



Strategies for Equitable Energy Efficiency Program Design

A toolkit for two high-priority populations in
the Twin Cities:
Black homeowners and
property owners renting to Latinx households

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Executive Summary

There is a growing recognition that disparities in residential energy efficiency are as large and widespread as disparities in other aspects of life, including health, wealth, and educational outcomes. Thanks to the work of researchers and program evaluators, the contours of these disparities are increasingly well documented. Less studied, and not yet fully understood, are the causes of these disparities and the policies and programs that can remedy them.

This research project tried to address these questions through direct engagement with members of two culturally specific populations whose energy burdens¹ are nearly double that of the Twin Cities overall and much higher than comparable households in other areas: Black homeowners in North Minneapolis and surrounding suburbs, and Latinx renters in East St. Paul and South Minneapolis.

Methodology

Research was conducted in three phases. In the first phase, the research team identified and selected population groups on which to focus the project. The team used US Census data to identify six high-priority population “strata” – groups with shared geographic and demographic characteristics and higher-than-average or higher-than-expected energy burdens:

- Black homeowners in North Minneapolis and surrounding suburbs
- Black renters in urban and suburban areas
- Latinx households, mostly renters, in East St. Paul and South Minneapolis
- Hmong and other non-white households, mostly renters, in west St. Paul
- Mostly white, low/moderate income homeowners in outer-ring suburbs and rural areas
- Mostly white, low/moderate income renters in Carver and western Scott Counties

The research team worked with a Steering Committee comprised of representatives from community-based organizations, Xcel Energy, and CenterPoint Energy to select Black homeowners and Latinx renters as the focus communities for this project.

The three-part, multi-modal approach to engagement with the selected communities included web-based surveys fielded in partnership with community-based organizations, phone interviews, and virtual focus groups. The quantitative and qualitative data were synthesized, and the recommendations were shared with the Steering Committee.

¹“Energy burden” is the percent of gross household income spent on energy utilities. Energy burden has become a “dominant construct used by analysts working on low-income energy issues in the U.S.” (Brown, et al. 2020, p. 3). According to the U.S. Department of Energy’s Low-Income Energy Affordability Data (LEAD) Tool, in 2018, the average energy burden in Minnesota was 2%, but households with income below 30% of the state median, had an average energy burden of 13% (DOE, 2019). Most analyses of energy burden are based on household electricity, natural gas, and delivered fuel costs and do not consider transportation-related energy costs (such as gasoline expenditures).

Results and Recommendations

The key results of this project are presented as two “toolkits,” one for each of the focus communities. In the case of addressing Latinx renter needs, the toolkits are focused on the property owners, because they will make many of the key decisions around building efficiency improvements, such as insulation and air sealing as well as heating, cooling, and water heating systems. The toolkits provide guidance on how energy efficiency programs can address the expressed needs of each community. They include suggestions for modifying existing energy programs and developing new programs for individual program elements, including outreach, marketing, processes, costs, and financing. For example, recommendations include leveraging CenterPoint Energy’s Home Service Plus plan² as well as enhancing the Home Energy Squad and Energy Advisor Service administered for utilities by the Center for Energy and Environment (CEE)³.

Each toolkit begins with a Community Profile describing the target population’s demographics, big-picture concerns, and attitudes toward energy efficiency. It is followed by a section featuring Program Design Ideas. This section provides guidance for modifying existing programs, or developing new programs, tailored to the specific needs of the target community. Each toolkit concludes with a section on Implementation Tactics. These are recommendations for specific program elements, including outreach, marketing, processes, costs, and financing, that address the expressed needs of each community and can be employed individually within an existing program or combined in service to developing a new effort.

Table 1 lists the program design ideas for each targeted population. More information about these program ideas can be found in the Toolkit for Black Homeowners in North Minneapolis and Surrounding Suburbs beginning on page 23 and the Toolkit for Property Owners Whose Renters Include Latinx Households in South Minneapolis and East St. Paul beginning on page 44.

² [Home Service Plus](https://www.centerpointenergy.com/en-us/home-service-plus/) is an optional major appliance maintenance, repair and replacement program offered to CenterPoint customers for an added monthly fee. More information is available at <https://www.centerpointenergy.com/en-us/home-service-plus/>.

³ The [Home Energy Squad](https://www.mncee.org/home-energy-squad) is a CIP program for Xcel and CenterPoint customers that provides varying levels of home energy assessments and direct installation of energy efficiency items. The Energy Advisory Service provides complimentary follow up to help households implement recommendations from their energy assessment. More information available at <https://www.mncee.org/home-energy-squad>.

Table 1. Program ideas for each targeted population

Black homeowners in North Minneapolis and surrounding suburbs
<p>Leverage Black homeowners’ enrollment in CenterPoint Energy’s equipment service plan, Home Service Plus, to promote efficiency, lower monthly bills, and support homeowners facing costly, unexpected equipment failures.</p> <p><i>Why this recommendation?</i></p> <p>The Black homeowners in this study face an extreme financial burden when their core home equipment fails unexpectedly. These homeowners are typically not enrolled in programs targeted towards low-income households that could provide energy efficiency benefits such as the Energy Assistance, low-income CIP, or the federal Weatherization Assistance Program (WAP). However, they <i>are</i> often enrolled in CenterPoint Energy’s Home Service Plus program. The benefits of Home Service Plus have enduring appeal for the Black homeowners that participated in this research. Efficiency programs can leverage this insight to support these households when they face an unexpected equipment failure by ensuring their replacement equipment is as efficient as possible and provided at the lowest possible cost with a no- or low-interest payment plan with reasonable monthly payments.</p>
<p>Provide personalized, customized equipment replacement support to Black homeowners.</p> <p><i>Why this recommendation?</i></p> <p>Black homeowners in the targeted geographies stand to benefit greatly from a utility energy efficiency program that can support them in choosing and paying for energy efficient equipment and can help them find a qualified contractor to install the equipment if needed. The utility is one of Black homeowners’ most trusted sources of information about their home and often their first call when equipment fails. These homeowners often do not have the resources to pay out-of-pocket for unexpected expenses over \$300 and are likely to choose lower-efficiency equipment to reduce their upfront costs, to use high-cost financing, if necessary (for example, a payday loan), and/or to have their monthly budgets severely impacted by the high costs of purchasing new equipment.</p>

Black homeowners in North Minneapolis and surrounding suburbs

Build on two existing energy efficiency program offerings, the Home Energy Squad and its associated Energy Advisor Service, to launch an integrated energy efficiency advisor service that provides personalized support to Black homeowners to help them prioritize, plan, and pay for energy efficiency improvements over time.

Why this recommendation?

As an entry point to energy efficiency, the home energy audit works for many Black homeowners in North Minneapolis. The homeowners who participated in this research generally trust their utilities and are aware that utilities offer home energy audits. However, while the homeowners who participated in an audit had a positive impression of it, few took action on the recommended measures. The barriers to action are steep but not insurmountable, and will require comprehensive, personalized support in which the audit is only the starting point for a long-term relationship between the homeowner and the program. This support could include help prioritizing identified measures based on the homeowner’s goals, a customized savings plan and timeline, assistance identifying financing resources outside the utility, robust support selecting tradespeople to complete projects, and, if needed, a monthly payment plan that does not require personal debt or good credit.

Owners of rental properties in East St. Paul and South Minneapolis

Target emergency replacements by focusing outreach on contractors and other trade allies that provide service to rental property owners, and by covering the incremental cost of upgrading to the efficient model.

Why this recommendation?

Interviews and surveys with rental property owners suggest utility programs’ highest priority should be to target property owners making emergency or end-of-life equipment replacements. In order to influence property owners making emergency or end-of-life equipment replacements, it will be critical to target their trusted contractors, service providers, and vendors – the first (and often only) source owners consult when something breaks. Utility incentives will likely need to cover 100% of the *added* cost for efficient equipment.

To encourage discretionary upgrades in rental properties, offer generous incentives and make it easy for the owners.

Why this recommendation?

Only the most generous incentives will get rental property owners to replace something that is not broken and about which tenants are not complaining. All interviewed owners would make a non-emergency replacement at no cost to them, and two-thirds would make the replacement for a 50% discount. Property owners will be more likely to act on this type of offer if they can use their trusted contractors to complete the improvements, if they do not need to ask renters to verify their incomes, and if the program processes do not require much, if any, of their time.

The team’s engagement with Black homeowners, Latinx renters, and rental property owners highlighted a critical distinction in how building decision-makers – both homeowners and rental property owners – make decisions about efficiency improvements. The distinction rests on whether the purchase is an emergency decision, necessitated by equipment failure, or whether it is a non-emergency, discretionary upgrade.

This distinction frames both the program design ideas in the toolkits and the research team’s recommendation that programs prioritize targeting one type (emergency decisions) over the other (non-emergency decisions). Table 2 provides an overview of key differences between the two decision types. Additional information about this concept is available on page 18, Emergency vs. non-emergency decisions: A framework for program design.

Table 2. Differences between emergency and non-emergency efficiency decisions

<i>Questions asked to survey participants.</i>	Emergency Decision	Non-emergency decision
Must the owner make the purchase?	Yes	No
How time-sensitive is the decision?	Extremely	Not at all
How much is the owner willing to spend?	At least the minimum amount required for the new equipment	Little to nothing
Will the owner take on a substantial financial burden, including using high-interest financing or incurring a large monthly payment, in order to make the purchase?	Yes	Unlikely
How important are non-energy benefits like improved comfort or reliability, relative to cost and availability?	Much less important or not at all important	As important or more important

Next Steps for Equitable Research and Program Design

As mentioned previously, the report includes several tactics suggested to make implementation or recommendations possible. While the recommendations in this document are tailored specifically to the populations with whom the team engaged, many aspects will likely be relevant to other populations that share similar characteristics. We encourage readers to explore how they can apply these recommendations in their own communities.

This project raised many questions that may prove fruitful fodder for future research, pilot programs, and policy innovation. The following is a select list of research questions and ideas offered by the research team for the benefit of academic researchers, efficiency industry practitioners, utility staff, and policy makers. Additional detail about these questions is available in the Next Steps for Equitable Research and Program design beginning on page 61.

1. **How can utility programs collect and share participant demographic data sufficient to support disaggregated program performance assessment?** In order to track the performance of utility programs in specific communities and target future program designs, it will be important that these data are collected and made available to the public.
2. **Can the suggested approaches be funded under current utility program regulatory rules and, if not, what policy alterations may be needed?** Utilities, community stakeholders, and regulators will want to assess the cost of implementing financial incentives and potentially labor-intensive implementation. They will need to consider whether such costs are allowed under current regulatory rules and if not allowed, what adjustments will be necessary.
3. **What are the potential impacts on the targeted communities of implementing the equitable program design recommendations?** Further research could build upon the impact analysis offered in [Appendix G](#) to determine the potential impacts of implementing the recommendations in this report.
4. **What are the culturally specific efficiency program needs of the four priority strata not selected for this project?** Others may want to conduct similar research on the other priority four strata.⁴ Could the ideas suggested here meet the needs of households of different race/ethnicity? What differences can be found?

⁴ See the discussion of priority strata on page 8 [highlighting to double check the page number when editing is finished].

Introduction

There is a growing recognition that disparities in residential energy efficiency are as large and widespread as disparities in other aspects of life, including health, wealth, and educational outcomes. Thanks to the work of researchers and program evaluators, the contours of these disparities are increasingly well documented. Several online mapping tools, for example, allow quick access to key data like energy burden⁵.

Less studied, and not yet fully understood, are the causes of these disparities and the policies and programs that can remedy them. Why are some households less energy efficient than others - is it solely the result of financial factors, or are other issues at play? How much do causal factors vary based on cultural characteristics? Can current utility programs and government policies close the gaps, or are entirely new approaches needed?

This research project explored these questions through direct engagement with members of two culturally specific populations whose energy burdens are higher than in the Twin Cities overall: Black homeowners in North Minneapolis and surrounding suburbs (hereafter referred to as Black homeowners) and property owners renting residential buildings in South Minneapolis and East St. Paul – two geographies with a high population of Hispanic and Latinx renters (hereafter referred to as rental property owners and Latinx renters, respectively).

The project team sought to understand why these homes (or rental properties) might be less efficient than others and what can be done about it. The goal was to produce a set of equitable program design ideas that efficiency program administrators and implementers could use to improve service to communities that have not benefited proportionally from energy efficiency.

The research results are presented as two “toolkits,” one for each of the focus communities. Each toolkit begins with a Community Profile describing the target population’s demographics, big-picture concerns, and attitudes toward energy efficiency. It is followed by a section featuring Program Design Ideas. This section provides guidance for modifying existing programs, or developing new programs, tailored to the specific needs of the target community. Each toolkit concludes with a section on Implementation Tactics. These are recommendations for specific program elements, including outreach, marketing, processes, costs, and financing, that address the expressed needs of each community and can be employed individually within an existing program or combined in service to developing a new effort.

While the recommendations in this document are tailored specifically to the populations with whom the team engaged, many aspects will likely be relevant to other populations that share similar characteristics. We encourage readers to explore how they can apply these recommendations in their own communities.

⁵ There are now more mapping tools related to energy efficiency and equity issues than can be listed here. They include national tools like the [U.S. Department of Energy’s LEAD tool \(U.S. Department of Energy’s LEAD tool\)](#) and the [Environmental Protection Agencies EJ Screen \(https://www.epa.gov/eiscreen\)](https://www.epa.gov/eiscreen) as well as single-state tools like [California’s CalEnviroScreen \(https://oehha.ca.gov/calenviroscreen\)](https://oehha.ca.gov/calenviroscreen) and [Washington’s Environmental Health Disparities Map \(https://doh.wa.gov/data-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map\)](https://doh.wa.gov/data-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map). Still other mapping tools have been launched by universities and non-profit organizations.

Emergency vs. non-emergency decisions: A framework for program design

The team’s research with Black homeowners, Latinx renters, and rental property owners lifted up a critical distinction in how building decision-makers make decisions about efficiency improvements. The distinction rests on whether the purchase is an **emergency decision, necessitated by equipment failure** or whether it is a **non-emergency, discretionary upgrade**.

Nearly every aspect of a building owner’s decision-making differs based on this seemingly simple distinction between **emergency** and **non-emergency decisions**. Table 3 provides an overview of key differences.

Table 3. Differences between emergency and non-emergency efficiency decisions

<i>Questions asked to survey participants.</i>	Emergency decision	Non-emergency decision
Must the owner make the purchase?	Yes	No
How time-sensitive is the decision?	Extremely	Not at all
How much is the owner willing to spend?	At least the minimum amount required for the new equipment	Little to nothing
Will the owner take on a substantial financial burden, including using high-interest financing or incurring a large monthly payment, in order to make the purchase?	Yes	Unlikely
How important are non-energy benefits like improved comfort or reliability, relative to cost and availability?	Much less important or not at all important	As important or more important

The findings from this research suggest the differences between emergency and non-emergency decision-making are so great – for both Black homeowners and rental property owners – that different program designs are required.

As a result, the program ideas in these toolkits are categorized based on which of the two very different decision-making contexts they target:

- Programs targeting emergency replacements: These programs can aim to capture efficiency opportunities presented by equipment failure or equipment end of life. In both circumstances, an equipment replacement is necessary, and the timeline is short. The goal of programs in this category is to ensure that newly purchased equipment is as efficient as possible.
- Programs targeting non-emergency, discretionary improvements: These programs can aim to encourage building owners to make efficiency improvements that are neither necessary nor required. In these situations, the building owner has no specific reason to act, and thus programs must convince them that the benefits of making the improvements outweigh the cost. The goal of programs in this category is to increase the number of non-emergency efficiency improvements made by building owners.

The surveys, interviews, and focus groups conducted for this project also suggest that these two efficiency program goals should not be treated equally. The evidence is overwhelming that, for both Black homeowners and rental property owners, encouraging discretionary upgrades will be challenging for many reasons. Because many energy decisions are made in an emergency, there is a potentially large untapped opportunity for encouraging more energy efficient improvements. Utility program administrators may thus want to prioritize emergency replacements – opportunities presented by equipment failure or end of life.

Table 4, below, lists the program ideas for each targeted population by category (emergency vs. non-emergency) and links to the relevant section of the document. Two of the program ideas build off existing programs and suggest leveraging those programs to promote energy efficiency and offer personalized support to households. For example, recommendations include leveraging CenterPoint Energy’s Home Service Plus Plan⁶ as well as enhancement to the Home Energy Squad and Energy Advisor Service administered by the Center for Energy and Environment (CEE)⁷.

⁶ [Home Service Plus](https://www.centerpointenergy.com/en-us/home-service-plus/) is an optional major appliance maintenance, repair and replacement program offered to CenterPoint customers for an added monthly fee. More information is available at (<https://www.centerpointenergy.com/en-us/home-service-plus/>).

⁷ The [Home Energy Squad](https://www.mncee.org/home-energy-squad) is a CIP program for Xcel and CenterPoint customers that provides varying levels of home energy assessments and direct installation of energy efficiency items. The Energy Advisory Service provides complimentary follow up to help households implement recommendations from their energy assessment. More information available at (<https://www.mncee.org/home-energy-squad>).

Table 4. Program ideas for each targeted population

Black homeowners	Program ideas
<i>Emergency decision</i>	Leverage Black homeowners’ enrollment in CenterPoint Energy’s equipment service plan, Home Service Plus, to promote efficiency, lower monthly bills, and support homeowners facing costly, unexpected equipment failures
<i>Emergency decision</i>	Provide personalized, customized equipment replacement support to Black homeowners
<i>Non-emergency decision</i>	Build on two existing energy efficiency program offerings, the Home Energy Squad and its associated Energy Advisor Service, to launch an integrated energy efficiency advisor service that provides personalized support to Black homeowners to help them prioritize, plan, and pay for energy efficiency improvements over time
Rental property owners	Program ideas
<i>Emergency decision</i>	Target emergency replacements by focusing outreach on contractors and other trade allies that provide service to rental property owners, and covering the incremental cost of upgrading to the efficient model
<i>Non-emergency decision</i>	To encourage discretionary upgrades in rental properties, offer generous incentives and make it easy for the owners

Overview of Research Approach

This research was conducted in three phases. A more detailed description of the methodology is provided in [Appendix A: Methodology](#).

Phase 1: Identify and select target communities

In the first phase, the research team needed to select population groups on which to focus the research project. The team used household-level demographic and energy-consumption data collected by the US

Census' American Community Survey (ACS)⁸ to identify six high-priority population “strata” – groups with shared geographic⁹ and demographic characteristics and higher-than-average or higher-than-expected energy burdens:

- Black homeowners in North Minneapolis and surrounding suburbs
- Black renters in urban and suburban areas
- Latinx households, mostly renters, in East St. Paul and South Minneapolis
- Hmong and other non-white households, mostly renters, in West St. Paul
- Mostly white, low/moderate income homeowners in outer ring suburbs and rural areas
- Mostly white, low/moderate income renters in Carver and west Scott Counties

In defining strata, the team prioritized three demographic criteria: race/ethnicity, income, and housing tenure (renter/owner). However, in all, more than 50 demographic variables were used to characterize the strata. While strata have shared energy, demographic, and geographic characteristics they are not “communities.” Rather, they are population groups from which it was hoped that self-determined communities could be subsequently identified through qualitative means.

The team presented detailed descriptions of the six high-priority strata to a Steering Committee comprised of representatives from community-based organizations working at the intersection of housing and energy justice, Xcel Energy, and CenterPoint Energy. Based on discussion informed by Steering Committee members and with the project’s research team, the team decided to focus the project on two strata: Black homeowners in North Minneapolis and surrounding suburbs and Latinx renters in East St. Paul and South Minneapolis.

The selection of a strata comprised of renters required a subtle shift in the project approach. While the design had called for focus on three communities, the research team reallocated resources in order to engage with two distinct populations within the Latinx renter strata that each impact the energy efficiency of homes: renters and property owners. This yielded two communities of focus (Black homeowners and Latinx renters) and three targeted populations (Black homeowners, Latinx renters, and property owners renting to Latinx households).

Phase 2: Community engagement

Data collection from the targeted communities was performed using an engagement methodology that employed a situational analysis of community members’ experience with, and knowledge of, energy

⁸ Due to lags in when ACS data is reported publicly, we relied primarily on data collected in 2017 during Phase 1. However, after completing all Phases of the project, we returned to our demographic analysis to assess any changes with more recent data collected by the ACS in 2019. We note any large deviations from 2017-2019 in the text where important.

⁹ Our priority in analyzing demographic and energy-consumption data was to identify household-level correlates of higher-than-average or higher-than-expected energy burden, rather than average trends in a narrow geographic area. Therefore, we rely on the 1-Year Estimates from the ACS that report household-level data geographically identified to “Public Use Microdata Area” (PUMA). Relying on PUMAs required us to cast a wider geographic net in identifying strata (compared to Census tracts or Census block groups) but allowed us to get much more specific in identifying demographic correlates without concern for the problems of ecological inference (Deitz and Meehan, 2019). For reference of the size of a PUMA, there are 10 PUMAs covering Hennepin County and 6 PUMAs covering Ramsey County.

efficiency tools and resources. The team used a three-part, multi-modal approach to engagement: web-based surveys, phone interviews, and virtual focus groups. This strategy supported participation by a diverse cross section of stakeholders in each community. Additional detail about the community engagement efforts is provided in Appendices C-F.

Phase 3: Analysis, synthesis, and reporting

In the final work phase, the research team synthesized the data collected during community engagement using quantitative and qualitative methods. Findings from the targeted communities were compared to studies in other geographies. The draft program design recommendations were then shared with the Steering Committee.

Toolkit for Black Homeowners in North Minneapolis and Surrounding Suburbs

Black homeowners in North Minneapolis and the surrounding suburbs of Brooklyn Center, Golden Valley, New Hope and Robbinsdale have, on average, among the highest energy burdens in the Twin Cities and higher energy burdens than Black homeowners in other geographies.

This toolkit presents three program design ideas intended to spark discussion and creative thinking around program design implementation for these households. Each program idea includes a discussion of the research findings that led the team to suggest it and specific design elements that will be important to include to address the needs expressed by Black homeowners. When possible, current Conservation Improvement Program (CIP) program practices are referenced, either as examples of approaches that align with the research findings or as examples of practices that do not.

Table 5 summarizes the program design ideas in this toolkit. The research team recognizes that the details of program implementation will be tailored to the capacities of the program administrator, governing rules of the territory, and the geographic and cultural context. Each reader will need to determine the suitability of these ideas for their unique situation.

Table 5. Program design ideas for Black homeowners

Black homeowners	Program ideas
<i>Emergency decision</i>	<p><i>Program idea #1</i> Leverage Black homeowners’ enrollment in CenterPoint Energy’s equipment service plan, Home Service Plus, to promote efficiency, lower monthly bills, and support homeowners facing costly, unexpected equipment failures</p>
<i>Emergency decision</i>	<p><i>Program idea #2</i> Provide personalized, customized equipment replacement support to Black homeowners</p>
<i>Non-emergency decision</i>	<p><i>Program idea #3</i> Build on two existing energy efficiency program offerings, the Home EnergySquad and its associated Energy Advisor Service, to launch an integrated energy efficiency advisor service that provides personalized support to Black homeowners to help them prioritize, plan, and pay for energy efficiency improvements over time</p>

Community Profiles

Black homeowners in North Minneapolis and surrounding suburbs engaged in this project reside in the geographic areas depicted in Figure 1. The following community profile draws on data from the US Census American Community Survey 1-Year Estimates for the year 2017 and on surveys and interviews conducted specifically for this project with 27 Black homeowners in the Minneapolis neighborhoods of Jordan, Hawthorne, Willard Hay, Near North, and Brooklyn Center (zip codes 55411 and 55429 and Census Public Use Microdata Areas [PUMAs] 1404 and 1405). Updated demographic data for the 2019 ACS analyzed after communities were engaged directly is shown in [Appendix B](#).

Figure 1. Location and key details for two targeted Black homeowner communities: North Minneapolis (PUMA 1405) and surrounding suburbs (PUMA 1404)¹⁰



¹⁰ Maps for PUMAs are approximate. For detailed [PUMA maps](http://proximityone.com/puma/puma10_mn_minneapolis.png) see: (http://proximityone.com/puma/puma10_mn_minneapolis.png).

Table 6. Black Homeowner Mean Income and Energy Burden, 2017 ACS data

Black homeowners in:	Est. # of households	Mean Income	Energy Burden
North Minneapolis/St. Anthony (#1405)	4,714	\$54,545	8.1%
Brooklyn Center/Golden Valley/New Hope/Robbinsdale (#1404)	1,556	\$60,142	7.1%

Demographics

Energy Burden

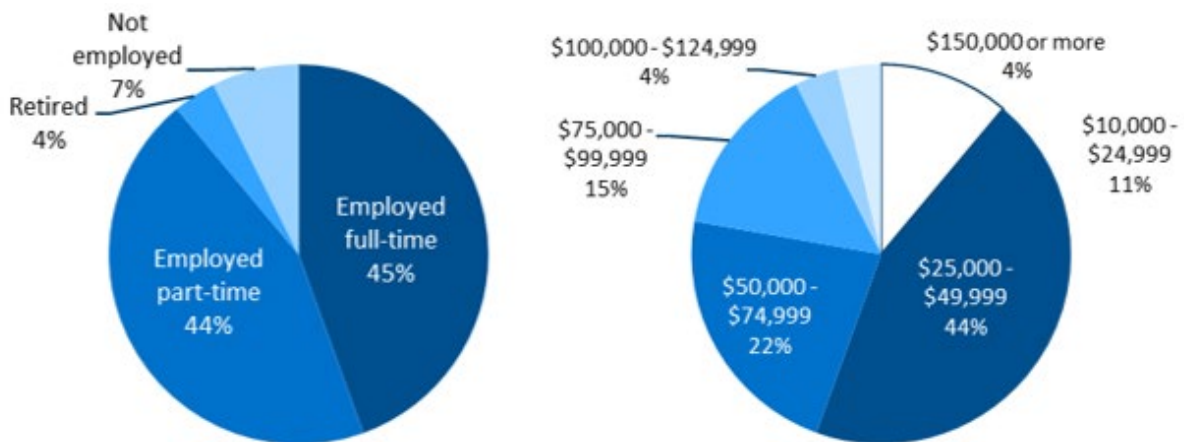
According to data from the 2017 American Community Survey (U.S. Census Bureau, 2021), the energy burden for Black homeowners throughout the Twin Cities metropolitan area is 4.7%, while in North Minneapolis and Brooklyn Center, the energy burden for Black homeowners is 8.1% and 7.1%, respectively. These figures are among the highest in the metropolitan area for Black homeowners.

Employment and Income

A substantial portion of Black homeowners surveyed in North Minneapolis and Brooklyn Center were in the labor force (89% of respondents are employed either full- or part-time); however, 77% made less than \$75,000. Figure 2 shows the distribution of employment status and income for the surveyed Black homeowners.

The employment rate among those surveyed was higher than figures reported in the US Census, which indicated a rate of 66% in North Minneapolis and 57% in Brooklyn Center. The average household income reported by the US Census was slightly higher at approximately \$60,000 in North Minneapolis and \$54,000 in Brooklyn Center.

