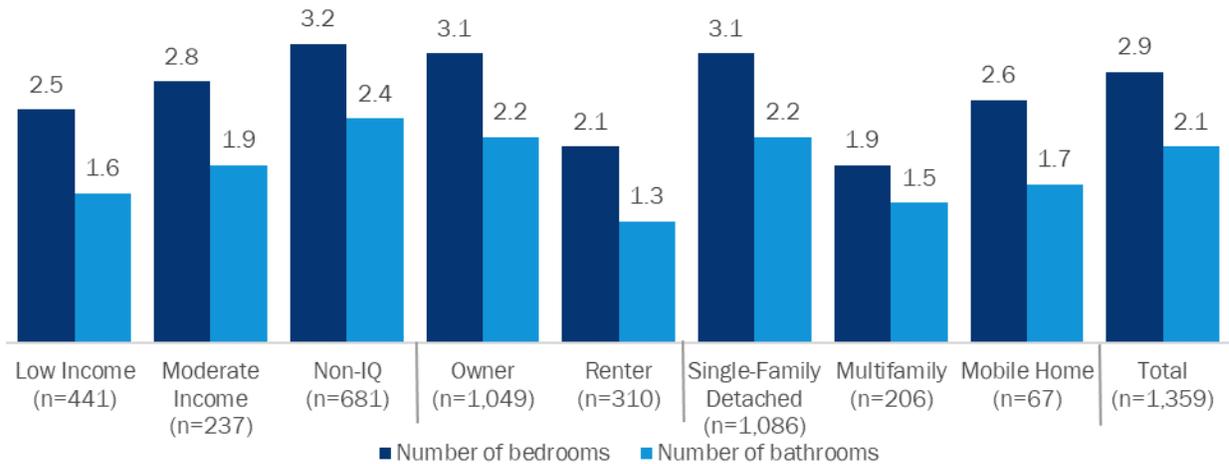
Figure 5. Housing Vintage



Low income customers and renters tend to live in the smallest homes, which are more likely to be small multifamily units than other customer types.

Housing size – as a function of the average number of bedrooms and bathrooms per residence – is significantly different across the core segments: the lower the income, the smaller the home; owners typically occupy larger residences than renters, and single-family homes tend to be larger than mobile homes or multifamily units (Figure 6).

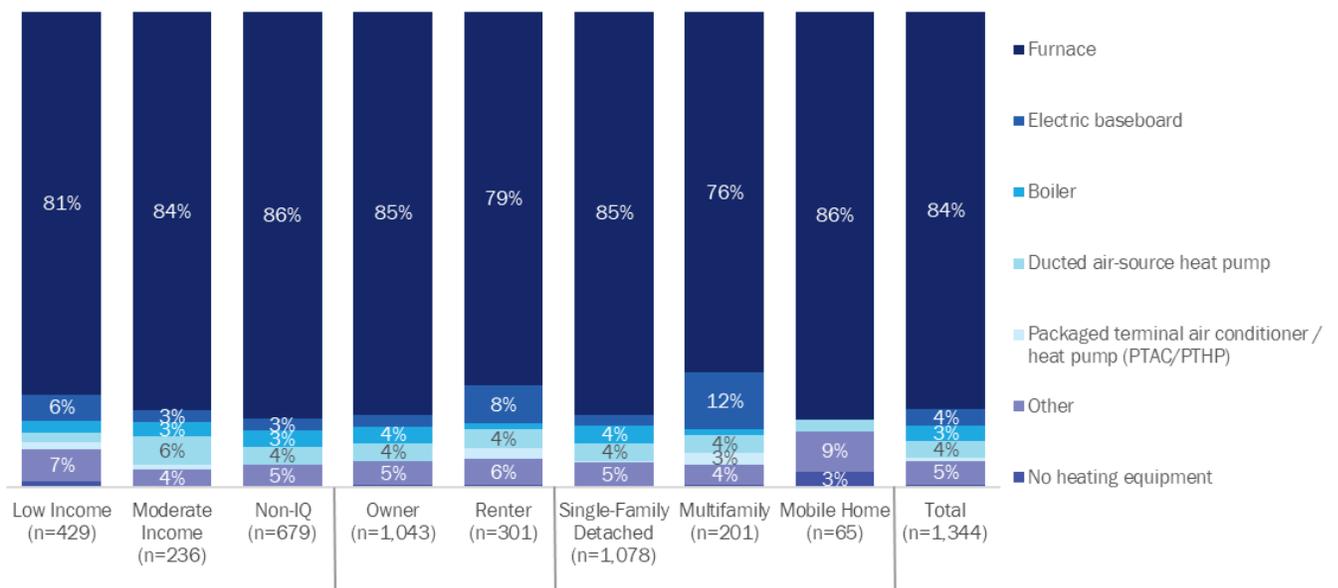
Figure 6. Housing Size



Forced air furnaces and central air conditioning are the most common heating and cooling equipment types across all customers, but significant minorities of low income customers, renters, and multifamily units use different technologies such as baseboard heaters.

The majority of customers in every core segment rely on a forced air furnace for space heating (Figure 7). Although a minority of cases, significantly more renters and multifamily residents use baseboard heat compared to their respective segment counterparts. Use of other heating technologies is uncommon.

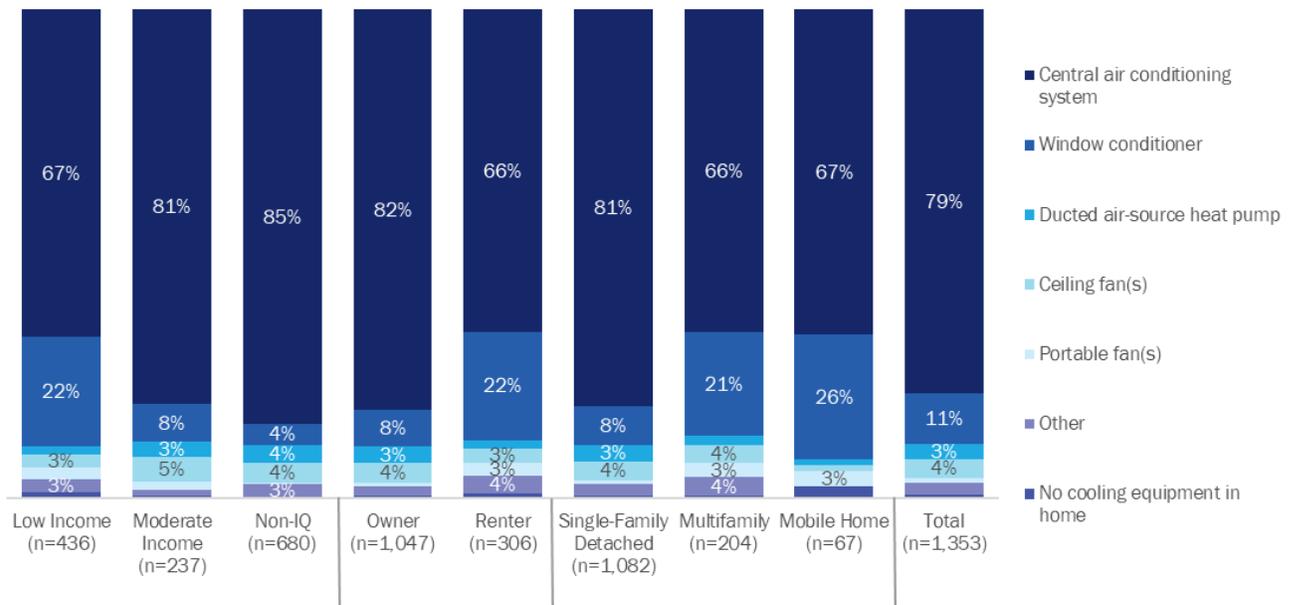
Figure 7. Primary Heating Equipment



Note: Estimates in figure exclude 'don't know' responses. Percentage labels <3% are not shown.

Although most customers in every core segment use central air conditioners to cool their home, substantial minorities of low income, renter, multifamily, and mobile home customers instead use window units (these groups are statistically more likely to use this cooling technology than their respective segment counterparts; Figure 8).

Figure 8. Primary Cooling Equipment



Note: Estimates in figure exclude 'don't know' responses. Percentage labels <3% are not shown.

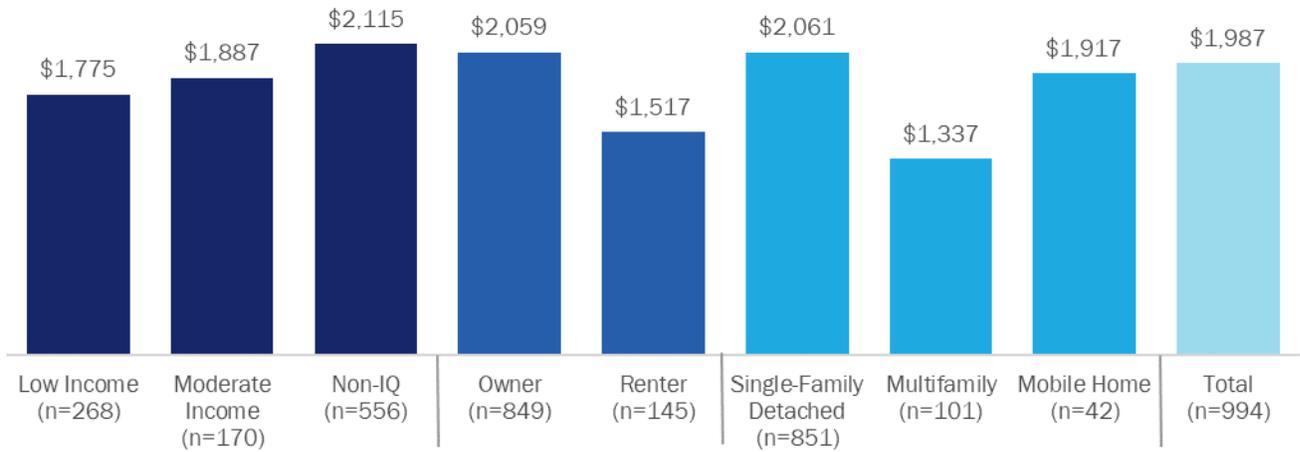
4.2 Energy Burden and Energy-Related Needs

4.2.1 Energy Costs

Non-IQ customers, homeowners, and/or those in single-family detached homes tend to have the highest energy costs, but mobile homes have a disproportionately high average cost for their size.

On average, AIC residential customers spent \$1,987 on household energy costs in 2020 (in total across all fuels, including: electricity, natural gas, and alternative fuels like wood and propane; Figure 9). Non-IQ customers, homeowners, and single-family detached customers tended to pay more for energy in 2020 than their historically disadvantaged counterparts. Higher energy bills among these groups are likely a function of housing size (see Figure 6), greater incidence of appliances and other energy using devices, and potentially a lesser likelihood of behavioral energy conservation. A key exception to this is mobile homes. Mobile home respondents, regardless of income status, had extremely high energy costs considering their smaller size; nearly the same average cost as much larger single-family homes. This is to be expected, as mobile homes are known within the energy industry to be particularly inefficient compared to single-family homes.

Figure 9. Average Total 2020 Household Energy Costs



Note: Estimates exclude customers with insufficient AIC billing data for calendar year 2020, alternative fuel users that were unable to provide annual fuel costs, and customers for whom we were unable to estimate non-AIC electric and natural gas costs.

Alternative fuel users (propane, wood, wood pellets) tend to spend more on energy each year than households that do not rely on these delivered fuels, with propane users demonstrating the highest annual energy costs.

Figure 10 exhibits average total 2020 household energy costs by fuels used in the home. Although electric-only households have the highest average electric bills, their total energy costs are the lowest of all fuel users. Additional analysis reveals electric-only households tend to be smaller in size with more limited incomes, thereby elucidating some reasons as to why electric-only households have the lowest average annual energy costs.

Figure 10. Average Total 2020 Household Energy Costs by Fuels Used in Home

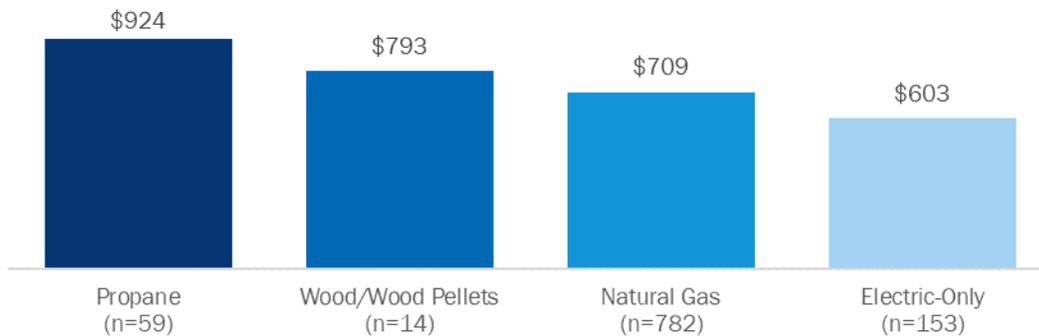


Note: Column values represent average annual household energy costs across all fuels. Other than electric-only, categories are not mutually exclusive. However, overlap is minimal: few households (1%) use more than one non-electric fuel type. Estimates exclude customers with insufficient AIC billing data for calendar year 2020, alternative fuel users that were unable to provide annual fuel costs, and customers for whom we were unable to estimate non-AIC electric and natural gas costs.

Electric-only homes tend to have more affordable energy bills regardless of home size

To explore whether the differences seen in Figure 10 were a function of the interrelationship between fuels used and home size (as electric-only homes skew smaller than others), we also calculated average energy costs per bedroom and analyzed these data by fuels used in the home (Figure 11). Even though electric-only homes tend to be smaller, they still cost less per bedroom to power.

Figure 11. Average Total 2020 Household Energy Costs per Bedroom by Fuel Use in Home



Note: Column values represent average annual household energy costs across all fuels. Other than electric-only, categories are not mutually exclusive. However, overlap is minimal: few households (1%) use more than one non-electric fuel type. Estimates exclude customers with insufficient AIC billing data for calendar year 2020, alternative fuel users that were unable to provide annual fuel costs, and customers for whom we were unable to estimate non-AIC electric and natural gas costs.

4.2.2 Energy Burden

In addition to assessing energy burden for the study’s core segments, we conducted exploratory analyses on energy burden trends; looking for demographic groups that suffer from greater energy burden and the housing characteristics that may contribute to energy burden. We examined energy burden in two ways: (1) through multivariate regression modeling; and (2) descriptively (i.e., statistical comparison of average energy burden across groups). This section summarizes and compares results from both methods. See Appendix B for detailed regression modeling results.

A Note on Interpreting Results

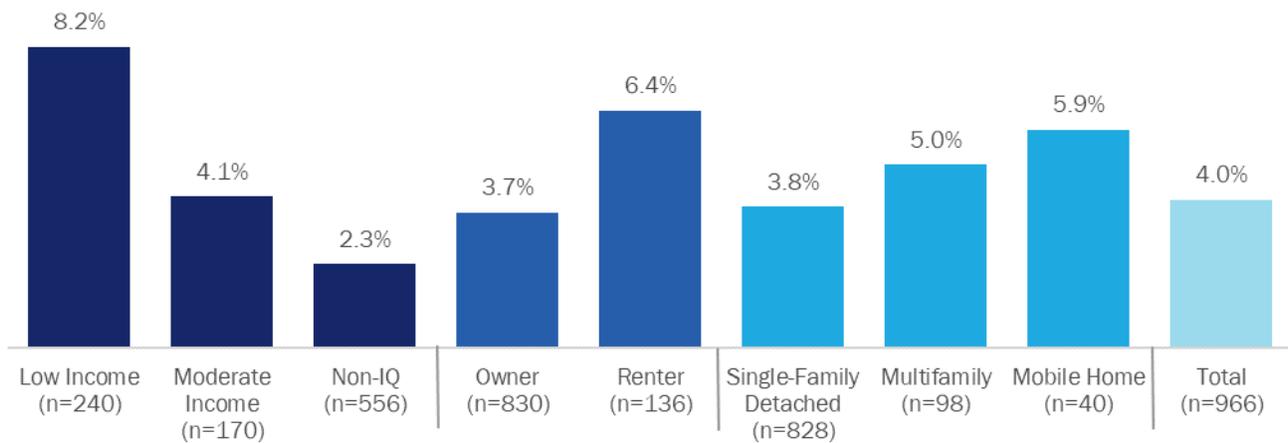
Multivariate regression modeling reveals that several demographic and housing factors are significantly related to energy burden – and the effect size of a given variable tends to be 2% or less when statistically controlling for other variables that also significantly predict energy burden. This reveals that a given group’s comparatively higher energy burden is not simply a function of membership in that group alone; and there are other interrelated factors that cumulatively result in higher energy burden amongst households in that group. Nonetheless, the descriptive (non-modeled) results are still real and valuable. Collectively, these results expose which demographic groups, housing types, and technologies could be targeted for program interventions, as these groups tend to experience higher energy burden due to the culmination of all the coexisting drivers of energy burden.

Results

Low income customers, renters, and mobile home customers have the highest energy burdens.

As seen in Figure 12, energy burden is not evenly experienced by AIC’s residential customers. On average (across the entire residential customer base), customers spend 4% of their annual income on household energy bills.¹³ However, as expected, as incomes get lower (and/or as energy costs get higher), customers experience greater levels of energy burden. Regardless of income, among the core segments analyzed, renters, customers in mobile homes, and customers in multifamily units had above-average energy burdens (i.e., above 4%). For low and moderate income customers, renters, and multifamily residents, energy burden is largely driven income: although they tend to spend comparatively less on energy (see Figure 9), they tend to have lower income. Mobile home residents, on the other hand, suffer on both sides of the energy burden equation: they have some of the lowest average incomes and yet some of the highest average annual energy costs despite being some of the smallest dwellings.

Figure 12. Average Energy Burden, by Core Segment



Home age and primary HVAC type are strong predictors of greater energy burden.

Outside of energy burden calculation inputs (i.e., energy costs and income), there are several other factors that collectively serve as predictors of energy burden (most of which are correlated with energy costs and/or income). We performed multivariate regression analysis to test whether other characteristics, other than income, were statistically significant predictors of increased energy burden.¹⁴ This analysis confirmed that the housing characteristics shown above in Figure 12 are significant predictors of energy burden and that, additionally, home age (Figure 13) and certain types of primary heating and cooling sources (Figure 14) are also significant predictors. The older the home, the greater the average energy burden. Further, customers

¹³ As seen in ACEEE’s 2018 energy burden research, the East North Central region (of which Illinois is a member) has moderate energy burdens for the U.S., with New England and East South Central regions having the highest and Mountain and Pacific regions having the lowest. Since ACEEE’s study uses median energy burden values, the results in that study are not directly comparable to those presented here (per this research, median energy burden for all AIC customers is 2.8%).

<https://www.aceee.org/sites/default/files/publications/researchreports/u1806.pdf>

¹⁴ We used multivariate linear regression to predict energy burden. Multivariate regression is a statistical method for assessing relationships, while controlling for potential interrelated factors. Specifically, our model assessed what housing and demographic factors are related to energy burden.

conditioning their homes with portable/window air conditioners or boilers experience significantly greater energy burden than those using other equipment types.¹⁵

Figure 13. Average Energy Burden, by Housing Vintage

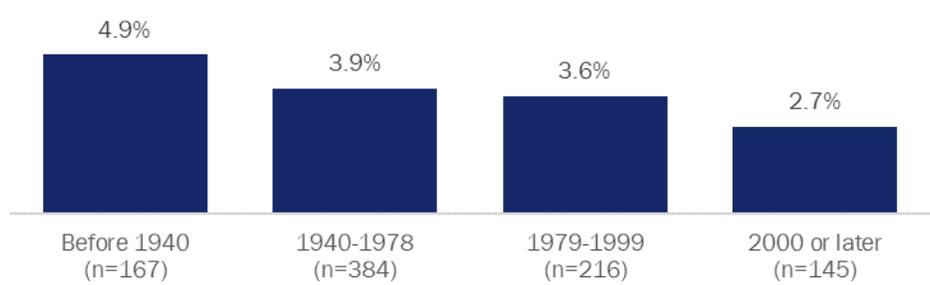
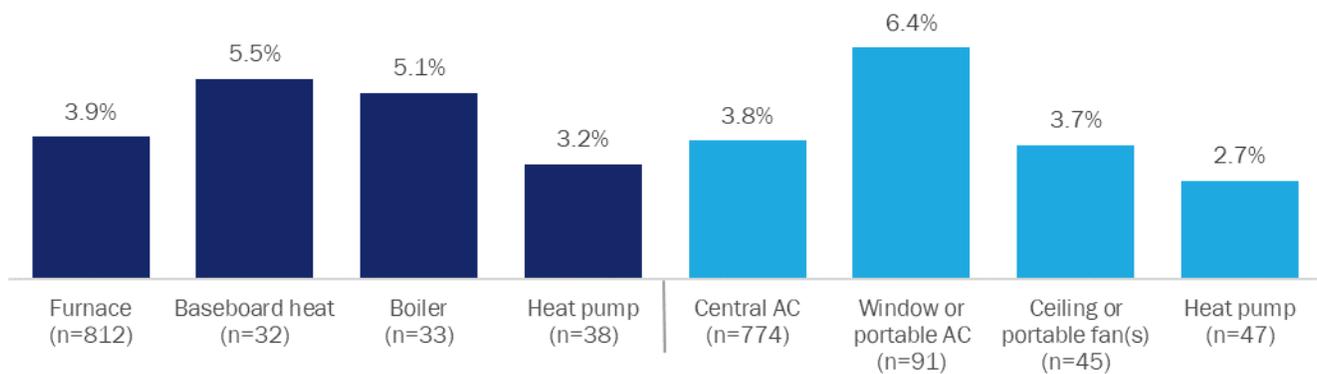


Figure 14. Average Energy Burden, by Primary Heating and Cooling Sources



The regression model predicts that, after controlling for other factors, homes with window/portable air conditioners have 0.9% higher energy burden than homes with other cooling technology types; yet the descriptive (non-modeled) results above demonstrate that homes with window/portable air conditioners have about 3% greater energy burdens, on average, than homes with other cooling sources. The difference between modeled and descriptive results reveals that higher energy burden among window air conditioner users is not simply a function of that variable alone. Specifically, we observe disproportionately lower incomes in homes with window/portable air conditioner (see Figure 8). As such, part of the energy burden difference between homes with and without window/portable air conditioners is likely a function of the income disparity between these groups. However, the regression modeling reveals that, when controlling for other factors like income, window/portable air conditioners further increase energy burden by nearly 1%.