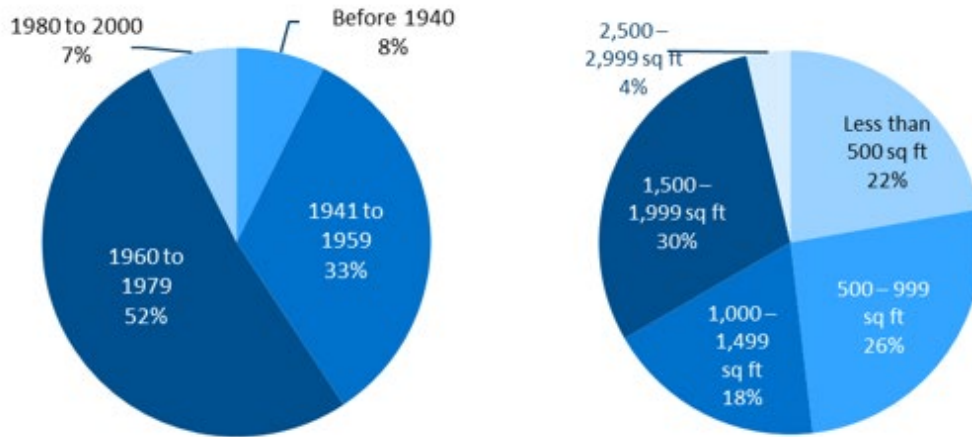
Figure 2. Employment and household income data from surveyed Black homeowners:
 Employment Status (on left) Household Income (on right)



Housing

Ninety percent of Black homeowners surveyed lived in homes built before 1980, and 89% had lived in their homes for 15 years or more. About half (48%) of their homes are larger than 1,000 square feet. Figure 3 shows the distribution of home age and size for the surveyed Black homeowners.

Figure 3. Year built and square footage of surveyed Black homeowners' homes:
Year Built (on left) Square Footage (on right)



According to the US Census, 88% and 94% of Black homeowners in North Minneapolis and Brooklyn Center, respectively, heat their homes with gas.

Additional Population Characteristics

All survey respondents speak English, and 50% have a bachelor's degree or higher.

Table 7 shows key demographic details for the Black homeowners in the targeted geographies and two comparison populations: all homeowners in the geographies and Black homeowners in the Twin Cities metro area.

Table 7. Comparison of key demographic details between Black homeowners in the targeted geographies, all homeowners in their geographies, and all Black homeowners in the Twin Cities metro area (shaded cells indicate higher values)

<i>Location</i>	Brooklyn Center/Golden Valley/New Hope/Robbinsdale	Brooklyn Center/Golden Valley/New Hope/Robbinsdale	North Minneapolis/St. Anthony	North Minneapolis/St. Anthony	Twin Cities metro
<i>Homeowner type</i>	Black homeowners	All homeowners	Black homeowners	All homeowners	Black homeowners
Energy burden¹¹	7.1%	3.5%	8.1%	4%	4.7%
% w/ high energy burden	34%	13%	53%	16%	25%
Avg. Income	60,142	96,892	54,545	93,185	80,039
House value	189,103	237,309	116,606	230,729	240,528
Monthly mortgage payment	1,129	1,215	997	1,162	1,235

¹¹ Following the methodology used for the U.S. Department of Energy’s Low-Income Energy Affordability Data (LEAD) Tool (DOE, 2019), we operationalize energy burden using data from the American Community Survey’s self-reported energy utility expenditures divided by income.

<i>Location</i>	Brooklyn Center/Golden Valley/New Hope/Robbinsdale	Brooklyn Center/Golden Valley/New Hope/Robbinsdale	North Minneapolis/St. Anthony	North Minneapolis/St. Anthony	Twin Cities metro
<i>Homeowner type</i>	Black homeowners	All homeowners	Black homeowners	All homeowners	Black homeowners
Avg. # of bedrooms	4	4.1	3.6	4	4.1
Electricity cost	1,787	1,288	1,305	1,215	1,519
Natural gas cost	1,470	961	1,272	936	937
Heat with gas	94%	92%	88%	93%	81%
Heat with electricity	6.1%	6.8%	12%	6%	16%
Avg. # of generations in household	1.9	1.4	1.4	1.4	1.7
Employment	57%	70%	66%	79%	85%
Food Stamp	11%	3%	30%	8%	10%
% LMI	72%	34%	70%	40%	51%

Homeowners' Knowledge of Energy Efficiency

Knowledge of energy efficiency services and program offerings varied significantly among the population surveyed. All interviewees were aware of the concept of energy efficiency and stated that such upgrades could be helpful to reduce energy costs and make their homes more comfortable. Despite a clear need for and ability to benefit from energy efficiency, **respondents framed the concept of energy efficiency as a “nice to have” or “luxury”** while acknowledging the “downside” of not making improvements (i.e., higher energy consumption and utility bills). Yet, despite limited resources, Black homeowners *referenced* making improvements to their homes: 100% of survey respondents said they are somewhat likely to complete a home improvement project in the next year and many have made “partial” improvements (e.g., replacing some but not all windows).

Interviewees were aware of the concept of an energy audit (45% of survey respondents were aware of the Home Energy Squad); however, **most homeowners were not aware of energy efficiency programs offered by Xcel Energy or CenterPoint Energy**. Specifically, one homeowner was aware of CenterPoint Energy’s smart thermostat rebate;¹² none were aware of any appliance or retrofit programs, and 50% were aware of Energy Assistance, which is not a utility program but can serve as an entry point to learning about efficiency programs.

Homeowners are interested in hearing about the energy efficiency experiences of others before making a decision. Roughly 50% of respondents indicated a desire to learn about other homeowners’ experiences with energy efficiency programs, services, and products via reviews and testimonials. When asked to identify the most important reason for making a home improvement, over 70% of respondents indicated “to make their home look better” as a priority, roughly 65% indicated to “make the air in my home healthier,”¹³ and 50% indicated to “make the temperature in their home more comfortable.”

Homeowners often refer to their utility or a trusted retailer or service professional for information related to energy efficiency programs and services (e.g., program applications, rebate forms, and educational material). When asked whom they trust for advice about repairs or home improvements, 60% of respondents indicated they often visit their preferred retail store and ask a salesperson, technician, or contractor. In comparison, 100% of those interviewed mentioned their utility, with a particular focus on CenterPoint Energy’s Home Service Plus program. These “points of first contact” are critical entry points for homeowners to access energy efficiency programs and services.

Homeowners would like the autonomy to select technicians or contractors of their choosing while still receiving a rebate for an appliance replacement or upgrade. When asked what would dissuade them from participating in a discount or rebate program for an appliance purchase, over 60% of respondents indicated limited availability of installation time slots (or need to wait for an eligible installer) as a prime reason. Roughly 50% identified a “limited group of eligible installers” as a dissuading factor. The homeowners interviewed have a strong network of support but do not have relationships with technical

¹² [CenterPoint Energy offers residential customers a rebate](https://www.centerpointenergy.com/en-us/residential/save-energy-money/efficiency-programs-rebates?sa=mn) of up to \$50 on programmable or smart thermostats. (https://www.centerpointenergy.com/en-us/residential/save-energy-money/efficiency-programs-rebates?sa=mn)

¹³ The Environmental Protection Agency has compiled resources on the intersection of energy efficiency and indoor air quality for single-family home renovations (EPA, 2021a) and multi-family homes (EPA, 2021b).

experts that can help them navigate the decision-making process associated with home improvements. They have difficulty deciphering whether or not a piece of equipment should be repaired or replaced and often do not have the financial resources to hire someone they trust to troubleshoot.

Homeowners' Ability to Afford Improvements

Homeowners are often unable to afford the upfront cost for major appliances, even when rebates are available. Upfront cost and financing present significant barriers to increasing access to energy efficiency programs and services. Homeowners are often income insecure and living paycheck to paycheck. All homeowners interviewed said they cannot afford to make many of the repairs their homes need – except the most important – and are unwilling to commit to any non-emergency upgrade. For many, the perceived (and observed) costs associated with replacing a major piece of equipment, such as a furnace, or insulating their home to keep it warmer in the winter far exceed their spending ability. When asked what they would do if they needed to spend \$1,500 to replace a major appliance in the next month, 50% indicated they would pay for it using a credit card, cash advance, or personal loan, underscoring the fact that many of the targeted households do not have the disposable income to pay for upgrades or improvements in either emergency or non-emergency situations.

Program Idea #1

Leverage Black homeowners' enrollment in CenterPoint Energy's equipment service plan, Home Service Plus, to promote efficiency, lower monthly bills, and support homeowners facing costly, unexpected equipment failures.

Targets emergency replacements: Aims to capture efficiency opportunities presented by equipment failure by ensuring all equipment replacements are high efficiency.

Why this recommendation?

The Black homeowners in this study face an extreme financial burden when their core home equipment fails unexpectedly. Unlike homeowners participating in low-income CIP, Energy Assistance, or the federal Weatherization Assistance Program (WAP), who can receive repairs and replacement of key appliances at no cost, the Black homeowners surveyed for this study are not enrolled in these programs and thus do not have access to this benefit.

However, the Black homeowners interviewed *are* enrolled in CenterPoint Energy's Home Service Plus program. Home Service Plus is a monthly payment plan that provides subscribers with a variety of services including preventive maintenance, appliance repair, and appliance replacement. **It is widely used and trusted by the participants in this study:**

"CenterPoint Energy has been a blessing. There have been times where if I didn't have Service Plus, I wouldn't have known what to do."

For three of the five Black homeowners interviewed, **Home Service Plus provides more than just emergency equipment service; it offers peace of mind.** For these homeowners, the cost associated with Home Service Plus represents a good value, in part because it protects them against the uncertainty associated with finding someone to service a broken appliance. When discussing previous emergency repairs and equipment replacements, the experience of using the Home Service Plus program stands in

contrast to their processes for completing repairs themselves. They describe Home Service Plus repairs as simple and straightforward:

“My furnace went out earlier this week on the below-zero day, so it was super cold. But we got it fixed, it was under Service Plus. It was covered.”

“[When my furnace failed,] CenterPoint Energy was the first call. Because I have Service Plus.”

When describing repairs not covered by Home Service Plus, interviewees named challenges every homeowner will find familiar: finding and vetting numerous contractors as well as uncertainty about the quality and price of the work.

“It’s really hard to find people to replace one window or one door. It’s very hard because most of these folks want you to pay to replace every window in your house. That’s nuts!”

“I had an emergency, it was over a weekend. I Googled. I called three or four different plumbers. The one who did the work is the one who would come out. Some don’t even come to North Minneapolis.”

In three areas, however, the current Home Service Plus offering represents a missed opportunity to provide additional, needed support to Black homeowners.

First, even though these homeowners participate in Home Service Plus they are not protected against the large, burdensome expenses associated with equipment replacement. Home Service Plus offers a replacement assistance plan that covers part of the cost of a new appliance; however, based on the reported cost they pay for Home Service Plus, the Black homeowners in this study likely do not subscribe to this additional service plan (\$18.95/month). Although Home Service Plus offers financing and on-bill payment plans, access and terms are contingent on good credit – something many Black homeowners told us they lack. One Home Service Plus customer said she is currently paying an extra \$400 per month on her utility bill to cover an emergency replacement, because her credit was not good enough to extend the payment plan over a longer term and lower the monthly fee:

“When I pay that, I will be out of money for the month. I’ll have about \$300 to live on. And I will navigate my other bills because I’m paying this bigger bill. I’m not paying the whole thing on some other bills.”

Second, Home Service Plus does not coordinate with CenterPoint Energy’s energy efficiency rebates and services. It is the authors’ understanding that Home Service Plus operates as a separate business unit from other utility operations, and that there is no coordination or communication regarding the rebates, services, and other benefits offered by efficiency programs and services provided to Home Service Plus customers. The siloed nature of these offerings was supported by interviews with Black homeowners, none of whom mentioned having conversations about efficiency or rebates during their Home Service Plus service calls and equipment replacements. While it is appropriate, from a regulatory perspective, for Home Service Plus to be entirely separate from CenterPoint’s regulated utility business, there may be opportunities to better share information.

Finally, for many homeowners, **the approximately \$40 monthly fee for Home Service Plus may itself be out of reach.** One homeowner, a devoted Home Service Plus customer, noted that:

“There have been times over the years where I really couldn’t afford Service Plus.”

Despite these drawbacks, the benefits of Home Service Plus have enduring appeal for the Black homeowners that participated in this research. Efficiency programs can leverage this insight in a number of ways.

What benefits could be provided to Black homeowners, in addition to those currently offered by Home Service Plus?

The research team identified several ways in which an equipment service plan could integrate efficiency, as well as other financial supports, targeted to the needs expressed by Black homeowners:

1. **Integrate energy efficiency incentives into equipment replacement consultations.** Any time a customer is considering equipment replacement, the service plan advisor could discuss the available incentives, grants, or rebates for energy efficiency equipment. For low- and moderate-income customers, the program can ensure these customers are able to replace failed equipment with the most efficient model at little or no added cost to them using utility rebates and other funding sources to cover the added cost of efficiency. This is a unique direct opportunity to educate utility customers about the benefits of energy efficient equipment.
2. **The service plan or efficiency program staff could, as one of its core functions, track available resources** to support the purchase of efficient equipment, including not only from utility programs but government and non-profit sources. This is particularly important for customers meeting income or other qualifications, with the goal of reducing the customers' upfront costs for efficient equipment.
3. **Do not make financing terms, including the interest rate and the length of the payment period, contingent on the household's credit score.** Rather, the payment term could be set based on the amount of the monthly payment the household can reasonably afford, given their income and other expenses.
4. **Inform subscribers about Average Monthly Billing.** This service can help customers avoid large, unexpected expenses and aligns with Black homeowners' desire to insure against such unexpectedly large bills.
5. **Include consumer protections to ensure the service is operated in the best interests of low- and moderate-income households.** These may include:
 - Providing a minimum level of coverage for qualified customers; for example, the program may decide that all qualified customers should have equipment replacement coverage.
 - Improved transparency around what is covered and what is not, to ensure that all subscribers understand what levels of support they will receive when equipment fails.
6. **Offer a reduced monthly fee for income-qualified customers.** Like other efficiency services provided as part of utility programs, income-qualified customers could be provided with an equipment service plan at reduced or no-cost.

How could it be implemented?

The research team envisioned at least three different ways to leverage Black homeowners' use of Home Service Plus to further efficiency goals and reduce the financial burden of energy costs and equipment failures.

- **Increase coordination between efficiency programs and Home Service Plus.** At a minimum, existing utility incentives could be offered to customers on Home Service Plus when they are purchasing new equipment.
- **Use efficiency funding to increase benefits and reduce costs for qualified Home Service Plus subscribers.** This could be done by creating a separate business line or “plan” for qualified customers (for example, lower income customers, or customers in specific geographies) within Home Service Plus, to enable qualified homeowners to benefit from the use of efficiency funding. Efficiency funds could be used in numerous ways, including to lower the monthly cost of Home Service Plus, to lower the interest rate or extend the financing term on efficient equipment purchases, and to reduce the first cost of efficient equipment.¹⁴
- **Create a parallel, not-for-profit efficiency program to provide the “insurance” benefits of Home Service Plus but with increased focus on energy efficiency.** In this implementation approach, the efficiency program would replicate the Home Service Plus approach.

Program Idea #2

Provide personalized, customized equipment replacement support to Black homeowners.

Targets emergency replacements: Aims to capture efficiency opportunities presented by equipment failure by ensuring all equipment replacements are high efficiency.

Why this recommendation?

The utility is one of Black homeowners’ most trusted sources of information about their home and often their first call when equipment fails. These homeowners may have a neighborhood “handy person” but often lack expert HVAC professionals and plumbers who can advise at a moment’s notice when they have an emergency.

These homeowners are also financially pinched – **they usually do not have the resources to pay out-of-pocket for unexpected expenses over \$300** – and so will choose lower-efficiency equipment to reduce their upfront costs, will use high-cost financing if necessary (for example, a payday loan), and will see their monthly budgets severely impacted by the high costs of purchasing new equipment. Importantly, none of the interviewees said they would be willing to pay a higher cost to get more efficient equipment in an emergency replacement scenario.¹⁵

Black homeowners in the targeted geographies stand to benefit greatly from a utility efficiency program that can support them in choosing and paying for energy-efficient equipment, and can help them find a qualified contractor to install the equipment if needed.

¹⁴ CenterPoint Energy provides free heating system tune-ups every other year to Energy Assistance recipients through its Low-income Free Heating System Tune-Up program (Minnesota Department of Commerce, 2021, Table 3). Considering that Home Service Plus is a maintenance-oriented program, it may be considered comparable to use CIP funding to help these customers keep equipment operating as efficiently as possible until replacement is needed.

¹⁵ Participants were not surveyed on their attitude towards utility loans.

What could a customized equipment replacement support service include?

The needs of Black homeowners facing an unexpected equipment failure, and the corresponding requirements of a utility efficiency program, are largely similar to those described in Recommendation #1, above:

- Technical assistance ascertaining the cause of the problem and whether replacement is needed.
- Identification of the most appropriate, lowest-cost efficient replacement option.
- Reduction of the initial cost of the efficient option to equal cost with the lowest-cost baseline option, with provision of the necessary grants/rebates from utility and non-utility sources, all handled “behind the scenes.”
- Creation of a payment plan that makes the monthly cost of the new equipment manageable.
- Support in identifying trusted contractors who will do quality work at a reasonable price.

Because of the substantial overlap in needs between homeowners facing emergency replacements and those undertaking discretionary upgrades, a program designed to support the former can leverage its staffing and other infrastructure for the purpose of helping the latter.

However, there is an important, additional activity that would be required of a utility program supporting homeowners facing unexpected failures: **targeted outreach and marketing**. It will be critical that Black homeowners are made aware of program services at the moment in which they are facing equipment failure.

How could outreach and marketing be implemented?

Black homeowners, in describing how they address unexpected equipment failure, provided numerous insights that utility programs can utilize. For a program in which the goal is to support these homeowners at the time of equipment failure, outreach strategies could include:

- Leveraging the staffing of equipment service programs to provide customers with 24-hour support addressing equipment failures, including scheduling an emergency visit from a qualified contractor.
- A 1-800 phone number that homeowners can call to obtain support with emergency failures.
- Publicizing the availability of this support service in:
 - Utility bill mailings: Black homeowners who participated in the study recalled specific information they’d received from utilities, including Home Energy Reports and lists of qualified trade allies.
 - Informational recordings played while on hold with the utility.
 - Social media postings by non-profit and community organizations.
 - Purchased online advertising on Google, Nextdoor, Facebook, and other neighborhood-based apps. These are all websites that Black homeowners said they consult when looking for information on home repairs and equipment purchases.

Program Idea #3

Build on two existing energy efficiency program offerings, the Home Energy Squad and its associated Energy Advisor Service, to launch an integrated energy efficiency advisor service that provides personalized support to Black homeowners to help them prioritize, plan, and pay for energy efficiency improvements over time.

Targets non-emergency improvements: Aims to increase the number of homeowners who make discretionary/non-emergency efficiency improvements to their homes.

The vision for a personalized efficiency advisor service arose from the engagement with Black homeowners conducted specifically for this project. Core to this vision is the importance of comprehensive, personalized support to homeowners in which a technical assessment of their home (the audit) is the starting point for a long-term relationship between the homeowner and the program.

Why this recommendation?

Home energy audits have long been a staple offering for utility programs, and for good reason. These services provide valuable information to homeowners at low or no cost.^{16 17}

As an entry point to energy efficiency, this study suggests **the home energy audit works for Black homeowners in North Minneapolis**. As a group, interviewees had a high level of trust in their utility companies – 100% of interviewees said the utility was their first call when equipment breaks. What is more, all of the homeowners contacted for this study were aware that utilities offer energy audits, three of the five said they have had an energy audit, and all had positive things to say about it; one recalled with particular excitement the infrared imagery.

Even in best-case scenarios, however, fewer than one-quarter of energy audits result in efficiency improvements.¹⁸ Interviews with Black homeowners in Minneapolis suggest the conversion rate for households like theirs may be very low. For these homeowners, the barriers to action are steep, but not insurmountable.

Homeowners we spoke with indicated they cannot afford the upfront cost of most improvements. In interviews, the high cost of the recommended improvements was the most commonly mentioned barrier:

¹⁶ In a 2011 survey of 500 home energy auditors, researchers found that auditors believe on average, 57% of households who could benefit from an audit do not know about the existence of audits, with a majority of auditors believing that a lack of understanding about the information provided by audits and the ability to afford the cost of upgrades recommended by audits as the primary drivers of low audit uptake. (Palmer, et al., 2013)

¹⁷ The [Home Energy Squad](https://www.mncee.org/home-energy-squad) is a joint program between Xcel Energy and CenterPoint Energy that provides audits in their service territories. In-home audits are \$70 or \$100 depending on the level of service. Income qualified households can receive an audit for free. Some communities further subsidize the audits at a reduced price or offer them for free (<https://www.mncee.org/home-energy-squad>).

¹⁸ This finding is consistent with prior evaluations documenting the limited uptake of measures recommended by home energy audits (see, e.g., Murphy, 2014; Frondel and Vance, 2013; Abrahamse et al., 2005).

"Most of what they were recommending I couldn't afford to do."

"I feel like, even though it's a free audit, it's not really free. I'm sure they're coming out to assess [for free], but whatever the suggestions they give are not going to be free."

All interviewed homeowners, whether or not they had undergone an audit, believed their homes' energy efficiency and comfort could be improved. But they felt **overwhelmed** by the time they thought it would take to get the work done, **confused** about what was needed, and concerned that **they didn't have the technical knowledge or trusted contractors** to ensure the work was done well and for a fair price.

"It's so stressful. I know that I need to be constantly working on my house. But when you don't have any savings and you're living from check to check and then something happens, it's so overwhelming."

"There's been times when I've felt like, is this person taking advantage of me? Because I don't know what [the work] entails."

"I get overwhelmed by the whole process and the financial piece of it. [Discretionary efficiency upgrades] are low priority when you have other issues you have to take care of."

While a low- or no-cost energy audit is a great starting point to help these homeowners improve their homes' efficiency, it is not sufficient to motivate action. **These homeowners need a much more comprehensive set of services that will not just tell them what needs to be done but guide them through each step of the process.**

"It would be nice for someone to say: 'This is what's going on with your house. These are things we need to fix. You really might want to save for this.' That would be really helpful because I just don't know."

"If there would be someone who could walk alongside me, who I could call, who I know, and they can be held accountable, that would ease my mind a lot."

"CenterPoint Energy sent a long list of contractors that do energy stuff. I called three of them and got estimates from all three. The one I liked the best gave me a detailed estimate showing all the problems with the attic."

What should an integrated efficiency advisor service targeting lower-income Black homeowners include?

Interviews and surveys with Black homeowners in Minneapolis lifted up seven components that could be considered essential to any effort to help members of this community improve the efficiency of their homes:

1. **Offer the home energy audit at very low or no cost.** Audits offered at a very low cost (\$75 or less) or, better, at no cost will be necessary to gain many Black homeowners' participation. Many in this group of homeowners wanted to learn more about their homes, and they considered the utility a trusted source. However, their household finances are often tight, leaving few resources for discretionary spending. While qualified low-income households are eligible for free audits under the low-income CIP program, households above the income

thresholds may still struggle to justify the expense. Expanding the availability of free audits would further reduce economic barriers and expand this critical entry point of improved energy efficiency and home comfort.¹⁹

2. **Prioritize the identified measures based on each homeowner's goals.** Because of their limited resources and disinclination to take on debt, many Black homeowners will likely be able to complete only one improvement at a time and may need to spend months or years saving up for the next improvement. This staged approach to major expenditures was described by participants, who recounted how they waited to take on new projects until they had the funds to pay for them. In order to help these homeowners tackle what may be a long list of improvements, programs will want to help homeowners prioritize the recommendations based on specific goals (for example, utility cost savings vs. comfort). The prioritized list could also note when multiple measures are more cost-effective if completed together.
3. **Create a customized plan for each homeowner that includes savings goals and a timeline for completing each high priority project.** Based on the homeowner's ability to save and the grants, rebates, and other available funding (see #4, below), the program can create a savings plan and an implementation plan that specifies when the homeowner can expect to be able to complete each of their highest priority improvements. Based on interviews with homeowners, it is expected these plans will project out at least one year and likely three years or more. Efficiency programs can keep the plan on file and check in with homeowners periodically to support them in achieving their savings goals and to let them know when new sources of funding become available.
4. **Act as a resource hub and navigator to help homeowners obtain grants, rebates, and other available funding.** For many Black homeowner interviewees, the day-to-day obligations of work, family, and community leave them overwhelmed, exhausted, and with little time or energy to navigate the complexities of energy efficiency funding. One said she applied for energy assistance but was not sure she qualified and hadn't had time (nor remembered) to follow up on her application. The siloed nature of efficiency funding and the myriad requirements for qualifying are substantial barriers to all customers, not just Black homeowners. Even members of the research team, arguably experts in efficiency program procedures, have found themselves stymied when trying to assess their rebate and tax credit options. It will be critical that programs dedicate resources to navigating the funding opportunities on behalf of homeowners in order to present them with the lowest possible total cost for each recommended improvement.
5. **Offer a monthly payment plan to allow homeowners to pay for efficiency measures, preferably without requiring personal debt.** All interviewees indicated they would like to avoid taking on debt when implementing efficiency measures due to issues of credit worthiness and distrust of financial instruments. In some cases, however, homeowners may want (or need) to undertake an improvement for which they do not have sufficient cash on hand. Interviewees reported doing this predominantly in emergencies – when critical equipment failed – not for

¹⁹ Utilities currently offer low-cost or free audits through CIP, which is a critical CIP offering. These utility offerings are sometimes further subsidized by local communities. For example, the City of Minneapolis offers free audits to households making \$100,000 or less. Additionally, some neighborhoods offer free audits regardless of income. These are examples of removing initial economic barriers and could be replicated in other communities.

discretionary upgrades. If debt is unavoidable, the Black homeowners interviewed said they preferred to make monthly payments until their debt was paid off. Additional considerations for structuring a monthly payment plan are discussed in more detail in the *Implementation tactics* section below.

6. **Provide robust support for homeowners in selecting tradespeople to complete their efficiency projects.** When it comes to larger repairs, the interviewed homeowners recalled how difficult it was to find tradespeople they could trust. Each had a strategy for this – including using a neighborhood “handy person,” referring to CenterPoint Energy’s list of qualified contractors, and using apps like Nextdoor to get referrals from neighbors. However, the time required to identify and select a tradesperson, combined with homeowners’ uncertainty about their own ability to vet someone’s skills and price, may prevent them from undertaking non-emergency improvements. The support these homeowners need, especially if the intent is to encourage discretionary upgrades, goes well beyond the typical programmatic activity of maintaining a long list of tradespeople who have met minimum qualifications. The experiences of interviewees indicated this community of homeowners would benefit from support in three key areas of tradesperson selection: identifying people who serve their neighborhood, vetting their skills and work quality, and ensuring their pricing is within expected ranges. This type of support could be provided in many ways, and a few possibilities are included below.

How could it be implemented?

Staffing Considerations

The research team believes the need to provide multiple types of support to homeowners – not just a technical energy audit – will require dedicated program staff whose primary responsibility is to serve as the homeowner’s “advisor” or “navigator.” Considerations for this customer-facing role include:

- Selecting staff who are skilled at interpersonal communication, demonstrate cultural competency, and can act with discretion given their confidential access to customer billing and financial information.
- Designating culturally or community-specific staff who are hired from within the community or neighborhood they will be serving.
- Investing in the navigator’s relationship with the homeowner by being present onsite during the energy audit.

It is likely that the customer-facing advisor or navigator role will need support from other program staff in order to be able to appropriately assist homeowners. These include areas a typical utility program may not currently address. It may be necessary to designate program staff roles to new activities, for example:

- Engaging with county, city, state and non-profit or community organizations to stay apprised of funding opportunities and other relevant services.
- Interacting with other departments within the utility to ensure customers are given access to all relevant services, for example billing options and energy assistance.

Contractor networks, qualified trade ally pools

Some current utility rebate programs, such as insulation and air sealing, require that work be done with a pre-approved contractor and provide lists of contractors who have gained this approval from the utility. This pre-approval process adds a level of assurance for customers that the work will be done properly. The Black homeowners who participated in this research have found the utilities' pre-approval process beneficial. Three of the five homeowners interviewed recalled receiving, saving, and later using CenterPoint Energy's list of qualified trade allies.

However, interviews suggest this population needs enhanced support in completing efficiency upgrades, beyond what current utility programs and pre-approved contract lists provide.

Additional steps programs can take to reduce the burden of vetting contractors that Black homeowners face include:

- **Maintain a smaller list of contractors who undergo more extensive vetting to give homeowners added assurance of the quality of their work.** While Black homeowners who participated in this study are relying on the current (long) lists, they say they don't have time to call through those lists to find people who will work for them and then to solicit and review their proposals. Utilities can explore feasible methods for creating more "curated" or limited lists of trade allies. One potential approach is to use a scoring system in which only the highest ranked trade allies are put on the list. It is typical for governments to use approaches like these for awarding contracts, with scoring elements not only for technical competence and experience but for other desired characteristics like geographic location, whether the business is minority or woman-owned, whether it is a small business, and the proportion of its staff that meet specific criteria (like being veterans or people of color).
- **Sort lists of qualified contractors by the neighborhood they are based in and the neighborhoods they serve.** Homeowners noted they prefer people who frequently work in their neighborhood and that they sometimes have difficulty finding people willing to work in North Minneapolis. They rely heavily on the reviews and opinions of their neighbors and will give preference to a contractor who has a good review from someone in their community.
- **Use program staff or trade allies contracted by the program to perform projects for homeowners.** In this approach, the "program" would complete the project for the customer, absolving the customer of the responsibility of finding and vetting a contractor.

Financial incentives and supports

Existing CIP programs promoting efficiency improvements typically use a rebate model for non-income qualified households. Some rebates require a customer to pay for an improvement upfront, mail in a rebate form, and then receive money back at a later date – sometimes up to eight weeks after the work is completed. Approved CenterPoint Energy contractors have permission, but are not required, to offer an instant rebate, in which the rebate is deducted from the customer's bill and the utility reimburses the contractor. Some programs use the instant approach at retail, with retailers discounting customers' purchases and obtaining reimbursement from the utility program. These programs are most commonly used for LED bulbs but are also available for water heaters and other appliances in select locations, including in California, Colorado, Maryland, Oregon, and Vermont.

Black homeowners in this study reported that they are very cost-conscious, want to avoid debt, and do not have extra funds available to pay for what they perceive as “nice-to-have” improvements. This suggests that a mail-in rebate incentive model will not entice Black homeowners to proceed with improvements, nor does it fit their financial needs. A mail-in rebate is suited for households with the economic means to pay the upfront cost of an expensive home improvement and wait for reimbursement. This population of Black homeowners, however, would feel a noticeable impact on their cash flow and could struggle with other financial obligations while waiting for the rebate to arrive.

In the immediate future, utilities with instant rebate options could aim to diffuse this approach as widely as possible so that the maximum number of customers have access to the instant rebate instead of the mail-in rebate. As soon as it is practical, all incentives could be transitioned to the instant rebate approach.

Implementation Tactics

This section includes many tactical recommendations for programs targeting Black homeowners. None of these recommendations constitutes a “program” in its own right. Rather, each recommendation addresses a specific activity and is intended to guide program implementation in areas including outreach channels, language, program processes, costs, and financing.

Outreach and marketing channels: Use a variety of strategies to reach Black homeowners

For the Black homeowners in this study, there was no single preferred outreach method.

The three most popular contact methods were email (37%), text (33%), and mail (22%). Almost no respondents preferred a phone call or signage in a public location. Utility programs will thus need to use a variety of strategies to reach Black homeowners rather than depending on any single channel or method.

These can include:

Utility Communications

The utility is often Black homeowners’ first call when dealing with their home systems and equipment:

"I would start with my energy provider and see what kind of pricing and payment plans are available and then compare buying the part directly and hiring somebody to install it."

Utilities can take advantage of this trust by communicating directly to customers about their efficiency and other offers.

- Customer service staff: Ensure that all utility staff who communicate with customers are prepared to answer questions about efficiency services and refer customers to the appropriate program staff.
- Bill inserts: Three of five interviewees recalled receiving and using CenterPoint Energy’s list of qualified contractors. This mode of communication may be especially important with this population.

- Home Energy Reports: Three of five interviewees recalled receiving their home energy reports and wondering what they could do to reduce their energy use. Targeting this population for home energy reports and marketing efficiency services in that report may be particularly effective with this population.

Online

Like most people, study participants use the internet to answer equipment questions and find service providers. Utilities can advertise on the sites they use to create awareness of efficiency programs. Frequently mentioned websites included:

- Google: In an emergency, these homeowners use Google to find the first person who will respond, mentioned by 50% of survey respondents.
- Nextdoor: Black homeowners surveyed said they use this site to find contractors and trust the reviews from their neighbors.
- Social media posts from trusted community/non-profit organizations: although not mentioned by study participants, a utility in California had excellent responses to social media posts made by community organizations that are well known and trusted in their communities (Van Clock, Vallery, and Frank, 2022).

Independent Handy People

Black homeowners were likely to have a neighborhood “handy person” to whom they turn when they have a home issue. Sixty-five percent of survey respondents said this is their first contact, the most common response.

“We have a handyman we use, from the neighborhood app; we’ve used him on a couple different projects. We have a plumbing/heating person and an exterior kind of person, too.”

Utilities could seek out people who do independent “handy person” work in targeted neighborhoods. Typical utility offerings that may be applicable to these skilled and semi-skilled independent workers include technical and sales training, education about utility programs, and education about other grants and financing opportunities available for low- and moderate-income households.

Retail Stores

Fifty eight percent of survey respondents mentioned they turn to retailers for advice about equipment. Many utilities already market rebates in retail stores. To best serve this population, rebates or other financial incentives should be provided at the point of sale. If the utility offers an equipment service plan for qualified customers, the utility could also market this service to buyers of low-priced equipment when they are in the retail store.

Topics that Resonate

The study indicates that **home energy reports** comparing a customer’s energy use to that of their neighbors appear to work for this population. These reports were read, remembered, and considered to be meaningful by study participants.

"CenterPoint Energy sends these notices every once in a while where they compare your energy use to your neighbors and the general average. It's nice to know if you're using more or less than the average house. If they send those letters to me, I'd definitely like to do whatever improvements I can to use less. Unfortunately, I think the only way I'm going to be able to do that would require major expense."

Survey participants noted their homes' **appearance** (73%) and **health** (65%) ranked among the highest priorities in making improvements.

With this cost-conscious population, utility communications that emphasize the **reasonable or low cost** of making improvements, the availability of **instant rebates**, and the opportunity to pay off the costs over time using a **monthly payment plan** will all be appealing.

Calling attention to **how the utility will support homeowners in getting the work done** is also likely to motivate this population.

Black homeowners who participated in this study expressed concerns about being uncomfortable in their homes (in terms of the temperature) and having high bills. **Improved comfort and lower costs** are two benefits of efficiency that programs should emphasize in their communications.

"On below zero days, it's cold, even with [space heaters] on."

What's Less Important

Energy efficiency for its own sake was not high on the priority lists of the Black homeowners participating in this study, although all were knowledgeable about energy efficiency and have taken steps to reduce energy use.

"Efficiency is not big on my list, but I'm not an energy waster either. I'm conscious of my use. I turn lights off in the rooms that I'm not in. We put plastic over windows. We have an old house so that makes it a little more challenging to be energy efficient and also more aware that we have to do things to make it more efficient."

Participant costs: Use steep discounts to entice homeowners to make discretionary improvements

For discretionary improvements, like upgrading a functioning water heater, to be feasible for most Black homeowners, the discount will need to be substantial—to the point of making the improvement free to the customer.

Only 30% of Black homeowners surveyed would consider a water heater replacement if offered a 50% discount. The rest – 70% – would require the new water heater to be free in order for them to consider it.

This study suggests that many Black homeowners are unwilling or unable to pay the full cost upfront and wait for a check to arrive. Any rebates or discounts offered by a utility program would need to be provided instantly. Survey respondents ranked "instant discount" first among all the options offered to them, and 62% said having to pay the full price upfront and wait six to eight weeks for reimbursement would dissuade them from participating in a rebate program.

However, the majority of participants would choose a check mailed two to three months after purchase over a VISA gift card at the time of purchase.

Financing: Match every recommendation with a payment plan

The Black homeowners in this study can barely afford emergency replacements, let alone discretionary upgrades.

"Most of what they [Home Energy Squad] were recommending I couldn't afford to do."

"At the time, we didn't have the money [for the basement insulation]."

Without steep discounts and a plan for how to pay for higher cost improvements, these homeowners will not undertake non-emergency or discretionary upgrades.

Two-thirds of survey respondents said they would not be able to pay out-of-pocket for an emergency \$1,500 repair. In order to cover this cost, they would use:

- A personal loan or line of credit from a bank (59%)
- A credit card or cash advance (52%)
- A loan from family or friends (33%)
- Financing from a retail store (29%)
- A payday/high interest loan (26%)

One interviewee explained the process she would take for a \$1,500 emergency repair:

"If it was \$1,500, I would seek financing through the vendor. If it was \$300 or \$500, we would scrape it together. Any credit card has high interest, and I wouldn't be surprised if it was the same with financing. The goal is to get it financed and get it paid off before the full amount of the term. Even if the interest rate were high, I wouldn't let that be a deterrent; I would just finance it and pay it off sooner rather than later."

The terms of a payment plan are also important. For costs of around \$1,500, some homeowners would want a year to pay off the amount (\$125 per month). For expenses above \$3,000, some suggested two to three years or more. In general (without reference to a specific loan amount), 62% of survey respondents wanted a term of 12 months or longer, and 88% wanted a term of six months or longer.

The ability to enroll in a payment plan without a credit check is also important. These homeowners may not have good enough credit to qualify for attractive financing offers typically provided to customers with high credit scores.

"I've worked for non-profits, and I never really have learned how to manage money – and now that I'm ready to manage money, I don't have any."

Toolkit for Property Owners Whose Renters Include Latinx Households in South Minneapolis and East St. Paul

Latinx households in South Minneapolis and East St. Paul have higher energy burdens than other Latinx households in the Twin Cities metro area and higher energy burdens than the other households in their neighborhoods.

Because a majority of the Latinx households in these two areas are renters – 76% in South Minneapolis and 64% in East St. Paul – this toolkit presents two program design ideas targeted to rental property owners. Property owners, not renters, make the decisions about nearly every aspect of the physical infrastructure of rental housing. Owners select replacement equipment when systems fail and decide whether to invest in non-emergency improvements to the building’s shell, HVAC equipment, and most appliances. Owners’ decisions have a substantial influence on a property’s energy efficiency.

Renters have far less control over the energy efficiency of their dwelling. Renters can, however, make small but impactful changes to reduce energy use and energy bills through choices, such as light bulbs and small appliances, and in their behavior. The fact that the program design ideas in this toolkit focus on property owners does not negate the importance of continued attention to offerings for renters. The toolkit concludes with two ideas for helping inform renters about energy efficient choices and behaviors.

The program design ideas in this toolkit are intended to spark discussion and creative thinking around program design and implementation that target rental property owners but will primarily benefit renters. Each program idea includes a discussion of the research findings that led the team to suggest it and specific design elements that will be important to include in order to address the needs expressed by Black homeowners. When possible, current CIP program practices are referenced, either as examples of approaches that align with the research findings or as examples of practices that do not.

Table 8 summarizes these ideas. The research team recognizes that the details of program implementation will be tailored to the capacities of the program administrator, governing rules of the territory, and the geographic and cultural context. Each reader will need to determine the suitability of these ideas for their unique situation.

Table 8. Program design ideas for property owners renting primarily to Latinx renters in South Minneapolis and East St. Paul

Latinx renters	Program ideas
<i>Emergency decision</i>	<i>Program idea #1</i> Target emergency replacements by focusing outreach on rental property service providers and covering the full cost of upgrading to the efficient model
<i>Non-emergency decision</i>	<i>Program idea #2</i> Encourage discretionary upgrades in rental properties by offering generous incentives and making it easy for property owners

Community Profiles

Latinx renters in East St. Paul and South Minneapolis were one of two communities of focus in this project. These renters reside in the geographic areas depicted in Figure 4. Below are two community profiles. The first, of Latinx renters, draws on data from the US Census American Community Survey (in Census PUMAs 1303 and 1406) and on surveys and interviews conducted specifically for this project with 15 Latinx renters (in the neighborhoods of Ventura Village, Powderhorn, Seward, Longfellow, and parts of Hiawatha, Lyndale, and Kingfield). The second community profile, of eight owners of rental properties in these geographies, follows.

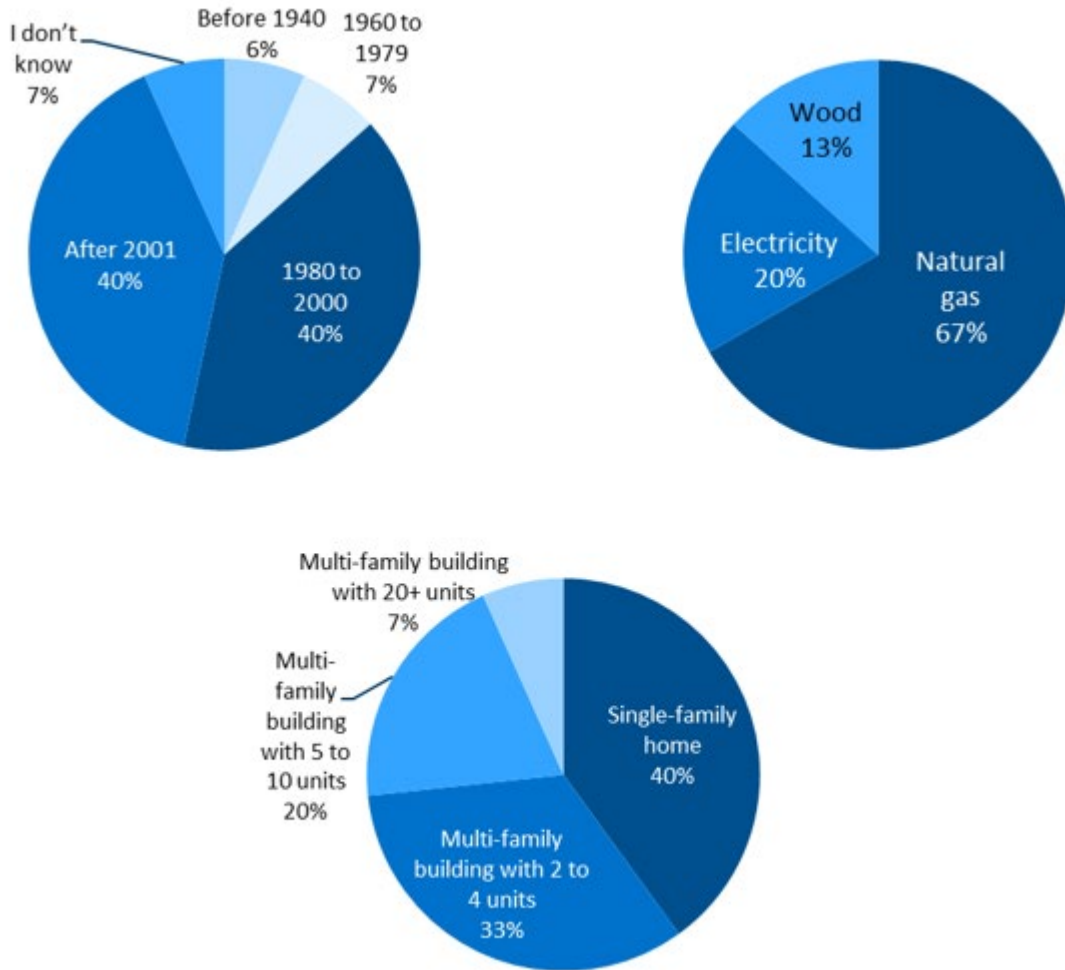
**Figure 4. Location and key details for two targeted Latinx renter communities:
East St. Paul (#1405) and South Minneapolis (#1406)**



Table 9. Latinx Renter Mean Income and Energy Burden, 2017 ACS data

Latinx renters in . . .	Est. # of households	Mean Income	Energy Burden
East Saint Paul (#1303)	6,149	\$60,713	5.4%
Southeast Minneapolis (#1406)	9,097	\$53,823	6.0%

Figure 6. Square footage, year built, and heating fuel of surveyed Latinx renters' homes:
 Year Built (on left)
 Heating Fuel (on right)
 Housing Type (in middle)



Additional Population Characteristics

All survey respondents reported Spanish as the primary language spoken at home.

Table 10 shows key demographic details for the Latinx households in the targeted geographies and two comparison populations: all households in the geographies and all Latinx households in the Twin Cities metro area.

Table 10. Comparison of key demographic details between Latinx households in the targeted geographies and all households in their geographies and all Latinx households in the Twin Cities metro area (shaded cells indicate higher values)

<i>Location</i>	East Saint Paul	East Saint Paul	Southeast Minneapolis	Southeast Minneapolis	Twin Cities metro
<i>Household type</i>	Latinx households	All households	Latinx households	All households	Latinx households
Energy burden	5.4%	4%	6%	3.3%	4.2%
% w/ high energy burden	24%	18%	25%	13%	18%
Avg. Income	60,713	60,428	53,823	78,655	70,593
House value	139,513	182,183	188,223	248,142	200,703
% Renter	64%	49%	76%	40%	53%
Avg. # of bedrooms	3.7	3.2	3.1	3.2	3.4
Electricity cost	1,853	1,329	1,333	890	1,259
Natural gas cost	198	262	561	583	445
Heat with gas	75%	71%	64%	74%	72%
Heat with electricity	20%	22%	34%	16%	22%
Avg. # of generations in household	2.1	1.5	1.8	1.4	1.7

<i>Location</i>	East Saint Paul	East Saint Paul	Southeast Minneapolis	Southeast Minneapolis	Twin Cities metro
<i>Household type</i>	Latinx households	All households	Latinx households	All households	Latinx households
Employment	70%	70%	77%	73%	80%
% w/ no HS education	32%	10%	37%	7.5%	18%
Health coverage	49%	93%	74%	91%	75%
% LMI	57%	61%	67%	50%	59%
Non English-speaking	41%	12%	40%	9%	21%

Property Owner Demographics

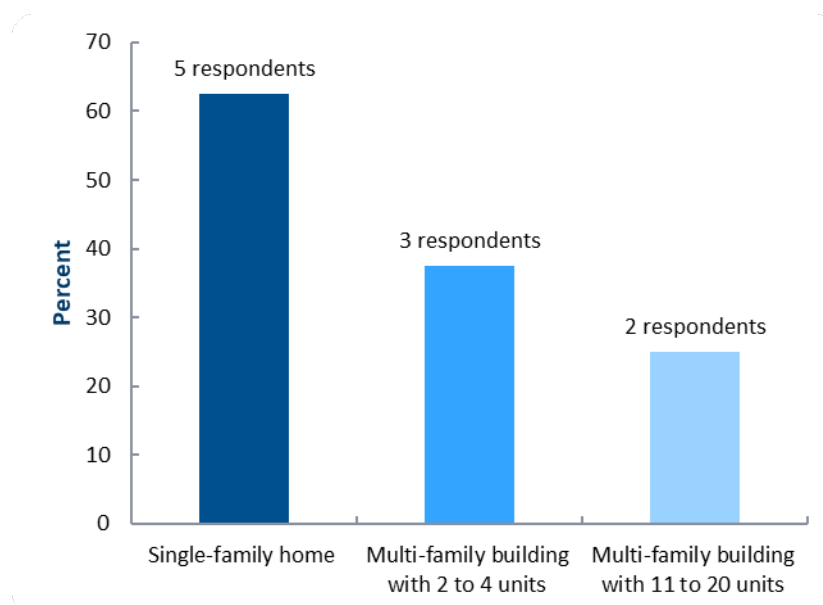
Employment and Income

The majority of respondents (5 of 8) reported full-time employment status, and all had a household income over \$75,000. Six of eight reported having a Master's or higher degree, and all said English was the primary language used at home.

Rental Properties

Figure 7 shows the type of rental properties owned by the surveyed property owners. More than half of respondents owned a single-family rental home.

Figure 7. Rental property types owned by surveyed owners



Note: Multiple responses allowed, n=8.

Outreach

- **Property owners and renters prefer trusted contacts for information related to energy efficiency programs and services (e.g., program applications and educational material).** When asked whom they trust for advice about repairs or home improvements, over 50% of renters indicated that they ask their friends, family, or neighbors. Over 80% of responding property owners indicated they trust a technician or contractor. The property owners interviewed all mentioned relying on a technician's or contractor's expertise, or that of an individual in their personal or professional network, to explore solutions related to energy efficiency. This finding reflects a growing understanding of the importance of "word of mouth" in getting information into the hands of potential beneficiaries of energy efficiency programs and services.

- **Property owners and renters are receptive to specific and directed digital communications containing educational materials geared toward do-it-yourself home improvements.** When asked whom they trust for advice about repairs or home improvements, over 80% of renters indicated that they conduct an online search for relevant information. Similarly, when asked how they'd like to receive information about discounts for appliance purchases and home improvements, over 60% of renters indicated email (e.g., digital brochures, flyers, or advertisements). Unsurprisingly, when asked how they would like to receive information about discounts for appliance purchases and building improvements, over 70% of property owners indicated email. In addition to information about discounts or rebates, over 70% of owners showed an interest in learning more about how an eligible appliance or energy efficiency program may reduce energy use at the property.

Knowledge of Energy Efficiency

- **Renters are interested in the role that energy efficiency can play in increasing comfort and quality of life** (in terms of helping to maintain or regulate temperatures inside the home). Over 60% of respondents identified their home as either "too cold in the winter, even with the heat on" or "too warm in the summer, even with the AC on," which highlights an opportunity to emphasize the benefit of "comfort" and "quality of life" as important factors when considering energy efficiency improvements. This is especially true for the almost 50% of respondents that pay a fixed amount – combined with their rent – to the property owners for their utilities and have little insight into their energy use. In this situation, monetary savings is not a motivating factor for the renters.
- **Property owners are generally hands-offs with their renters but receptive to renters approaching them concerning energy efficiency.** However, they do not want to be forced into making decisions when an appliance or piece of equipment isn't broken. Most property owners interviewed shared frustrations with renters misusing equipment (e.g., opening windows when the heat is on), resulting in a failure or higher-than-average energy consumption. They see energy efficiency as an opportunity to engage in an education-oriented conversation with their renters; however, the property owners don't want to "micro-manage,"—especially when the bills are not the property owners' responsibility. Similarly, renters are most interested in a hands-off approach—implementing temporary or semi-permanent home improvements that don't engage their property owners.

Primary Drivers of Action

- Despite 80% of renters indicating a degree of familiarity with one or more of the discount programs or energy efficiency services currently available to ratepayers, Latinx renters shared a limited understanding of utilizing the programs or services available without property owner intervention. In this context, **renters shared a desire to learn how best to access services that allow them to make temporary changes to their homes to increase comfort and reduce their utility costs.**
- One hundred percent of property owners interviewed shared that a return on their investment was a primary driver for energy-efficient improvements. Many try not to spend discretionary money on their properties unless there is a direct impact on the value of the entire building or the amount of rent the owner can charge. This presents an opportunity for cost-sharing **when both the property owner and renter benefit.** When asked if they could lower their monthly

utility bill by \$5 to \$10 by replacing their home's heater with a newer model but had to apply for Energy Assistance, over 90% of renters indicated they would be interested. When monetary savings aren't realized for renters, an alternative benefit – often related to comfort – must be emphasized. Similarly, renters did not explicitly mention concerns related to upfront cost and financing – it is viewed as the property owner's responsibility to cover the cost of any replacement or repair. However, when asked if, in a non-emergency situation, they could lower their monthly utility bill by \$5 to \$10 by replacing their home's heater with a newer model but had to split the cost with the property owner (or management company), over 80% of respondents indicated they would be interested.

Program Idea #1

Target emergency replacements by focusing outreach on rental property service providers and covering the incremental cost of upgrading to the efficient model.

Targets emergency replacements: Aims to capture efficiency opportunities presented by equipment failure by ensuring all equipment replacements are high efficiency.

Why this recommendation?

Interviews and surveys with rental property owners suggest utility programs' highest priority should be to **target property owners making emergency or end-of-life equipment replacements**. Convincing property owners to undertake non-emergency or discretionary upgrades will be much more difficult, as property owners are extremely unlikely to undertake discretionary improvements of any kind, and least of all efficiency improvements.

Rental property owners say non-emergency equipment replacements are a very low priority. Research conducted for the City of Minneapolis with rental property owners found that they take “action on major improvements . . . when there is a problem due to high bills, a breakdown, or similar” (Nilsson, 2019). Interviews and surveys with rental property owners conducted for this project affirm this attitude. Six of nine owners surveyed said **they only make changes to their properties to fix or replace something that is broken** and see no other reasons to make changes:

"If it's not broken, I don't mess with it."

"I don't want to replace something that isn't broken. I do not do that."

Rental property owners are even less likely to make discretionary *efficiency* improvements because they **do not believe efficiency investments produce a financial return**. The primary way owners derive monetary value from an investment in their property is when it allows them to raise rents, and the owners who participated in this survey do not believe efficiency improvements like insulation, or a new water heater justify rent increases. Further, some owners renting to lower-income households in the Twin Cities say they do not *want* to raise rents.

A second way owners derive financial benefit from investment in their property is when those investments result in an increased property value. However, owners interviewed for this project do not believe the real estate industry values efficiency investments and thus money spent increasing efficiency will not increase the value of their buildings. Further, the landlords interviewed for this research had

owned their rental properties for multiple years, even decades, and were not looking to sell in the near future, so would not benefit substantively from an increase in property value.

A third way in which property owners could benefit from efficiency improvements is through lower utility costs. However, none of the property owners surveyed pay utilities, and 50% of the renters surveyed pay their own utilities, a situation known in the efficiency industry as the “split incentive.”

What property owners *do* prioritize are emergency and end-of-life equipment replacements. When critical building equipment fails or stops performing reliably, owners address these problems immediately, presenting utility programs with small but critical windows to influence their purchase decisions.

To influence property owners making emergency or end-of-life equipment replacements, it will be **critical to target their trusted contractors, service providers, and vendors**. Eight of nine rental property owners surveyed said their first call when something breaks is to a trusted contractor or technician. Some owners prefer to work with small or local firms with a history in their communities:

"I like smaller, I like independent, so I wouldn't be calling Owens Services, I call Dame Heating in St. Paul. [They have] a long history in the community, a good reputation. If they're small, you can know them, and they will know you."