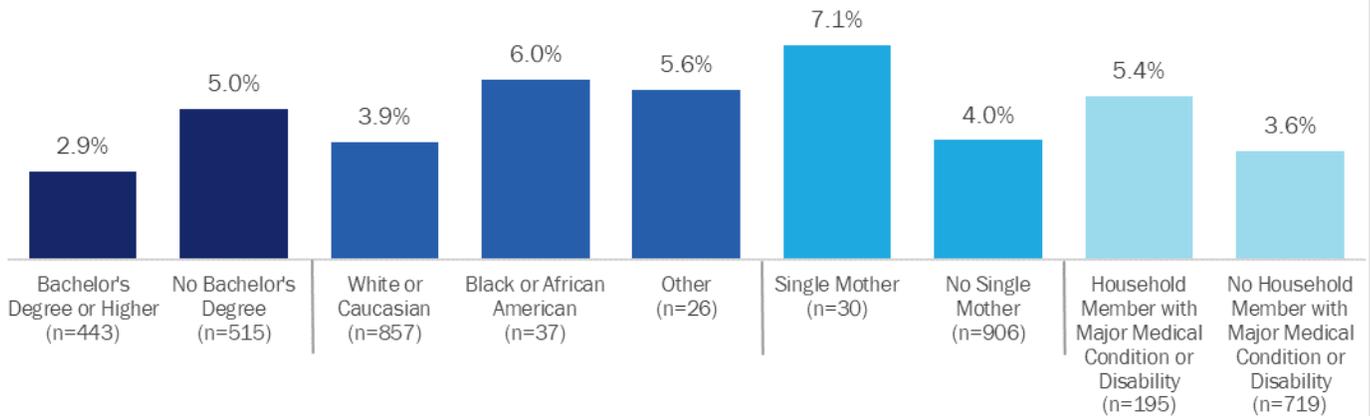
Energy burden has a statistically significant relationship with several key demographics.

In addition to certain housing characteristics, key demographic traits are also significant predictors of energy burden. As seen in Figure 15, Black respondents, households with a disabled resident, respondents without a

¹⁵ Although baseboard heaters are also associated with similarly high levels of energy burden as boilers, other confounding factors have better explanatory power when modeling root causes of energy burden. This suggests that other interrelated factors (such as overrepresentation of baseboard heat among low income customers) explain why customers with baseboard heat experience higher energy burden. Despite lacking a causal relationship to energy burden, these results reveal that baseboard heaters are a good target for alleviating energy burden.

bachelor's degree, and single mothers¹⁶ tend to have significantly greater energy burdens than white respondents, households without disabilities, college-educated customers, and other parental structures, respectively.¹⁷

Figure 15. Average Energy Burden, by Demographic Groups



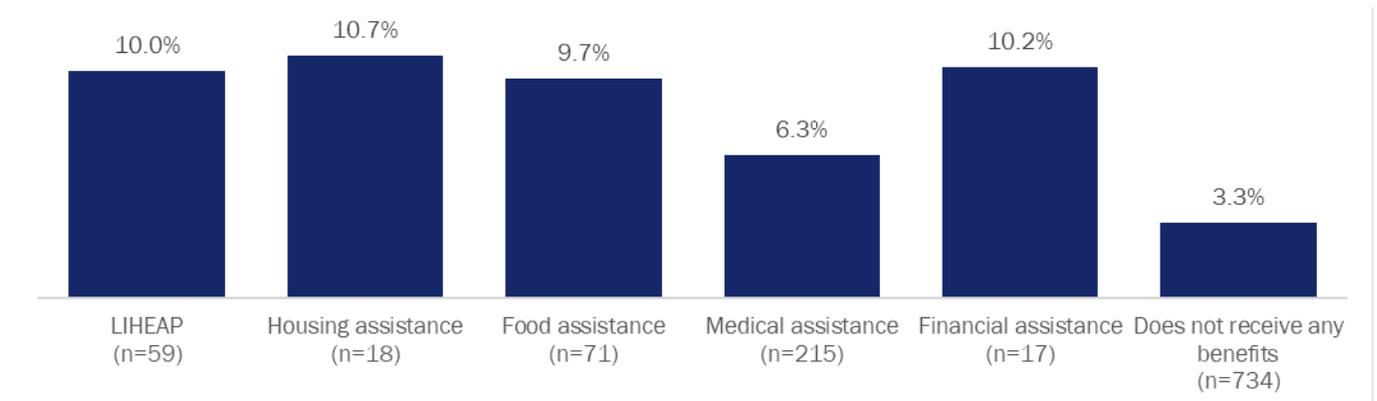
The regression model demonstrates that, after controlling for other factor (e.g., education, housing type, etc.), race is not a significant predictor of energy burden. However, in the descriptive (non-modeled) results above, we see that White customers have significantly lower energy burden than Black and other non-White customers. Again, this finding reveals that race alone is not at the root of racial disparities in energy burden; rather, other factors that exaggerate energy burden disproportionately impact Black and non-White customers. **Customers that receive public benefits or assistance continue to have particularly high energy burdens despite the assistance, including those enrolled in utility bill payment assistance through LIHEAP.**

Figure 16 shows standard energy burden average for customers who receive some type of public benefit or assistance. After accounting for the monetary value of these benefits, customers receiving public assistance demonstrate modified energy burden values that are much larger than the standard energy burden of most other groups studied (Figure 17). Amongst these groups, those who are enrolled in LIHEAP had the highest modified energy burden, on average. This suggests that LIHEAP assistance is not enough to fully address energy burden for these customers.

¹⁶ There was insufficient sample to investigate single fathers.

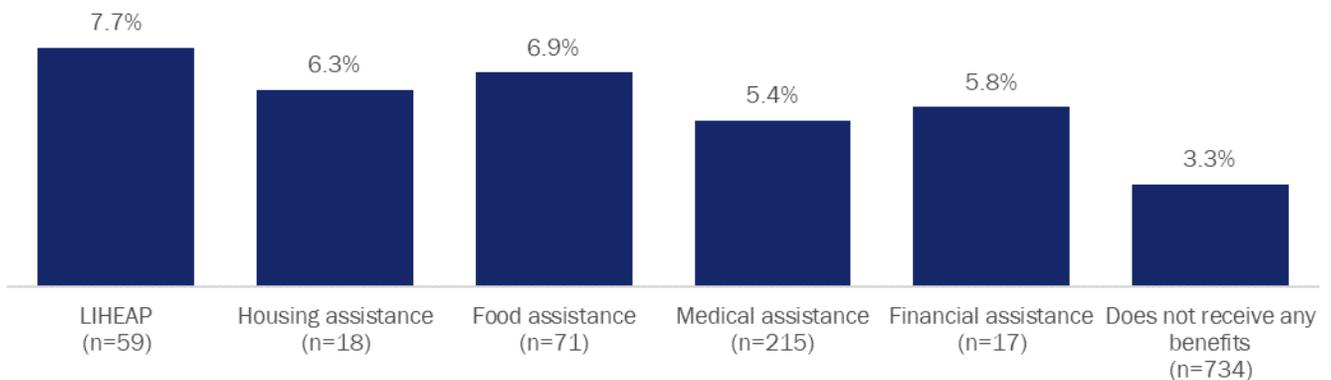
¹⁷ Although average energy burden varies by race and single motherhood, regression modeling suggests other intercorrelated factors (e.g., housing characteristics, income, etc.) are the causal mechanisms behind racial and familial disparities in energy burden.

Figure 16. Average Energy Burden, by Public Assistance Received



Note: Multiple responses allowed.

Figure 17. Average Modified Energy Burden, by Public Assistance Received

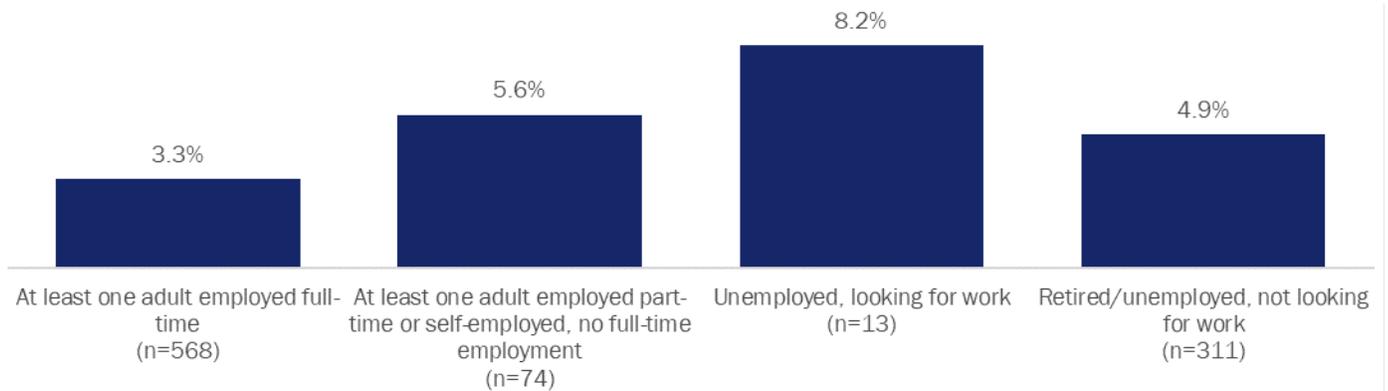


Note: Multiple responses allowed.

Stable employment is linked to lower levels of energy burden.

Not surprisingly, those who are unemployed and looking for work have higher average energy burden (Figure 18). Additionally, we also found that those reporting difficulties paying any bills – especially AIC bills – have higher average energy burdens than those not reporting any difficulties.

Figure 18. Average Energy Burden, by Employment Status



There are certain demographics and home characteristics that, surprisingly, are not correlated with energy burden in this study. The lack of energy burden differences in fuels used speaks to income trends associated with more expensive fuels.

The researchers exhaustively searched the data for group differences in and drivers of energy burden. Notably, the following did *not* significantly predict energy burden:

- Awareness or participation in AIC programs (including the online marketplace)
- Fuels used
- Self-reported infiltration issues
- Children or seniors present in the home
- Veteran status¹⁸
- Social security recipients¹⁹

The lack of energy burden differences between various fuel users is somewhat surprising, given the significant differences in average annual energy costs by fuel type observed in Figure 10. Additional analysis reveals a strong correlation between fuel use and income: those using alternative fuels tend to have the greatest incomes, followed by natural gas users, with electric-only customers having the lowest average incomes. Thus, fuels associated with higher energy bills tend to be concentrated within comparatively more affluent customer groups, thereby diminishing the relationship between fuel types used and resulting energy burden.

¹⁸ Although those identifying as veterans (per those that said they receive VA payments) had similar energy burdens as non-veterans, the small veteran sample size (n=28) limits the confidence we have in this null finding. Additional research is warranted.

¹⁹ Although social security recipients exhibited statistically greater energy burdens than non-recipients (4.5% vs. 3.8%), the difference is arguably too minimal to justify targeting efforts.

4.2.3 Energy Payment Assistance

More than half of respondents who likely qualify for energy bill payment assistance do not receive it; and only about a third are aware of the assistance. Homeowners are especially unaware.

Among customers who qualify for the LIHEAP and the associated Percentage of Income Payment Plan (PIPP), less than two-thirds (61%) are aware of these financial relief services (Figure 19).²⁰ Awareness varies by homeownership status, with renters demonstrating significantly greater awareness than homeowners.

Figure 19. Awareness of LIHEAP/PIPP, by Homeownership Status

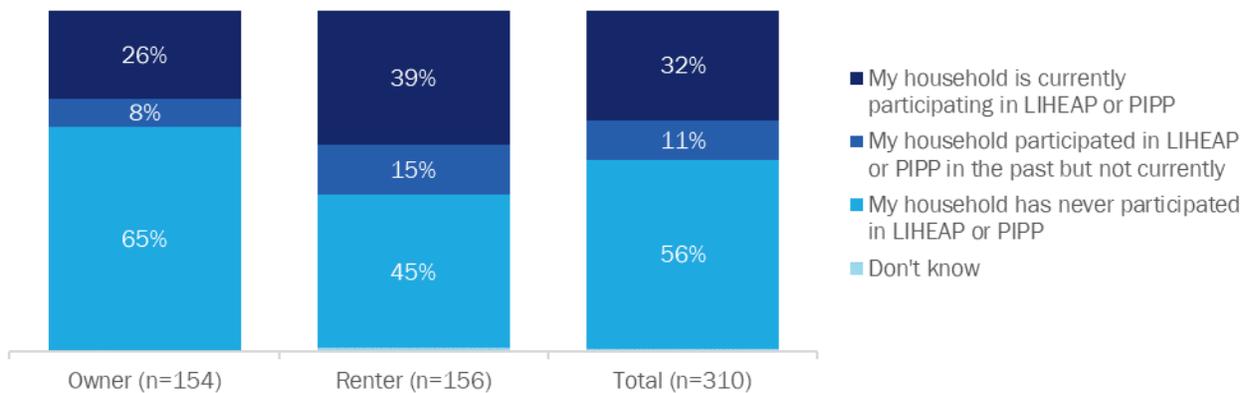


Note: Figure represents responses among customers who qualify for LIHEAP/PIPP. LIHEAP participants were automatically coded as “aware.”

LIHEAP is underutilized by qualifying households, especially eligible homeowners.

Less than half (43%) of LIHEAP/PIPP-eligible customers are current or past participants, with renters being more likely to participate than qualifying homeowners (Figure 20). Lack of LIHEAP/PIPP awareness among qualifying non-participant households is the primary barrier limiting participation.

Figure 20. Participation in LIHEAP/PIPP, by Homeownership Status



Note: Figure represents responses among customers who qualify for LIHEAP/PIPP. LIHEAP participants were automatically coded as “currently participating in LIHEAP.” Percentage labels <3% are not shown.

²⁰ Since this study covers the 2020 calendar year, we used the 2020 LIHEAP eligibility criteria of at or below 150% FPL to assess LIHEAP eligibility. LIHEAP eligibility criteria has since been raised to at or below 200% FPL. See current guidelines here: <https://www2.illinois.gov/dceo/CommunityServices/UtilityBillAssistance/Pages/HowtoApply.aspx>

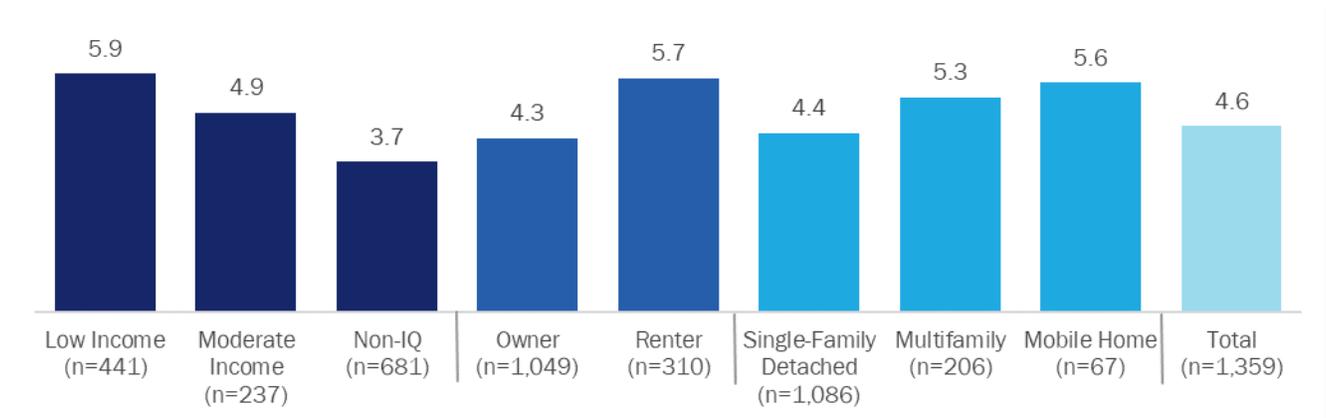
4.3 Economic Hardship

We also constructed a measurement of “lived economic hardship” as energy costs and energy burden alone fail to demonstrate the lived experience associated with high energy bills. The economic hardship metric is an index that measures a household’s financial difficulties. This metric uses a 0 to 10 scale, where higher values demonstrate greater levels of economic hardship. Additional details on the economic hardship methodology are provided in Appendix C.

Economic hardship trends are highly similar to energy burden trends across all core segment analyses.

As expected, the lower the income, the greater the lived economic hardship (Figure 21). Similarly, we observe significantly higher levels of economic hardship among renters, multifamily residents, and mobile home customers. Additional analysis reveals that those receiving governmental financial assistance (e.g., LIHEAP, Medicaid, etc.) experience significantly greater economic hardship than those that do not receive such assistance; hardship is greatest among those reporting receiving housing assistance (the average hardship score is 7.1).

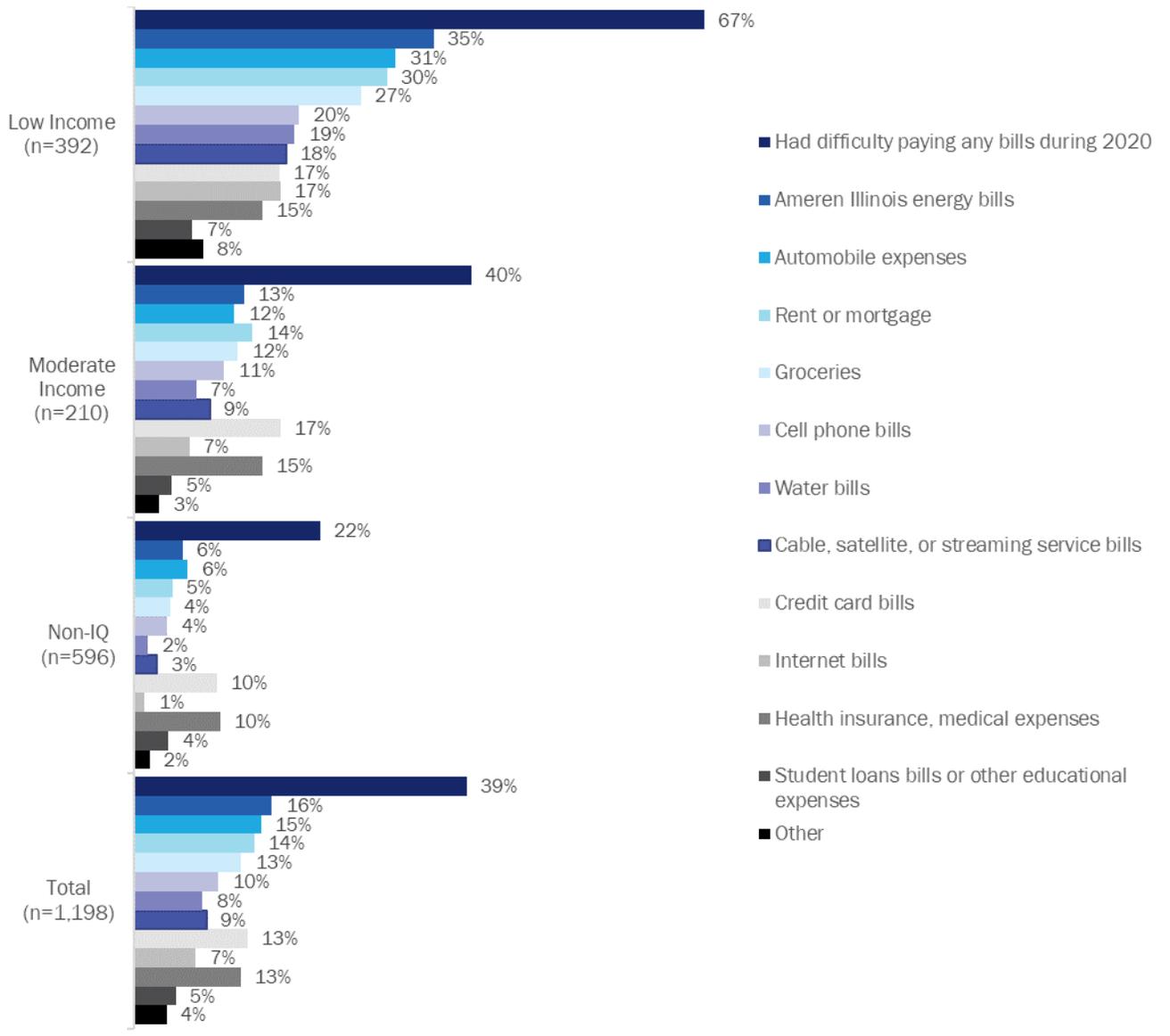
Figure 21. Average Economic Hardship Score



IQ customers reported difficulties paying their AIC bill more often than any other type of bill.