What should a program that targets equipment failure and end-of-life in rental properties include?

This approach will be applicable to building systems and equipment that fail or have an end-of-life event, including heating systems, water heaters, appliances, and lighting. Building components that do not typically have critical failure events are addressed in Program idea #2, below, and include shell and weatherization measures like insulation, air sealing, and duct sealing.

Interviews and surveys with rental property owners in the Twin Cities lifted up four components that should be considered essential to any effort to help rental property owners choose the most efficient equipment during emergency or end-of-life replacements:

1. **Focus program outreach and marketing on contractors, trade allies, and equipment vendors that work with rental property owners and managers.** When equipment fails, property owners and managers turn to their trusted contractors for technical advice and to purchase and install replacement equipment. Every property owner interviewed described how their first call in an emergency situation is to a trusted, long-time service provider or vendor. Additionally, 89% of property owners surveyed indicated that they trust a technician or contractor to give them advice about repairs. Some noted their preference for small, local businesses rather than larger companies or national chains. Utility programs can consider contractors, trade allies, and equipment vendors as a key target market in any program aiming to influence property owners.
2. **Build relationships with rental property service providers through consistent outreach and education.** Rental property owners take the advice of their trusted service providers. Influencing property owners' purchase decisions will thus depend on earning the trust of their service providers. Utility programs will need to conduct outreach and provide education to these service providers to ensure they are bought in regarding the energy and

non-energy benefits of high-efficiency products and can explain the financial supports offered by utilities. This may require providing technical education to service providers if they are not familiar with, comfortable with, or supporters of newer efficient technologies like heat pumps.

3. **Provide information to property owners about the availability of emergency-replacement incentives.** While equipment service providers can be the utility program's primary target, information provided directly to owners will also be important, as a utility program will not reach every service provider and some owners may do projects entirely or partially by themselves. One interviewed owner described how he installed attic insulation in some of his properties himself and, when a water heater failed, he purchased the new unit and hired someone else to install it.
4. **Use incentive funding to cover 100% of the added cost for efficient equipment.** When making improvements or repairs, property owners often spend the minimum amount necessary. One property owner noted he typically spends no more than \$350 to replace a major appliance, an amount that excludes new products (which typically start at around \$500) and suggests this owner is buying refurbished or used equipment. While property owners in emergency replacement situations are prepared to pay to replace the failed equipment, this study indicates that they are typically unwilling to pay more for an efficient option. Utility programs will, therefore, need to cover the added materials and labor costs associated with a more efficient product in order to convince rental property owners to purchase it. It may be the case that the incremental cost of efficient equipment – especially when compared to extremely low-cost options like used equipment – exceeds the amount utilities are able to pay under limits imposed by cost-effectiveness tests or other regulatory requirements. We also understand that some stakeholders may, reasonably, hesitate to increase utility incentive caps or combine multiple funding streams to fully cover the incremental cost of efficient equipment. However, existing approaches will likely be insufficient to spur efficiency in rental housing. This topic is addressed in the section [Next Steps for Equitable Research and Program Design](#).

How could it be implemented?

The task for utility programs will be to **identify service providers who work with rental property owners**. The engagement conducted for this research suggests conversations with local property owners and management companies will surface this information. The owners interviewed for this project were forthcoming with the names of their preferred vendors for various equipment types.

Identifying and educating rental property owners will be another key programmatic activity. Programs will want to explore how others in their geography have previously identified rental property owners as well as the infrastructure that can be leveraged – for example, licensing or other requirements. Two examples surfaced by the research team include rental license billing notices, sent annually by the City of Minneapolis, in which sustainability programs have previously paid to print and insert efficiency program information. In addition, most rental property owners pay the water and sewer bills for their multi-family properties, another potential leverage point.

When it comes to the logistics of paying the added cost for upgrading to an efficient product, surveys and interviews suggest **rental property owners are flexible with regard to the rebate method**. Unlike the homeowners engaged in this study, who vastly preferred an instant discount, rental owners were

willing to pay the added upfront cost of an efficient product and wait to be reimbursed. More information about providing financial incentives to rental property owners is discussed below in the Implementation tactics for all programs targeting rental property owners serving Latinx renters section.

Program Idea #2

Encourage non-emergency or discretionary upgrades in rental properties by offering generous incentives and making it easy for property owners.

Targets non-emergency improvements: Aims to increase the number of homeowners who make discretionary/non-emergency efficiency improvements to their homes.

Why this recommendation?

Only the most generous incentives will get rental property owners to replace something that is not broken, and about which tenants are not complaining, the key word being *generous*. Despite the fact that property owners were nearly universally opposed to making non-emergency replacements, they were also aligned in being motivated to act by **generous incentives**.

Among the surveyed rental property owners, **all would make a non-emergency replacement at no cost to them**, and **two-thirds would make the replacement for a 50% discount**. This contrasts sharply with Black homeowners interviewed for this project, none of whom would be interested in replacing a working water heater, even with a 50% discount.

"If it's an optional thing to do, cost is a huge consideration. So the most recent window project I did, I believe that was either a full grant or at least a 50% cost sharing. I wouldn't probably have been able to do that without the program."

"I never ignore financial incentives."

Efficiency incentives are available to Twin Cities rental property owners today in amounts that may reach 50% of a project's cost or include up to 60% bonus for rebates (for buildings with a majority of low-income renters).²⁰ However, the continued high energy burden of renters and financial hesitancy of rental property owners points to the importance of refining these offers and suggests that current offers lack critical elements that make participation appealing to rental property owners.

²⁰ For example, [CenterPoint Energy's Low Income Rental Efficiency Program](https://energycents.org/conservation-programs/centerpoint-energy-rental/) for 1-4 unit buildings covers up to 50% of the cost of improvements (<https://energycents.org/conservation-programs/centerpoint-energy-rental/>). [CenterPoint and Xcel Energy's Multi-Family Building Efficiency program](https://www.multifamilyenergysolutions.com/rewarding-incentives) provides an additional 60% bonus to rebates earned on qualified affordable multi-family housing (<https://www.multifamilyenergysolutions.com/rewarding-incentives>).

What should a program that targets discretionary upgrades in rental properties include?

Engagement with rental property owners and Latinx renters in Minneapolis and St. Paul suggests four components that should be considered essential to any effort to encourage rental property owners to make discretionary, or non-emergency efficiency improvements to their buildings:

1. **Generous incentives.** As noted above, a utility program will likely need to cover at least 50% of the total project cost to convince property owners to participate. The closer a program can get to covering 100% of the cost, the more rental property owners will likely be willing to participate. Some programs already cover 50% or more of the measure cost for rental property owners.²¹ Again, the incremental cost of efficient equipment may exceed the amount utilities are able to pay under efficiency program limits, and stakeholders may hesitate to increase utility incentive caps or combine multiple funding streams. However, existing approaches will likely be insufficient to spur efficiency in rental housing. This topic is addressed in the section [Next Steps for Equitable Research and Program Design](#).
2. **Allow property owners to work with their trusted contractors and vendors to complete the improvements.** Owners may balk at using a utility-specified contractor due to their close relationships with their own trusted service providers. A study of rental property owners in Minneapolis found that some property owners believed their trusted contractors gave them such preferential pricing that improvements done through their providers “could result in a less expensive upgrade than the offerings from energy companies, even with a loan or cost reduction” (Nilsson, 2019). Utility programs could allow improvements to be made by any contractor, with quality assurance performed by the program if workmanship is a concern.
3. **If the program must qualify rental properties to participate, do so without requiring renters to provide financial or other personal information to the property owner nor to the program.**²² Property owners uniformly say they do not communicate with their renters unless necessary, and that they are particularly unlikely to ask renters to provide proof of their incomes. Renters, too, say they do not want to interact with their landlords unless

²¹ There are existing examples of programs paying greater than 50% of project costs for rental property efficiency projects. The Minneapolis 4d program provides rental property owners with property tax savings in exchange for maintaining affordable rents. The 4d program also provides energy efficiency program funding. In its first few years, the City of Minneapolis and utility funding covered 90% of energy efficiency project costs. This amount decreased to 70% of costs in 2022 because the demand for funds outstripped supply.

²² Revisions to CenterPoint Energy’s Low-Income Rental Efficiency (LIRE) program made in 2021-2022 offer an example of how utility programs can target customers with specific demographic characteristics without verifying income. (Minnesota Department of Commerce, 2022) This revision created a path for pre-approved geographic-based qualification, rather than individual household income verification. The revisions allow rental units located in Areas of Concentrated Poverty (areas that poverty is over 40%) and in Minneapolis Greens Zones to automatically qualify for the low-income rental program. As part of the ECO Act passed in 2021, the Department of Commerce also initiated an effort to revise methods of qualifying Low-income CIP eligibility of multi-family buildings. Several criteria are now acceptable, including geography proxy-based criteria that must be approved on a case by case basis with consultation between the utilities and the Department of Commerce. Geographic based criteria, when approved, can significantly lessen the burden on property owners to in determining whether their building would be eligible for low-income CIP programs.

necessary. Alternate methods to target rental properties include using the demographics of the property's Census block or zip code; the median rent for the building, with lower rents indicating renters with lower incomes; and the proportion of households in the building receiving energy assistance or having late payments or being in arrears, all of which indicate financial strain and likely lower incomes.

4. **Keep it simple.** Some property owners have full-time occupations, in addition to managing their rental buildings. Program processes that include cumbersome documentation and time-consuming processes will deter property owners from participating.

How could it be implemented?

There are many ways to design a program to encourage property owners to make non-emergency upgrades.

Use “advisors” or “navigators” to create a single point of contact for property owners. The property owners interviewed for this study would benefit from outreach programs designed to help small business owners. The concept of energy advisors or navigators for small business owners has been implemented successfully along Lake Street in Minneapolis.²³ A City of Minneapolis pilot, named Energy Business Technical Assistance Program (E-TAP) aimed to replicate this success and operated for 14 months in 2018 and 2019²⁴. Valuable information on this effort, including key takeaways, can be found in the program evaluation and should prove useful for utilities interested in piloting this approach. (Citizens Utility Board of Minnesota, 2020)

Offer a rental property-specific energy audit that addresses owners' four key interests, described below in the [Implementation tactics](#) section, for all programs targeting rental property owners serving Latinx renters.

An additional approach that may encourage early replacement of equipment is to **structure programs such that the financial benefits of replacing functional (but inefficient) equipment are much larger than replacing equipment once it fails**. This approach is based on an understanding of the critical differences in decision-making between emergency equipment replacements versus non-emergency or discretionary upgrades. These are discussed in detail above in the [Introduction](#).

Once equipment fails, property owners *must* replace it. Thus, at the time of failure, there is no reason for an efficiency program to pay the full cost of the equipment being replaced. Instead, efficiency programs can aim to pay the *difference* in cost between the lowest-cost replacement (usually a baseline-efficient model) and the efficient option, allowing owners to replace their failed equipment with an efficient option at no *additional* cost to them.

²³ Community-based navigators have also shown to be effective in creating “institutional capabilities for increased recognition of participation challenges and facilitated opportunities for alternative solutions that may have been overlooked under the standard self-referral implementation of [the Weatherization Assistance Program]” in a program in the Green Impact Zone of Kansas City, Missouri (Reames, 2015).

²⁴ The Energy Business Technical Assistance Program (E-TAP) was administered by the City of Minneapolis to support small businesses by providing information about cost-saving energy efficiency opportunities and assistance in implementing recommendations, including help with securing energy rebates. Consultants were hired to work directly with small businesses and help them navigate energy programs.

In contrast, non-emergency or discretionary replacements present the utility program (and the property owner) with an entirely different decision-making framework. Because they do not need to replace the equipment, the property owner will require larger financial incentives to motivate action (50% of the total equipment cost or more).

Implementation tactics for all programs targeting rental property owners serving Latinx renters

This section includes many tactical recommendations for programs targeting property owners serving Latinx renters in Minneapolis and St. Paul. None of these recommendations constitutes a “program” in its own right. Rather, each recommendation addresses a specific activity and is intended to guide program implementation in areas including outreach channels, language, program processes, costs, and financing.

Messaging and program design: Emphasize efficiency upgrades as solutions to property owners’ four key interests

The interviewed property owners identified four key interests that can drive them to engage with utility programs, and which can be incorporated into program messaging and process design:

Get free stuff: Use the enticement of free services to engage owners in an energy audit

This study suggests that many property owners have owned their buildings for several years and believe they have a clear sense of the building’s flaws. For this reason, owners may not be willing to pay for an energy audit unless it includes free services. The potential to get free materials has historically been some property owners’ primary driver for undertaking an audit:

"I probably just wouldn't do [an energy audit]. I can go into my house and I can see what has to be done. I know without an energy audit that ... the door installation isn't good. In the last energy audit that I did with that CEE program, not only did they do the audit, but they did the weather stripping around the doors and other stuff, wrapped up the water heaters. And that was all free. So I didn't have to pay for any of it. So I was happy."

Address renter complaints: Explain efficiency measures as a solution to problems renters complain about

Property owners value good, long-term renters. When good renters complain, owners pay attention. Renter complaints are a key reason a property owner may be willing to engage in an energy audit or other utility service, if they believe doing so will help them figure out the cause of temperature discomfort, mold, cold water, or other renter problems. Owners in this category need technical problem solving and help identifying solutions:

"It's very problematic, this house. The furnace is blowing at 70, but it's never heating up. I don't know if the furnace is big enough, if that's the problem. The other possible problem is that the furnace is in the attic, which is an unheated space. It's an old building and it's not properly

insulated. It's on a corner, and it doesn't have any protection either – it's not next to another house. I mean, I've done a lot of work to it, but I think after this winter, I've got to figure something out. I put in newer windows, double glaze, but there were even drafts at the windows. The home energy audit would probably be really important at this point. Getting somebody in there – it's just too drafty.”

Stay up to date: Provide education on efficiency measures to teach owners the latest and greatest in building technologies and the people who can install them

The majority of property owners surveyed have owned investment properties for several years and may not be up to date on the latest technologies and practices. Owners who manage their buildings on the side of their primary profession likely lack the time to stay informed of the latest advances in building technology. Utility programs can frame the energy audit or other educational offerings (paired with free stuff) as a quick way for busy property owners to learn about the newest opportunities.

“So I'm just thinking, I probably really have to find someone that will blow insulation in the walls. Do you know people who blow in insulation?”

Reduce expenses: Show how improving efficiency reduces utility costs paid by owners

While many property owners pass all utility costs on to renters, in some cases, owners do bear the burden of residence or common area electric and gas usage or water and sewer fees. In these cases, owners have a financial incentive to invest in efficiency if the return on investment is favorable to them.

“I would say every six months or so, someone will bring something up about maybe installing solar panels on our roof or doing a lighting audit, something along those lines. More specifically, it's about reducing our expenses. When the solar panels were brought up, it was a question of, is this feasible, can we afford it, what options are out there.”

Outreach methods: Owners prefer to be contacted by email

All owners contacted for this research preferred to correspond with a utility program in English.

Their favorite method of communication is email (preferred by seven of nine survey respondents). More than 70% of respondents said they would like to receive information about appliance discounts or other rebates for building improvements by email.

Costs: Rental property owners think about costs differently than homeowners

When it comes to paying for improvements to their buildings, rental property owners tend to have resources at their disposal and are looking to maximize their return on investment.

Unlike the Black homeowners in this study, most **property owners are willing and able to pay the full cost of new equipment with either cash or a credit card**. None said they would use a payday loan, and only one would use store financing or a personal loan.

Property owners are also, for the most part, **willing to wait to receive a rebate**. Six of nine said they would be willing to pay the full cost upfront even if they needed to wait to receive a rebate. Further, property owners interviewed said they preferred to wait a few weeks to get a rebate in the mail if it meant the rebate would be larger than an instant rebate. However, when offered the choice of redemption methods for a same-sized rebate, most preferred an instant rebate at the point of sale or a VISA gift card.

Ideas for educating property owners and renters

To-do checklist for renter turnover

Property owners emphasized the importance of timing when it comes to making improvements. **When renters turn over, a unit is temporarily vacant, presenting owners with an opportune moment to make changes:**

“When they move out, I replace all the lights with the new-fangled green lights – I always do that. But if [the residents] are there, I’m hands-off; I’m not bothering them.”

One way to capitalize on renter turnover is to provide property owners with **a checklist for high-priority upgrades to make at turnover**, as well as the financial and technical services the utility program provides.

To-do checklist for renters

Property owners generally have minimal interaction with renters, and those surveyed seem to avoid interactions to the greatest extent possible. Most conversations between owner and renter are reactive – the owner is responding to a question or complaint from a renter.

Owners have observed substantial variability when it comes to renters’ energy awareness and knowledge:

“Some tenants really pay attention, but a lot of them don’t. The tenants who’ve been there a while, I go through that stuff and explain it to them, but a lot of times they’re not about maintenance. They’re renting, and they don’t think about it.”

Utility programs can support owners in providing information about energy efficient behaviors to renters by creating **to-do checklists for renters** that owners can post in rental units or provide to renters at move-in. This could include behaviors that minimize utility costs and ways to cost-effectively heat and cool their spaces.

Outreach to renters: Use caution and be sensitive to their concerns

In a competitive housing market, especially, low-income renters are often in a vulnerable position relative to their housing situation. They have many concerns: fear about losing their housing, concern about drawing attention to themselves and their immigration status, worry that accepting public benefits will negatively impact their ability to get citizenship. What is more, renters have only the most limited ability to effect changes in their homes. Any communication between a utility program and renters must be cognizant of these concerns and limitations.

Next steps for equitable research and program design

This project raised many questions that may prove fruitful fodder for future research, pilot programs, and policy innovation. The following is a select list of research questions and ideas offered by the research team for the benefit of academic researchers, efficiency industry practitioners, utility staff, and policy makers.

1. **How can utility programs collect and share participant demographic data sufficient to support disaggregated program performance assessment?** The research team intended to begin this project with an assessment of CIP program participation at the household level based on demographic characteristics including race/ethnicity, income, and geography. However, the team determined that the data required to support this analysis either are not being collected or, if they are, were not publicly available. In order to track the performance of utility programs in specific communities and target future program designs, it will be important that these data are collected and made available to the public.
2. **Can the suggested approaches be funded under current utility program regulatory rules and, if not, what policy alterations may be needed?** The recommendations presented in this research often hinge on the amount of the financial incentive offered. Still other recommendations call for long-term, labor-intensive implementation. Utilities, community stakeholders, and regulators will want to assess the cost of implementing them and whether such costs are allowed under current regulatory rules. If such costs are not permitted, utilities, advocates, and policy makers may want to open a discussion on the adjustments that would be needed to provide the necessary services to the targeted populations.
3. **What are the potential impacts on the targeted communities of implementing the equitable program design recommendations?** Further research could build upon the impact analysis offered in [Appendix G](#) to determine the potential impacts of implementing the recommendations in this report on the targeted communities.
4. **What are the culturally specific efficiency program needs of the four priority strata not selected for this project?** Others may want to conduct similar research on the other priority four strata²⁵ and assess how they compare to this project's findings. Could the ideas suggested here meet the needs of households of different race/ethnicity? What differences can be found?

²⁵ See the discussion of priority strata on page 8 [highlighting to double check the page number when editing is finished].

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Appendix A: Methodology

Methods used to identify two target communities

The first task of this project was to identify demographically and geographically distinct communities with two characteristics: a low rate of Conservation Improvement Program (CIP) participation and/or a quantifiable need for energy efficiency services. From among the communities identified for either their low rate of program participation or their high need for efficiency, three communities would be selected as “target communities” and become the focus of this project’s community engagement and analysis, culminating in culturally specific program design recommendations.

The first objective – identifying communities with low CIP participation, proved infeasible. There were no published participation data disaggregated at a sufficient level of demographic and geographic detail to support such an assessment and the research team was also unable to obtain such data from the utilities. This early finding suggests that collecting and publishing participation data that includes demographic and geographic characteristics will be an important next step for Minnesota utilities (and others) to support future equitable program designs. This recommendation is discussed in greater detail in the concluding section, [Next Steps for Equitable Research and Program Design](#).

Instead, the research team turned to the use of population data from the U.S. Census Bureau’s American Community Survey (ACS) 1-Year Estimates for the year 2017, an annual survey of households in the United States that includes many demographic and economic questions, including energy expenditures.

The University of Minnesota research team led this work and employed a novel methodology to support the overarching goal to identify three communities with a high need for energy efficiency services. The first step in this novel methodology was to create subpopulation strata:

Strata are sub-groups within the population that have a common set of demographic and/or geographic characteristics. Strata are defined multidimensionally across multiple variables, to help improve the correlation with meaningful, self-determined definitions of community. The definition of strata does not supersede the definition of communities, rather our approach to strata identification is intended to identify population subgroups with shared energy, demographic, and geographic characteristics—from which self-determined communities could be subsequently identified through qualitative means.

The methodology employed three distinct steps, described below: data aggregation, screening, and exploration.

Step 1: Data aggregation to create strata

The first step of the methodology was to aggregate census data. The research team collected annual data from the US Census’s ACS for the state of Minnesota for 2010-2017 and narrowed this data pull down to household-level data from the 2017 ACS for households in the seven-county Twin Cities metro area. This included data for **8,903 unique survey responses** sampled from a population of approximately 1.2 million households.

Creation of the first tier of 274 strata

The research team divided the ACS data into **274 overlapping strata**. As noted above, strata are defined as subpopulations with intersecting combinations of **geographic** residence and **demographic characteristics** for which there were a **sufficient number of survey responses**. The following criteria were used to develop the first tier of 274 strata:

Geographic criteria

For this research, geographic areas were defined at the **PUMA** level (Public Use Microdata Area). PUMAs are non-overlapping areas of at least 100,000 people. In the seven-County Twin Cities area there are 24 PUMAs. Hennepin County has the most PUMAs (9) and Carver County has the fewest (1). The PUMA is the smallest geographic area for which a sufficient number of household-level Census data observations (i.e. respondents) are available.

Demographic characteristics

The screening process prioritized the following demographic characteristics for defining strata: race/ethnicity (Black, Hispanic, Hmong, non-white or Hispanic, white non-Hispanic); home tenure (owner, renter); and income (low or moderate income)²⁶.

Minimum number of observations

Strata with fewer than 10 actual observations (survey respondents) or representing fewer than 1,000 households (weighted responses) were excluded, for a total of **66 excluded strata**.

Use of a matrix to organize strata

The research team created a data matrix that included more than 50 demographic variables for each strata. These included both data from the Census and variables computed by the research team (for example, energy burden):

- Financial variables (income, mortgage or rent cost, housing value, use of food stamps, employment)
- Household characteristics (multi-generational household, race/ethnicity, education, non-English language speakers, moved in the last year, immigrated in the last year)
- Housing characteristics (owned or rented, building type, number of bedrooms, age of home)
- Energy characteristics (energy costs, heating fuel type, energy burden)

A strata could be defined by some or all of the characteristics above. In defining strata, the team prioritized the characteristics of geography, race/ethnicity, income, and housing tenure (renter/owner). Examples of the strata that were created as a result of the data aggregation include:

- Black homeowners in the North Minneapolis and St. Anthony

²⁶ Low/moderate income (LMI) designation follows guidelines from the U.S. Department of Housing and Urban Development for 80% of the [2017 median family income in Minnesota](https://www.huduser.gov/portal/datasets/il/il17/State-Incomelimits-Report-FY17.pdf) of \$80,400. (<https://www.huduser.gov/portal/datasets/il/il17/State-Incomelimits-Report-FY17.pdf>).

- Low and moderate income homeowners in the Northwest Anoka County (which includes Andover, Ramsey, Anoka & East Bethel)
- Hispanic households in the Southeast Minneapolis
- Low and moderate income renters in the Carver & western Scott Counties

Step 2: Screening

The research team sought to identify strata in which average energy burdens were higher than comparable households' energy burden. These strata were judged to be in higher need of energy efficiency services and would thus be candidates to become the focus of this research. Three steps were used to accomplish this, which resulted in a total of **62 strata** of interest (23% of all strata):

1. Strata with average energy burden above 5.5% → **43 strata**
2. Strata in which more than 30% of respondents reported an energy burden above 6% → **11 additional strata**
3. Strata with higher than predicted energy burden, based on the results of eight regression models²⁷ → **7 additional strata**

The resulting **62 strata** of interest featured:

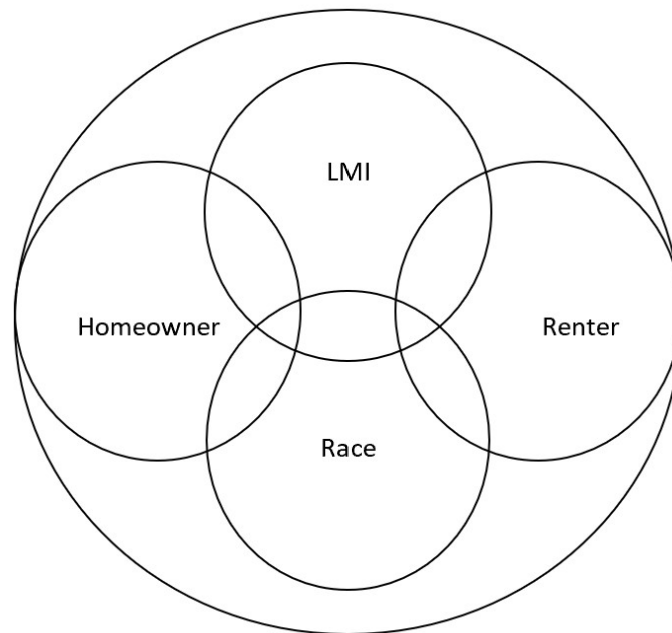
- Geographic diversity: There was at least one strata in each of the seven Twin Cities metro area Counties
- Racial/ethnic diversity: There were strata defined by respondents' identification as Black (12 strata), Hispanic (3 strata), and Hmong (1 strata)
- There was a preponderance of strata with high proportions of low and moderate income households: 43 strata (69% of all strata) were defined by low/moderate income alone or with another characteristic

It is important to note that the strata overlap— individual households may fall into one or more strata. This can be portrayed using a Venn diagram (Figure 1). For example, for the same geographic area of North Minneapolis and St. Anthony there were six strata of interest defined as:

- All Black households
- Black homeowners
- Black renters
- All low/moderate income households
- Low/moderate income non-white or Hispanic households
- All non-white or Hispanic households.

²⁷ To identify strata with higher-than-expected energy burdens, the team estimated a series of regression models that predicted a household's energy burden based on different combinations of variables. The team investigated eight regression models that included combinations of income, heating fuel type, demographics, and housing characteristics. For each strata, the team compared actual observed energy burdens to predicted energy burdens from each of the eight regression models. The strata in which household-level energy burden was higher than the regression models predicted became the focus of the next stage of analysis.

Figure 8. Example Venn diagram showing the overlapping nature of strata



In order to assess which among overlapping strata should be further prioritized, the team examined all the strata in each PUMA together and selected the strata with the narrowest possible definition to support the subsequent work of using the quantitative or strata definitions to identify communities. This resulted in six groups of 17 strata defined first by race/ethnicity, income, and housing tenure and second by geography:

- Black homeowners in North Minneapolis and surrounding suburbs
 - Brooklyn Center/Golden Valley/New Hope/Robbinsdale
 - North Minneapolis/St. Anthony
- Black renters in urban and suburban areas
 - Maplewood/Roseville/north St. Paul
 - West St. Paul
 - North Minneapolis/St. Anthony
 - Edina/St. Louis Park/Hopkins
- Mostly white, low/moderate income homeowners in outer ring suburbs and rural areas
 - Andover/Ramsey/Anoka/ East Bethel
 - Coon Rapids/Fridley/Columbia Heights
 - Oakdale/Forest Lake, Stillwater & Hugo
 - Champlin/Rogers Cities/ Lake Minnetonka
 - Eden Prairie/ Minnetonka
 - Eagan/Inver Grove Heights/ South St. Paul
 - Lakeville/Hastings/Rosemount & Farmington
- Hmong and other non-white households, mostly renters, in west St. Paul
- Hispanic households, mostly renters
 - East St. Paul
 - Southeast Minneapolis
- Mostly white, low/moderate income renters in Carver and west Scott Counties

Step 3: Use of qualitative descriptors to select targeted strata

The research team wrote descriptions of each strata that included a map and list of key demographic descriptors including the number of households in the strata, income, educational attainment, race/ethnicity, housing characteristics, employment status, whether they were linguistically isolated (non-English speakers), and their use of food stamps and health coverage. The descriptions of the selected strata are presented in the main body of this report in each of the community profile sections. The descriptions of the other four strata are included in [Appendix B: Strata profiles](#) below.

These strata descriptions were presented to the project's Steering Committee during an hour-long discussion in which participants jointly explored hypotheses about the causes of high energy burden in the strata. Discussion among committee members and with the project's research team yielded the decision to focus the project on two strata: **Black homeowners in North Minneapolis and surrounding suburbs** and **Latinx renters in East St. Paul and South Minneapolis**.

The selection of a strata comprised of renters required a subtle shift in the project approach. While the design had called for focus on three communities, the research team reallocated resources in order to engage with two distinct populations within the Latinx renter strata that each impact the energy efficiency of homes: renters and property owners. This yielded two communities of focus (Black homeowners and Latinx renters) and three targeted populations: Black homeowners, Latinx renters, and property owners renting to Latinx households.

After community selection took place based on 2017 ACS data, new data census data became available. To further verify trends surrounding energy burden in the selected communities, 2017-2020 ACS data was reviewed. The additional data shows that Black Homeowners and Latinx Renters continue to experience energy burden at a rate higher than average in the Twin Cities metropolitan area. This updated data is presented in [Appendix B, Strata Profiles](#).

Formation and use of a Steering Committee

At project initiation, the project team convened individuals representing local community-based organizations and utility companies to act as a Steering Committee. The committee was charged with reviewing research materials, providing feedback on findings, and helping connect the project team to community stakeholders to facilitate engagement.

The Committee met regularly to guide the project team, with meetings held in March, May, July, September, and December 2021 and February 2022.

Data collection through community engagement

The project's engagement methodology employed a thorough situational analysis of each respondent's experience with, and knowledge of, energy efficiency tools and resources. The team used a three-part approach: web-based surveys, phone interviews, and virtual focus groups. This multi-modal engagement strategy supported participation by a diverse cross-section of stakeholders in each community. Below are descriptions of each data collection effort.

An important note: CIP for natural gas utilities includes a mixture of both market rate programs and low-income programs. For the purposes of this study, the project team decided to focus engagement

with Black homeowners on market rate CIP programs, and with Latinx renters and property owners on low-income CIP programs.

Online surveys

The project team used a structured online survey protocol. The protocols allowed the project team to collect open-ended data while exploring respondents' perceptions and opinions concerning energy efficiency.

The survey protocol was available to Black homeowners, Latinx renters, and property owners from November 2021 to February 2022. A \$15 incentive was provided to all survey participants.

In conducting outreach to distribute the online survey, the project team worked with the following organizations for referrals:

- Advancement of Hmong Americans
- Building Dignity Council
- Community Action Partnership of Ramsey and Washington Counties
- COPAL
- Corcoran Neighborhood Association
- Dayton Bluff's Community Council
- Eastside Freedom Library
- Eastside Housing Justice Work Group
- Energy Centers Coalition
- Great Plains Institute
- Greater East Side Community Council
- Guardian Properties
- Hawthorne Neighborhood Council
- Harrison Neighborhood Association
- Inquilinx Unidxs
- Jordan Area Community Council
- Latino Communities United in Service (CLUES)
- Longfellow Community Council
- Minnesota Interfaith Power & Light
- MN Renewable Now
- Navigate MN
- Neighborhood Hub
- Northside Residents Redevelopment Council
- Payne-Phalen Community Council
- Powderhorn Park Neighborhood Association
- Pueblos Midwest
- Standish Ericsson Neighborhood Association
- Webber Camden Neighborhood Organization
- West Side Community Organization
- UNIDOS MN
- Urban League Twin Cities

The project team also created a social media campaign using the following images to recruit survey participants (Figure 9).

Figure 9. Sample images from the social media campaign to engage Black homeowners and Latinx renters



The number of zip codes of survey participants included:

- Twenty-seven Black homeowners in zip codes 55411 (3) and 55429 (24), which included parts of the North Minneapolis neighborhoods of Jordan, Hawthorne, Willard Hay, and Near North, and Brooklyn Center.
- Eight property owners and 15 Latinx renters from zip codes 55106, 55404, 55407, and 55409, which included the neighborhoods of Ventura Village, Powderhorn, Seward, Longfellow, and parts of Hiawatha, Lyndale, and Kingfield.

Phone Interviews

The project team used a semi-structured phone interview protocol and recruited simultaneously with the online survey outreach. Survey respondents were for a follow-up interview based on their expressed interest in the survey. A \$25 incentive was provided to all interview participants.

Focus Groups

The project team hosted focus groups with intermediary organizations working directly with the community to learn more about their experience in navigating barriers to accessing energy efficiency programs, rebates, and home improvement services. Participants were incentivized for their attendance by providing a \$25 gift card.

Recruitment began in December 2021 and lasted through January 2022. A total of three virtual focus groups were held:

- Monday, December 14 (3 attendees)
- Wednesday, December 15 (2 attendees)
- Thursday, January 27 (2 attendees)

The following organizations participated in the focus group sessions:

- Esperanza United
- Hawthorne Neighborhood Council
- MN Interfaith Power and Light
- Northside Residents Redevelopment Council
- Payne Phalen Neighborhood Council

During each session, the team asked an informal series of questions focused on learning more about each organization's approach to outreach and engagement, and their knowledge barriers to accessing energy efficiency services reported by participants.

Research Limitations

Despite a multi-modal approach that included leveraging personal and professional networks and social media to reach individuals in each community, the pervasive impact of the COVID-19 pandemic on low-income, BIPOC, and small business communities prevented a deeper level of engagement. This challenge presented itself several times throughout the engagement process, which are reflected in two ways:

- The breadth of engagement. At the start of the social media campaign, word spread quickly in two zip codes: 55429 (homeowners) and 55106 (renters) - with several respondents completing the survey in a short period of time. Due to budget constraints in providing a \$15 incentive to each respondent, we had a maximum number of surveys we could accept. This limited the ability to keep the survey open for an extended period of time, which may have allowed others in neighboring zip codes to submit responses.
- The number of qualitative responses. Due to the nature of conducting phone interviews and virtual focus groups and the time commitment required on the part of participants, there was a relatively low response rate amongst survey respondents. The response rates were 18% for homeowners and 13% for renters. The response rate was substantially higher for property owners at 62%.

Appendix B: Strata Profiles

Updated Strata Profiles: Comparing 2017 to 2017-2020 Data for Selected Strata

Demographic strata were selected for the project based on the 1-Year ACS data collected in 2017. Toward the end of the project, ACS data through 2020 was published by the US Census. This section compares the demographic profiles of the selected strata for 2017 to the annual average values for 2017-2020. This additional comparison was to verify the selected groups have continued to experience higher energy burdens than average. The average energy burden in Twin Cities metro counties for years 2017-2020 was 3.6%.

We caution that year-to-year fluctuations in demographic data can be due to sampling fluctuations due to the limited sample size in the ACS of individuals in specific strata²⁸. These sampling fluctuations from year-to-year are greater the more specifically a stratum is defined. For example, there are greater sampling fluctuations in the estimate of average energy burden for Black homeowners in PUMA 1405 than there are sampling fluctuations in the estimate for all Black households in PUMA 1405 than there are sampling fluctuations in the estimate for all households in PUMA 1405.

Black Homeowners in North Minneapolis and Surrounding Suburbs

The community profile for this stratum based on 2017 ACS data is shown in the Table 11.

Table 11. Black Homeowner Mean Income and Energy Burden, 2017 ACS data

Black homeowners in	Mean Income	Energy Burden
North Minneapolis/St. Anthony (#1405)	\$54,545	8.1%
Brooklyn Center/Golden Valley/New Hope/Robbinsdale (#1404)	\$60,142	7.1%

The updated profile for 2017-2020 is shown in the Table 12.

²⁸ The term “sampling fluctuations” refers to the variability inherent in an estimate derived from a statistical sample, such as the American Community Survey, due to the randomness in some individuals selected for inclusion in the sample and not others. With a smaller sample size in more specifically defined strata, sampling fluctuations increase.

Table 12. Black Homeowner Mean Income and Energy Burden, 2017-2020 ACS data

Black homeowners in	Mean Income	Energy Burden
North Minneapolis/St. Anthony (#1405)	\$67,970	6.3%
Brooklyn Center/Golden Valley/New Hope/Robbinsdale (#1404)	\$88,855	4.5%

Latinx households in South Minneapolis and East St. Paul

The community profile for this stratum based on 2017 ACS data is shown in the Table 13.

Table 13. Latinx Renter Mean Income and Energy Burden, 2017 ACS data

Latinx renters in	Mean Income	Energy Burden
East Saint Paul (#1303)	\$60,713	5.4%
Southeast Minneapolis (#1406)	\$53,823	6.0%

The updated profile for 2017-2020 is shown in the Table 14.

Table 14. Latinx Renter Mean Income and Energy Burden, 2017-2020 ACS data

Latinx renters in	Mean Income	Energy Burden
East Saint Paul (#1303)	\$60,282	4.8%
Southeast Minneapolis (#1406)	\$64,838	4.3%

In comparing the 2017 and 2017-2020 ACS estimates for the two communities we focused on in this study, we find that the reported profiles show that these communities continue to face higher than average energy burden. While reported energy burdens for the 2017-2020 average were lower for each stratum, they remain well above the average energy burden in 2017-2020 for households in the Twin Cities metro-area counties of 3.6%.

Across both communities, the issue of relatively smaller sample size in the specific strata highlights a need for more focused data collection, such as the qualitative analysis conducted in Phase 2 of this study.

Additional Strata Profiles (2017 Data)

The following four strata profiles document relevant demographic characteristics about the subject households in the strata not selected as target communities for this research project. Strata descriptions for the selected strata are located in the main body of the report in the community profile sections. These four strata represent groups of households that share demographic and geographic characteristics and may hold potential for future research and program targeting, a subject discussed in greater detail in the report section [Next Steps for Equitable Research and Program Design](#).

The full set of characteristics of each strata are included in a supplementary spreadsheet, available upon request.

Black renters in urban and suburban areas

Figure 10. Potential Strata Areas for Black Renters

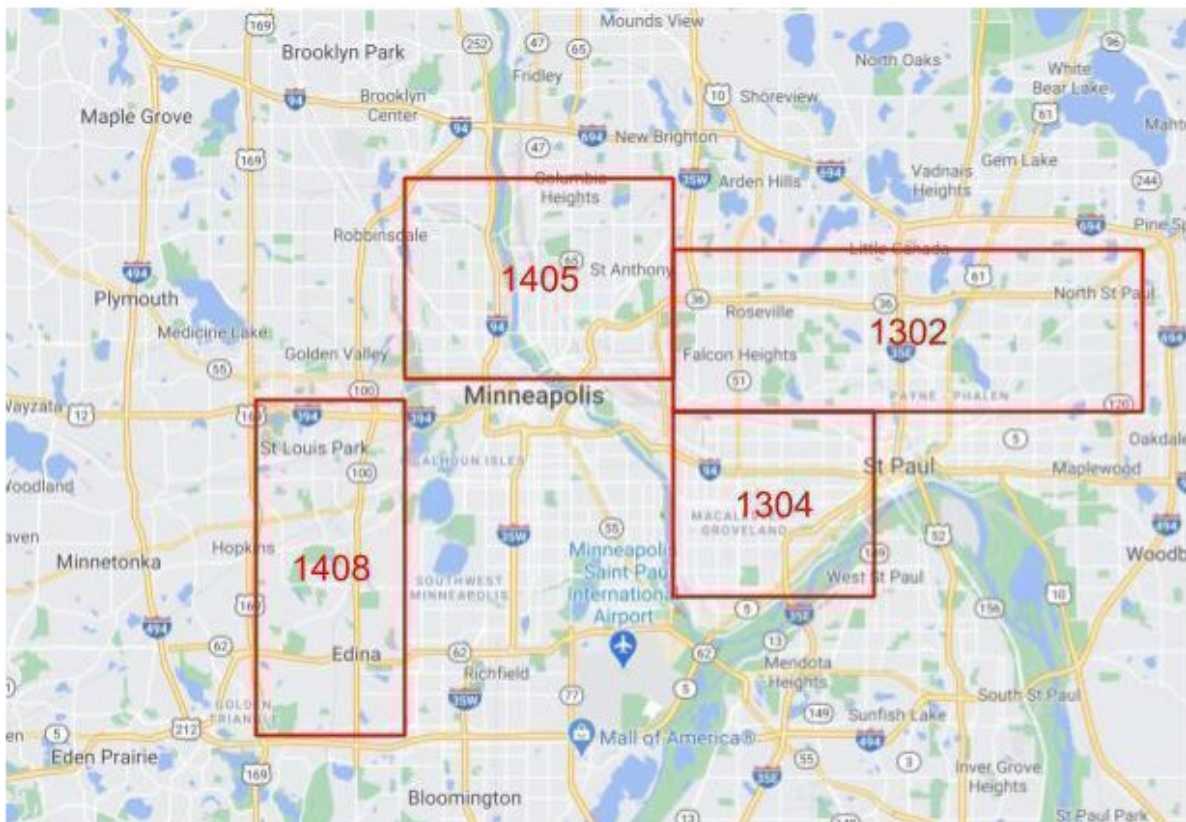


Table 15. Black renter strata

PUMA	Cities	Est. # of households in strata	Mean income	Energy burden
1302	Maplewood, Roseville, and north St. Paul	3,859	\$37,285	4%
1304	West St. Paul	9,311	\$45,684	5%
1405	North Minneapolis/St. Anthony	8,445	\$29,213	7%
1408	Edina/St. Louis Park/Hopkins	4,573	\$22,305	7%

Nearly all Black renters in these geographies are low/moderate income.

Black renters in these four geographies have higher rates of electric heating than other renters in the same area. Renters in Maplewood/Roseville/north St. Paul and West St. Paul have among the highest rate of electric heating (47% and 52%).

Black renters in North Minneapolis/St. Anthony and Edina/St. Louis Park/Hopkins have higher energy burdens (6.9%) than Black renters in the other geographies.

Black renters in West St. Paul and North Minneapolis/St. Anthony have higher than typical rate of food stamp redemption (50% and 78%).

Notable among those living in Maplewood/Roseville/north St. Paul:

- They have the highest rate of employment among these four geographies (78%)

Notable among those living in North Minneapolis/St. Anthony:

- 32% of homes were built before 1940
- One-third live in single family homes (31%)
- They have the lowest rate of employment among all Black renters (42% employment, 56% not in labor force)

Notable among those living in Edina/St. Louis Park/Hopkins:

- 88% of homes were built in the 1960s and 1970s
- Nearly all live in multi-family buildings (five or more units) (81%)
- They have higher rates of non-English speakers than the other geographies (23%)²⁹
- They have the second highest rate of employment among these four geographies (75%)
- Half (50%) have a high energy burden, the highest rate among all Black renters

²⁹ A hypothesis of the research team is that this may be a Somali population.

Table 16. How Black renters compare to other renters in their geographic area and other Black renters in the Twin Cities metro

Factor	Black renters in Maplewood , Roseville, and north St. Paul	All renters in Maplewood , Roseville, and north St. Paul	Black renters in West St. Paul	All renters in West St. Paul	Black renters in North Minneapolis/St. Anthony	All renters in North Minneapolis/St. Anthony	Black renters in Edina/St. Louis Park/Hopkins	All renters in Edina/St. Louis Park/Hopkins	All Black renters in metro
Energy burden	4.4%	2.8%	5%	3.8%	6.9%	4.1%	6.9%	2.3%	3.9%
% w/ high energy burden	39%	12%	34%	20%	37%	24%	51%	11%	21%
Avg. Income	37,285	70,091	45,684	50,565	29,213	44,901	22,305	77,393	42,827
Rent amount	938	997	685	941	719	977	700	1,186	877
Avg. # of bedrooms	2.7	2.6	3.2	2.8	3.2	2.9	2.9	2.6	2.9
Electricity cost	965	764	944	801	883	797	932	633	853
Natural gas cost	1,003	222	198	98	736	458	162	163	291

Factor	Black renters in Maplewood , Roseville, and north St. Paul	All renters in Maplewood , Roseville, and north St. Paul	Black renters in West St. Paul	All renters in West St. Paul	Black renters in North Minneapolis/St. Anthony	All renters in North Minneapolis/St. Anthony	Black renters in Edina/St. Louis Park/Hopkins	All renters in Edina/St. Louis Park/Hopkins	All Black renters in metro
Heat with gas	53%	62%	35%	46%	65%	69%	49%	50%	61%
Heat with electricity	47%	33%	52%	47%	30%	26%	39%	37%	34%
Avg. # of generations in household	1.3	1.2	1.5	1.3	1.6	1.3	1.5	1.2	1.5
Employment	78%	69%	66%	71%	42%	66%	75%	70%	72%
Food stamps	18%	9%	50%	23%	78%	34%	29%	12%	38%
% LMI	96%	70%	88%	78%	98%	82%	95%	60%	80%

Mostly white, low/moderate income homeowners in outer ring suburbs and rural areas

Figure 11. Potential Strat Areas for White, Low to Moderate Income Homeowners

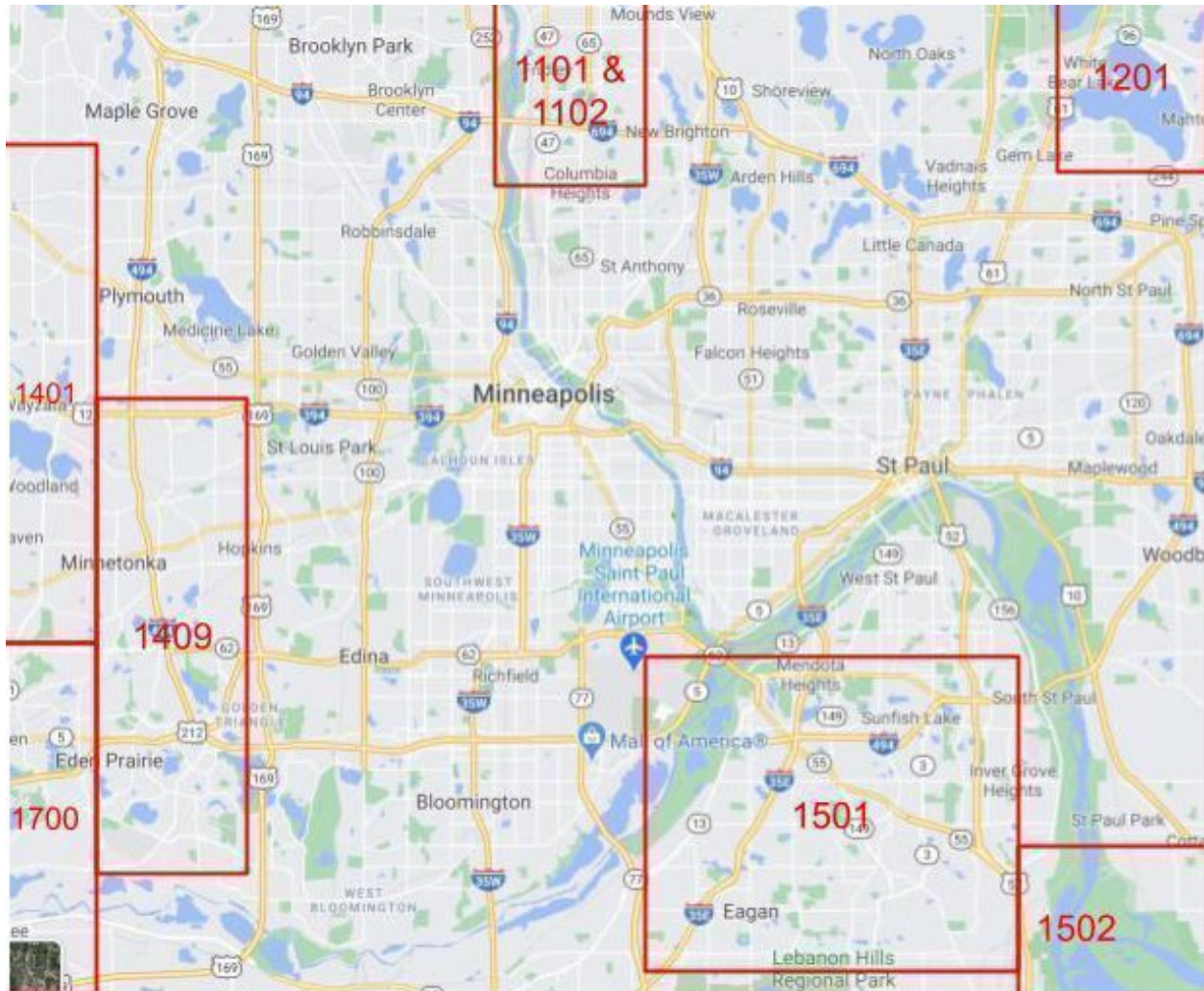


Table 17. Mostly white, low/moderate income homeowners in outer suburbs

PUMA	Cities	Est. # of households in strata	Mean Income	Energy Burden
1101	Andover, Ramsey, Anoka & East Bethel	11,928	\$35,596	7%
1102	Coon Rapids, Fridley & Columbia Heights	22,225	\$38,634	6%
1201	Oakdale, Forest Lake, Stillwater & Hugo	20,036	\$45,172	6%
1401	Champlin, Rogers Cities & Lake Minnetonka	13,101	\$41,077	7%
1409	Eden Prairie and Minnetonka	9,686	\$37,286	7%
1501	Eagan, Inver Grove Heights & South St. Paul	17,079	\$40,049	7%
1502	Lakeville, Hastings, Rosemount & Farmington	15,840	\$39,909	6%
1700	Carver and west Scott Counties – homeowners	16,590	\$39,567	7%

These strata are *nearly all white* - ranging from a low of 84% (PUMA 1102) to a high of 98% (PUMA 1409 and 1700). All have relatively *high rates of people not in the labor force* (36% to 55%).

All strata have *very low food stamp redemption* (all but one under 8%) and *high rates of healthcare coverage* (all but one above 92%).

In all but one geography, over 82% *heat with gas*. Nearly all live in single family homes (74% to 93%).

Notable in Andover/Ramsey/Anoka/East Bethel (1101):

- About half of homes were *built after 1990* (48%)
- High rate of those with *high energy burden* (39%)

Notable in Lakeville/Hastings/Rosemount/Farmington (1502):

- About half of homes were *built after 1990* (52%)
- High rate of those with *high energy burden* (40%)

Notable in Carver/west Scott counties (1700):

- Among the *lowest rate of food stamp redemption* (1%)
- Slightly fewer *heat with gas* than in the other strata (78%)
- Reported some *Hispanic households* (8%)
- Highest rate of transiency (moved within the state last year) in this group (11%)
- Highest rate of households in these geographies with high energy burden (46%)

Table 18. How mostly white LMI homeowners compare to other homeowners in their geographic area and other LMI homeowners in the Twin Cities metro

Factor	LMI home owners in Andover, Ramsey, Anoka & East Bethel	All home owners in Andover, Ramsey, Anoka & East Bethel	LMI home owners in Coon Rapids, Fridley & Columbia Heights	All home owners in Coon Rapids, Fridley & Columbia Heights	LMI home owners in Oakdale, Forest Lake, Stillwater & Hugo	All home owners in Oakdale, Forest Lake, Stillwater & Hugo	LMI home owners in Champlin, Rogers Cities & Lake Minnetonka	All home owners in Champlin, Rogers Cities & Lake Minnetonka	All LMI home owners in metro
Energy burden	7.3%	3.7%	6.3%	4.1%	5.6%	3.1%	7.1%	3.2%	6.2%
% w/ high energy burden	39%	13%	29%	14%	32%	10%	32%	8.4%	32%
Avg. Income	35,596	113,098	38,634	85,942	45,172	125,598	41,077	151,718	39,851
House value	237,024	268,638	174,077	195,907	248,968	338,803	345,353	520,188	220,826
Monthly mortgage payment	992	1,276	857	1,055	973	1,505	1,276	1,825	990
Avg. # of bedrooms	4	4.6	3.8	4.1	4	4.3	4.2	4.5	3.8
Electricity cost	1,173	1,454	1,095	1,210	1,598	2,000	1,436	1,779	1,242

Factor	LMI home owners in Andover, Ramsey, Anoka & East Bethel	All home owners in Andover, Ramsey, Anoka & East Bethel	LMI home owners in Coon Rapids, Fridley & Columbia Heights	All home owners in Coon Rapids, Fridley & Columbia Heights	LMI home owners in Oakdale, Forest Lake, Stillwater & Hugo	All home owners in Oakdale, Forest Lake, Stillwater & Hugo	LMI home owners in Champlin, Rogers Cities & Lake Minnetonka	All home owners in Champlin, Rogers Cities & Lake Minnetonka	All LMI home owners in metro
Natural gas cost	811	925	815	894	610	530	870	1,055	693
Heat with gas	89%	88%	91%	93%	90%	85%	85%	85%	88%
Heat with electricity	4%	7.6%	4.9%	4.4%	7.3%	12%	11%	9%	8%
Avg. # of generations in household	1.2	1.5	1.2	1.4	1.3	1.4	1.3	1.5	1.2
Employment	57%	76%	51%	70%	44%	69%	56%	74%	52%
% non-English speaking	1.3%	1%	12%	6.3%	0%	0%	6.2%	1.5%	3.5%
% White	96%	94%	84%	90%	96%	97%	92%	95%	87%

Table 19. How mostly white LMI homeowners compare to other homeowners in their geographic area and other LMI homeowners in the Carver and West Scott Counties

Factor	LMI home owners in Eden Prairie and Minnetonka	All home owners in Eden Prairie and Minnetonka	LMI home owners in Eagan, Inver Grove Heights & South St. Paul	All home owners in Eagan, Inver Grove Heights & South St. Paul	LMI home owners in Lakeville, Hastings, Rosemount & Farmington	All home owners in Lakeville, Hastings, Rosemount & Farmington	LMI home owners in Carver and West Scott Counties - homeowners	All home owners in Carver and West Scott Counties - homeowners
Energy burden	7.3%	3.1%	6.7%	3.4%	6%	3%	6.8%	3.1%
% w/ high energy burden	34%	8.2%	32%	11%	40%	10%	46%	12%
Avg. Income	37,286	155,676	40,049	125,308	39,909	119,830	39,567	133,141
House value	252,309	408,653	210,804	327,200	224,414	289,751	245,251	364,896
Monthly mortgage payment	931	1,730	893	1,375	970	1,418	1,145	1,651
Avg. # of bedrooms	3.9	4.4	3.7	4.3	4.1	4.5	3.96	4.6
Electricity cost	1,122	1,444	1,527	1,705	1,217	1,448	1,264	1,474

Factor	LMI home owners in Eden Prairie and Minnetonka	All home owners in Eden Prairie and Minnetonka	LMI home owners in Eagan, Inver Grove Heights & South St. Paul	All home owners in Eagan, Inver Grove Heights & South St. Paul	LMI home owners in Lakeville, Hastings, Rosemount & Farmington	All home owners in Lakeville, Hastings, Rosemount & Farmington	LMI home owners in Carver and West Scott Counties - homeowners	All home owners in Carver and West Scott Counties - homeowners
Natural gas cost	756	1,096	461	715	816	933	824	830
Heat with gas	82%	87%	89%	90%	84%	87%	78%	80%
Heat with electricity	16%	11%	8.8%	7.9%	5.9%	6.3%	9.3%	11%
Avg. # of generations in household	1.2	1.4	1.3	1.4	1.2	1.5	1.3	1.6
Employment	46%	73%	45%	67%	64%	82%	55%	79%
% non-English speaking	0%	1.4%	2.2%	1.3%	0%	0.4%	0.2%	1%
% White	98%	91%	89%	93%	97%	95%	98%	97%

Hmong and other households of color, mostly renters, in West St. Paul

Figure 12. One Potential Strat Area for Hmong and Other Households of Color



Table 20. Hmong and other households of color in West St. Paul strata

PUMA	Cities	Est. # of households in strata	Mean Income	Energy Burden
1304	West Saint Paul - Hmong only	3,704	\$41,262	6%
1304	West Saint Paul - LMI non-white only ** Note: This strata overlaps with strata #2, Black renters.	20,941	\$26,062	6%

These strata are *predominantly* renters (73% and 86%), with a large proportion that *heat with electricity* (41% and 47%). A substantial portion *live in homes built before 1940* (35% and 23%).