Corroborating economic hardship results, income is strongly correlated with difficulty in paying bills: the lower the income status, the greater the likelihood of struggling to pay bills (Figure 22). Strikingly, the number one bill or expense that low income customers struggled to pay was their AIC bill, followed by automobile expenses, rent or mortgage, and groceries. Although moderate income and non-IQ customers occasionally struggled to pay certain bills, difficulty in paying their Ameren Illinois bill was not nearly as prominent for these groups; instead, credit cards and medical expenses were the most common bills these income groups said they sometimes struggled to pay.

Figure 22. Difficulty Paying Bills by Income Status



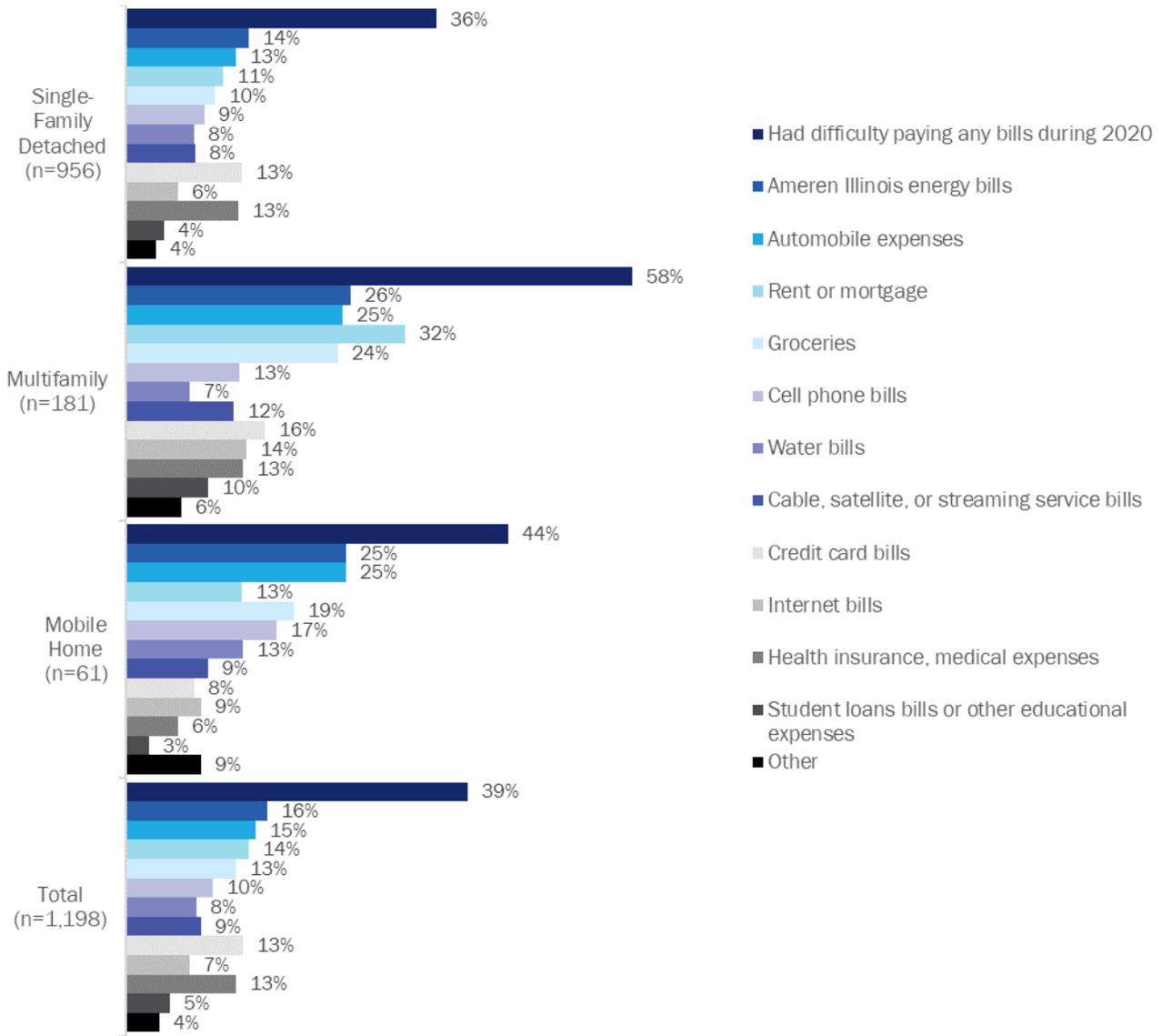
Note: Multiple responses allowed. Estimates in figure exclude 'prefer not to answer' responses.

Of all core segments, multifamily residents and renters in general demonstrated the greatest difficulty paying bills over the course of 2020.

Housing type is also related to difficulty paying bills, with multifamily residents exhibiting the greatest struggle, followed by customers living in mobile homes (Figure 23). The data reveals that specific bill difficulties are uniquely tied to housing type: multifamily dwellers (which are mostly renters) exhibit the greatest difficulty in paying their monthly housing costs, whereas those living in mobile homes (a particularly low cost housing solution with high rates of home ownership) were comparatively less than half as likely to cite housing costs when noting which bills they struggled to pay in 2020. However, both multifamily and mobile home residents were similarly likely to say they had difficulty affording Ameren Illinois bills, groceries, and automobile

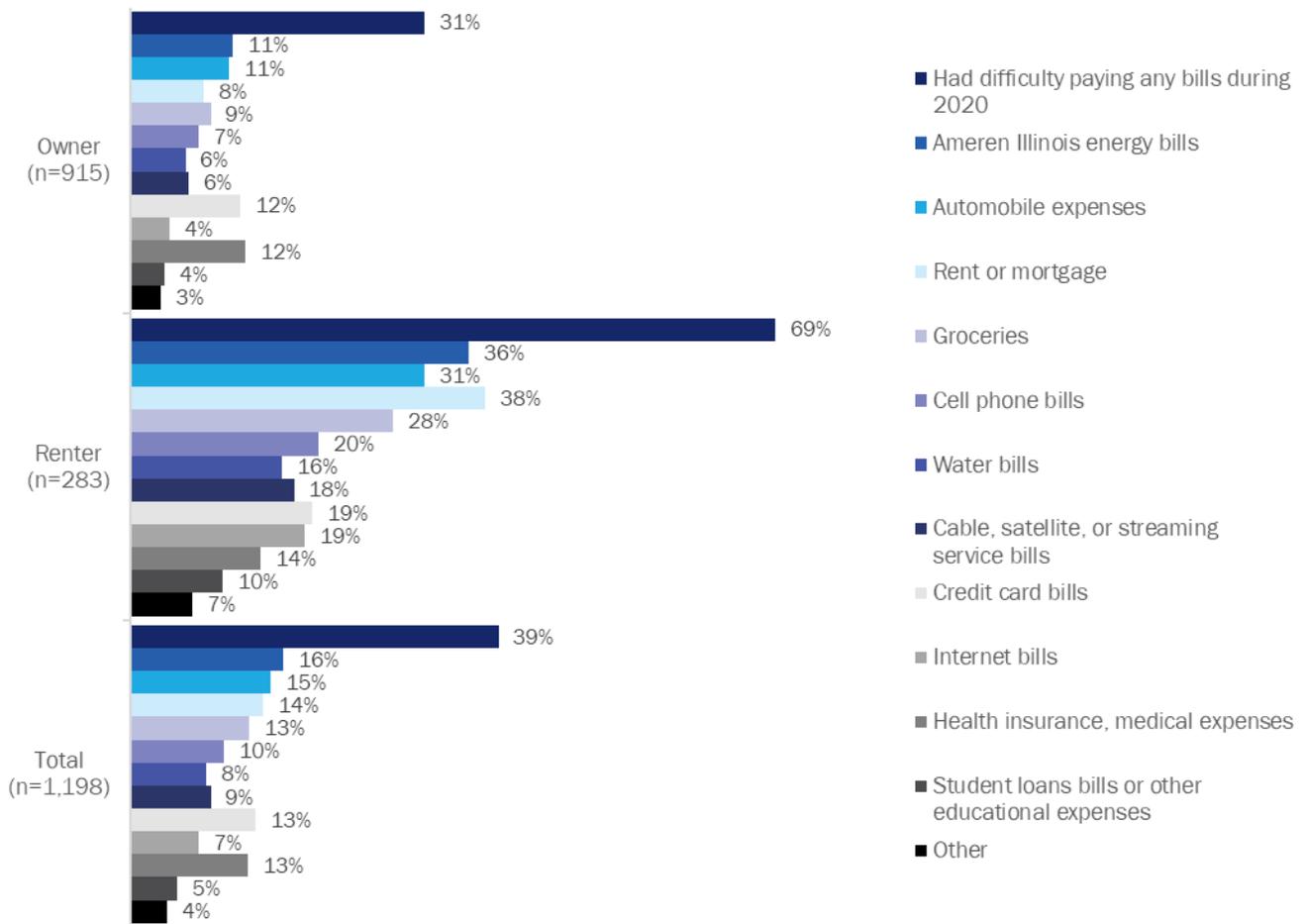
expenses. Renters demonstrated much greater difficulty paying bills compared to homeowners (Figure 24). Renters exhibited the greatest struggle with housing costs and Ameren Illinois bills, followed by automobile expenses and groceries.

Figure 23. Difficulty Paying Bills by Housing Type



Note: Multiple responses allowed. Estimates in figure exclude 'prefer not to answer' responses.

Figure 24. Difficulty Paying Bills by Home Ownership Status

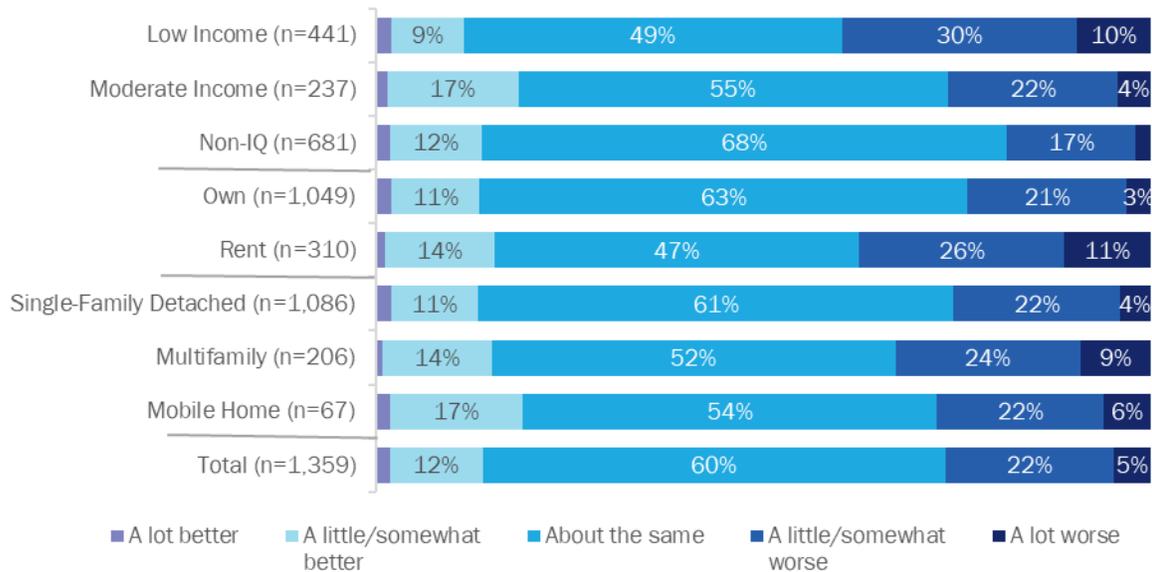


Note: Multiple responses allowed. Estimates in figure exclude ‘prefer not to answer’ responses.

The COVID-19 pandemic has had a drastic impact on a small but highly vulnerable subset of AIC customers.

Across all core customer segments, the majority of customers said their financial situation is similar or better since before the COVID-19 pandemic began (Figure 25). However, financial buoyancy was not evenly distributed, with low income customers and renters being the most likely to indicate at least a modest change for the worse (cited by roughly two in five members in either group). Additional analysis reveals that the COVID-19 pandemic is intricately linked to economic hardship (likely making an already bad situation worse): after controlling for differences by housing type, income, and homeownership status, those reporting greater negative changes to their financial situation since the onset of the pandemic are linked with significantly greater levels of economic hardship.

Figure 25. COVID-19 Impacts to Household Financial Situation



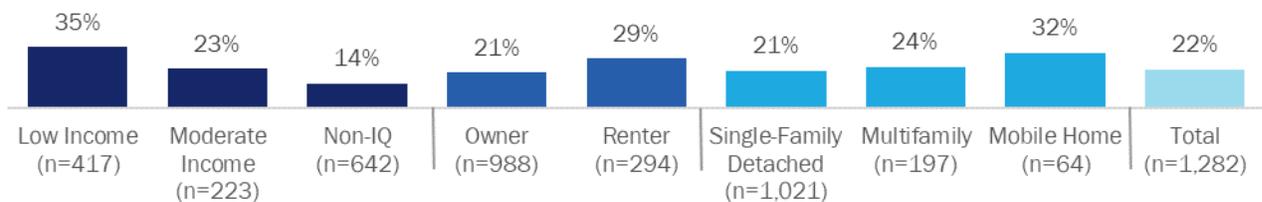
Note: Percentage labels <3% are not shown.

4.4 Health, Comfort, and Safety

Income is a powerful predictor of health outcomes, with lower income customers being most likely to suffer from major medical problems or greater levels of health hardship.

The lower the household’s income, the greater the likelihood that a household member has a major medical condition or a disability; with over one-third of low income customers mentioning a disabled household member (Figure 26). Renters are also more likely to have disabled household members. Conversely, disability status is not strongly differentiated by housing type.

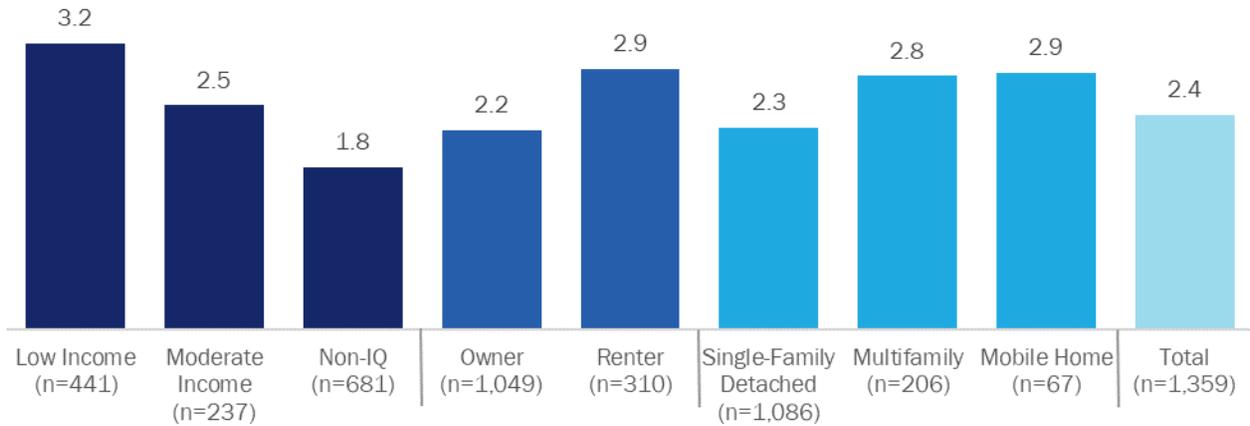
Figure 26. Customers with a Household Member with a Major Medical Condition or Disability



Note: Estimates in figure exclude ‘prefer not to answer’ responses.

Using several survey questions, we constructed a composite metric that measures health hardship. This metric measures general well-being on a scale of 0 (minimum health hardship) to 10 (maximum health hardship). The health hardship results (Figure 27) resemble those in the energy burden analysis: the greater the income, the lesser the health hardship

Figure 27. Average Health Hardship Score

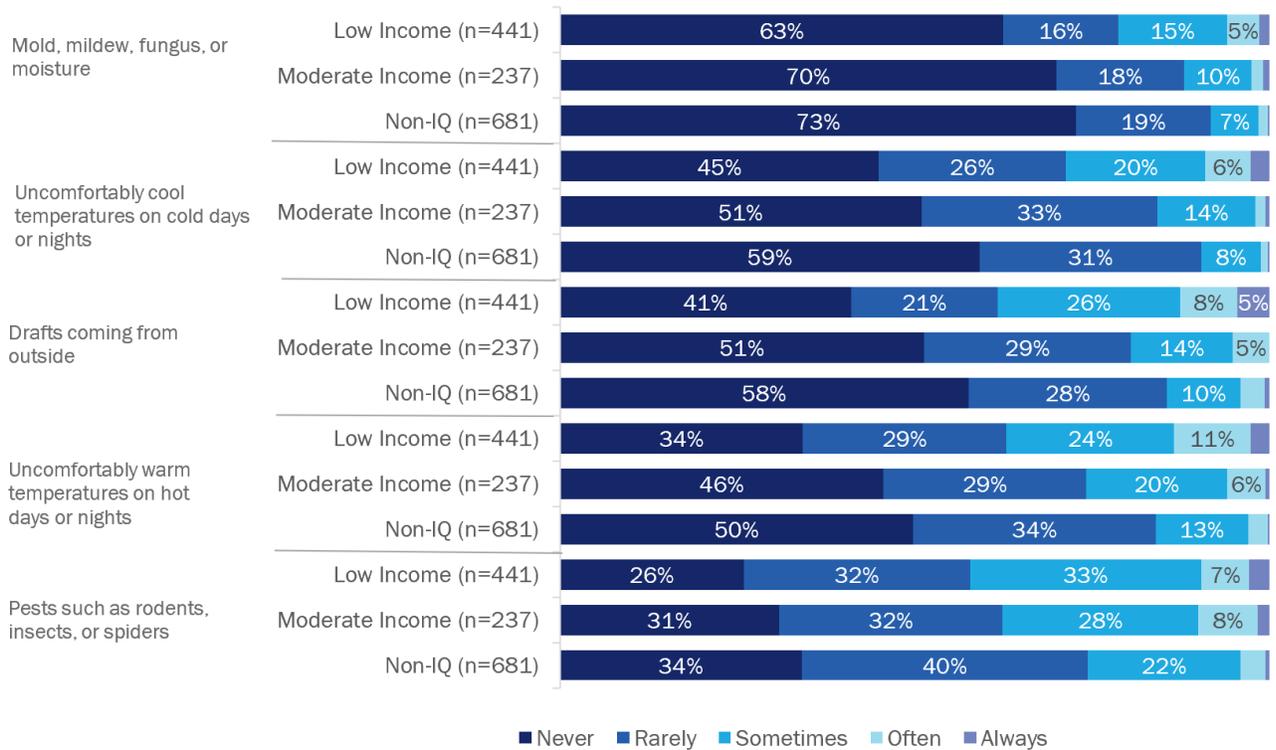


Additional analysis reveals that, regardless of disability status, the lower the income, the greater health hardship experienced; revealing that greater likelihood of disabilities in low income households is not the sole driver of health hardship in low income households. Although renters and multifamily residents exhibited significantly greater levels of health hardship than owners and customers in single-family detached dwellings, respectively, additional statistical analysis reveals that these relationships disappear when we control for income and disability status; i.e., these groups tend to have lower average income and disabled household members more often, which are the bigger drivers of higher health hardship among these groups.

IQ customers are more likely than non-IQ customers to experience health, comfort, or safety (HCS) concerns stemming from the quality of their home, with building shell issues being the most common.

Home-related HCS hazards are strongly differentiated by income status, with most measured hazards demonstrating a linear relationship with income: the lower the income, the greater the frequency of the in-home HCS hazard (Figure 28). A small, but significant number of low income customers experience mold/mildew and pest problems “sometimes”, “often”, or “always”. Depending on the severity of these issues, such HCS hazard can cause IQ Initiative project deferral, presenting a major barrier to participation.

Figure 28. Frequency of In-Home Health, Comfort, and Safety Hazards by Income Status

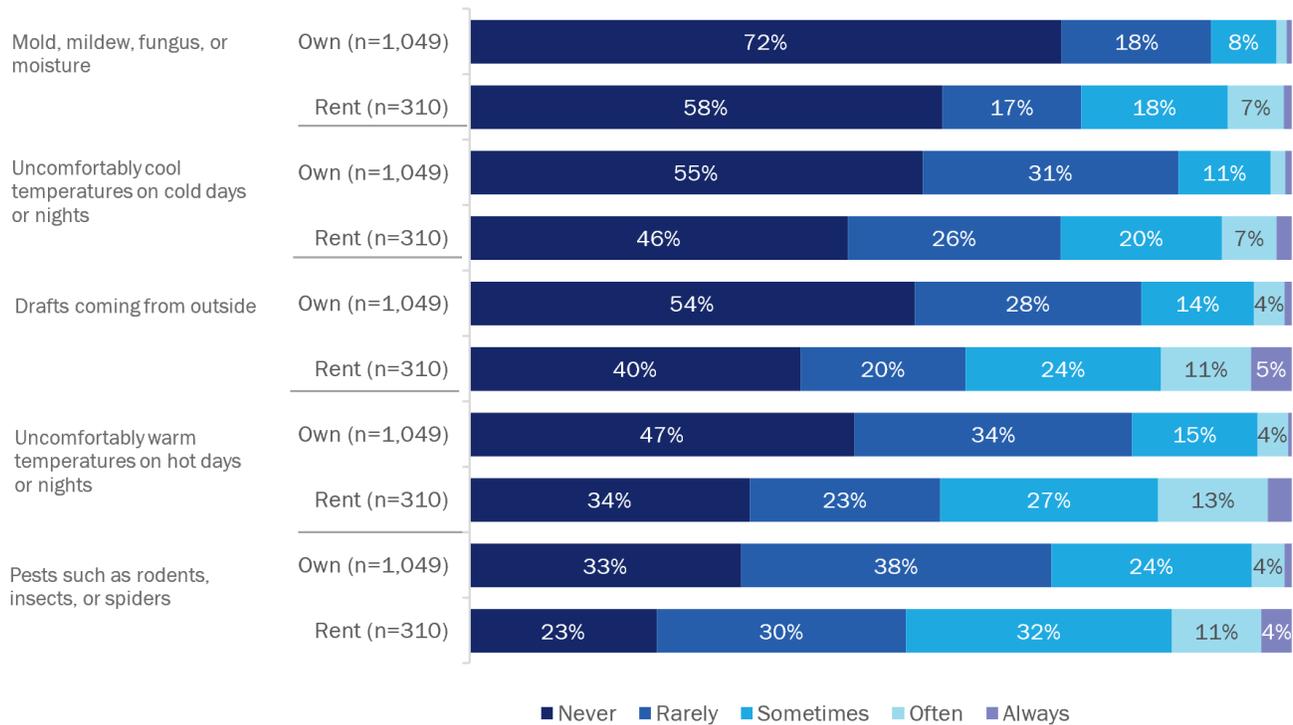


Note: Percentage labels <3% are not shown. The survey question informing this figure reads: “During the last year, how often, if at all, did you or a household member experience any of the following inside your home?”

Across all measured HCS indicators, renters experience significantly more frequent HCS hazards than owner occupants.

HCS hazards are especially frequent among renters, with pests being particularly common (Figure 29). Although the least frequent HCS hazard, the largest owner/renter disparity is in instances of mold, mildew, fungus, or moisture: renters are 1.5 times more likely to experience these indoor air quality issues than homeowners.

Figure 29. Frequency of In-Home Health, Comfort, and Safety Hazards by Homeownership Status

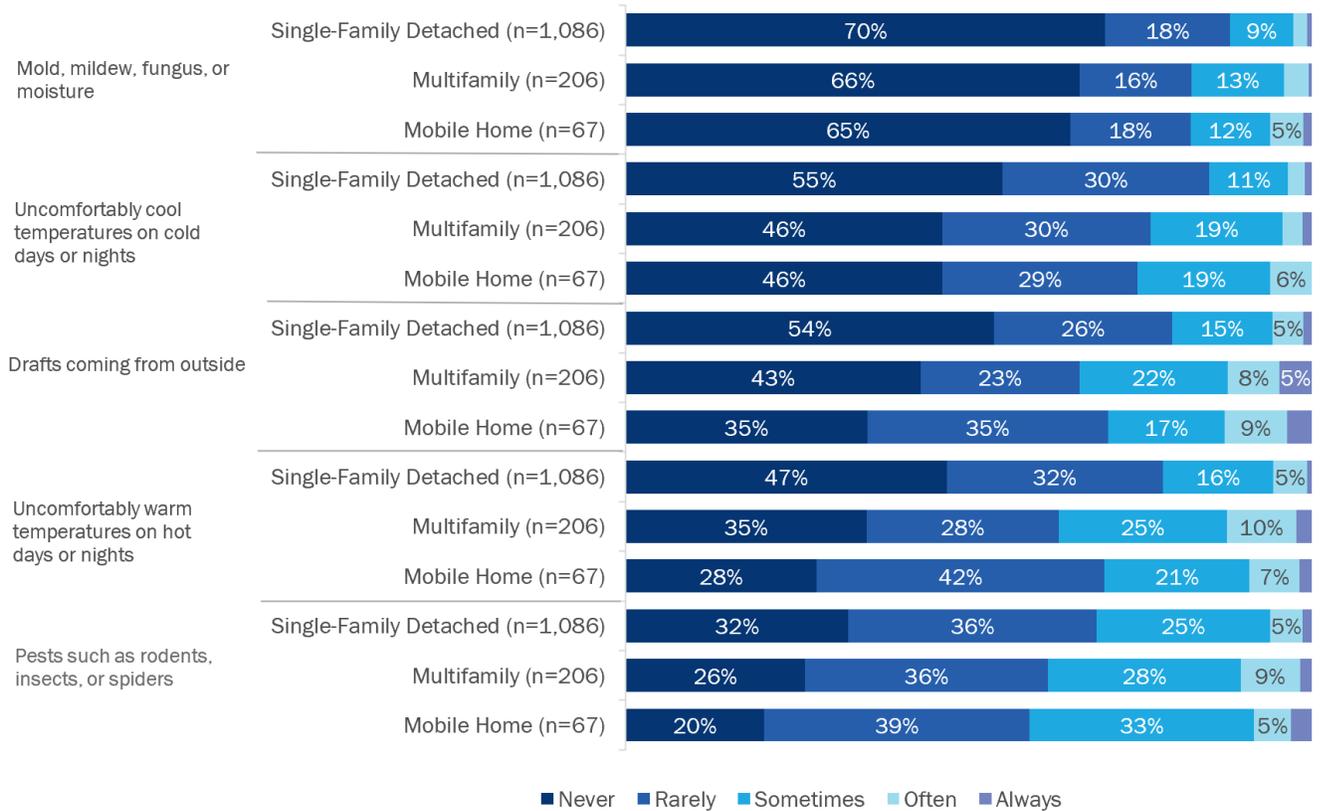


Note: Percentage labels <3% are not shown. The survey question informing this figure reads: “During the last year, how often, if at all, did you or a household member experience any of the following inside your home?”

When assessing HCS by housing type, multifamily properties and mobile homes have the greatest HCS remediation needs.

Compared to those in single-family homes, mobile home and multifamily residents report greater frequency of uncomfortably warm temperatures and drafts. Further, multifamily customers also experienced more uncomfortably cool temperatures and pests than single-family households (Figure 30).

Figure 30. Frequency of In-Home Health, Comfort, and Safety Hazards by Housing Type

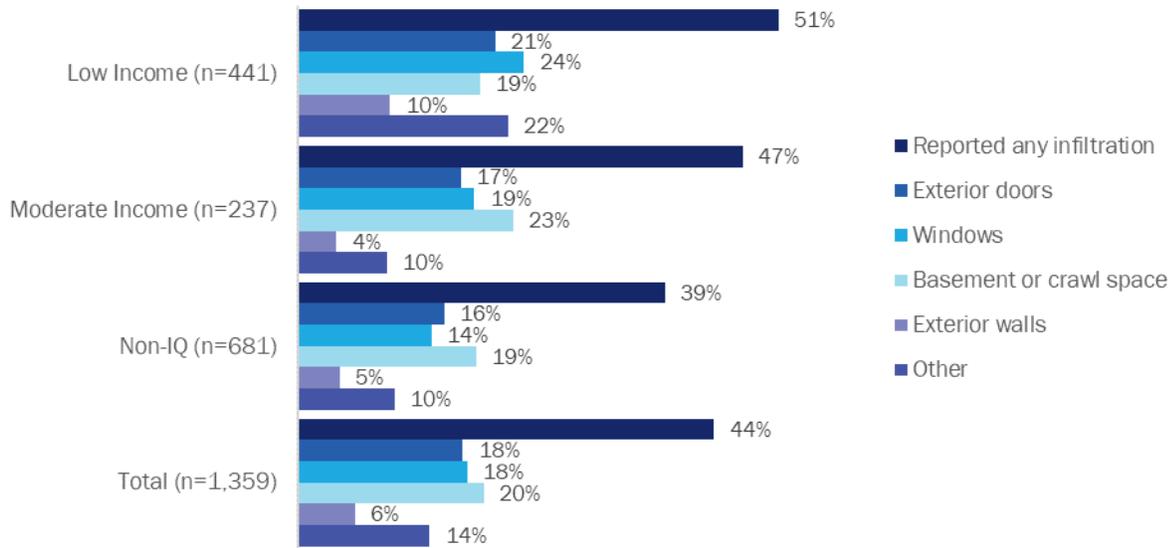


Note: Percentage labels <3% are not shown. The survey question informing this figure reads: “During the last year, how often, if at all, did you or a household member experience any of the following inside your home?”

About half of customers report infiltration issues in their home, especially IQ customers, multifamily units, mobile homes, and renters. Leaky doors and windows are particularly problematic.

Per survey results, low income household infiltration is most commonly stems from holes or gaps in and around exterior doors, windows, and basements/crawlspace (Figure 31). Compared to non-IQ customers, low income customers were statistically more likely to report any infiltration problems, namely with their roof, exterior walls, windows, and floor.

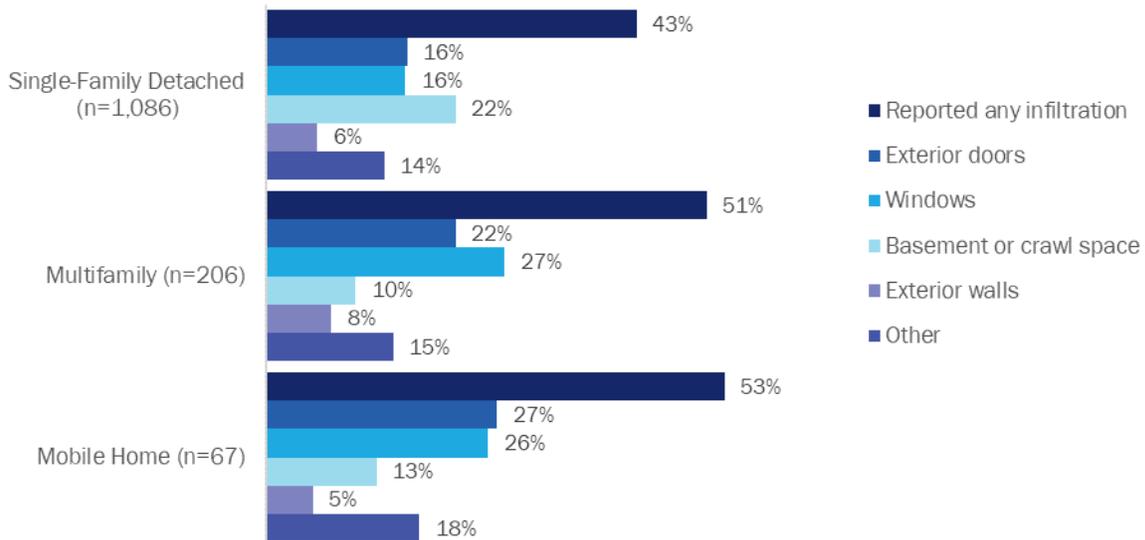
Figure 31. Infiltration Issues by Income Status



Note: Multiple responses allowed.

Infiltration problems are fairly evenly shared across AIC’s residential housing stock; however, about twice as many multifamily residents mentioned leaky windows compared to single-family customers (Figure 32).

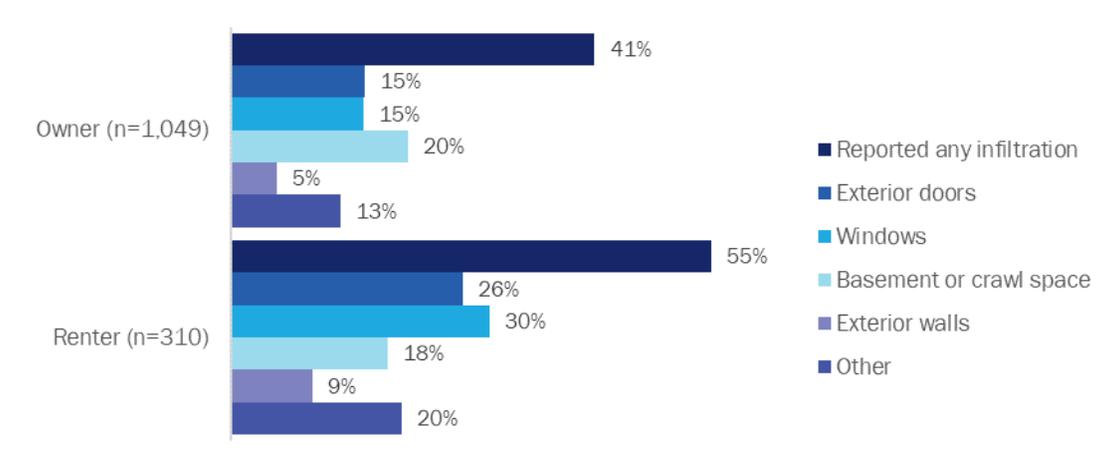
Figure 32. Infiltration Issues by Housing Type



Note: Multiple responses allowed.

Renters experienced significantly more infiltration issues than owners, with renters being about twice as likely to mention leaks, holes, or gaps in their exterior walls, doors, or windows (Figure 33).

Figure 33. Infiltration Issues by Homeownership Status



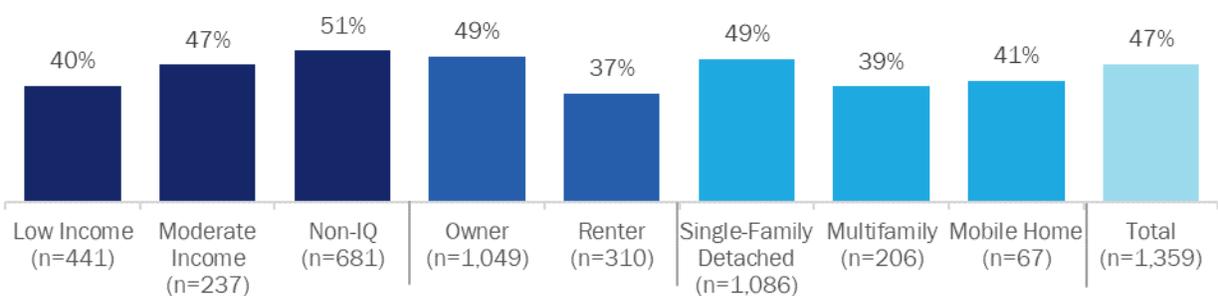
Note: Multiple responses allowed.

4.5 Barriers to Participation in the IQ Initiative

More affluent groups are more likely to know of AIC’s energy efficiency offerings.

About half of residential customers are aware of AIC’s energy efficiency offerings, however low income customers and renters are significantly less aware of these offerings compared to other groups (Figure 33).

Figure 34. General Awareness of AIC Energy Efficiency Programs



Note: Proportions above represent the percent that said “yes” to the following survey question: *Are you aware that Ameren Illinois offers free, discounted, and rebated energy efficient products like light bulbs, smart thermostats, air conditioners, furnaces, and appliances?*

Lack of awareness is the primary barrier limiting participation in AIC energy efficiency offerings in general; and particularly the Online Marketplace.

Only about one-sixth of residential customers said they have received free, discounted, or rebated energy-efficient products through AIC since moving into their current home, with traditionally advantaged groups (non-IQ, homeowners, single-family homes) being the most likely to participate in any of AIC’s efficiency programs (Figure 35). Additional analysis reveals that housing type participation gaps are largely a function of

homeownership: once we control for homeownership status, there is no significant difference in participation by housing type. This analysis also exposes that moderate income customers are particularly underserved: once housing type and homeownership status are controlled for, moderate income customers are nearly half as likely than other customers to have participated in an AIC program, but low income customers demonstrate statistically similar participation levels as non-IQ households. Renters are much less likely to have participated, which is driven by a lack of awareness and, most likely, circumstances common to renting: transience and a lack of control or decision-making power over upgrades.

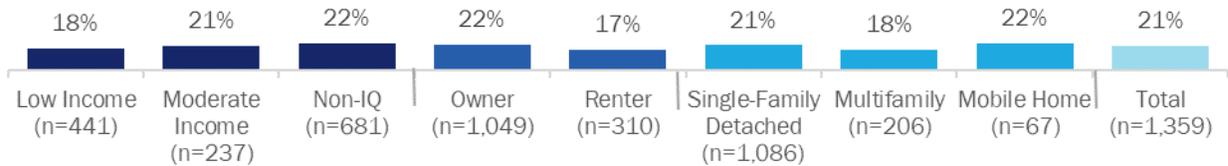
Figure 35. Participated in Any AIC Energy Efficiency Program



Note: The survey question informing this figure reads: “Have you received any free, discounted, or rebated energy efficient equipment, appliances, or products through Ameren Illinois since you’ve lived at [ADDRESS]?”

Compared to general awareness of AIC energy efficiency offerings, about half as many residential customers are specifically aware of AIC’s online marketplace (Figure 36). Marketplace awareness is similarly low across all core segments.

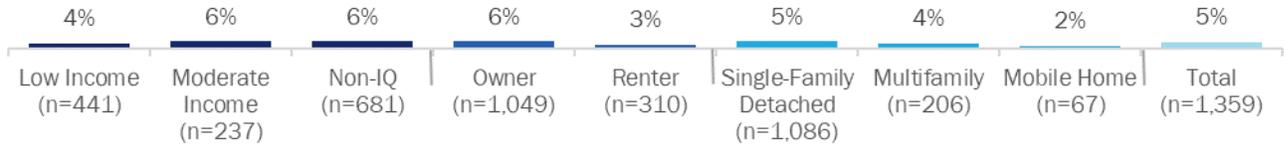
Figure 36. Awareness of AIC Online Marketplace



Note: The survey question informing this figure reads: “Are you aware that Ameren Illinois has an Online Marketplace where customers can purchase discounted energy efficient products like smart thermostats, LED lighting, and air purifiers?”

Very few residential customers said they have ever purchased anything on AIC’s online marketplace (Figure 37). Marketplace purchasing behavior is similarly rare across all core segments.