These strata have a relatively high rate of *non-English language speakers* (17%) and among the highest rate of *multigenerational households* among all priority strata. These strata have *moderately high levels of food stamp redemption* (21% and 35%).

Both strata have a relatively *high rate of transiency* (moved within the state in the last year) relative to all priority strata, with the non-white-only or Hispanic strata having the second highest rate (21%).

The non-white or Hispanic household strata is composed of 48% Black, 13% Hmong, and 13% Hispanic households. 5.7% also identify as white.

Notable in the Hmong strata:

- Higher rate of *homeowners* (21%)
- Higher rate of *single family homes* (41%)
- Large proportion with *no high school education* (34%)
- Large proportion with *some college* (55%)
- None with *college degree or more*
- Larger proportion of those *not in the workforce* (42%)
- Lower proportion of *transiency* (moved within the state within the last year) (15%)

Table 21. How Hmong households compare to other households in their geographic area and other Hmong and LMI non-white households in the Twin Cities metro

	Hmong Households in West Saint Paul	Hmong Households in metro	LMI, non-white households in West Saint Paul	LMI, non-white households in metro	All households in West Saint Paul
Energy burden	6.1%	4.3%	5.9%	5.2%	3.2%
% w/ high energy burden	41%	19%	32%	28%	15%
Avg. Income	41,262	81,377	26,062	32,225	88,581
Rent amount	637	846	742	826	941
% Renter	73%	40%	86%	75%	
Avg. # of bedrooms	3	3.8	3.1	3.1	3.1
Electricity cost	1,533	1,519	1,016	1,009	1,222
Natural gas cost	232	558	102	387	232
Heat with gas	53%	65%	46%	64%	61%
Heat with electricity	41%	27%	47%	31%	25%
Avg. # of generations in household	1.6	1.9	1.5	1.5	1.3
Employment	51%	81%	67%	72%	70%

	Hmong Households in West Saint Paul	Hmong Households in metro	LMI, non-white households in West Saint Paul	LMI, non-white households in metro	All households in West Saint Paul
Food stamps	21%	25%	35%	31%	12%
% LMI	83%	49%	--	--	49%
Non English- speaking	17%	20%	18%	22%	5%

Mostly white, low/moderate income renters in Carver and west Scott Counties

Figure 13. One Potential Strat Area for mostly white, low to moderate income renters in Carver and west Scott Counties

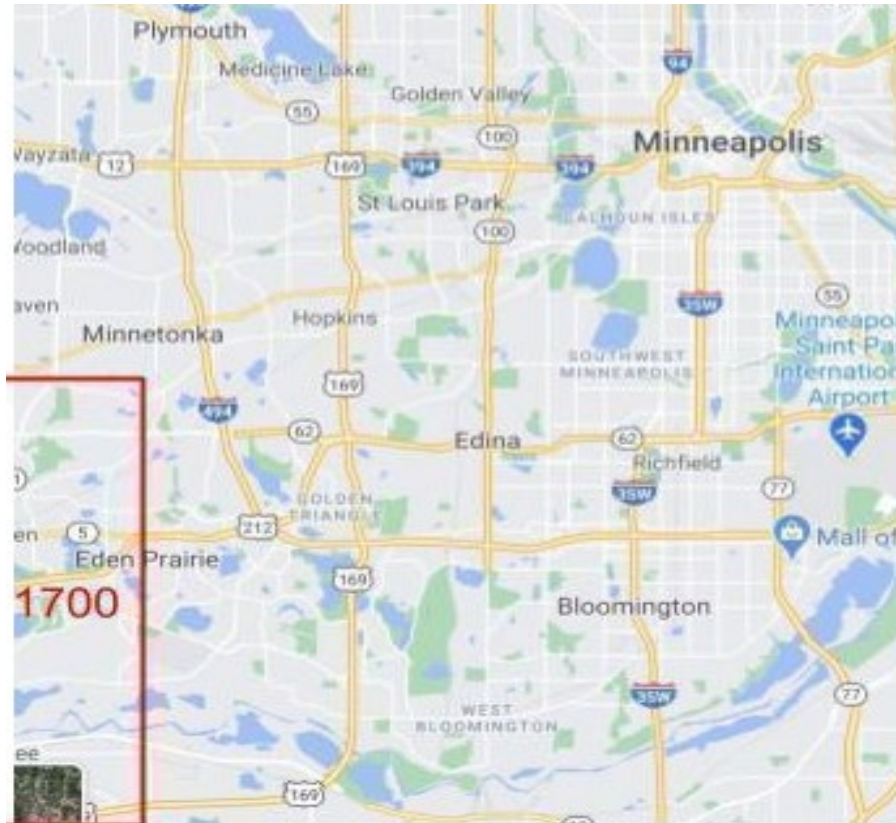


Table 22. Mostly white, low/moderate income renters in Carver and west Scott Counties strata

PUMA	Cities	Est. # of households in strata	Mean Income	Energy Burden
1700	Carver and west Scott Counties - LMI renters	5,263	\$32,040	6%

This strata is *predominantly white* (92%). They reported almost *no non-English language speakers* and no Black, Hispanic, or Hmong households. This strata is demographically similar to strata #3, however these households are renters rather than homeowners.

The strata has a *high rate of healthcare coverage* (96%) and half of households have a *high school degree* (50%).

The strata has a large proportion of people *not in the workforce* (37%).

The strata has a high proportion of homes heated with electricity (54%) and a one-third of homes were *built in the 1990s* (33%). One-third live in *single family homes* (34%).

This strata has *low college attainment* (14%) but a high proportion of households with *some college* (30%).

Table 23. How mostly white LMI renters compare to other renters in their geographic area and other LMI renters in the Twin Cities metro

Factor	LMI renters in Carver and west Scott Counties	All renters in Carver and west Scott Counties	All LMI renters in metro
Energy burden	6.4%	4.4%	3.9%
% w/ high energy burden	32%	18%	18%
Avg. Income	32,040	70,311	31,239
Rent amount	919	1,079	931
Avg. # of bedrooms	2.9	3.2	2.6
Electricity cost	1,026	1,115	704
Natural gas cost	470	535	190
Heat with gas	33%	55%	59%
Heat with electricity	54%	35%	34%
Avg. # of generations in household	1.3	1.3	1.3
Employment	63%	73%	64%
Food stamps	13%	7.5%	24%
% White	92%	77%	60%

Appendix C: Black Homeowners – Survey Instruments and Responses

Black homeowners survey instrument

Introduction

Thank you for agreeing to complete this survey. It is designed to help us learn about your home's use of natural gas and to better understand your behaviors related to home improvements. Your responses will remain anonymous and any identifying information collected to facilitate compensation will remain confidential.

Section 1: Your Home

1. What year was your home built? *Your best estimate is fine.*
 - a. Before 1940
 - b. 1941 to 1959
 - c. 1960 to 1979
 - d. 1980 to 2000
 - e. After 2001
 - f. I don't know
2. What is the size of your home (in square feet)? *Your best estimate is fine.*
 - a. Less than 500 sq ft
 - b. 500 – 999 sq ft
 - c. 1,000 – 1,499 sq ft
 - d. 1,500 – 1,999 sq ft
 - e. 2,000 – 2,499 sq ft
 - f. 2,500 – 2,999 sq ft
 - g. More than 3,000 sq ft
 - h. I don't know
3. How do you keep your home warm during the winter?
 - a. Force-air furnace
 - b. Boiler with built-in radiators or pipes
 - c. Built-in electrical units
 - d. Combination heating boiler (water and space heating done with same unit)
 - e. Other
 - f. I don't know
4. How old is your home's heater? *Your best estimate is fine.*
 - a. Less than 2 years old
 - b. 2 to 4 years old
 - c. 5 to 9 years old
 - d. 10 to 14 years old
 - e. 15 to 19 years old
 - f. 20 or more years old
 - g. I don't know

5. What type of fuel does your home’s heater use?
 - a. Natural gas
 - b. Electricity
 - c. Oil
 - d. Wood
 - e. Other
 - f. Don’t know
6. Do you use any of the following appliances to help heat your home during the fall and winter?
Select all that apply.
 - a. Portable electric heater
 - b. Portable propane heater
 - c. Ducted or Ductless heat pump (also known as a “mini-split”)
 - d. Fireplace
 - e. Wood or pellet stove
 - f. Kitchen range, oven, or stove
 - g. Other
 - h. I don’t use another appliance to heat my home.
7. What type of water heater is installed in your home?
 - a. Electric tank
 - b. Natural gas tank
 - c. Tankless or on-demand (most likely gas, but could also be electric)
 - d. Hybrid (also known as a heat pump water heater)
 - e. Combination heating boiler (water heating and heating done with the same unit)
 - f. Other
 - g. I don’t know
8. How old is your water heater? *Your best estimate is fine.*
 - a. Less than 2 years old
 - b. 2 to 4 years old
 - c. 5 to 9 years old
 - d. 10 to 14 years old
 - e. 15 to 19 years old
 - f. 20 or more years old
 - g. I don’t know
9. Since living in your home, which of the following home improvements has your household made? *Select all that apply.*
 - a. Replaced my home’s windows
 - b. Installed a new cooling system
 - c. Installed a new hot water heater
 - d. Installed a new heating system
 - e. Insulated walls, floors, or the attic
 - f. Installed solar panels
 - g. Sealed drafts or air leaks (e.g., around doors, windows, outlets)
 - h. Other
10. How would you describe your home’s temperature? *Select all that apply.*
 - a. My home is often too cold in the winter, even with the heat on.
 - b. My home is often too warm in the summer, even with the AC on
 - c. My home’s hot water doesn’t stay hot for very long.

- d. My home is drafty. I can hear or feel the wind coming from windows or doors.

Section 2: Outreach Channels

11. How likely are you to complete a home improvement project or purchase a major home appliance (e.g., water heater or air conditioner) in the next year?
 - a. Not at all likely
 - b. Somewhat likely
 - c. Very likely
 - d. Extremely likely
12. Who do you trust to give you advice about repairs or home improvements?
 - a. I ask my friends, family, or neighbors
 - b. I visit my preferred retail store and ask a salesperson
 - c. I do an online search (e.g., Google)
 - d. Other
13. Your electric and/or gas company offers discounts for appliance purchases and home improvements. What is the best way for them to contact you about these offers?
 - a. Phone call (e.g., automated messages)
 - b. Email (e.g., digital brochures, flyers, or advertisements)
 - c. Mail (e.g., brochures, flyers, or advertisements)
 - d. Text Message (automated messages from utilities or service providers)
 - e. Signage in a public location (e.g., Home Depot or Menards)
 - f. Rebate forms at the store (e.g. Home Depot, Menards)
 - g. Other
14. In addition to information about discounts or rebates, what other information are you interested in? *Select all that apply.*
 - a. Availability (e.g. how soon the appliance could be picked up or delivered)
 - b. Product reviews or people's opinions and recommendations
 - c. Options available for purchase and features
 - d. Energy use (e.g., how much it'll cost to operate the appliance)
 - e. The ability of the appliance to help my home feel more comfortable
 - f. Other
15. When your electric or gas company contacts you with information, what language do you prefer to use?

Section 3: Upfront Cost and Financing

16. If you needed to spend \$1,500 to repair or replace a major home appliance (for example, your water heater or furnace) in the next month, how would you pay for it?
 - a. Cash or check
 - b. Credit card or cash advance
 - c. Store financing
 - d. A loan from a family member or friend
 - e. Personal loan or line of credit (non-credit card) from a bank or credit union
 - f. Payday loan
 - g. Renting from a retail store
 - h. Other
17. If you needed to finance your \$1,500 purchase, which term are you most comfortable with?

- a. 1-6 months
 - b. 6-12 months
 - c. 12-24 months
 - d. 24+ months
18. If your purchase qualified for a rebate, how would you prefer to receive it? *(Rank the options in order of preference)*
- a. Instant discount
 - b. VISA gift card or e-gift card given to you at the time of purchase
 - c. VISA gift card or e-gift card mailed or emailed 2 weeks after the purchase
 - d. Check mailed to them 1-2 months after the purchase
 - e. Other
19. Which of the following situations would dissuade you from participating in a discount or rebate program for your appliance purchase?
- a. A limited group of eligible installers or contractors on a pre-approved list (you won't be able to use someone you know).
 - b. Limited availability of installation time slots (you may need to wait from service)
 - c. Being required to pay the full price up-front to receive a rebate in 6-8 weeks
 - d. The time required to contact eligible installers and get quotes.
20. Which, if any, of the following situations would lead you to replace your home's water heater with a model that lowered your monthly utility by \$5-10 a month - even if it isn't broken:
- a. A 50% discount.
 - b. An offer for a free water heater.
 - c. The ability to get a new water heater for no money down and pay it off each month on your utility bill.

Section 4: Description of the Program or Service (CenterPoint – Gas)

21. Has your home had an energy audit?
- a. Yes
 - b. No
 - c. I don't know
22. Did your household make any of the changes suggested by the energy auditor?
- a. Yes
 - b. No
 - c. I don't know
23. When you decide to replace an appliance or make a home improvement (for example, insulating your home), which of the following are the MOST IMPORTANT reasons that you do it? *Check all that apply.*
- a. To make the temperature in my home more comfortable (by making it less drafty).
 - b. To make the air in my home healthier (by reducing dust and mold).
 - c. To reduce my utility bills.
 - d. To make my home look better.
 - e. To add more space to my home.
 - f. To fix or replace something that is broken.
 - g. Other
24. Are you familiar with any of the following programs:
- a. Energy Assistance
 - b. Low Income Heating System Tune-Up

- c. Home Energy Squad
 - d. PowerOn (Xcel Energy) and Gas Affordability (CenterPoint Energy)
25. Are you familiar with any of the following rebate programs offered by CenterPoint Energy?
Select all that apply.
- a. Heating System Rebates
 - b. Programmable or Smart Thermostat Rebate
 - c. Water Heater Rebates
 - d. Fireplace Rebate
 - e. Residential Laundry Rebate
 - f. Air Sealing and Insulation Rebates
 - g. I am familiar with rebates generally, but not these specifically.
 - h. I did not know CenterPoint Energy offered rebates.

Section 5: Contact and Demographic Information

26. What is your first name?
27. How would you like to receive your gift card?
- a. Text message
 - b. Email
28. What is your cell phone number/email address?
29. What is your age?
30. What is your race and/or ethnicity? *Select all that apply.*
- a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African-American
 - d. Latino/a/x or Hispanic
 - e. Native Hawaiian or Pacific Islander
 - f. White
 - g. Other
31. What is your Zip Code?
32. Which best describes your current employment status?
- a. Employed full-time
 - b. Employed part-time
 - c. Retired
 - d. Not employed
33. What was the total income for all members of your household for the past year?
- a. Less than \$9,999
 - b. \$10,000 - \$24,999
 - c. \$25,000 - \$49,999
 - d. \$50,000 - \$74,999
 - e. \$75,000 - \$99,999
 - f. \$100,000 - \$124,999
 - g. \$125,000 - \$124,999
 - h. \$150,000 or more
34. What is the highest degree or level of school you have completed?
- a. Less than high school diploma or GED
 - b. High school diploma or GED
 - c. Some college or Associate's degree

- d. Bachelor’s degree (for example: BA, BS)
 - e. Master’s, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)
35. Which languages (other than English) are spoken in your home?
36. In your home, do you or any member of your household have access to the Internet?
- a. Yes
 - b. No

Black homeowners survey responses

What year was your home built? Your best estimate is fine.

Value	Percent	Count
Before 1940	7.4%	2
1941 to 1959	33.3%	9
1960 to 1979	51.9%	14
1980 to 2000	7.4%	2
Totals	100%	27

How long have you lived in your home?

Value	Percent	Count
2 to 4 years	3.7%	1
5 to 9 years	7.4%	2
10 to 14 years	18.5%	5
15 years or more	70.4%	19
Totals	100%	27

What is the size of your home (in square feet)? Your best estimate is fine.

Value	Percent	Count
Less than 500 sq ft	22.2%	6
500 – 999 sq ft	25.9%	7
1,000 – 1,499 sq ft	18.5%	5
1,500 – 1,999 sq ft	29.6%	8
2,500 – 2,999 sq ft	3.7%	1
Totals	100%	27

How do you keep your home warm during the winter? Select all that apply.

Value	Percent	Count
Force-air furnace	48.1%	13
Boiler with built-in radiators or pipes	37.0%	10
Built-in electrical units	40.7%	11
Combination heating boiler (water and space heating done with same unit)	48.1%	13

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
I don't know	7.4%	2

How old is your home's heater? Your best estimate is fine.

Value	Percent	Count
2 to 4 years old	11.1%	3
5 to 9 years old	37.0%	10
10 to 14 years old	14.8%	4
15 to 19 years old	25.9%	7
20 or more years old	11.1%	3
Totals	100%	27

What type of fuel does your home's heater (such as, your furnace) use?

Value	Percent	Count
Natural gas	33.3%	9
Electricity	14.8%	4
Oil	14.8%	4
Wood	18.5%	5
I don't know	18.5%	5
Totals	100%	27

Do you use any of the following appliances to help heat your home during the fall and winter? Select all that apply.

Value	Percent	Count
Portable electric heater	33.3%	9
Portable propane heater	51.9%	14
Ducted or Ductless heat pump (also known as a "mini-split")	37.0%	10
Fireplace	48.1%	13
Wood or pellet stove	29.6%	8
Kitchen range, oven, or stove	29.6%	8
I don't use another appliance to heat my home.	3.7%	1

What type of water heater is installed in your home?

Value	Percent	Count
Electric tank	11.1%	3
Natural gas tank	33.3%	9
Tankless or on-demand (most likely gas, but could also be electric)	18.5%	5

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
Hybrid (also known as a heat pump water heater)	22.2%	6
Combination heating boiler (water heating and heating done with the same unit)	11.1%	3
I don't know	3.7%	1
Totals	100%	27

How old is your water heater? Your best estimate is fine.

Value	Percent	Count
Less than 2 years old	3.7%	1
2 to 4 years old	14.8%	4
5 to 9 years old	25.9%	7
10 to 14 years old	11.1%	3
15 to 19 years old	25.9%	7
20 or more years old	7.4%	2
I don't know	11.1%	3
Totals	100%	27

Since living in your home, which of the following home improvements have you made? Select all that apply.

Value	Percent	Count
Replaced my home's windows	37.0%	10
Installed a new cooling system	37.0%	10
Installed a new hot water heater	37.0%	10
Installed a new heating system	37.0%	10
Insulated walls, floors, or the attic	44.4%	12
Installed solar panels	29.6%	8
Sealed drafts or air leaks (e.g., around doors, windows, outlets)	22.2%	6

How would you describe your home's temperature? Select all that apply.

Value	Percent	Count
My home is often too cold in the winter, even with the heat on	44.4%	12

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
My home is often too warm in the summer, even with the AC on	33.3%	9
My home's hot water doesn't stay hot for very long	55.6%	15
My home is drafty. I can hear or feel the wind coming from windows or doors	37.0%	10
I do not have any issues with my home's temperature	3.7%	1

Since owning your home, have you participated in an energy audit?

Value	Percent	Count
Yes	3.7%	1
No	96.3%	26
Totals	100%	27

Did your household make any of the changes suggested by the energy auditor?

Value	Percent	Count
Yes	100.0%	1
Totals	100%	1

How likely are you to complete a home improvement project or purchase a major home appliance (e.g., water heater or air conditioner) in the next year?

Value	Percent	Count
Not at all likely	3.7%	1
Somewhat likely	51.9%	14
Very likely	33.3%	9
Extremely likely	11.1%	3
Totals	100%	27

In your opinion, what are the MOST IMPORTANT reason for making a home improvement (for example, insulating your home)? Select all that apply.

Value	Percent	Count
To make the temperature in my home more comfortable (by making it less drafty).	51.9%	14
To make the air in my home healthier (by reducing dust and mold).	66.7%	18

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
To reduce my utility bills.	59.3%	16
To make my home look better.	70.4%	19
To add more space to my home.	25.9%	7
To fix or replace something that is broken.	11.1%	3

Who do you trust to give you advice about repairs or home improvements? Select all that apply.

Value	Percent	Count
I ask my friends, family, or neighbors	40.7%	11
I visit my preferred retail store and ask a salesperson	59.3%	16
I do an online search (e.g., Google)	51.9%	14
I ask a technician or contractor	66.7%	18
Other - Write In	3.7%	1

Your electric and/or gas company offers discounts for appliance purchases and home improvements. What is the best way for them to contact you about these offers?

Value	Percent	Count
Phone call (e.g., automated messages)	3.7%	1
Email (e.g., digital brochures, flyers, or advertisements)	37.0%	10
Mail (e.g., brochures, flyers, or advertisements)	22.2%	6
Text Message (automated messages from utilities or service providers)	33.3%	9
Signage in a public location (e.g., Home Depot or Menards)	3.7%	1
Totals	100%	27

In addition to information about discounts or rebates, what other information are you interested in? Select all that apply.

Value	Percent	Count
Availability (e.g. how soon the appliance could be picked up or delivered)	48.1%	13
Product reviews or people's opinions and recommendations	51.9%	14

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
Options available for purchase and features	33.3%	9
Energy use (e.g., how much it'll cost to operate the appliance)	59.3%	16
The ability of the appliance to help my home feel more comfortable	22.2%	6
Other - Write In	7.4%	2

If you needed to spend \$1,500 to replace a major home appliance (for example, your water heater or furnace) in the next month, how would you pay for it?

Value	Percent	Count
Cash or check	33.3%	9
Credit card or cash advance	51.9%	14
Store financing	29.6%	8
A loan from a family member or friend	33.3%	9
Personal loan or line of credit (non-credit card) from a bank or credit union	59.3%	16
Payday loan	25.9%	7
Renting from a retail store	7.4%	2
Other - Write In	7.4%	2

If you needed to finance your \$1,500 purchase, which term are you most comfortable with?

Value	Percent	Count
1-6 months	11.1%	3
6-12 months	25.9%	7
12-24 months	33.3%	9
24+ months	29.6%	8
Totals	100%	27

If your purchase qualified for a rebate, how would you prefer to receive it? Rank the options in order of preference.

Item	Overall Rank	Score	Total Respondents
Instant discount	1	77	27
Check mailed to them 1-2 months after the purchase	2	71	27

Appendix C: Black Homeowners – Survey Instruments and Responses

Item	Overall Rank	Score	Total Respondents
VISA gift card or e-gift card given to you at the time of purchase	3	63	27
VISA gift card or e-gift card mailed or emailed 2 weeks after the purchase	4	59	27

Which of the following situations would dissuade you from participating in a discount or rebate program for your purchase? Select all that apply.

Value	Percent	Count
A limited group of eligible installers or contractors on a pre-approved list (you won't be able to use someone you know)	51.9%	14
Limited availability of installation time slots (you may need to wait from service)	70.4%	19
Being required to pay the full price up-front to receive a rebate in 6-8 weeks	59.3%	16
The time required to contact eligible installers and get quotes.	25.9%	7

Which of the following situations would convince you to replace your home's water heater with a model that lowered your monthly bill by \$5 to \$10 (even if it isn't broken)? Select all that apply.

Value	Percent	Count
A 50% discount on a new water heater	29.6%	8
An offer for a free water heater	70.4%	19
The ability to get a new water heater for no money down and pay it off each month on your utility bill	37.0%	10

Are you familiar with any of the following programs? Select all that apply.

Value	Percent	Count
Energy Assistance	48.1%	13
Low Income Heating System Tune-Up	40.7%	11
Home Energy Squad	44.4%	12

Appendix C: Black Homeowners – Survey Instruments and Responses

Value	Percent	Count
PowerOn (Xcel Energy) and Gas Affordability (CenterPoint Energy)	55.6%	15
I am not aware of any of these programs.	11.1%	3

Are you familiar with any of the following rebates offered by CenterPoint Energy? Select all that apply.

Value	Percent	Count
Heating System Rebates	18.5%	5
Programmable or Smart Thermostat Rebate	51.9%	14
Water Heater Rebates	37.0%	10
Fireplace Rebate	44.4%	12
Residential Laundry Rebate	44.4%	12
Air Sealing and Insulation Rebates	44.4%	12
I am familiar with rebates generally, but not these specifically	11.1%	3
I did not know CenterPoint Energy offered rebates.	7.4%	2

In the past year, has your household received Energy Assistance or other bill payment assistance to reduce the amount owed on your electric or gas bill?

Value	Percent	Count
No	88.9%	24
I don't know	11.1%	3
Totals		27

What is your race and/or ethnicity? Select all that apply.

Value	Percent	Count
Black or African-American	100.0%	27

Which best describes your current employment status?

Value	Percent	Count
Employed full-time	44.4%	12
Employed part-time	44.4%	12
Retired	3.7%	1
Not employed	7.4%	2
Totals	100%	27

What was the total income for all members of your household for the past year?

Value	Percent	Count
\$10,000 - \$24,999	11.1%	3
\$25,000 - \$49,999	44.4%	12
\$50,000 - \$74,999	22.2%	6
\$75,000 - \$99,999	14.8%	4
\$100,000 - \$124,999	3.7%	1
\$150,000 or more	3.7%	1
Totals	100%	27

What is the highest degree or level of school you have completed?