Figure 37. Made Purchase on AIC Online Marketplace

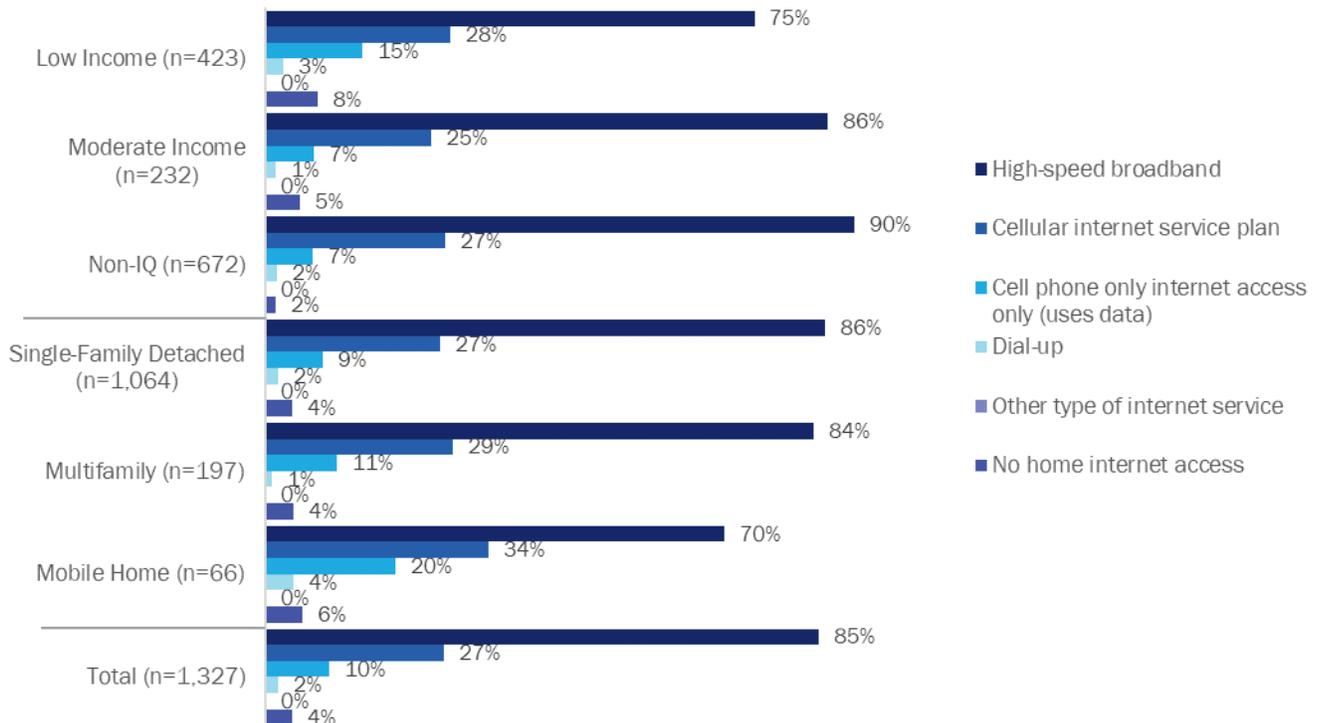


Note: The survey question informing this figure reads: “Have you ever purchased any energy efficient products from the Ameren Illinois Online Marketplace?”

Internet access does not appear to be a common barrier to accessing AIC’s programs and assistance services.

Across all core customer segments, the great majority of households have some sort of internet access; typically, high-speed broadband (Figure 38). Despite this high level of penetration, there are some notable disparities: low income customers and mobile home residents are significantly less likely to have broadband (and in turn are more likely to solely rely on their cell phones for internet access) and non-IQ customers are the least likely to not have any home internet access. Internet access is not significantly different between homeowners and renters.

Figure 38. Home Internet Access

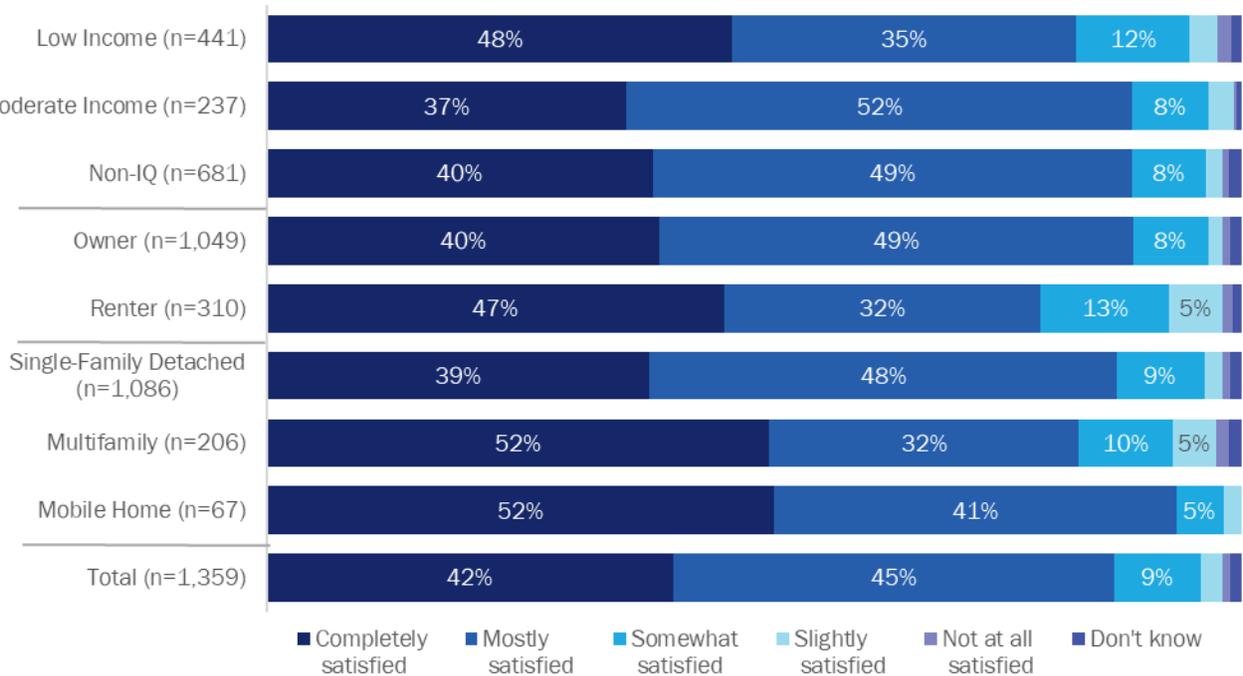


Note: Multiple responses allowed. Estimates in figure exclude ‘don’t know’ responses.

Despite struggling to afford their AIC bills, vulnerable customer groups are nonetheless extremely satisfied with AIC.

Across all core customer segments, most customers are highly satisfied with AIC overall (Figure 39). The most ardent supporters, in fact, are traditionally underserved groups: low income, renter, multifamily, and mobile home customers.

Figure 39. Overall AIC Satisfaction



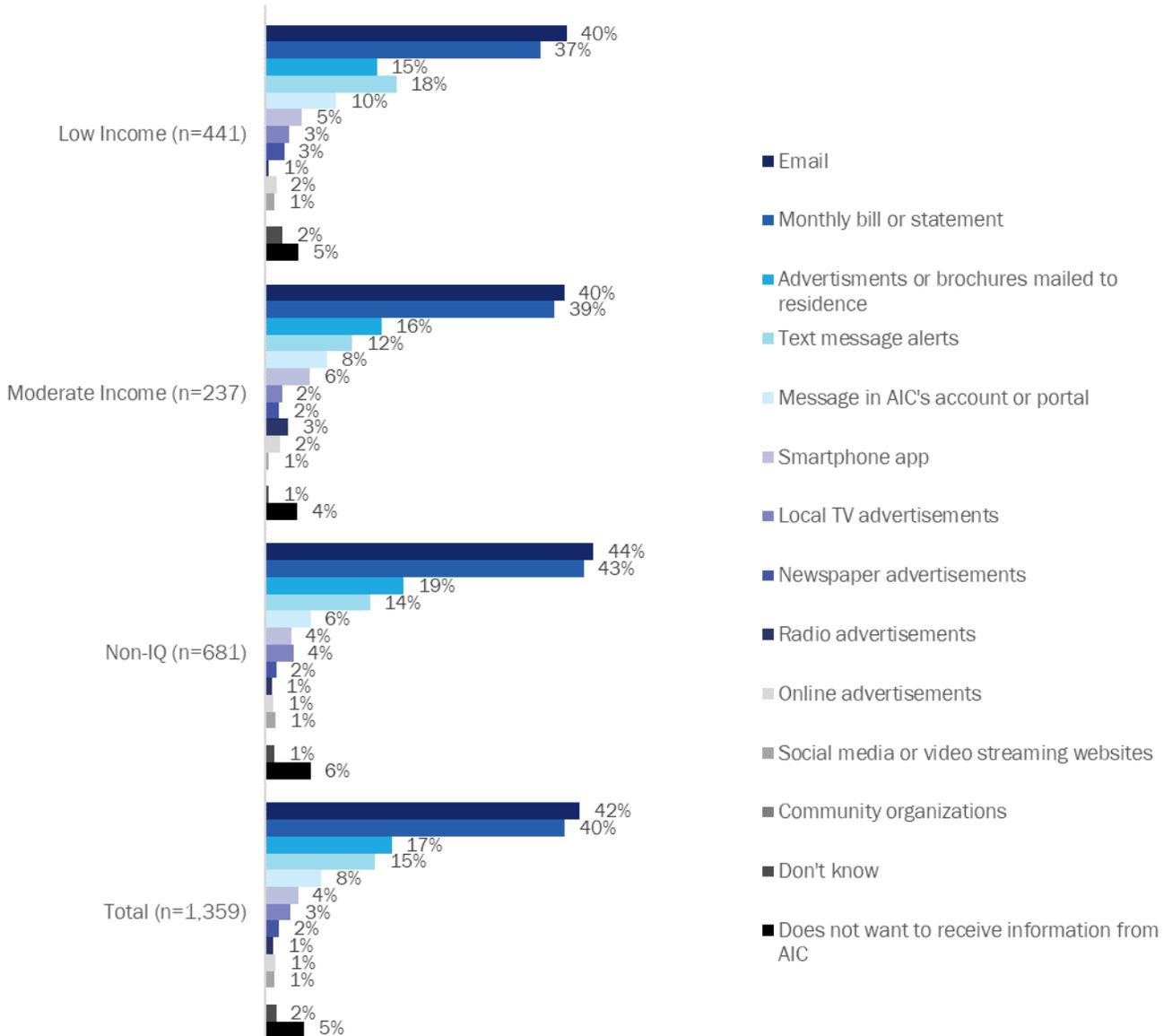
Note: Percentage labels <3% are not shown.

4.6 Engagement Strategies

Most customers prefer traditional marketing channels for receiving AIC communications, with IQ customers demonstrating similar preferences to non-IQ customers.

Regardless of socioeconomic background, all core segments have similar preferences for how AIC should communicate energy assistance offers to them (Figure 40). Customers largely prefer receiving this information via email or provided with their monthly billing statement, although a notable minority are also interested in receiving text messages or direct mailers. When considering bill inserts and other direct mailer together, customer tend to prefer mailed or physical (i.e., paper) collateral and communications slightly more than e-mails. Social media is especially low on the list of preferences.

Figure 40. Preferred AIC Communications Methods



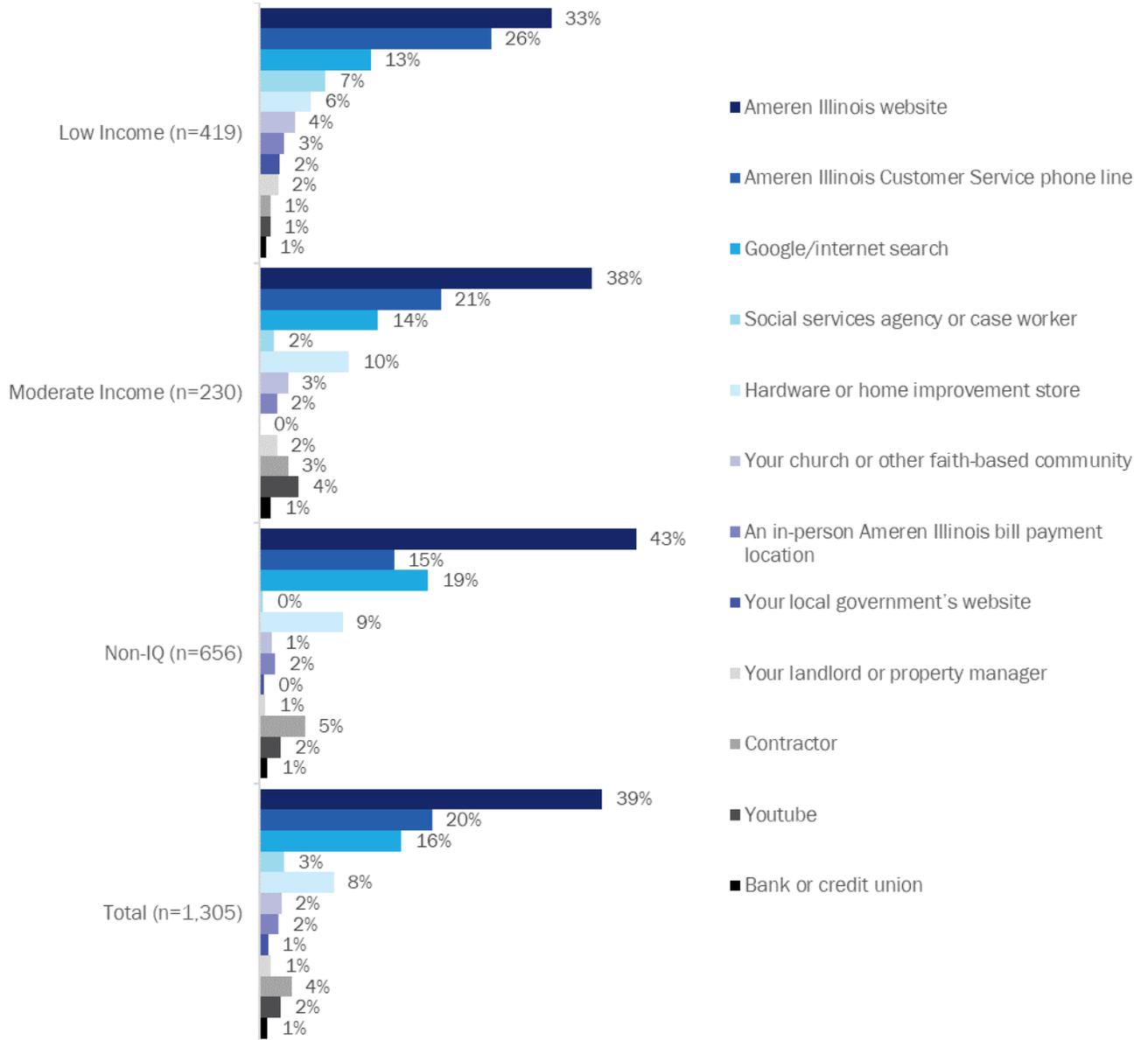
Note: Customers were allowed to select up to two options.

Both IQ and non-IQ customers alike are most likely to consult AIC if they were to look for help in reducing their energy bills; few initially think to consult contractors or non-energy social service agencies or community organizations.

The MaxDiff exercise revealed that most customers' first choice to consult when seeking help to reduce monthly energy bills would be to either go to the AIC website or call the AIC customer service phone line, as shown in Figure 41. The distant third and fourth most popular approaches were a Google/internet search and going to a hardware store. All other tested sources would be the first choice for 5% or fewer of customers, revealing that few customers would consult community organizations or social service providers when seeking

energy bill help. Popular information source preferences were not strongly differentiated by income level, homeownership status, or housing type.

Figure 41. Top Preferred Source of Information When Seeking Help to Reduce Energy Bills



Note: MaxDiff sample sizes differ from other survey questions due to separate data cleaning practices. See Appendix D for more detail.

5. Conclusions and Recommendations

Since 2018, AIC has invested significantly in expanding support for its IQ customers. As of 2021, the IQ Initiative is the single largest Initiative in the AIC portfolio and AIC continually looks for ways to augment their offerings to this customer group. Heading into the 2022–2025 plan cycle, this study shows there is still significant potential to help alleviate energy burden among AIC’s most vulnerable customers. IQ customers, unsurprisingly, continue to experience greater financial hardship and energy burden than non-IQ customers, as they disproportionately live in older, inefficient homes with infiltration problems and outdated and inefficient HVAC technologies. Further, many IQ customers are in an acute energy affordability crisis: two-thirds of low income customers and 40% of moderate income customers say that they have had difficulty paying their AIC bill; the most common bill they reported struggling to pay.

This study also revealed specific groups of vulnerable customers in need of special focus in the next portfolio cycle: mobile and manufactured homes and renters (mostly in multifamily units) have much higher energy burdens than other types of homes and homeowners, respectively. Customers who use alternative fuels like propane have much higher energy costs compared to electricity or natural gas users, although those using alternative fuels tend to be either moderate income or non-IQ and are more likely to be able to afford their higher costs. Further, customers who are Black; are or have disabled household members; are not college educated; are unemployed and seeking work; receive public assistance; and/or belong to a single-mother household are all statistically more likely to face higher energy burden. These customer groups face greater energy burdens and/or costs, and IQ customers within these groups are particularly vulnerable.

Overall, AIC’s 2022–2025 IQ Initiative is set up well to address the energy-related needs of IQ customers in general, as well as many of these subgroups. Most of the planned funding is for serving single-family homes, where more than two-thirds of IQ customers live; there is also substantial funding for multifamily properties; and AIC has plans for additional efforts targeting mobile and manufactured homes and electrification of alternative fuel users. The Initiative already provides most of the HVAC and weatherization upgrades that IQ customers might need, at no-cost or a heavy discount, but we did find a few opportunities to add more measures, especially in multifamily units. Further, AIC has already taken a big step by establishing a metric for prioritizing additional outreach and offerings to underserved communities: the Empower Communities index. Our results suggest that the current index, which assigns higher priority to communities with greater proportions of IQ and/or non-White customers, is fundamentally sound but AIC could expand it to better reach additional high need groups.

HCS represents perhaps the area of greatest misalignment between IQ customer needs and Initiative design, which is historically rooted in state and federal policy limitations around the use of AIC energy efficiency and IHWAP funds. HCS hazards continue to be a major issue for IQ customers, most commonly thermal comfort issues stemming from poor weatherization, major infiltration issues, and inefficient HVAC systems. A significant minority of IQ customers also frequently experience mold/moisture and pest issues; and low income customers face these issues more often than moderate income or non-IQ customers. However, current AIC and IHWAP rules often cause projects to be deferred until these types of HCS issues are resolved. The Initiative will address minor HCS issues if they can do so cheaply, expediently, and safely during the upgrade process but, historically, federal and state policy around the use of energy efficiency and weatherization funding have made providing significant HCS services a challenge for Illinois utilities and CAAs. CEJA’s new directives to utilities to address HCS needs alongside energy upgrades, however, establishes a new paradigm around HCS and potentially creates an opportunity to address this critical gap for the IQ population. AIC is in the process of developing plans to further address HCS needs in the PY2022 Implementation Plan.

Even as AIC has steadily improved, and continues to improve, the design of the IQ Initiative, major barriers to participation remain. In general, we found that IQ customers are not accessing all the energy-related support services available to them: less than half of qualifying low income customers have ever received LIHEAP assistance and very few have ever participated in an AIC energy efficiency offering. Awareness is the biggest barrier to participation in AIC energy efficiency offerings across all AIC residential customers, but low income customers are particularly unaware (less than 40% are aware). Additionally, the prevalence of rental housing in the low income market and the lack of sufficient discretionary income consistently prevents efficiency investments for IQ customers.

Extensive, compelling, and culturally relevant ME&O is a critical part of the solution; and finding the right ME&O channels and partners is particularly key to achieving this goal. We found that IQ customers are not especially different than non-IQ customers in terms of their preferred communication methods and information sources. Both groups have varying preferences between e-mail and paper communications, with a slight edge to paper promotions; and both are also most likely to go directly to AIC for information on specifically how to reduce their energy bills, rather than a contractor, social services agency, or other community organizations.

While customers naturally think to go to AIC first for their energy bill related needs, this does not mean that they will actually go to AIC for help, in large part due to lack of awareness of AIC offerings. Given this reality, AIC should continue to explore opportunities to leverage community organizations to inform customers of utility offerings. These organizations are rooted in the communities where these customers live and have a more direct connection to their day-to-day lived experience. Our 2018 LINA found that community organizations, particularly FBOs, were the most trusted resources in general; people tend to go to them when they need help. As such, community organizations are still an effective strategy for meeting customers where they already are going for support and driving awareness of AIC's offerings by layering them on top of the community partners' other support services.

Based on this research, we offer the following key findings and recommendations for AIC efforts targeted at IQ customers going into the 2022–2025 cycle.