Value	Percent	Count
High school diploma or GED	22.2%	6
Some college or Associate's degree	29.6%	8
Bachelor's degree (for example: BA, BS)	33.3%	9
Master's, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)	14.8%	4
Totals	100%	27

Appendix D: Latinx Renters – Survey Instrument and Responses

Latinx renters survey instrument

Introduction

Thank you for agreeing to complete this survey. It is designed to help us learn about your home’s use of natural gas and to better understand your behaviors related to home improvements. Your responses will remain anonymous and any identifying information collected to facilitate compensation will remain confidential.

Section 1: Your Home

1. Which best describes your home? *Select all that apply.*
 - a. Single-family home
 - b. Multi-family building with 2 to 4 units
 - c. Multi-family building with 5 to 10 units
 - d. Multi-family building with 11 to 20 units
 - e. Multi-family building 20+ units
2. What year was your building built? *Your best estimate is fine.*
 - a. Before 1940
 - b. 1941 to 1959
 - c. 1960 to 1979
 - d. 1980 to 2000
 - e. After 2001
 - f. I don’t know
3. What is the size of your home, in square feet? *Your best estimate is fine.*
 - a. Less than 500 sq ft
 - b. 500 – 999 sq ft
 - c. 1,000 – 1,499 sq ft
 - d. 1,500 – 1,999 sq ft
 - e. 2,000 – 2,499 sq ft
 - f. 2,500 – 2,999 sq ft
 - g. More than 3,000 sq ft
4. How long have you lived in your home?
 - a. Less than 2 years old
 - b. 2 to 4 years
 - c. 5 to 9 years
 - d. 10 to 14 years
 - e. 15 years or more
 - f. I don’t know
5. How do you keep your home warm during the winter?
 - a. Force-air furnace
 - b. Boiler with built-in radiators or pipes
 - c. Built-in electrical units

- d. Combination heating boiler (water and space heating done with same unit)
 - e. Other
 - f. I don't know
6. How old is your home's heater? *Your best estimate is fine.*
- a. Less than 2 years old
 - b. 2 to 4 years old
 - c. 5 to 9 years old
 - d. 10 to 14 years old
 - e. 15 to 19 years old
 - f. 20 or more years old
 - g. I don't know
7. What type of fuel does your home's heater use? *Your best guess is fine.*
- a. Natural gas
 - b. Electricity
 - c. Oil
 - d. Wood
 - e. Other
 - f. Don't know
8. Do you use any of the following appliances to help heat your home during the fall and winter?
Select all that apply.
- a. Portable electric heater
 - b. Portable propane heater
 - c. Ducted or Ductless heat pump (also known as a "mini-split")
 - d. Fireplace
 - e. Wood or pellet stove
 - f. Kitchen range, oven, or stove
 - g. Other
 - h. I don't use another appliance to heat my home.
9. What type of water heater does your home use?
- a. Electric tank
 - b. Natural gas tank
 - c. Tankless or on-demand (most likely gas, but could also be electric)
 - d. Hybrid (also known as a heat pump water heater)
 - e. Combination heating boiler (water heating and heating done with same unit)
 - f. Other
 - g. I don't know
10. How are you billed for natural gas?
- a. I receive a bill directly from Xcel Energy and/or CenterPoint Energy.
 - b. I receive a bill from my property owner.
 - c. I receive a bill from a third-party billing provider.
 - d. I pay a set amount to my property owner (or management company) each month.
 - e. I do not pay for natural gas separately; it is included in rent.
 - f. I do not pay for natural gas; I have electric heat.
 - g. I don't know
11. How would you describe your home's temperature? *Select all that apply.*
- a. My home is often too cold in the winter, even with the heat on.
 - b. My home is often too warm in the summer, even with the AC on?

- c. My home's hot water doesn't stay hot for very long.
- d. My home is drafty. I can hear or feel wind coming from windows or doors.

Section 2: Outreach Channels

12. If you were able to make a home improvement (for example, replacing your windows or doors to keep the cold out), who would you trust to give you information about how to save money?
- a. I'd ask my friends, family, or neighbors
 - b. I'd visit my preferred retail store and ask a salesperson
 - c. I'd do an online search (e.g., Google)
 - d. Other
13. Your electric and/or gas company offers discounts for appliance purchases and home improvements. What is the best way for them to contact you about these offers?
- a. Phone call (e.g., automated messages)
 - b. Email (e.g., digital brochures, flyers, or advertisements)
 - c. Mail (e.g., brochures, flyers, or advertisement)
 - d. Text Message (automated messages from utilities or service providers)
 - e. Signage in a public location (e.g., Home Depot)
 - f. Other
14. In addition to information about discounts or rebates, what other information are you interested in? *Select all that apply.*
- a. Availability (e.g. how soon the appliance could be picked up or delivered)
 - b. Product reviews or people's opinions and recommendations
 - c. Options available for purchase and features
 - d. Energy use (e.g., how much it'll cost to operate the appliance)
 - e. Ability of the appliance to help my home feel more comfortable
 - f. Other
15. When your electric or gas company contacts you with information, what language do you prefer to use?

Section 3: Upfront Cost and Financing

16. If the past year, have you received Energy Assistance or other bill payment assistance to reduce the amount owed on your electric or gas bill?
- a. Yes
 - b. No
 - c. I don't know.
17. If you could lower your monthly utility bill by \$5-10 a month [or keep your home warmer in the winter) by replacing your home's heater (for example, a furnace) with a newer model, would you be interested?
- d. Yes
 - e. No
18. [If yes] If your property owner (or management company) could only replace your home's heater if you split the out-of-pocket (for example, by paying \$1,000), would you still be interested?
- a. Yes
 - b. No

19. [If yes] If your property owner (or management company) could only afford to replace your home's heater if the property qualifies for a discount based on your household income, would you be willing to share this information with your utility company?
 - a. Yes
 - b. No
20. [If yes] If your property owner (or management company) could only afford to replace the water heater if you applied for Energy Assistance, would you still be interested?
 - a. Yes
 - b. No

Section 4: Description of the Program or Service (St. Paul – Xcel / Mpls – CenterPoint)

21. Has your home had an energy audit?
 - a. Yes
 - b. No
 - c. I don't know
22. [If yes] Did your household or the property owner make any of the changes suggested by the energy auditor?
 - a. Yes
 - b. No
 - c. I don't know
23. When you decide to make a home improvement, which of the following are the MOST IMPORTANT reasons that you do it? *Check all that apply.*
 - a. To make the temperature in my home more comfortable (by making it less drafty)
 - b. To make the air in my home healthier by reducing dust and mold)
 - c. To reduce my utility bills
 - d. To make my home look better
 - e. To fix or replace something that is broken
 - f. Other
24. Are you familiar with any of the following programs?
 - a. Energy Assistance and Weatherization
 - b. Low Income Heating System Tune-Up
 - c. PowerOn (Xcel Energy) and Gas Affordability (CenterPoint Energy)

Section 5: Contact and Demographic Information

25. What is your first name?
26. How would you like to receive your gift card?
 - a. Text message
 - b. Email
27. What is your cell phone number/email address?
28. What is your age?
29. What is your race and/or ethnicity? *Select all that apply.*
 - a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African-American
 - d. Latino/a/x or Hispanic

- e. Native Hawaiian or Pacific Islander
 - f. White
 - g. Other
30. What is your Zip Code?
31. Which best describes your current employment status?
- a. Employed full-time
 - b. Employed part-time
 - c. Retired
 - d. Not employed
32. What was the total income for all members of your household for the past year?
- a. Less than \$9,999
 - b. \$10,000 - \$24,999
 - c. \$25,000 - \$49,999
 - d. \$50,000 - \$74,999
 - e. \$75,000 - \$99,999
 - f. \$100,000 - \$124,999
 - g. \$125,000 - \$124,999
 - h. \$150,000 or more
33. What is the highest degree or level of school you have completed?
- a. Less than high school diploma or GED
 - b. High school diploma or GED
 - c. Some college or Associate’s degree
 - d. Bachelor’s degree (for example: BA, BS)
 - e. Master’s, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)
34. Which languages (other than English) are spoken in your home?
35. In your home, do you or any member of your household have access to the Internet?
- a. Yes
 - b. No

Latinx renters survey responses

Which best describes your home?

Value	Percent	Count
Single-family home	40.0%	6
Multi-family building with 2 to 4 units	33.3%	5
Multi-family building with 5 to 10 units	20.0%	3
Multi-family building with 20+ units	6.7%	1
Totals	100%	15

What year was your building built? Your best estimate is fine.

Value	Percent	Count
Before 1940	6.7%	1

Appendix D: Latinx Renters – Survey Instrument and Responses

Value	Percent	Count
1960 to 1979	6.7%	1
1980 to 2000	40.0%	6
After 2001	40.0%	6
I don't know	6.7%	1
Totals	100%	15

How long have you lived in your home?

Value	Percent	Count
Less than 2 years old	13.3%	2
2 to 4 years	13.3%	2
5 to 9 years	26.7%	4
10 to 14 years	13.3%	2
15 years or more	33.3%	5
Totals	100%	15

What is the size of your home (in square feet)? Your best estimate is fine.

Value	Percent	Count
Less than 500 sq ft	33.3%	5
500 – 999 sq ft	20.0%	3
1,000 – 1,499 sq ft	26.7%	4
1,500 – 1,999 sq ft	13.3%	2
I don't know	6.7%	1
Totals	100%	15

How do you keep your home warm during the winter? Select all that apply.

Value	Percent	Count
Force-air furnace	46.7%	7
Boiler with built-in radiators or pipes	33.3%	5
Built-in electrical units	13.3%	2
Combination heating boiler (water and space heating done with same unit)	20.0%	3
I don't know	6.7%	1

How old is your home's heater? Your best estimate is fine.

Value	Percent	Count
Less than 2 years old	6.7%	1
2 to 4 years old	26.7%	4
5 to 9 years old	33.3%	5
15 to 19 years old	26.7%	4

Appendix D: Latinx Renters – Survey Instrument and Responses

Value	Percent	Count
I don't know	6.7%	1
Totals	100%	15

What type of fuel does your home's heater use?

Value	Percent	Count
Natural gas	66.7%	10
Electricity	20.0%	3
Wood	13.3%	2
Totals	100%	15

Do you use any of the following appliances to help heat your home during the fall and winter? Select all that apply.

Value	Percent	Count
Portable electric heater	66.7%	10
Portable propane heater	13.3%	2
Ducted or Ductless heat pump (also known as a "mini-split")	13.3%	2
Fireplace	33.3%	5
Wood or pellet stove	26.7%	4
Kitchen range, oven, or stove	6.7%	1
I don't use another appliance to heat my home.	6.7%	1
Other - Write In	13.3%	2

What type of water heater is installed in your home?

Value	Percent	Count
Electric tank	26.7%	4
Natural gas tank	26.7%	4
Tankless or on-demand (most likely gas, but could also be electric)	6.7%	1
Hybrid (also known as a heat pump water heater)	26.7%	4
Combination heating boiler (water heating and heating done with the same unit)	6.7%	1
I don't know	6.7%	1
Totals	100%	15

How old is your water heater? Your best estimate is fine.

Value	Percent	Count
Less than 2 years old	6.7%	1
2 to 4 years old	26.7%	4
5 to 9 years old	26.7%	4
10 to 14 years old	26.7%	4
15 to 19 years old	6.7%	1
I don't know	6.7%	1
Totals	100%	15

Since living in your home, which of the following home improvements have you made? Select all that apply.

Value	Percent	Count
Replaced my home's windows	40.0%	6
Installed a new cooling system	13.3%	2
Installed a new hot water heater	60.0%	9
Installed a new heating system	33.3%	5
Insulated walls, floors, or the attic	40.0%	6
Installed solar panels	33.3%	5
Sealed drafts or air leaks (e.g., around doors, windows, outlets)	46.7%	7
Other - Write In	13.3%	2

How would you describe your home's temperature? Select all that apply.

Value	Percent	Count
My home is often too cold in the winter, even with the heat on	46.7%	7
My home is often too warm in the summer, even with the AC on	13.3%	2
My home's hot water doesn't stay hot for very long	13.3%	2
My home is drafty. I can hear or feel the wind coming from windows or doors	26.7%	4
I do not have any issues with my home's temperature	26.7%	4

How are you billed for natural gas?

Value	Percent	Count
I receive a bill directly from Xcel Energy and/or CenterPoint Energy.	33.3%	5
I receive a bill from my property owner.	13.3%	2
I receive a bill from a third-party billing provider.	6.7%	1
I pay a set amount to my property owner (or management company) each month.	33.3%	5
I do not pay for natural gas separately, it is included in rent.	6.7%	1
I do not pay for natural gas, I have electric heat.	6.7%	1
Totals	100%	15

Has your home had an energy audit?

Value	Percent	Count
Yes	46.7%	7
No	46.7%	7
I don't know	6.7%	1
Totals	100%	15

Did your household make any of the changes suggested by the energy auditor?

Value	Percent	Count
Yes	100.0%	7
Totals	100%	7

In your opinion, what is the MOST IMPORTANT reason for making a home improvement (for example, insulating your home)?

Value	Percent	Count
To make the temperature in my home more comfortable (by making it less drafty).	26.7%	4
To make the air in my home healthier (by reducing dust and mold).	20.0%	3
To reduce my utility bills.	40.0%	6
To fix or replace something that is broken.	13.3%	2

Appendix D: Latinx Renters – Survey Instrument and Responses

Value	Percent	Count
Totals	100%	15

Who do you trust to give you advice about repairs or home improvements? Select all that apply.

Value	Percent	Count
I ask my friends, family, or neighbors	66.7%	10
I visit my preferred retail store and ask a salesperson	40.0%	6
I do an online search (e.g., Google)	80.0%	12
I ask a technician or contractor	46.7%	7
Other - Write In	6.7%	1

Your electric and/or gas company offers discounts for appliance purchases and home improvements. What is the best way for them to contact you about these offers?

Value	Percent	Count
Phone call (e.g., automated messages)	20.0%	3
Email (e.g., digital brochures, flyers, or advertisements)	60.0%	9
Mail (e.g., brochures, flyers, or advertisements)	13.3%	2
Signage in a public location (e.g., Home Depot or Menards)	6.7%	1
Totals	100%	15

In addition to information about discounts or rebates, what other information are you interested in? Select all that apply.

Value	Percent	Count
Availability (e.g. how soon the appliance could be picked up or delivered)	66.7%	10
Product reviews or people's opinions and recommendations	40.0%	6
Options available for purchase and features	46.7%	7
Energy use (e.g., how much it'll cost to operate the appliance)	66.7%	10

Appendix D: Latinx Renters – Survey Instrument and Responses

Value	Percent	Count
The ability of the appliance to help my home feel more comfortable	33.3%	5
Other - Write In	6.7%	1

Are you familiar with any of the following programs? Select all that apply.

Value	Percent	Count
Energy Assistance	46.7%	7
Low Income Heating System Tune-Up	40.0%	6
Home Energy Squad	33.3%	5
PowerOn (Xcel Energy) and Gas Affordability (CenterPoint Energy)	20.0%	3
I am not aware of any of these programs.	33.3%	5

Are you familiar with any of the following rebates offered by CenterPoint Energy? Select all that apply.

Value	Percent	Count
Heating System Rebates	20.0%	3
Programmable or Smart Thermostat Rebate	20.0%	3
Water Heater Rebates	26.7%	4
Fireplace Rebate	6.7%	1
Residential Laundry Rebate	6.7%	1
Air Sealing and Insulation Rebates	6.7%	1
I am familiar with rebates generally, but not these specifically.	20.0%	3
I did not know CenterPoint Energy offered rebates.	40.0%	6

In the past year, has your household received Energy Assistance or other bill payment assistance to reduce the amount owed on your electric or gas bill?

Value	Percent	Count
Yes	53.3%	8
No	46.7%	7
Totals	100%	15

If you could lower your monthly utility bill by \$5 to10 by replacing your home’s heater with a newer model, but had to split the cost with your property owner (or management company), would you be interested?

Value	Percent	Count
Yes	80.0%	12
No	20.0%	3
Totals	100%	15

If you could lower your monthly utility bill by \$5 to10 by replacing your home’s heater with a newer model, but had to apply for Energy Assistance, would you be interested?

Value	Percent	Count
Yes	93.3%	14
No	6.7%	1
Totals	100%	15

If you could keep your home warmer in the winter by replacing your home’s heater with a newer model, but had to split the cost with your property owner (or management company), would you be interested?

Value	Percent	Count
Yes	86.7%	13
No	13.3%	2
Totals	100%	15

If you could keep your home warmer in the winter by replacing your home’s heater with a newer model, but had to apply for Energy Assistance, would you be interested?

Value	Percent	Count
Yes	100.0%	15
Totals	100%	15

What is your race and/or ethnicity? Select all that apply.

Value	Percent	Count
Black or African-American	6.7%	1
Latino/a/x or Hispanic	93.3%	14
Other - Write In	13.3%	2

Which best describes your current employment status?

Value	Percent	Count
Employed full-time	73.3%	11
Employed part-time	20.0%	3
Not employed	6.7%	1
Totals	100%	15

What was the total income for all members of your household for the past year?

Value	Percent	Count
Less than \$9,999	13.3%	2
\$10,000 - \$24,999	33.3%	5
\$25,000 - \$49,999	20.0%	3
\$50,000 - \$74,999	20.0%	3
\$100,000 - \$124,999	6.7%	1
\$125,000 - \$124,999	6.7%	1
Totals	100%	15

What is the highest degree or level of school you have completed?

Value	Percent	Count
High school diploma or GED	20.0%	3
Some college or Associate's degree	33.3%	5
Bachelor's degree (for example: BA, BS)	20.0%	3
Master's, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)	20.0%	3
I prefer not to say	6.7%	1
Totals	100%	15

Appendix E: Property owners – Survey Instruments and Responses

Property owners survey

Introduction

Thank you for agreeing to complete this survey. It is designed to help us learn about your property (or properties') use of natural gas and to better understand your behaviors related to home improvements. Your responses will remain anonymous and any identifying information collected to facilitate compensation will remain confidential.

Section 1: Your Rental Property

1. Which best describes your rental property(ies)? *Select all that apply.*
 - a. Single-family home
 - b. Multi-family building with 2 to 4 units
 - c. Multi-family building with 5 to 10 units
 - d. Multi-family building with 11 to 20 units
 - e. Multi-family building 20+ units
2. What year was your property(ies) built? *Select all that apply.*
 - a. Before 1940
 - b. 1941 to 1959
 - c. 1960 to 1979
 - d. 1980 to 2000
 - e. After 2001
 - f. I don't know
3. What is the average size of a unit at your property(ies), in square feet?
 - a. Less than 500 sq ft
 - b. 500 – 999 sq ft
 - c. 1,000 – 1,499 sq ft
 - d. 1,500 – 1,999 sq ft
 - e. 2,000 – 2,499 sq ft
 - f. 2,500 – 2,999 sq ft
 - g. More than 3,000 sqft
4. What type of space heaters are used by your rental units? *Select all that apply.*
 - a. Force-air furnace
 - b. Boiler with built-in radiators or pipes
 - c. Built-in electrical units
 - d. Combination heating boiler (water and space heating done with same unit)
 - e. Other
 - f. I don't know
5. On average, how old are your rental property's (or properties') space heaters? *Your best estimate is fine.*
 - a. Less than 2 years old
 - b. 2 to 4 years old

- c. 5 to 9 years old
 - d. 10 to 14 years old
 - e. 15 to 19 years old
 - f. 20 or more years old
 - g. Don't know
6. What type of water heaters are used by your rental units? *Select all that apply.*
- a. Electric tank
 - b. Natural gas tank
 - c. Tankless or on-demand (most likely gas, but could also be electric)
 - d. Hybrid (also known as a heat pump water heater)
 - e. Combination heating boiler (water heating and heating done with same unit)
 - f. Other
 - g. I don't know
7. On average, how old are your rental property's (or properties') water heaters? *Your best estimate is fine.*
- a. Less than 2 years old
 - b. 2 to 4 years old
 - c. 5 to 9 years old
 - d. 10 to 14 years old
 - e. 15 to 19 years old
 - f. 20 or more years old
 - g. Don't know
 - h. Who is responsible for paying for the natural gas used at your rental property?
8. The tenant is responsible for 100% of the cost
- a. A portion of the cost is paid by the tenant
 - b. I am responsible for 100% of the cost

Section 2: Outreach Channels

9. How likely are you to complete a home improvement project or purchase a major appliance (e.g., water heater or furnace) for one or more units in the next year?
- a. Not at all likely
 - b. Somewhat likely
 - c. Very likely
 - d. Extremely likely
10. Who do you trust to give you information about how to make improvements to your units and how to save money?
- a. I ask my friends, family, or neighbors
 - b. I ask other property owners
 - c. I visit my preferred retail store and ask a salesperson
 - d. I do an online search (e.g., Google)
 - e. Other
11. Your electric and gas companies offer discounts for appliances and home improvements. What is the best way for them to contact you about these offers?
- a. Phone call (e.g., automated messages)
 - b. Email (e.g., digital brochures, flyers, or advertisements)
 - c. Mail (e.g., brochures, flyers, or advertisement)
 - d. Text Message (automated messages from utilities or service providers)

- e. Signage in a public location (e.g., Home Depot)
 - f. Other
12. In addition to information about discounts or rebates, what other information are you interested in? *Select all that apply.*
- a. Availability (e.g., how soon the appliance could be picked up or delivered)
 - b. Product reviews or people's opinions and recommendations
 - c. Options available for purchase and features
 - d. Energy use (e.g., how much it'll cost to operate the appliance)
 - e. Ability of the appliance to help my home feel more comfortable
 - f. Other
13. When your electric or gas company contacts you with information, what language do you prefer to use?

Section 3: Upfront Cost and Financing

14. Have you struggled to upgrade your one or more unit's space heaters (for example, a furnace) or water heater?
- a. Yes
 - b. No
15. [If yes] Why? *Select all responses that apply.*
- a. I don't know what to do. I would like to learn more about energy efficiency
 - b. I would like to upgrade my property's appliance(s) but cannot afford the upfront cost
 - c. I don't think energy efficiency upgrades are an option for my property
 - d. Other
16. If you needed to spend \$2,000 to replace a major home appliance (for example, a unit's water heater or furnace) in the next month, how would you pay for it?
- a. Cash or check
 - b. Credit card or cash advance
 - c. Store financing
 - d. Loan from a family member or friend
 - e. Personal loan or line of credit (non-credit card) from a bank or credit union
 - f. Payday loan
 - g. Renting from a retail store
 - h. Other
17. If you needed to finance the purchase, which term are you most comfortable with?
- a. 1-6 months
 - b. 6-12 months
 - c. 12-24 months
 - d. 24+ months
18. If your purchase qualified for a rebate, how would you prefer to receive it? *(Rank the options in order of preference)*
- a. Instant discount
 - b. VISA gift card or e-gift card given to them at the time of purchase
 - c. VISA gift card or e-gift card mailed or emailed 2 weeks after the purchase
 - d. Check mailed to them 1-2 months after the purchase
 - e. Other
19. Which of the following would discourage you from participating in a rebate program for an appliance purchase or building improvement (e.g., air sealing and insulation)?

- a. Limited group of eligible installers or contractors on a pre-approved list (you won't be able to use someone you know).
 - b. Limited availability of installation time slots (you may need to wait from service)
 - c. Being required to pay the full price up-front to receive a rebate in 6-8 weeks
 - d. The time required to proactively contact eligible installers and get quotes.
 - e. Being required to collect income documentation from my renters
 - f. Being required that your renters apply for Energy Assistance.
20. Which, if any, of the following situations would lead you to replace a water heater at your property - even if it isn't broken:
- a. A 50% discount on a new water heater
 - b. An offer for a free water heater
 - c. The ability to get a new water heater for no money down and pay it off each month on your property's utility bill

Section 4: Description of the Program or Service

21. Has your property had an energy audit?
- a. Yes
 - b. No
 - c. I don't know
22. [If yes] Did you or your tenants make any of the changes suggested by the energy auditor?
- a. Yes
 - b. No
 - c. I don't know
23. [If yes] Please indicate who made the changes.
- a. You
 - b. Your renter
 - c. Both
24. In your opinion, which of the following are the MOST IMPORTANT reasons for making an improvement at your property(ies). *Select all that apply.*
- a. To make the temperature at my property(ies) more comfortable (by making units less drafty)
 - b. To make the air in my property(ies) healthier (by reducing dust and mold)
 - c. To reduce your utility bills
 - d. To make my property(ies) look better
 - e. To add more space to my property(ies)
 - f. To fix or replace something that is broken at my property(ies)
 - g. Other
25. Are you familiar with any of the following programs?
- a. Energy Assistance
 - b. Weatherization
 - c. Multi-Family Building Efficiency Program
 - d. Affordable Housing Multi-Family Bonus Rebates Program
 - e. Low Income Rental Efficiency Program?

Section 5: Contact and Demographic Information

26. What is your first name?

27. How would you like to receive your gift card?
 - a. Text message
 - b. Email
28. What is your cell phone number/email address?
29. What is your age?
30. What is your race and ethnicity? *Select all that apply.*
 - a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African-American
 - d. Latino/a/x or Hispanic
 - e. Native Hawaiian or Pacific Islander
 - f. White
 - g. Other
31. What was the total income for all members of your household for the past year?
 - a. Less than \$9,999
 - b. \$10,000 - \$24,999
 - c. \$25,000 - \$49,999
 - d. \$50,000 - \$74,999
 - e. \$75,000 - \$99,999
 - f. \$100,000 - \$124,999
 - g. \$125,000 - \$149,999
 - h. \$150,000 or more
32. What is your rental property's Zip Code?
33. How long have you owned your rental property?
 - a. Less than 2 years old
 - b. 2 to 4 years
 - c. 5 to 9 years
 - d. 10 to 14 years
 - e. 15 years or more
34. How is your property managed?
 - a. I manage the property myself
 - b. I use a third-party property management company
35. [If they manage the property by themselves] Do you manage your property(ies) full-time?
 - a. Yes, I manage my property(ies) full-time
 - b. No, I manage my property(ies) part-time and do not work.
 - c. No, I manage my property(ies) part-time and have other employment
 - d. Other
36. What is the highest degree or level of school you have completed?
 - a. Less than high school diploma or GED
 - b. High school diploma or GED
 - c. Some college or Associate's degree
 - d. Bachelor's degree (for example: BA, BS)
 - e. Master's, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)
37. Do you or any member of your household speak a language other than English at home?
 - a. Yes (If yes, what is this language?)
 - b. No

38. In your home, do you or any member of your household have access to the Internet?
- Yes
 - No

Property owners survey responses

Which types of rental properties do you own (or manage)? Select all that apply.

Value	Percent	Count
Single-family home	62.5%	5
Multi-family building with 2 to 4 units	37.5%	3
Multi-family building with 11 to 20 units	25.0%	2

What is the size of your largest rental property?

Value	Percent	Count
Single-family home	50.0%	4
Multi-family building with 2 to 4 units	25.0%	2
Multi-family building with 11 to 20 units	25.0%	2
Totals	100%	8

What year was your largest rental property built? Your best estimate is fine.

Value	Percent	Count
Before 1940	62.5%	5
1960 to 1979	25.0%	2
After 2001	12.5%	1
Totals	100%	8

What is the average size of a unit at your largest rental property (in square feet)? Your best estimate is fine.