- **Finding 1:** Customers who use alternative fuels, especially propane users (who spent \$2,900 on average in 2020 energy bills), tend to have significantly higher annual energy costs than those who use natural gas (\$2,000) or electricity only (\$1,575). While alternative fuel users are a small minority of AIC customers overall (7% use propane and 2% use wood or wood pellets), it is possible that there are communities in AIC service territory where alternative fuel usage is more common. Alternative fuel users are more often moderate income or non-IQ, but there may also be pockets of low income alternative fuel users.
- **Recommendation:** Conduct research to identify target communities with higher incidence of alternative fuel usage, especially pockets with many IQ alternative fuel users. AIC is already planning a targeted electrification offering for IQ and non-IQ alternative fuels users and Opinion Dynamics will propose a fuel segmentation study as part of the 2022 evaluation cycle to support this effort.
- **Finding 2:** Low income customers have much higher average energy burden (8.2%) compared to any other income group (4.1% for moderate income; 2.3% for non-IQ). Although they may also struggle to pay a range of other bills (e.g., automobile expenses, housing payments, groceries, and other bills), they are most likely to cite AIC bills as something they struggled to pay. This finding may reflect prioritization of a hierarchical order of needs in modern life: after paying for rent and other living necessities, low income households may have little money left over for energy bills.

- **Finding 3:** Mobile homes have a much higher energy burden on average (5.9%) compared to single-family (3.8%) or multifamily (5.0%) homes. Mobile homes are particularly problematic from an energy burden perspective, as their inhabitants have some of the lowest average incomes and yet some of the highest average annual energy costs despite being some of the smallest dwelling structures.
 - **Recommendation:** Continue efforts to develop and implement a targeted offering for mobile/manufactured homes. AIC already plans to implement a mobile/manufactured home weatherization offering in the next cycle, as either a separate pilot or an offering within one of the Residential Program initiatives.
 - **Recommendation:** Conduct additional research to further understand the energy upgrade and HCS needs of mobile/manufactured homes specifically. This study collected high level information about primary heating and cooling information, as well as potential weatherization and HCS issues. Given the unique technological situations associated with mobile homes, however, further research dedicated to this customer segment is needed. Although not focused exclusively on IQ customers, Opinion Dynamics will propose a mobile/manufactured home study as part of the 2022 evaluation cycle and work with AIC to determine which inputs would best support their planned offering.
- **Finding 4:** The majority of renters are low income households; renters predominately reside in multifamily units and have a higher energy burden on average (6.4%) than homeowners (3.7%). Renters also have higher incidences of HCS issues compared to homeowners. Renter energy burden is primarily driven by lower incomes, as renters and multifamily properties have significantly lower energy costs than other customer types. Renters face a multitude of barriers that prevent their participation in IQ offerings: lack of discretionary income and the authority to make major changes to their homes, high levels of transiency, and particularly low awareness of AIC energy efficiency offerings.
 - **Recommendation:** Consider opportunities through the IQ Multifamily channel of the IQ Initiative to further incentivize landlords and property managers to make energy and comfort-related upgrades to their renters' units; and educate tenants on how to do more, within the limits of their rental situation, to save energy. One strategy other programs have used is a tiered incentive system that provides higher incentives to landlords for measures that directly impact tenant energy bills.²¹ Further, the Springfield Urban League, an AIC MDI partner, recently completed a survey with landlords and tenants and found that using targeted ME&O (e.g., local community events) to raise awareness of AIC's energy efficiency offerings amongst landlords and tenants and educating tenants on low- to no-cost behavior changes to reduce their energy use may also be part of the solution.²² Opinion Dynamics could also conduct additional secondary research or primary research with other utilities to identify a more comprehensive overview of the latest thinking on ways to overcome the classic renter-owner divide.
- **Finding 5:** Many historically marginalized demographic groups face disproportionately higher energy burdens. The following groups have significantly higher energy burdens than the average AIC residential customer (4.0%): Black customers (6.0%) and other non-White racial groups (5.6%); those with household members with major medical conditions or disabilities (5.4%); heads of households lacking a bachelor's degree (5.0%); non-retired unemployed households (8.2%); and single-mother households (7.1%).

²¹ California's Low Income Weatherization Program for Multifamily Properties (LIWP-MF) uses this approach. Source: American Council for an Energy-Efficient Economy (ACEEE). 2019. *Closing the Gap in Energy Efficiency Programs for Affordable Multifamily Housing*. <https://www.aceee.org/sites/default/files/publications/researchreports/u1903.pdf>.

²² Springfield Urban League. 2021. *Ameren Landlord and Tenant Research Report*. <https://amerenillinoisavings.com/wp-content/uploads/2021/07/PY21-MARCH-2021-MDI-Research-Booklet-FINAL-Rev03.pdf>

- **Recommendation:** The Empower Communities index should continue to prioritize communities with higher proportions of non-White and IQ customers. AIC should also expand the Empower Communities definition, however, to prioritize communities with higher proportions of customers with major medical conditions or disabilities, a lack of college education, are unemployed and looking for work, and either single-mother or (more generally) single-parent households. The Champaign County Regional Planning Commission (CCRPC), one of AIC’s MDI partners, uses a Census and Demographics Tool to create the Empower Communities index, by zip code. AIC should work with the CCRPC to identify and included available census data related to these additional demographics.
- **Finding 6:** Customers who receive some type of public assistance have higher average energy burden compared to those who do not, even after accounting for the benefits of that assistance (measured as “modified energy burden”). Particularly, those who received energy bill payment assistance continue to struggle: LIHEAP recipients have the modified energy burdens of 7.1% compared to 3.3% for those who do not receive public benefits. Relatedly, less than two-thirds of LIHEAP-eligible customers are aware of the program. While many of the challenges these customers face are out of AIC’s control, this finding suggests that there is a need to drive greater awareness of LIHEAP and, regardless, bill payment assistance is not enough to fully address energy burden. Further support reducing energy costs through energy efficiency upgrades could help.
 - **Recommendation:** Develop a ME&O campaign dedicated to raising awareness of LIHEAP that targets those who may qualify. Additionally, consider establishing an in-kind partnership (i.e., provide AIC-branded or co-branded marketing collateral) with community organizations that promote LIHEAP or connect their clients with other social services, such as welfare or food and housing assistance.
 - **Recommendation:** Include receipt of public assistance as another prioritization criteria for the Empower Communities index.
- **Finding 7:** Customers conditioning their homes with portable/window air conditioners and baseboard heat have the highest average energy burdens across all primary heating and cooling sources; 6.4% and 5.5%, respectively. AIC’s 2022–2025 energy efficiency plan currently includes window air conditioner replacements for the IQ Single Family channels, but not for the IQ Multifamily channel. Portable/window air conditioner and baseboard heat is especially common in multifamily homes. These findings suggest that these notoriously inefficient heating and cooling technologies, which are disproportionately found in low income and multifamily homes, are more expensive to operate than more efficient HVAC systems; thereby exacerbating energy burdens for these disadvantaged groups. However, these are by no means the only causes of energy burden in these homes. As such, addressing these measures is only part of the solution. Rather, whole home approaches will be critical to significant energy burden remediation.
 - **Recommendation:** Consider adding portable/window air conditioner replacement to the list of eligible measures for the IQ Multifamily channel, particularly in tenant units. AIC could either replace old units with ENERGY STAR® units; or, if not cost-prohibitive, could go further and install ductless heat pumps.²³ Ductless heat pumps, which are an eligible measure though the IQ Multifamily channel, could also be a solution if specifically used in cases where customers have both a window air conditioner and baseboard heating, which each drive higher energy burdens.
- **Finding 8:** IQ customers are more likely than non-IQ customers to experience HCS concerns stemming from the quality of their home, most commonly with building shell issues. Customers in multifamily

²³ The ENERGY STAR® name and mark are registered trademarks owned by the US EPA.

homes mentioned window infiltration issues nearly twice as often as single-family detached home dwellers; 27% versus 16%.

- **Recommendation:** Explore opportunities to further identify and address window infiltration issues through the IQ Initiative, especially the IQ Multifamily channel. For example, work with implementation partners to ensure windows are fully examined during assessments; add window replacement as a potential option for resolving issues; and set up a specific process to determine whether lower cost improvements (e.g., weatherstripping or caulking and sealing) are sufficient, or if window replacement is truly needed. Given the historical cost-effectiveness challenges with window replacement, establish clear criteria for full window replacement.
- **Finding 9:** IQ customers were considerably more likely to have mold/moisture or pest problems (about one-third and one-quarter respectively); and some IQ customers appear to have severe issues that may cause project deferment and, as such, create barriers to IQ Initiative participation.
 - **Recommendation:** As AIC determines whether and how it must adjust IQ Initiative operations to comply with CEJA's HCS directives to utilities, consider whether rule changes are possible around mold, mildew, fungus, moisture, or pest remediation to avoid project deferment. AIC should also coordinate with CAAs on this issue, as they face similar rules and restrictions when using IHWP funding.
- **Finding 10:** IQ and non-IQ customers have similar communication preferences. Across all survey respondents, direct mail (57%) and e-mail (42%) were the most preferred methods, followed by text message alerts (15%). Very few customers preferred online or social media advertisement (about 1% each).
 - **Recommendation:** Continue to include e-mail outreach as part of ME&O strategies but focus more on direct mail or paper collateral as much as possible and consider opportunities to expand the use of text message alerts. Our 2021 process research pertaining to two IQ Initiative offerings, Smart Savers²⁴ and Safe and Virtual Energy Efficiency (SAVE) Kits²⁵, has shown that multiple touchpoints through a variety of channels (e.g., a mix e-mail, paper, phone, and texts) may be necessary to reliably reach customers with information on additional offerings available to them. The paper collateral contained with the SAVE Kits, however, was much more effective than the other strategies (e-mail and phone calls) at driving interest and intention to participate in the IQ Initiative and other AIC offerings.
- **Finding 11:** Both IQ and non-IQ customers are most likely to consult established AIC resources first for assistance with reducing their energy bill: more than half would first go to the AIC website or call the AIC customer service line (39% and 20%, respectively). However, notable minorities of customers would first use internet searches (16%) or visit their local hardware or home improvement store (8%) instead. Very few customers would first turn to social service agencies or community organizations for information on ways to reduce their energy bill. While most customers do not think to consult these community organizations for energy bill assistance, our 2018 LINA concluded that community organizations (particularly faith-based organizations [FBOs] such as churches, temples, mosques, or religion-based non-profits) are the most trusted resources of information in general in low income communities within AIC service territory.

²⁴ Opinion Dynamics. (2021). *Ameren Illinois Company Smart Savers Process Evaluation*. <https://ilsag.s3.amazonaws.com/AIC-Smart-Savers-Process-Evaluation-Memo-FINAL-2021-12-13.pdf>.

²⁵ Opinion Dynamics. (2021). *Ameren Illinois Company Income Qualified Initiative 2021 Participant Survey Results*. <https://ilsag.s3.amazonaws.com/AIC-Income-Qualified-Initiative-Participant-Survey-Results-Memo-FINAL-2022-02-01.pdf>

- **Recommendation:** Continue relying on the AIC website and call centers (either the general phone line or the Home Energy Specialists team²⁶) as a critical information resource for AIC customers to learn more about ways to reduce their energy bill. Additionally, consider ways that the AIC website or the Home Energy Specialists team could connect customers with services from community partners or other critical social services.
- **Recommendation:** Consider additional investments in search engine marketing, and potentially in-store promotions (e.g., signage or booths) at local hardware or home improvement stores. If standard search engine marketing methods (i.e., pay-per-click ads) prove to be cost prohibitive, narrow the focus to search engine optimization; this is the most cost-effective component of search engine marketing and would make AIC more visible in search engine results for the 16% of customers that rely on broader internet searches.
- **Recommendation:** AIC should continue their focus on building community partnerships through the MDI for use in conducting marketing and outreach to target customer groups.
- **Recommendation:** Consider an ME&O strategy specific to FBOs, particularly those in Empower Communities. AIC recently piloted an FBO retrofit offering in late 2021 and otherwise serves FBOs through other Business Program initiatives. AIC could consider asking previous FBO participants to partner with them in an ME&O effort. For instance, pastors whose churches participated in an AIC offering and had a positive experience might be willing to act as ambassadors: tell their churchgoers about AIC's offerings (for both residents and businesses) and about their own experiences participating; and then potentially hand out informational materials or invite an AIC representative to speak after a sermon.
- **Finding 12:** While not the core purpose of this study, our survey collected useful datapoints on over 1,300 customers' homes, such as housing type, fuel type, and primary heating and cooling systems. These data may be useful for vetting IL-TRM assumptions about IQ and non-IQ homes when specific customer information is unknown (e.g., for some types of energy efficiency kits).
- **Recommendation:** As part of the 2022 IL-TRM V11.0 update process, Opinion Dynamics is conducting a review of existing available data that can help improve characterization of energy savings measures in IQ homes. Our primary expected data source is existing program tracking databases, which have collected a rich set of data with respect to HVAC efficiency and building shell efficiency that can be mined for these purposes, but we plan to supplement these data where relevant with data collected in this study. We will provide one or more IL-TRM workpapers summarizing our findings and recommending potential changes to the IL-TRM's characterization of measures.

²⁶ The Home Energy Specialists team is the IQ Initiative's dedicated call center that provides support to customers with the Initiative application and throughout the participation process.

Appendix A. Survey Instrument

Screening [ASK ALL]

Our questions in this survey will be primarily about your home, household members, and energy use at [ADDRESS]. If you have more than one residence, please only consider the one at this location.

[ASK ALL]

Q1. Which of the following best describes your residence at [ADDRESS]? Please select the most applicable.

1. It is my primary residence
2. It is a rental property that I own or sublease [THANK AND TERMINATE]
3. It is a vacation or secondary residence [THANK AND TERMINATE]
4. I no longer have an Ameren account at that address (moved, sold home, etc.) [THANK AND TERMINATE]
5. I do not recognize this address [THANK AND TERMINATE]
6. This is a business, church, university campus, or other nonresidential organization [THANK AND TERMINATE]
0. Something else, please specify: [OPEN-END TEXT] [THANK AND TERMINATE]

[THANK AND TERMINATE TEXT: We need to hear from customers about their primary residence. Thanks very much for your time and effort.]

Home Characteristics [ASK ALL]

Now we have a few questions about your home to ensure we are hearing from a variety of customers.

[ASK ALL]

Q2. Do you own or rent your home?

1. Own
2. Rent
0. Other, please specify: [OPEN-ENDED TEXT]

[ASK ALL]

Q3. Including yourself, how many people of each age group live in your home year-round? *Please enter "0" if no one from that age group lives in your household.*

1. Under 6 years old: [NUMERIC RESPONSE 0-10]
2. 7 to 17 years old: [NUMERIC RESPONSE 0-10]
3. 18 to 34 years old: [NUMERIC RESPONSE 0-10]
4. 35 to 64 years old: [NUMERIC RESPONSE 0-10]
5. 65 to 79 years old: [NUMERIC RESPONSE 0-10]
6. 80 years or older: [NUMERIC RESPONSE 0-10]

[GEN OCCUPANTS = SUM Q3_1 TO Q3_6

GEN 150_FPL = 0]

[ASK ALL]

Q4. What was your annual household income from all sources in 2020, before taxes? *Please include all members of your household. Your best estimate is fine.*

1. No income whatsoever in 2020 [REPLACE 150_FPL=1 IF Q4=1]
2. Less than \$10,000 [REPLACE 150_FPL=1 IF Q4=2]
3. \$10,000 to \$14,999 [REPLACE 150_FPL=1 IF Q4=3]
4. \$15,000 to \$19,999 [REPLACE 150_FPL=1 IF Q4=4]
5. \$20,000 to \$24,999 [REPLACE 150_FPL=1 IF Q4=5 AND OCCUPANTS <3]
6. \$25,000 to \$29,999 [REPLACE 150_FPL=1 IF Q4=6 AND OCCUPANTS <4]
7. \$30,000 to \$34,999 [REPLACE 150_FPL=1 IF Q4=7 AND OCCUPANTS <4]
8. \$35,000 to \$39,999 [REPLACE 150_FPL=1 IF Q4=8 AND OCCUPANTS <5]
9. \$40,000 to \$44,999 [REPLACE 150_FPL=1 IF Q4=9 AND OCCUPANTS <6]
10. \$45,000 to \$49,999 [REPLACE 150_FPL=1 IF Q4=10 AND OCCUPANTS <7]
11. \$50,000 to \$74,999 [REPLACE 150_FPL=1 IF Q4=11 AND OCCUPANTS <9]
12. \$75,000 to \$99,999 [REPLACE 150_FPL=1 IF Q4=12 AND OCCUPANTS <=12]
13. \$100,000 to \$149,999
14. \$150,000 to \$199,999
15. \$200,000 or more

[ASK ALL]

Q5. Does your home use any of the following energy sources for heating, water heating, cooking, laundry, or other important household energy needs? [1=Yes, 2=No, 98=Don't know]

1. [DISPLAY IF service_type="Combo" OR "Gas"] Natural gas
2. Propane
3. Wood or wood pellets

[ASK IF Q5=2]

Q6. Do you use propane just outdoors - such as a BBQ grill - or do you have any major indoor appliances that use propane, such as a furnace, oven/stove, water heater, or clothes dryer?

1. Outdoor use only
2. Have indoor appliance(s) that use propane

[ASK IF Q5=3]

Q7. Do you just use wood or wood pellets recreationally - such as occasionally lighting a fire or cooking food - or do you use wood or wood pellets as a primary heating or cooking fuel in your home?

1. Recreational use only
2. Use wood or wood pellets as a primary heating or cooking fuel

[COMPUTE VARIABLES: NATGAS_USER = 1 IF SERVICE_TYPE=Combo OR Gas OR Q5 = 1; PROPANE_USER=1 IF Q6=2; WOOD_USER = 1 IF Q7=2]

[ASK IF Q2=2 AND [NATGAS_USER=1 OR PROPANE_USER=1 OR WOOD_USER=1]]

Q8. Which, if any, of your energy bills are included in your rent? *Please select all that apply.*

1. Electricity

2. [DISPLAY IF NAT_GAS_USER = 1] Natural gas
3. [DISPLAY IF PROPANE_USER = 1] Propane
4. [DISPLAY IF WOOD_USER = 1] Wood or wood pellets
97. None of my energy bills are included in my rent
98. Don't know

[ASK ALL]

Q9. Which of the following best describes the residence at [ADDRESS]?

1. Single family detached house
2. Manufactured or mobile home
3. Single family attached home with 2 to 4 units in the same building (duplex, triplex, quadplex, rowhouse, or townhome)
4. Apartment, condo, or other multifamily building with 4 stories (floors) or less
5. Apartment, condo, or other multifamily building with 5 or more stories (floors)
0. Other, please specify: [OPEN-ENDED TEXT]

[DISPLAY ON SEPARATE SCREEN IF Q9= 3, 4, OR 5] For the remainder of the survey, when we ask about “your home” please refer to your individual apartment, condo, townhome, etc., and not the whole building your home is inside of or attached to.

[ASK ALL]

Q10. Approximately when was your home built? *Your best estimate is fine.*

1. Before 1940
2. 1940-1978
3. 1979-1999
4. 2000 or later
98. Don't know

[ASK ALL]

Q11. How long have you lived at [ADDRESS]?

1. Less than one year
2. Between one to two years
3. Between three to five years
4. Five or more years

[ASK ALL]

Q12. How many bedrooms and bathrooms does your home have? *Please enter “0” for any room that is not applicable to your home.*

1. BEDROOMS: [NUMERIC RESPONSE, 0-10]
2. Full Bathrooms: [NUMERIC RESPONSE, 1-10]
3. Half Bathrooms: [NUMERIC RESPONSE, 0-10]

HVAC [ASK ALL]

Q13_Intro Now we would like to know more about the heating and cooling systems used in your home.

[ASK ALL]

Q13. Which heating equipment do you normally use as the **main** source for heating your home?
[SINGLE RESPONSE]

1. Furnace

Typically, a central unit is in a garage, basement, crawlspace, or closet, and heats the entire house by blowing hot air through ducts.



2. Electric Baseboard

Contains electric heating elements that generate heat for the room. They are individual units that heat individual rooms, require no central heating or duct work, and are typically located along the base of the wall. Do not select this if your baseboards use a fuel type other than electricity.



3. Fireplace



4. Wood or Wood Pellet Stove



5. Portable Space Heater(s)



6. Wall Furnace

Also known as a “gravity furnace,” these individual units are attached to the wall and provide heat to one or two individual rooms. Depending on the type you have, you can adjust the temperature setting using either a wall-mounted thermostat or by using controls located directly on the heating unit. Some units are tall (over five feet tall) and others are short (about two feet tall, located on the wall near the floor). They do not use ducts.



7. Floor Furnace

Typically found in older, smaller homes, floor furnaces have just a single large vent that provides heat for the entire home. The vent is typically located in a common area or central hallway of the home. There are not any ducts or vents in individual rooms so doors to rooms must be left open for them to be heated.



8. Electric Wall Heater

Also known as “cadet” heaters, these *individual units are attached to the wall (often a few feet below a light switch) and use electricity to blow hot air to heat individual rooms. You can adjust the amount of heat that comes out using a knob or digital thermostat that is located directly on the heating unit. They do not use ducts.*



9. Boiler

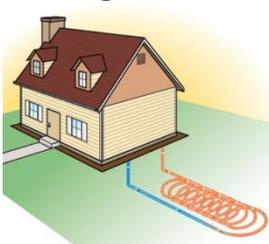
Heats water to create either steam or hot water that is then distributed throughout your home through radiators, baseboard heaters, or radiant heating. Typically, a central unit used to heat multiple rooms.



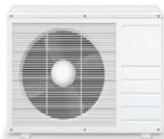
10. Ducted Air-Source Heat Pump
Ducted air-source heat pumps have an outdoor compressor (that look similar to an air conditioner) and distribute hot and cold air through a home's ductwork (floor or ceiling vents).



11. Ground-Source/Geothermal Heat Pump
Ducted ground-source heat pumps have an underground heat exchanger. Ground-source/geothermal heat pumps provide both heating and cooling to homes.



12. Ductless Heat Pump ("Mini-Split")
Ductless mini-split heat pumps do not use ducts or floor vents. Instead, they have one or more wall-mounted indoor units located near the ceiling that provide both hot and cool air. These indoor-units work in conjunction with an outside compressor that is typically mounted to an exterior wall or is installed on a concrete surface.



13. Packaged Terminal Air Conditioner/ Packaged Terminal Heat Pump ("PTAC"/ "PTHP")
A self-contained heating and air conditioning system that is mounted to a wall. They do not have any outdoor compressors and do not use ducts or floor vents.



- 0. Other, please specify: [OPEN END]
- 97. None, my home does not have any heating equipment [EXCLUSIVE]
- 98. Don't know [EXCLUSIVE]

[ASK ALL]

Q14. Which cooling equipment do you typically use as the **main** source for cooling your home?
[SINGLE RESPONSE]

1. Central air conditioning system

A central system forces cool air through ducts to rooms in the home. Typically, a central system is used to cool multiple rooms and has a unit on the outside of the home that cools the air and forces it through the ducts.



2. Window conditioner

A window or room air conditioner is a simple form of air conditioning where a single unit is mounted on a window and cools the room.



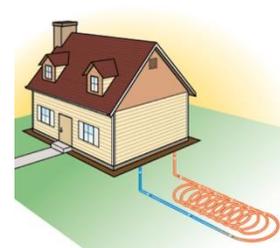
3. Ducted Air-Source Heat Pump

Ducted air-source heat pumps have an outdoor compressor (that look similar to a traditional air conditioner) and distribute hot and cold air through a home's ductwork (floor or ceiling vents).



4. Ground-Source/Geothermal Heat Pump
Heat Pump

Ducted ground-source heat pumps have an underground heat exchanger. Ground-source/geothermal heat pumps provide both heating and cooling to homes.



5. Ductless Heat Pump (“Mini-Split”)

Ductless mini-split heat pumps do not use ducts or floor vents. Instead, they have one or more wall-mounted indoor units located near the ceiling that provide both hot and cool air. These indoor-units work in conjunction with an outside compressor that is typically mounted to an exterior wall or is installed on a concrete surface.



6. Packaged Terminal Air Conditioner/ Packaged Terminal Heat Pump (“PTAC” / “PTHP”)

A self-contained heating and air conditioning system that is mounted to a wall. They do not have any outdoor compressors and do not use ducts or floor vents.



7. Evaporative or swamp cooler

An evaporative or swamp cooler is a unit that cools air efficiently through the direct evaporation of water. These devices are typically installed on the roof, exterior wall, or windows of a home. They consist of a fan, a thick pad, a water reservoir, controls, and/or air filters.



8. Portable room air conditioner

A freestanding portable air conditioner can be moved around in a room or a home but does require a vent or window to force out exhaust and warm air.



9. Ceiling fan(s)

10. Portable fan(s)

0. Other, please specify: [OPEN END]

97. None, my home does not have any cooling equipment [EXCLUSIVE]

98. Don't know [EXCLUSIVE]

Energy Sources and Costs

Next, we have some questions about energy-related costs, issues, and technologies at your home to help us better understand customers' energy needs and opportunities.

[ASK IF PROPANE_USER OR WOOD_USER=1 OR (SERVICE_TYPE=Electric AND NATGAS_USER=1)]

Q15. In 2020, how much did your household spend on the following? *Please enter your best estimate for the total amount you spent in all of 2020 for the fuel(s) listed below without any commas or other symbols.*

1. [DISPLAY IF SERVICE_TYPE=Electric AND NATGAS_USER=1] Natural gas service: \$[NUMERIC RESPONSE, UNSURE]
2. [DISPLAY IF PROPANE_USER=1] Propane service: \$[NUMERIC RESPONSE, UNSURE]
3. [DISPLAY IF WOOD_USER=1] Wood or wood pellets: \$[NUMERIC RESPONSE, UNSURE]

Internet Access and Sources of Info [ASK ALL]

These next few questions are about phone and internet services that you and your household members may use to find and receive information about energy-related topics.

[ASK ALL]

Q16. Which of the following internet services do you have at your home, if any? *Please select all that apply.*
[MULTIPLE RESPONSE; RANDOMIZE 1-3]

1. Dial-up internet service through a telephone company or other service provider
2. High-speed broadband service through a telephone, cable, or satellite company or other service provider
3. Cellular internet service from your cell phone provider
0. Other, please specify: [OPEN-ENDED RESPONSE]
97. None, do not have access to the internet at my home [EXCLUSIVE]
98. Don't know

[ASK ALL]

Q17. How would you or other household members prefer to receive information from Ameren Illinois about how to save energy, reduce your energy bill, replace equipment in your home, and other energy-related matters?

Please select up to two preferences. [SELECT UP TO TWO; RANDOMIZE 1-12]

1. Email
2. Text message alerts
3. Smartphone app
4. Message in your online Ameren Illinois' account or portal
5. On your monthly bill or statement
6. Social Media or video streaming websites
7. Advertisements or brochures mailed to your residence
8. Online advertisements
9. Local TV advertisements
10. Radio advertisements

11. Newspaper advertisements
12. Through an organization in your community

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
97. None, I don't want to receive information from Ameren Illinois about saving energy, reducing my bill, replacing equipment, and similar topics [EXCLUSIVE]
98. Don't know [EXCLUSIVE]

Health/Comfort/Safety and Medical Equipment [ASK ALL]

The following questions ask about the general health, comfort, and safety of members of your household, including any with major medical conditions and disabilities. These questions will be used to create better offerings for households in your community, particularly those with special needs. As a reminder, all your responses will be kept confidential.

[ASK ALL]

- Q18. **During the last year**, how often, if ever, was your or a member of your household's health not good?
1. Never
 2. Rarely
 3. Sometimes
 4. Many times
 5. Most or all the time

[ASK Q18>1]

- Q19. **During the last year**, how often, if ever, did your or a household member's poor health keep you or them from doing usual activities, such as work, school, or other daily routines?
1. Never
 2. Rarely
 3. Sometimes
 4. Many times
 5. Most or all the time

[ASK ALL]

- Q20. **During the last year**, how often, if at all, did you or a household member experience any of the following inside your home? [1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always]
1. Uncomfortably cool temperatures on cold days or nights
 2. Uncomfortably warm temperatures on hot days or nights
 3. Drafts coming from outside
 4. Mold, mildew, fungus, or moisture
 5. Pests such as rodents, insects, or spiders
 6. Other, please specify: [OPEN-ENDED RESPONSE]

[ASK ALL]

- Q21. Do any of the following areas of your home have leaks, holes, gaps, or other issues that allow air, water, or pests inside your home? *Please select all that apply.*
- [MULTIPLE RESPONSE; RANDOMIZE 1-7]

1. Roof
2. Attic, ceiling, or overhead space
3. Exterior walls
4. Exterior doors
5. Windows
6. Floors
7. Basement or crawl space

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
97. No leaks, holes, gaps, or other issues like this in my home

[ASK ALL]

Q22. Including yourself, do any members of your household have a major medical condition or are disabled?

1. Yes
2. No
99. Prefer not to answer

Program Awareness, Participation, and Barriers

The next few questions are about energy assistance and efficiency programs that are available to many Ameren Illinois customers.

[ASK IF 150_FPL=1 AND LIHEAP=0]

Q23. The Low-Income Home Energy Assistance Program (LIHEAP) and the Percentage of Income Payment Plan (PIPP) provides income-eligible households with financial help to pay their home's energy costs.

Before today, were you aware of the Low-Income Home Energy Assistance Program (LIHEAP) or the Percentage of Income Payment Plan (PIPP)? *Select all that you are aware of.*

1. LIHEAP
2. PIPP
3. I am not aware of either LIHEAP or PIPP [EXCLUSIVE]

[ASK IF Q23=1 OR 2]

Q24. To the best of your knowledge, what is your household's participation status in the Low-Income Home Energy Assistance Program (LIHEAP) or the Percentage of Income Payment Plan (PIPP)?

1. My household is currently participating in LIHEAP or PIPP
2. My household participated in LIHEAP or PIPP in the past but not currently
3. My household has never participated in LIHEAP or PIPP
98. Don't know

[ASK IF Q24=3]

Q25. Why has your household never participated in the Low-Income Energy Assistance Program (LIHEAP) or the Percentage of Income Payment Plan (PIPP)? *Please select all that apply.*

[MULTIPLE RESPONSE; RANDOMIZE 1-8]

1. My household has not needed them

2. I do not know enough about them
3. They would not provide enough help to my household
4. I do not think my household would qualify
5. My household tried to participate but was ineligible or did not qualify
6. My household tried to participate but it was too difficult
7. It is not worth the effort or time to try to participate
8. My household has not had time to try to participate

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK IF Q24=2]

Q26. Why is your household not currently participating in the Low-Income Energy Assistance Program (LIHEAP) or the Percentage of Income Payment Plan (PIPP)? *Please select all that apply.*
[MULTIPLE RESPONSE; RANDOMIZE 1-8]

1. My household has not needed them
2. They did not provide enough help to my household
3. My household tried to renew participation but was ineligible or did not qualify
4. My household tried to renew participation but it was too difficult
5. It is not worth the effort or time to try to renew my participation
6. My household did not have time to renew participation

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK ALL]

Q27. Are you aware that Ameren Illinois offers free, discounted, and rebated energy efficient products like light bulbs, smart thermostats, air conditioners, furnaces, and appliances?

1. Yes
2. No
98. Don't know

[ASK IF Q27=1]

Q28. Have you received any free, discounted, or rebated energy efficient equipment, appliances, or products through Ameren Illinois since you've lived at [ADDRESS]?

1. Yes
2. No
98. Don't know

[IF Q28=2]

Q29. Why has your household not received any free, discounted, or rebated energy efficient equipment, appliances, or products from Ameren Illinois? *Please select all that apply.*
[MULTIPLE RESPONSE; RANDOMIZE 1-11]

1. My household has not purchased any energy efficient equipment, appliances, or products
2. The energy efficient products my household purchased are not eligible or did not qualify for Ameren Illinois' rebates or free products

3. I do not know enough about the Ameren Illinois' rebates or free products
4. I am unsure if my equipment, appliances, and products are energy efficient
5. I tried to get an Ameren Illinois rebate(s) or free product(s) but it was too difficult
6. It is not worth the effort or time to try to get rebates or free products from Ameren Illinois
7. My household does not need rebates or free products from Ameren Illinois
8. The rebate amounts are too small
9. My household does not qualify for free products
10. [DISPLAY IF Q2=2] My landlord purchases all the energy-using products in my home
11. [DISPLAY IF Q2=2] I would have to get permission from my landlord

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK ALL]

Q30. Are you aware that Ameren Illinois has an Online Marketplace where customers can purchase discounted energy efficient products like smart thermostats, LED lighting, and air purifiers?

1. Yes
2. No
98. Don't know

[IF Q30=1]

Q31. Have you ever purchased any energy efficient products from the Ameren Illinois Online Marketplace?

1. Yes
2. No
98. Don't know

[IF Q31=2]

Q32. Why has your household not purchased any energy efficient products from the Ameren Illinois Online Marketplace? *Please select all that apply.*

[MULTIPLE RESPONSE; RANDOMIZE 1-10]

1. My household has not needed any products available on the Marketplace
2. I do not know enough about what products are available on the Marketplace
3. My household prefers different brands or types of products than those available on the Marketplace
4. My household cannot afford the products on the Marketplace, even with the discount
5. It is not worth the effort or time to purchase discounted products on the Marketplace
6. My household prefers to purchase energy-using products offline at a store/retailer, through a contractor/distributor, etc.
7. The discounts on the products are too small
8. It's easy to forget about the Marketplace when there are lots of places to purchase the products
9. [DISPLAY IF Q2=2] My landlord purchases all the energy-using products in my home
10. [DISPLAY IF Q2=2] I would have to get permission from my landlord

[ANCHOR]

0. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK ALL]

Q33. How satisfied are you overall with Ameren Illinois as your energy utility? [1=Completely satisfied; 2 = Mostly satisfied; 3=Somewhat satisfied; 4=Slightly Satisfied; 5=Not at all satisfied, 98=Don't know]

- 1. [INSERT SCALE WITH LABELED ENDPOINTS]
- 98. Don't know

Energy Burden / Economic Hardship [ASK ALL]

[ASK ALL]

We have a few questions about what income and assistance households like yours use that will help us better understand the impact of energy costs to residents in your area. Although we understand that your financial situation may have changed due to the COVID-19 pandemic, we would like to understand your household's financial situation in 2020, which will also give us information on a whole year.

Q34. What sources of income or other financial assistance did your household receive, if any, in 2020? Please select all that apply. If your household did not receive any source of income or financial assistance in 2020, please select "None."

[MULTIPLE RESPONSE; RANDOMIZE 1-13]

- 1. Wages and tips (hourly or salary)
- 2. Self-employment income
- 3. Investment income
- 4. Pensions or other retirement savings
- 5. Social security payments
- 6. Disability payments
- 7. Veterans (VA) payments
- 8. Unemployment compensation or benefits (not including COVID-19 benefits)
- 9. Child support or alimony
- 10. Public assistance for your housing, food, medical, child-care, energy, or other basic needs
- 11. Assistance from family and/or friends
- 12. Loans from banks or other financial lenders
- 13. Financial assistance that is/was available only because of the COVID-19 pandemic, like stimulus checks, additional unemployment benefits, special business loans, etc.

[ANCHOR]

- 0. Other, specify [OPEN END]
- 97. None [EXCLUSIVE]
- 99. Prefer not to say [EXCLUSIVE]

[ASK IF Q34=5,6,7,8,9,10,11,12,13,0]

Q35. In 2020, did you receive any assistance or benefits from the following public programs? [1=YES, 2=NO, 9=PREFER NOT TO SAY; RANDOMIZE 1-6]

- 1. Housing assistance such as rent payment assistance, Section 8, or other subsidized housing
- 2. Food assistance such as Supplemental Nutrition Assistance Program (SNAP), Women-Infant-Children Food Program (WIC), or other food assistance
- 3. Medical assistance from Medicare, Medicaid, or Children's Health Insurance (CHIP)
- 4. Energy assistance such as Family Electric Rate Assistance (FERA) or Low-Income Home Energy Assistance Program (LIHEAP)

5. Financial assistance such as Temporary Assistance for Needy Families (TANF), Supplemental Security Income (SSI), or other welfare programs
6. Government child-care assistance such as Head Start

[ASK ALL]

Q36. DURING THE LAST YEAR, how well would these statements describe you and your situation? *Please select one for each statement.*

- a. Because of my money situation, I feel like I will never have the things I want in life
 - b. I am just getting by financially
 - c. I am concerned that the money I have won't last
-
1. Not at all
 2. Very little
 3. Somewhat
 4. Very well
 5. Completely

[ASK ALL]

Q37. DURING THE LAST YEAR, how often would the following statements apply to you?

- a. My finances control my life
 - b. I have money left over at the end of the month
-
1. Never
 2. Rarely
 3. Sometimes
 4. Often
 5. Always

[ASK ALL]

Q38. DURING THE LAST YEAR, which bills and expenses, if any, did your household have difficulty paying on more than one occasion? *Please select all that apply.* [RANDOMIZE 2-18]

1. Not applicable, my household did not have difficulty paying any of the bills or expenses more than once during 2020 [ANCHOR]
2. Rent or mortgage
3. Credit card bills
4. Student loans bills or other educational expenses like tuition or supplies
5. Health insurance, medical bills, medicine expenses, or medical equipment lease
6. Alimony or child support payments
7. Ameren Illinois energy bills
8. [DISPLAY IF SERVICE_TYPE=Electric AND NATGAS_USER=1] Natural gas bills
9. Water bills
10. Groceries or other regular food expenses
11. Childcare
12. Public transportation passes
13. [DISPLAY IF PROPANE_USER] Propane refill costs
14. [DISPLAY IF WOOD_USER] Wood or wood pellet costs
15. Cell phone bills
16. [DISPLAY IF Q16=1 OR 2] Internet bills
17. Cable TV, satellite TV, or TV streaming service (like Netflix or Hulu) bills

18. Automobile expenses (loan/lease, insurance, gas, routine maintenance)
[ANCHOR]
0. Other, please specify: [OPEN-ENDED RESPONSE]
99. Prefer not to answer

Demographics [ASK ALL]

We have a few more questions about your household to ensure we are hearing from a representative sample of Ameren Illinois customers. Please know these questions are for statistical purposes only and will **not** be documented in your household's Ameren account.

[ASK ALL]

Q39. Are you or other adult household members currently ...? *Please select all that apply.*

[MULTIPLE RESPONSE]

1. Employed full-time
2. Employed part-time
3. Self-employed
4. Not employed, but actively looking for work
5. Not employed, and not looking for work
6. Retired
7. A student
8. Homemaker or stay-at-home caregiver

[ASK IF Q39=1, 2, OR 3]

Do you or other members of your household have wages that are garnished? *Wage garnishment occurs when a person's earnings are required by a court order to be withheld by an employer for the payment of a debt.*

1. Yes
2. No
99. Prefer not to answer

[ASK ALL]

Q40. What is your highest level of education?

1. Elementary or middle school (grades K-8)
2. Some high school (grades 9-12)
3. High school degree or GED
4. Some college, no degree
5. Associates or trade/vocational school degree
6. Bachelor's degree
7. Graduate or professional degree
99. Prefer not to answer

[ASK ALL]

Q41. Which of the following describes your ethnic background? *Please select all that apply.*

[MULTIPLE RESPONSE; RANDOMIZE 1-5]

1. White or Caucasian
2. Black or African American
3. Hispanic or Latino

4. Asian or Pacific Islander
5. American Indian, Alaskan Native, or Native Hawaiian
0. Other, please specify: [OPEN-ENDED RESPONSE]
99. Prefer not to answer [EXCLUSIVE]

[ASK ALL]

Q42. Do you identify as male, female, or something else?

1. Male
2. Female
3. Non-binary or other
99. Prefer not to answer

[ASK ALL]

Q43. What is the primary language spoken in your home?

1. English
2. Spanish
3. Polish
4. Mandarin
5. Cantonese
6. Tagalog
7. Korean
8. German
0. Other, please specify: [OPEN-ENDED RESPONSE]
99. Prefer not to answer

[ASK ALL]

Q44. Excluding utilities, what is the total monthly [IF Q2=1, DISPLAY: housing payment, IF Q2=2, DISPLAY: rent] for your home? *If your household does not have a monthly [IF Q2=1, DISPLAY: housing, IF Q2=2, DISPLAY: rent] payment, please type in 0.*

1. \$[NUMERIC RESPONSE]
99. Prefer not to answer

COVID Impacts [ASK ALL]

Q45. How has the COVID-19 pandemic impacted your household's financial situation? Would you say your overall financial situation had gotten better, worse, or stayed about the same since before the pandemic began?

1. A lot better
2. Somewhat better
3. A little better
4. About the same
5. A little worse
6. Somewhat worse
7. A lot worse

Discrete Choice Exercise [ASK ALL]

[ASK ALL]

Q46. If you were to seek help to reduce your monthly energy bills, which of the following would you be **most likely** and **least likely** to go to for help?

[MAXDIFF WILL RANDOMLY PULL SELECTIONS FROM THIS LIST]

1. Ameren Illinois' Customer Service phone line
2. Ameren Illinois' website
3. An in-person Ameren Illinois bill payment location
4. Youtube
5. Google/internet search
6. Contractor
7. Social services agency or case worker
8. Your landlord or property manager
9. Hardware or home improvement store
10. Your church or other faith-based community
11. Your local government's website
12. Bank or credit union

Closing [ASK ALL]

[ASK ALL]

Q47. Would you or other members of your household be willing to participate in future research studies by Ameren Illinois that are similar to this one?

1. Yes
2. Maybe
3. No

[ASK ALL]

Q48. That's all of our questions. As a thank you for your time, we would like to send you a \$10 gift card. Please provide us with the email address we should send the gift card to.

1. [OPEN-END]
2. I don't have access to email
3. I don't want the gift card

[IF Q48=2]

Q49. We will mail you a \$10 VISA gift card to your preferred mailing address. It can be used anywhere credit cards are accepted and will take up to 8 weeks for processing and delivery to your address. To receive your \$10 Visa gift card, please confirm we have the correct name and mailing address.

[DISPLAY: NAME. MAILING ADDRESS, CITY, STATE, ZIP CODE]

1. This is the correct name and mailing address
2. This is **not** correct the correct name and mailing address
3. I don't want the gift card

[ASK IF Q49=2]

Q50. Please provide your name and mailing address.

1. First and last name: [OPEN-END]
2. [DISPLAY IF Q49=2] Street address (include any apartment or unit numbers): [OPEN-END]
3. [DISPLAY IF Q49=2] City: [OPEN-END]
4. [DISPLAY IF Q49=2] State: [OPEN-END]
5. [DISPLAY IF Q49=2] Zip Code: [OPEN-END]

Appendix B. Energy Burden Methods and Regression Results

Energy Burden Methods

Energy burden is a measure of economic hardship and is central to the objectives of this study. The standard, basic calculation of “customer energy burden” is the sum of each customer’s household energy bills during a given year divided by their household income for that year, notated as:

Equation 3. Customer Energy Burden

$$\text{Customer Energy Burden} = \frac{\text{Annual Household Energy Bills}}{\text{Annual Household Income}}$$

A weighted average of individual customer energy burden results represent the overall average energy burden metric for any given analysis group (e.g., average low income customer energy burden).

To estimate annual household energy bills, we combined AIC billing data for calendar year 2020,²⁷ estimated non-AIC electric and natural gas costs,²⁸ and self-reported propane and wood/wood pellets costs.²⁹

To estimate annual household income for energy burden calculations, we took the midpoint of the household income range customers selected in the survey (e.g., \$30,000 to less than \$34,999 = \$32,500 midpoint). For the highest income category that respondents could select (above \$200,000), we used a value of \$200,001.

We did not include all survey respondents in the energy burden analysis. After removing customers with insufficient billing data to calculate energy burden (26% of all respondents), we excluded customers with energy burden estimates exceeding 20% from the energy burden analyses. These outlier cases were rare: limited to a subset of customers reporting “no income whatsoever in 2020” or 2020 household income “less than \$10,000” (representing less than 2% of all respondents). These cases produced extremely high energy burden values; in some cases up to nearly 4,000%. As such, including them would obscure interpretation of any estimate of average burden. Of those reporting “less than \$10,000” in income, only a subset demonstrated energy burdens exceeding 20% (1% of all respondents). We were ultimately able to include 996 customers, or 73% of all survey respondents, in the energy burden analysis.

Modified Energy Burden Methods

A potential shortcoming of the energy burden metric is that it does not account for the value of public assistance benefits that qualified customers receive. Customers receiving public benefits likely have a lower

²⁷ We summed 2020 AIC billing data—either electricity, natural gas, or both—for each respondent. We did not estimate energy burden for customers that lacked complete AIC billing data for 2020 (26% of all respondents); respondents needed at least 12 billing cycles for a given fuel type to be included in this calculation. As billing cycles may not correspond precisely with calendar years, some respondents have January 2021 billing data included in their 2020 annual AIC cost estimate as to capture a full 12 months of AIC energy costs.

²⁸ We used regression-based techniques to estimate annual electric or natural gas costs for customers that receive either service from a different utility. Survey data provided the inputs necessary to indicate whether a given AIC electric-only customer received natural gas from another utility (e.g., Nicor Gas). Due to insufficient data, we were unable to predict fuel use and costs for some customers that only receive electric or gas service (respectively) from AIC 4% of respondents); we did not estimate energy burden for these customers.

²⁹ Alternative fuel costs were only included from customers who reported using propane or wood/wood pellets indoors for primary cooking, water heating, or space heating needs. Indoor wood and propane users who could not provide annual estimated fuel costs were excluded from energy burden calculations.

energy burden than reflected by the simple energy burden metric since public benefits enable customers to use more their disposable income toward affording basic needs than would be the case without public benefits.

The value of public benefits is included in the modified energy burden metric, notated as follows:

Equation 4. Modified Energy Burden

$$\text{Modified Energy Burden} = \frac{\text{Annual Household Energy Bills}}{\text{Annual Household Income} + \text{Value of Public Benefits Received}}$$

To measure the value of public assistance benefits customers received annually, we first asked customers in the survey who reported receiving any public assistance which specific types of benefits they received during the past year.³⁰ Customers could choose from:

1. Housing assistance such as rent payment assistance, Section 8, or other subsidized housing
2. Food assistance such as Supplemental Nutrition Assistance Program (SNAP), Women-Infant-Children Food Program (WIC), or other food assistance
3. Medical assistance from Medicare, Medicaid, or Children's Health Insurance (CHIP)
4. Energy assistance such as Family Electric Rate Assistance (FERA) or Low-Income Home Energy Assistance Program (LIHEAP)
5. Financial assistance such as Temporary Assistance for Needy Families (TANF), Supplemental Security Income (SSI), or other welfare programs
6. Government child-care assistance such as Head Start

Next, we calculated the estimated dollar value of the public assistance benefits. The data sources and calculations vary by each type of public assistance, as described in more detail in the subsections below. After we calculated the average dollar value of public assistance benefits, we added them to the annual income of customers who reported receiving the benefits and computed the modified energy burden metric. The following subsections provide additional details on each benefit estimate.

Housing Benefits Estimates

Housing benefits typically cover the cost of rent that is above one-third of a household’s annual income. To estimate the dollar value of housing benefits like public housing, Section 8 vouchers, and subsidized private housing, we used the approach developed by the U.S. Census Bureau.³¹ The Census Bureau’s formula takes into account annual household income and local average housing costs, as notated:

Equation 5. Housing Benefits

$$\text{Housing Benefits} = (\text{Fair Market Housing} - [0.3 * \text{Income}]) * ([0.44 * \text{Local Area Adjustment}] + 0.56)$$

Fair market rent is based on the number of bedrooms in the housing unit and the county where the unit is located, and is tracked by the U.S. Department of Housing and Urban Development (HUD).³² We obtained the

³⁰ We did not include cash-based benefits like Social Security, unemployment compensation, disability, or veterans’ benefits since these are issued at regular time-intervals with predictable values, and thus are likely included in self-reported income estimates.

³¹ Johnson, P., Renwick, T., and Short, K. 2010. *Estimating the Value of Federal Housing Assistance for the Supplemental Poverty Measure*. <https://www.census.gov/content/dam/Census/library/working-papers/2010/demo/spm-housingassistancejuly2011.pdf>

³² HUD Fair Market Rent data: <https://www.huduser.gov/portal/datasets/fmr.html>. Since this dataset did not include values for 5-bedroom and 6-bedroom units, we estimated those values by averaging the difference in average cost between consecutive unit sizes, and increasing that resulting average to get to 5-bedroom and 6-bedroom costs.

number of bedrooms in customers’ homes from their survey response and estimated annual household income by taking the midpoint of the income range customers selected in the survey. The local area adjustment is the ratio of the local average housing cost to the national average cost for each size unit, and it adjusts housing benefits accordingly in areas with very high or low housing costs. We used the national average cost for each size unit from the 2019 California Statewide LINA study conducted by Opinion Dynamics and adjusted those values for inflation to estimate 2020 national average costs.^{33,34}

Food Benefits Estimates

We estimated the value of benefits for three food assistance programs: Supplemental Nutrition Assistance Program (SNAP), National School Lunch Program (NSLP), and Supplemental Nutrition Program for Women, Infants, and Children (WIC). SNAP benefits go to income-qualified households of any type, school lunch benefits go to income-qualified households’ children who are in primary school (grades K-12), and WIC benefits go to income-qualified households with women, infants, and/or children under five to help meet their nutritional needs. We calculated annual average food benefit dollar estimates from for these three programs using the following formula:

Equation 6. Food Benefits

$$\text{Food Benefits} = (\text{SNAP}_{\text{per household}}) + (\text{WIC}_{\text{per child}} * \text{Children in Household} < 7 \text{ y.o.}) + (\text{NSLP}_{\text{per child}} * \text{Children in Household } 7\text{-}17 \text{ y.o.})$$

We estimated the SNAP average monthly benefit values for 2020 from the Center on Budget and Policy Priorities’ guide to SNAP eligibility and benefits, and data from the Food and Nutrition Service within the U.S. Department of Agriculture.^{35,36} We also used data from the U.S. Department of Agriculture to estimate Illinois’ average value of WIC and NSLP benefits per child.^{37,38} We estimated customers’ household size and number of children in the household from their responses to a survey question asking for the number of household members by age groups (under 6, 7 to 17, 18 to 34, 35 to 64, 65 to 79, and 80 or older).³⁹

Medical Benefits Estimates

We estimated the dollar value of medical benefits from MediCAID/MediCARE in terms of recipients’ out of pocket medical expenses and not in terms of the total medical benefits received. Limiting the benefits to recipients’ out of pocket expenses and comparing them to the out of pocket medical expenses of nonrecipients of MediCAID/MediCARE provides a more accurate estimate of the additional dollar value of medical benefits recipients receive. We used the following formula for calculating the average annual value of these benefits:

³³ 2019 CA Low-Income Needs Assessment: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-efficiency/iqap/2019linavol1.pdf>

³⁴ We used this approach for all unit sizes except for 1-bedroom and 2-bedroom units, for which we used the values estimated by the National Low Income Housing Coalition: <https://nlihc.org/resource/nlihc-releases-out-reach-2020>

³⁵ Center on Budget and Policy Priorities: <https://www.cbpp.org/research/food-assistance/a-quick-guide-to-snap-eligibility-and-benefits>

³⁶ USDA SNAP 2020 estimates: <https://www.fns.usda.gov/snap/fy-2020-cost-living-adjustments>

³⁷ USDA WIC 2020 estimates: <https://www.fns.usda.gov/pd/wic-program>

³⁸ USDA NSLP 2020 estimates: <https://www.fns.usda.gov/pd/child-nutrition-tables>

³⁹ There were 19 customers who did not list any household members in any age group. For those cases, we assumed that their household only has one member (themselves), since they had already confirmed in the survey that the household in question was their primary residence.

Equation 7. Medical Benefits

$$\text{Medical Benefits} = (\text{Avg Spending}_{\text{No MediCAID/MediCARE}} - \text{Avg Spending}_{\text{MediCAID/MediCARE}}) * \text{Household Size}$$

We estimated the average out of pocket expenditures for recipients and nonrecipients of MediCAID/MediCARE using data from the 2019 Medical Expenditure Panel Survey (MEPS).⁴⁰ We used customers' responses to a survey question about the number of people in their household to estimate household size.³⁹ We included children in the household size estimate since children in families that qualify for MediCAID/MediCARE often receive CHIP. Data are not available for the estimated value of CHIP benefits, but MediCAID/MediCARE benefits can serve as a proxy.

Financial Benefits Estimates

One of the most common financial assistance programs is the Temporary Assistance for Needy Families (TANF), which support income-qualified families with a child dependent(s) under 19 years old. The value of these benefits is determined based multiple household characteristics in addition to income and number of children (e.g., number of children, number of dependents, disabled caretakers, etc.). We calculated the annual dollar value of financial benefits using the following formula:

Equation 8. Financial Benefits

$$\text{Financial Benefits} = \text{TANF}_{\text{Max per household}} * (\text{TANF}_{\text{3-Person Family}} / \text{TANF}_{\text{Max 3-Person Family}})$$

We collected 2020 TANF dollar value estimates for Illinois from data reported by Illinois Department of Human Services and the U.S. Department of Health and Human Services' (HHS) Office of Family Assistance.^{41,42} We also calculated an adjustment factor using the ratio of the average TANF benefit value to the maximum TANF benefit value for a family of three—where two are children—to calculate the average maximum benefit each household is eligible for rather than just the average benefit. For example, the maximum benefit for a household with two children (where assistance includes children only) in Illinois is \$326, and the average benefit is \$319 for a household with two children. The resulting adjustment factor of 0.979 (\$319/\$324) was applied to all household sizes. We estimated the number of children in each household based on customers' responses to a survey question about number of household members by age group.

Energy Benefits Estimates

We estimated the dollar value of the Low Income Home Energy Assistance Program (LIHEAP) that supports eligible low-income households with their heating and cooling energy costs, bill payment assistance, energy crisis assistance, weatherization, and energy-related home repairs.⁴³ We calculated the annual dollar value of LIHEAP by estimating the midpoint between the minimum and maximum benefit levels for LIHEAP in Illinois in 2020. We used data from the U.S. Department of Health and Human Services and assigned that midpoint value to households that had participated in LIHEAP in 2020 per customers' survey responses.⁴⁴

⁴⁰ MEPS 2019 data: https://meps.ahrq.gov/mepsweb/data_stats/download_data_files.jsp

⁴¹ Illinois 2020 TANF data: <https://www.dhs.state.il.us/page.aspx?item=12678>

⁴² HHS 2020 TANF data: <https://www.acf.hhs.gov/ofa/data/characteristics-and-financial-circumstances-tanf-recipients-fiscal-year-2020>

⁴³ Benefits.gov: <https://www.benefits.gov/benefit/623>

⁴⁴ 2020 LIHEAP benefits: <https://liheapch.acf.hhs.gov/tables/benefits.htm>

Energy Burden Regression Results

We ran a multivariate regression to further understand the statistical drivers of energy burden, while controlling for the influence of other factors. The regression results are presented in Table 2. Only significant predictors ($p < .1$) are included in this model.

Table 2. Linear Regression Results Predicting Level of Energy Burden

Independent Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (B)	t	Significance (p)
(Constant)	0.058	0.004	N/A	15.751	0.000
Multifamily property	-0.012	0.004	-0.107	-2.815	0.005
Mobile home	0.015	0.005	0.099	3.206	0.001
Electric only household	-0.006	0.003	-0.068	-2.213	0.027
Home vintage	-0.003	0.001	-0.084	-2.559	0.011
Renter occupied	0.007	0.004	0.069	1.754	0.080
Boiler heating system	0.011	0.005	0.072	2.409	0.016
Portable/window air conditioner	0.009	0.004	0.074	2.367	0.018
Count of residents: 35 to 64 years old	-0.006	0.001	-0.192	-4.778	0.000
Count of residents: 65 years or older	-0.004	0.002	-0.114	-2.604	0.009
Household member with major medical condition or disability	0.005	0.002	0.076	2.390	0.017
Household did not have difficulty paying any bills	-0.008	0.002	-0.128	-3.588	0.000
Household had difficulty paying Ameren Illinois energy bills	0.007	0.004	0.076	2.085	0.037
LIHEAP recipient	0.023	0.006	0.135	3.691	0.000
Food assistance recipient (e.g., SNAP)	0.026	0.005	0.200	5.283	0.000
Medical assistance recipient (e.g., Medicare, Medicaid)	0.009	0.002	0.120	3.440	0.001
Respondent has bachelor's degree or higher	-0.009	0.002	-0.155	-4.970	0.000
Total monthly rent/housing payment (excluding utilities)	-4.556E-06	0.000	-0.090	-2.718	0.007

Note: R square = .395; Adjusted R square = .381

Appendix C. Economic and Health Hardship Methods

Economic Hardship

We also constructed a measurement of “lived economic hardship” as energy costs and energy burden alone fail to demonstrate the lived experience associated with high energy bills. To enable measurement of economic hardship, the survey included questions from previously validated metrics of financial health: the Consumer Financial Protection Bureau’s (CFPB) Financial Well-Being Scale.⁴⁵ The first question in this battery asks how each item describes the respondent’s situation, using a five-point scale from *Not at all* to *Completely*. The three items include:

- Because of my financial situation, I feel like I will never have the things I want in life.
- I am just getting by financially.
- I am concerned that the money I have won’t last.

The second set of questions in this battery asks how often each item applies to the respondent, using a five-point scale from *Never* to *Always*. The two items include:

- I have money left over at the end of the month.
- My finances control my life.

We calculated the CFPB index using the five items and the respondent’s age, as instructed by the CFPB. Scores range from 19 to 90, where lower scores correspond to higher levels of economic hardship. To ease interpretation and for consistency with prior use of the metric in other industry studies, we inversed the scale and normalized the values to a 0 to 10 scale, where higher values demonstrate greater levels of economic hardship.

Health Hardship

We constructed a measurement of “health hardship” that operationalizes household health into a quantitative value ranging from 0 (no health hardship) to 10 (high health hardship). It is comprised of two survey questions we developed from the Centers for Disease Control and Prevention’s Behavioral Risk Factor Surveillance System (BRFSS), as follows:

- **Frequency of poor health:** We asked respondents how often their health and the health of members of their household was not good during the past year, using a five-point scale from *Never* to *Most or all the time*.
- **Frequency poor health limited usual activities:** We asked respondents who indicated that they and/or members of their household experienced poor health more than never during the past year how often the poor health prevented them from doing their usual activities. We used the same five-point scale from *Never* to *Most of all the time*.

These results were summed (resulting in a range of 2 to 10), which was normalized to a 0 to 10 scale so that interpretation of the health hardship metric was similar to that of the economic hardship metric.

⁴⁵ The Researchers used The CFPB’s methods for the abbreviated version of their “Financial Well-Being Scale.” See this link for further details on the methodology: https://files.consumerfinance.gov/f/201512_cfpb_financial-well-being-user-guide-scale.pdf

Appendix D. MaxDiff Methods

In addition to standard format questions, the survey included a “MaxDiff” exercise that required respondents to choose which sources they would be most likely and least likely to go to for help when looking to find ways to reduce their monthly energy bills. MaxDiff is a discrete choice methodology that requires respondents to choose their ‘most preferred’ and ‘least preferred’ item from a randomized list presented to them on their screen. The randomized list is pulled from a larger list of options. This task is repeated multiple times, with respondents seeing a new random list each time. The MaxDiff design for this study included 12 items (see list below), with 5 items per set, and 8 sets (tasks) per respondent.

The following illustrates the question (task) framing and the list of items used in the MaxDiff exercise:

If you were to seek help to reduce your monthly energy bills, which of the following would you be **most likely** and **least likely** to go to for help?

- Ameren Illinois’ Customer Service phone line
- Ameren Illinois’ website
- An in-person Ameren Illinois bill payment location
- Youtube
- Google/internet search
- Contractor
- Social services agency or case worker
- Your landlord or property manager
- Hardware or home improvement store
- Your church or other faith-based community
- Your local government’s website
- Bank or credit union

Figure 42 shows an example MaxDiff screen, demonstrating the respondent experience.

Figure 42. Example MaxDiff Screen

If you were to seek help to reduce your monthly energy bills, which of the following would you be Most Likely and Least Likely to go to for help?

(1 of 8)

Most Likely		Least Likely
<input type="radio"/>	Contractor	<input type="radio"/>
<input type="radio"/>	Your church or other faith-based community	<input type="radio"/>
<input type="radio"/>	Your local government's website	<input type="radio"/>
<input type="radio"/>	Social services agency or case worker	<input type="radio"/>
<input type="radio"/>	Ameren Illinois website	<input type="radio"/>

Click the 'Next' button to continue...

Prior to analyzing the data, we reviewed and cleaned the MaxDiff respondent data. Resultantly, MaxDiff sample sizes differ from other survey questions due to separate data cleaning practices. In all, 54 respondents (4% of sample) were omitted from MaxDiff analysis due to incomplete or satisficing (i.e., unrealistically quick or straight lining) responses.

We used hierarchical Bayesian (HB) modeling to estimate scores for each of the 12 items included in the MaxDiff. These scores reveal the relative preference for each item. We then used the HB estimates to conduct “First Choice” simulations, which predict the proportion of customers would pursue each information source as their first option.

For more information, please contact:

Alan Elliott
Director

510-214-0180 tel
aelliott@opiniondynamics.com

1 Kaiser Plaza, Suite 445
Oakland, CA 94612



Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 492 7944 fax
800 966 1254 toll free

1000 Winter Street
Waltham, MA 02451

San Francisco Bay

510 444 5050 tel
510 444 5222 fax

1 Kaiser Plaza
Suite 445
Oakland, CA 94612

San Diego

858 270 5010 tel
858 270 5211 fax

1200 Prospect Street
Suite #G-100
La Jolla, CA 92037

Portland

503 287 9136 tel
503-281-7375 fax

1500 NE Irving Street
Suite #370
Portland, OR 97232