Value	Percent	Count
500 – 999 sq ft	25.0%	2
1,000 – 1,499 sq ft	12.5%	1
1,500 – 1,999 sq ft	37.5%	3
2,000 – 2,499 sq ft	25.0%	2
Totals	100%	8

What type of space heater is used by the units in your largest rental property?

Value	Percent	Count
Force-air furnace	25.0%	2
Boiler with built-in radiators or pipes	62.5%	5
Combination heating boiler (water and space heating done with same unit)	12.5%	1
Totals	100%	8

On average, how old is/are the space heater/s in your largest rental property? Your best estimate is fine.

Value	Percent	Count
2 to 4 years old	12.5%	1
5 to 9 years old	50.0%	4
10 to 14 years old	25.0%	2
15 to 19 years old	12.5%	1
Totals	100%	8

What type of fuel does your largest rental property's space heater use?

Value	Percent	Count
Natural gas	100.0%	8
Totals	100%	8

What type of water heater is used by the units in your largest rental property? Select all that apply.

Value	Percent	Count
Electric tank	12.5%	1
Natural gas tank	75.0%	6
Combination heating boiler (water heating and heating done with the same unit)	12.5%	1

On average, how old is/are the water heater/s in your largest rental property? Your best estimate is fine.

Value	Percent	Count
2 to 4 years old	12.5%	1
5 to 9 years old	50.0%	4
10 to 14 years old	25.0%	2
15 to 19 years old	12.5%	1
Totals	100%	8

Who is responsible for paying for the natural gas used at your largest rental property?

Value	Percent	Count
The tenant is responsible for 100% of the cost	50.0%	4
A portion of the cost is paid by the tenant	25.0%	2
I am responsible for 100% of the cost	25.0%	2
Totals	100%	8

Have any of your rental properties had an energy audit?

Value	Percent	Count
Yes	75.0%	6
No	12.5%	1
I don't know	12.5%	1
Totals	100%	8

Did you make any of the changes suggested by the energy auditor?

Value	Percent	Count
Yes	83.3%	5
I don't know	16.7%	1
Totals	100%	6

How likely are you to complete to purchase a major appliance (e.g., water heater or air conditioner) for one or more rental properties in the next year?

Value	Percent	Count
Not at all likely	62.5%	5
Somewhat likely	25.0%	2
Very likely	12.5%	1
Totals	100%	8

In your opinion, what is the MOST IMPORTANT reason for making an upgrade in one or more of your rental properties? Select all that apply.

Value	Percent	Count
To make the temperature at my rental units is more comfortable (by making units less drafty)	12.5%	1
To make the air in my rental units healthier (by reducing dust and mold)	25.0%	2
To reduce my or my tenants' utility bills	12.5%	1

Appendix E: Property Owners – Survey Instruments and Responses

Value	Percent	Count
To make my rental units look better	12.5%	1
To fix or replace something that is broken in a rental unit	62.5%	5

Who do you trust to give you advice about rental property repairs? Select all that apply.

Value	Percent	Count
I ask my friends, family, or neighbors	37.5%	3
I do an online search (e.g., Google)	50.0%	4
I ask a technician or contractor	87.5%	7
Other - Write In	25.0%	2

Your electric and/or gas company offers discounts for appliance purchases or improvements to your rental properties. What is the best way for them to contact you about these offers?

Value	Percent	Count
Email (e.g., digital brochures, flyers, or advertisements)	75.0%	6
Mail (e.g., brochures, flyers, or advertisements)	12.5%	1
Text Message (automated messages from utilities or service providers)	12.5%	1
Totals	100%	8

In addition to information about discounts or rebates, what other information are you interested in? Select all that apply.

Value	Percent	Count
Availability (e.g. how soon the appliance could be picked up or delivered)	25.0%	2
Product reviews or people's opinions and recommendations	37.5%	3
Options available for purchase and features	25.0%	2
Energy use (e.g., how much it'll cost to operate the appliance)	75.0%	6
The ability of the appliance to help my home feel more comfortable	37.5%	3
Other - Write In	25.0%	2

If you needed to spend \$1,500 to repair or replace a major appliance in one of your rental properties (for example, a water heater or furnace) in the next month, how would you pay for it?

Value	Percent	Count
Cash or check	50.0%	4
Credit card or cash advance	50.0%	4
Store financing	12.5%	1

If you needed to finance your \$1,500 purchase, which term are you most comfortable with?

Value	Percent	Count
1-6 months	25.0%	2
6-12 months	37.5%	3
Other - Write In	37.5%	3
Totals	100%	8

If your purchase qualified for a rebate, how would you prefer to receive it? Rank the options in order of preference.

Item	Overall Rank	Score	Total Respondents
Instant discount	1	32	8
VISA gift card or e-gift card given to you at the time of purchase	2	21	8
Check mailed to them 1-2 months after the purchase	3	14	8
VISA gift card or e-gift card mailed or emailed 2 weeks after the purchase	4	13	8

Which of the following situations would dissuade you from participating in a discount or rebate program for your appliance purchase? Select all that apply.

Value	Percent	Count
A limited group of eligible installers or contractors on a pre-approved list (you won't be able to use someone you know).	50.0%	4
Limited availability of installation time slots (you may need to wait from service)	50.0%	4
Being required to pay the full price up-front to receive a rebate in 6-8 weeks	37.5%	3

Appendix E: Property Owners – Survey Instruments and Responses

Value	Percent	Count
The time required to contact eligible installers and get quotes.	37.5%	3

Which of the following situations would convince you to replace a rental property's water heater with a model that lowered your monthly bill by \$5 to \$10 (even if it isn't broken)? Select all that apply.

Value	Percent	Count
A 50% discount on a new water heater	62.5%	5
An offer for a free water heater	100.0%	8
The ability to get a new water heater for no money down and pay it off each month on your property's utility bill	37.5%	3

Are you familiar with any of the following programs? Select all that apply.

Value	Percent	Count
Energy Assistance	100.0%	8
Weatherization	62.5%	5
Multi-Family Building Efficiency Program	12.5%	1
Low Income Rental Efficiency Program	25.0%	2

What is your race and/or ethnicity? Select all that apply.

Value	Percent	Count
Asian	12.5%	1
White	87.5%	7

Which best describes your current employment status?

Value	Percent	Count
Employed full-time	62.5%	5
Employed part-time	25.0%	2
Retired	12.5%	1
Totals	100%	8

What was the total income for all members of your household for the past year?

Value	Percent	Count
\$75,000 - \$99,999	62.5%	5
\$125,000 - \$124,999	12.5%	1
\$150,000 or more	25.0%	2
Totals	100%	8

What is the highest degree or level of school you have completed?

Value	Percent	Count
Some college or Associate's degree	12.5%	1
Bachelor's degree (for example: BA, BS)	12.5%	1
Master's, Professional, or Doctoral degree (for example: MA, MS, MBA, MD, JD, PhD)	75.0%	6
Totals	100%	8

Appendix F: Interview Guides

Black Homeowners Interview Guide

Hello [Respondent's name]

I appreciate your willingness to participate in this conversation, is this still a good time to talk?

[Wait for confirmation to continue; or reschedule]

My name is [insert name], and I am part of the evaluation team with the Citizens Utility Board of Minnesota, a non-profit consumer advocate for energy customers. I've been working with them to identify opportunities to increase access to energy efficiency programs and services. The purpose of this interview is to learn about your knowledge of energy efficiency, and experience with local programs and services.

I have us scheduled for 30 minutes, does that still work for you?

Before we get started, I want to go over a few logistics about the interview.

- I want to make sure that you understand that this interview is completely voluntary. You do not have to do this interview. You can end this interview at any time. You can choose to not answer any of the questions we ask you.
- Your privacy is important to us and we will take all necessary precautions to protect your anonymity. By that, I mean that when we transcribe this interview, we will remove your name and affiliation from the transcripts and reports. If we choose to use anything you say in a report or presentation, we will not identify you by name or as someone Citizens Utility Board.
- The risks associated with your participation in this interview are minimal and no more probable or severe than those you encounter in your everyday experiences. We will do our best to mitigate these risks by maintaining confidentiality.
- We would like to record the interview for research and learning purposes only. This is helpful for me so I'm not taking copious notes and can listen and be present for our conversation. The recordings will not be shared outside of the research team. A transcript will be prepared for use by the researchers. Audio recordings will be stored electronically, behind password protection. On the transcripts, participants will be identified only by their assigned number. Information and comments from the transcripts may be used in reports and/or presentations, but your name, or any other unique information that someone could use to identify you, will never be reported or released. The only individuals that will have access to the original transcription files, and anything linking you to the transcript, will be researchers in this study.

Do you have any questions about the information I just shared? Are you comfortable with me recording the conversation?

[Turn on the recording.]

In order to have a record of your consent, can you please state your name and that you agree to be interviewed and understand that this call is being recorded.

Do you have any questions for me at this point, before we get started with the substantive questions?

[Pause, answer any questions.]

Section 1: Description of the Program or Benefits

1. As you know, we are interested in understanding your energy usage at home and interest in lowering your monthly utility bill. I'd like to start by having you share what the term "energy efficiency" means to you -- it could be a definition or simply your understanding of it.
2. In the past few months, I've been learning about a lot of ways to lower my utility bill, but I know that may not be the case for everyone. I'm curious how often you talk about lowering your utility bill or hear information from others.
 - a. Who have you heard information from or talked to about lowering your utility bill (e.g., a representative from a utility, salesperson at a retailer), and in what context (e.g., advertising a program, service, or appliance)?
 - b. What resources have been the most helpful in shaping your understanding of how to lower your utility bill?
 - c. How would you like to learn more about lowering your utility bill (e.g., instructional videos, brochures with pictures, written manuals, diagrams, etc.)?
3. Let's transition to talking about your home - is it comfortable during the summer and winter months?
 - a. Are you able to keep the temperature where you want it, even on really hot or cold days? [Prompts: is it often too hot, too cold, or drafty?]
 - b. What do you do to stay cooler, or warmer?
 - c. Have you made any changes to your home to keep it cooler in the summer, or warmer in winter?
4. How would you describe your utility bills during the summer and winter?
 - a. Are they affordable?
 - b. Do you ever get a really high bill that you have trouble paying?
 - c. If so, what do you do? [Prompts: call the utility, reduce usage, etc.]
5. If you're anything like me, you're always thinking about ways to lower your bills; thinking specifically about your heating bill, what motivates you to reduce your energy use (for example, during the thermostat up in the summer and down in the winter? [Prompts: lower payments each month, improved health and safety, increased home value, improved comfort of your home.]
 - a. Why is this an important consideration?

Section 2: Outreach Channels

6. Are any of your home's major appliances broken right now (e.g., furnace, air conditioner, water heater, washer, dryer, refrigerator)?
 - a. If yes, are you in the process of purchasing a replacement? [Prompts: where and why did you decide to purchase from that retailer, etc.]
 - b. If no, when did you last purchase a major appliance? Where did you purchase the appliance(s) from? Did you do any research beforehand? If so, what types of information did you review?
7. I know a few people who purchased homes this year and two things that are talked about a lot are home improvement projects (or repairs) and who to call for advice, support, and

- recommendation for where to shop. Have you made any big or small improvements to your home recently?
- a. If yes, what motivated you to make improvements?
 - b. If no, why have you chosen not to make improvements?
8. Based on your survey response, it sounds like you turn to [response] when you want some advice about repairs or improvement projects. If you were to get advice from an organization, how do you prefer to receive important information concerning your home? [Prompt: brochures with pictures and diagrams, brochures with detailed descriptions of the services, video overviews, or face-to-face presentations/conversations.]
 - a. If the information you were receiving was specific to lowering your utility bill, what is the best way to get that information to you?
 9. Unexpected home repairs are unfortunate under any circumstance and I hope you haven't had to deal with many, but do you know when you last replaced your furnace or water heater? (if no recent experience, use electric or non-energy large purchase)
 - a. How did you go about reviewing the different options for which one to buy?
 - b. How did you decide which one to buy? (What factors helped you decide?)
 10. If your water heater broke, would you replace it yourself?
 - a. If yes, why? [Prompt: you've replaced this type of appliance before, you know someone that can help, you can't afford the cost of a technician.]
 - b. If no, will you find a contractor? Where?
 11. If your furnace (or other space heating appliance) breaks, would you replace it yourself?
 - a. If yes, why? [Prompt: you've replaced this type of appliance before, you know someone that can help, you can't afford the cost of a technician.]
 - b. If no, will you find a contractor? Where?
 12. When searching for an installer or contractor, what qualities or characteristics do you look for?

Section 3: Upfront Cost and Financing

13. In a non-emergency situation, how much would you be willing to spend to replace an appliance in your home to improve your household's quality of life (for example, keeping the house cooler when it's hot, or warmer when it's cold, or having hot water longer while taking a shower)?
14. If the [insert example response] cost more than [amount willing to spend], would you still purchase it if you were offered a:
 - a. Instant or mail-in rebate? How much would the rebate need to be?
 - b. Monthly plan with the cost added to your utility bill
 - c. Low-interest (+/- 3%) loan to cover the cost.
 - d. Interest-free loan to cover the cost.
 - e. Forgivable loan (i.e., after making a set amount of on-time payments).

Section 4: Program Requirements

15. One of the ways you can learn how to lower your utility is through a home energy audit, where someone visits your home to assess your energy use and improve its efficiency. Have you previously had an energy audit conducted of your home?
 - a. If yes, did you call the service provider, or did they reach out to you? How was the experience - would you recommend the service to friends, family members, or neighbors?

- b. If not, is that something you would be interested in? Why?
 - i. How much would you feel comfortable paying for this service? [Prompt: An in-person audit ranges from \$70-\$100, is that cost-prohibitive for you? How much would you feel comfortable paying for this service?]

Latinx Renters Interview Guide

Hello [NAME]

I appreciate your willingness to participate in this conversation, is this still a good time to talk?

[Wait for confirmation to continue; or reschedule]

My name is [insert name], and I am part of the evaluation team with the Citizens Utility Board of Minnesota, a non-profit consumer advocate for energy customers. I've been working with them to identify opportunities to increase access to energy efficiency programs and services. The purpose of this interview is to learn about your knowledge of energy efficiency, and experience with local programs and services.

I have us scheduled for 30 minutes, does that still work for you?

Before we get started, I want to go over a few logistics about the interview.

- I want to make sure that you understand that this interview is completely voluntary. You do not have to do this interview. You can end this interview at any time. You can choose to not answer any of the questions we ask you.
- Your privacy is important to us and we will take all necessary precautions to protect your anonymity. By that, I mean that when we transcribe this interview, we will remove your name and affiliation from the transcripts and reports. If we choose to use anything you say in a report or presentation, we will not identify you by name or as someone Citizens Utility Board.
- The risks associated with your participation in this interview are minimal and no more probable or severe than those you encounter in your everyday experiences. We will do our best to mitigate these risks by maintaining confidentiality.
- We would like to record the interview for research and learning purposes only. This is helpful for me so I'm not taking copious notes and can listen and be present for our conversation. The recordings will not be shared outside of the research team. A transcript will be prepared for use by the researchers. Audio recordings will be stored electronically, behind password protection. On the transcripts, participants will be identified only by their assigned number. Information and comments from the transcripts may be used in reports and/or presentations, but your name, or any other unique information that someone could use to identify you, will never be reported or released. The only individuals that will have access to the original transcription files, and anything linking you to the transcript, will be researchers in this study.

Do you have any questions about the information I just shared? Are you comfortable with me recording the conversation?

[Turn on the recording.]

In order to have a record of your consent, can you please state your name and that you agree to be interviewed and understand that this call is being recorded.

Do you have any questions for me at this point, before we get started with the substantive questions?

[Pause, answer any questions.]

Section 1: Description of the Program or Benefits

1. We are interested in understanding your energy usage at home and interest in lowering your monthly utility bill. I'd like to start by having you share what the term "energy efficiency" means to you -- it could be a definition or simply your understanding of it.
2. In the past few months, I've been learning about a lot of ways to lower my utility bill, but I know that may not be the case for everyone. I'm curious how often you talk about lowering your utility bill or hear information from others.
 - a. Who have you heard information from or talked to about lowering your utility bill (e.g., a representative from a utility, salesperson at a retailer, property owner), and in what context (e.g., advertising a program, service, or appliance)?
 - b. What resources have been the most helpful in shaping your understanding of how to lower your utility bill?
 - c. How would you like to learn more about lowering your utility bill (e.g., instructional videos, brochures with pictures, written manuals, diagrams, etc.)?
3. Let's transition to talking about your home -- how would you describe your utility bills during the summer and winter?
 - a. Are they affordable?
 - b. Do you ever get a really high bill that you have trouble paying?
 - c. If so, what do you do? [Prompts: call the utility, reduce usage, etc.]
4. Have you ever asked your property owner (or management company) to make an improvement to your home to increase your comfort, like putting in new windows or fixing a broken appliance?
 - a. If you wanted your landlord to make an improvement like replacing your windows or sealing a gap in the doorway (to prevent drafts), would you ask them to do it - why or why not?

Section 2: Outreach Channels

5. Are any of your home's major appliances broken right now (e.g., heating, cooling, water heater, washer, dryer, fridge)?
 - a. If yes, have you spoken with your property owner (or management company) about a replacement? Do you believe your property owner (or management company) would involve you in the selection process?
 - b. If no, do you believe that any of your appliances need replacing? Why (i.e., because they are operating inefficiently, and have you spoken to your property owner (or management company) it?
6. How would you describe your home's temperature - is it comfortable during the summer and winter months?
 - a. Are you able to keep the temperature where you want it, even on really cold days? [Prompts: is it often too hot, too cold, or drafty?]

- b. How do you address heating issues in your home? [Prompts: placing plastic on the windows, opening windows, talking to your property owner, etc.]
 - i. Have you spoken with your property owner (or management company) about this issue?
7. If your home isn't comfortable during the winter months, have you spoken to your property owner (management company) about it?
 - a. If so, how did you describe the problem? What was their response?
 - b. If not, why? [Prompt: Do you feel comfortable speaking with your property owner (or management company when it isn't an emergency?).

Section 3: Description of the Program or Service (CenterPoint – Gas)

8. What would motivate you to ask your property owner to replace an appliance (for example, your water heater or furnace)? Check all that apply. [Prompts: To make the temperature in my home more comfortable (by making it less drafty); to make the air in my home healthier by reducing dust and mold); to reduce my utility bills; to make my home look better; to fix or replace something that is broken]
9. In order for your property owner (or management company) to receive assistance for home improvements, you may need to have a home audit [explain time required, scheduling] and provide income documentation (e.g., paystubs, tax statements, or proof of cash assistance).
 - a. Does this sound like something you'd be willing to do?
 - b. How much time would you be willing to dedicate to this process?
 - c. Are you willing to provide income documentation?

Property Owners Interview Guide

Hello [NAME]

I appreciate your willingness to participate in this conversation, is this still a good time to talk?

[Wait for confirmation to continue; or reschedule]

My name is [insert name], and I am part of a research team partnering with the Citizens Utility Board of Minnesota, a non-profit consumer advocate for energy customers. I've been working with them to identify opportunities to increase access to energy efficiency programs and services. The purpose of this interview is to learn about your knowledge of energy efficiency, and experience with local programs and services.

I have us scheduled for 30 minutes, does that still work for you?

Before we get started, I want to go over a few logistics about the interview.

- I want to make sure that you understand that this interview is completely voluntary. You can end this interview at any time. You can choose to not answer any of the questions we ask you.
- Your privacy is important to us and we will take all necessary precautions to protect your anonymity.

- We would like to record the interview for research and learning purposes only. This is helpful for me so I'm not taking copious notes and can listen and be present for our conversation. The recordings will not be shared outside of the research team.

Do you have any questions about the information I just shared? Are you comfortable with me recording the conversation?

[Turn on the recording.]

In order to have a record of your consent, can you please state that you understand that this call is being recorded.

[Pause for statement.]

Thank you. Let's begin.

[Begin interview.]

Section 1: Description of the Program or Benefits

1. I'd like to start by having you share what the term "energy efficiency" means to you -- it could be a definition or simply your understanding of it.
 - a. If you walked into a unit that was saving money on their heating bill how would you know?
 - b. What do you think that means for the household? Do you think they're comfortable?
2. In the past few months, I've been learning about a lot of ways to lower my utility bills and increase the comfort of my home, but I know that may not be the case for everyone. I'm curious – have you ever spoken with your tenants about being more energy efficient (that is, identifying ways to decrease their use of electricity or natural gas)?
 - a. If yes, what was discussed?
 - b. If no, why?
3. Are you responsible for one or more utility bills at your property?
 - a. If yes, how often do you talk about lowering your bill?
 - i. Who have you heard information from or talked to about lowering your utility bill (e.g., a representative from a utility, a salesperson at a retailer), and in what context (e.g., advertising a program, service, or appliance)?
 - ii. Which resources have been the most helpful in shaping your understanding of how to lower your utility bill?
 - b. If no [move to the next question]

Section 2: Outreach Channels

4. Let's transition to talking about your property - have any of your renters requested an appliance upgrade or energy-related improvement (e.g., to address air leaks) in their unit or for the building?
 - a. If yes, what were the requests? What was your response?
5. In general, energy efficiency has been heavily promoted in the past few years. Have you made any energy efficiency improvements to your property in the past several years?
 - a. If yes, what motivated you to make the upgrades?

- b. If no, why have you chosen not to make any upgrades yet?
- 6. When you are considering making an improvement to or upgrade to a unit at your property, are there specific requirements you consider before making any purchases (for example, costs or return on investment)?
- 7. Based on your survey response [Question 21], it sounds like you turn to [response] when you want some advice about building repairs or improvement projects. If you were to get advice from an organization or directly from a utility company, how do you prefer to receive it? [Prompt: brochures with pictures and diagrams, brochures with detailed descriptions of the services, video overviews, or face-to-face presentations/conversations.]
 - a. If the information you were receiving was specific to lowering your (or your renters') utility bill, what is the best way to get that information to you?
- 8. When searching for an installer or contractor, what qualities or characteristics do you look for?

Section 3: Upfront Cost and Financing

- 9. In a non-emergency situation, how much would you be willing to spend to replace an appliance in your property to improve your renter's quality of life (i.e., keeping the home cooler in the summer)? For example, replacing an older air conditioner with a newer model?
- 10. If the air conditioner cost twice as much as [the amount they're willing to spend], would you still purchase it if your renter was able to split the cost with you 50/50?

Section 4: Program Requirements

- 11. [Final Question] One of the ways property owners can learn how to lower their building use of natural gas and electricity is through an energy audit, where someone visits your property to assess energy use and provides recommendations to improve its efficiency.
 - a. Have you previously had an energy audit conducted of your property?
 - i. If yes, did you call the service provider, or did they reach out to you? How was the experience - would you recommend the service to friends, family members, or neighbors?
 - ii. If not, is that something you would be interested in? Why?
 - b. How much would you feel comfortable paying for this service?

Thank you for your time. My colleague will process your gift card within 1 business day. If you have any questions, please feel free to reach out to him directly.

Appendix G: Impact Analysis

This appendix presents an assessment of the potential quantitative and qualitative benefits of implementing the program design tactics recommended in this report.

Quantitative Assessment

The quantitative estimates below draw on data from 2019 CIP Status Reports and associated filings from Xcel Energy and CenterPoint Energy (Xcel Energy 2019 p. 6,7; CenterPoint Energy 2019, p. 15, 17). The research team chose to use the 2019 filings as the most recent program data from the pre-pandemic period. However, a notable limitation of this work is that the estimates are based on utility filings for one CIP year (2019).

The research team does not suggest that any of the outcomes discussed below, in particular, are a likely result, but offer ranges as a method to evaluate the impact of a range of potential results. Furthermore, as noted, the estimates in this section reference program performance and goals from a pre-pandemic period and from program approaches that may no longer be in use or which have been substantially modified. Thus, we suggest that the quantifications of potential impact included here be used as a model for estimating impact rather than as a projection of the actual increase in energy savings or participation that could be expected from the implementation of the program design recommendations.

More detailed market analysis will be necessary to more precisely predict the impact these specific recommendations will have on residential CIP and low-income CIP participation. A market analysis would explore more details such as the expected number of emergency appliance replacements that could take place each year, the number of structures that would be likely candidates for additional insulation and air sealing, the number of households throughout the metropolitan area that are similar to the demographic characteristics of study's subject communities, the marketing budgets necessary to effectively reach target populations, and other relevant factors.

The utilities have made and continue to make changes to their program designs since their 2019 CIP Status Reports. The estimates below can thus be used to approximate improvement over a base case of business-as-usual program designs that may result from implementing the recommendations in this report. Those recommendations include five program design ideas (Table 1, reprinted from above) and several suggestions for implementation tactics related to outreach, marketing, program processes, and participant costs.

Table 1. Program ideas for each targeted population	
Black homeowners in North Minneapolis and surrounding suburbs	
Leverage Black homeowners’ enrollment in CenterPoint Energy’s equipment service plan, Home Service Plus, to promote efficiency, lower monthly bills, and support homeowners facing costly, unexpected equipment failures	
Provide personalized, customized equipment replacement support to Black homeowners	
Build on two existing energy efficiency program offerings, the Home Energy Squad and its associated Energy Advisor Service, to launch an integrated energy efficiency advisor service that provides personalized support to Black homeowners to help them prioritize, plan, and pay for energy efficiency improvements over time	
Owners of rental properties in East St. Paul and South Minneapolis	
Target emergency replacements by focusing outreach on contractors and other trade allies that provide service to rental property owners, and by covering the incremental cost of upgrading to the efficient model	
To encourage discretionary upgrades in rental properties, offer generous incentives and make it easy for the owners	

In all the following estimates, energy savings are provided in MMBTU, with conversion factors 1 MMBTU = 1 Dth = 293.2972222222 kWh. Instances are summed in the tables below. However, this may overcount participants if a substantial number of households in Xcel territory were to be served with both electric and gas measures.

Table 23 sums the estimates in Table 24, Table 25, and Table 26. This summary is an estimate of potential one-year electric and gas savings from implementation of the recommended program designs in Xcel Energy and CenterPoint Energy territories. The first column indicates the estimated number of participants (by household) for three scenarios: low, moderate, and high. The succeeding columns show energy savings for the same set of scenarios. The resulting matrix estimates nine potential energy savings values. The sections below provide greater details on the inputs and assumptions used for each utility, fuel, and scenario.

Table 24. Overview of Combined Potential Energy Savings for Xcel and CenterPoint, over 2019 Base Case

Participation Estimates	Combined Estimated Number of Participants	Low Savings Estimates in MMBTU	Moderate Savings Estimates in MMBTU	High Savings Estimates in MMBTU
Low	18,344	89,209	115,263	145,042
Moderate	20,884	101,607	131,347	165,325
High	25,088	122,099	157,882	198,757

The research team was not able to reliably estimate the impact on program implementation costs of adopting the program design recommendations, as each of the recommendations could be implemented in a variety of ways. For example, program design recommendation #2, “Provide personalized, customized equipment replacement support to Black homeowners”, includes three possible implementation approaches, each of which will require different types of staffing and incur varying internal costs. Further complicating any attempt to estimate implementation costs were the uncertainties around the actual costs utilities incur for program elements like staffing, management, marketing/outreach, and incentive processing.

Xcel Energy

Gas Savings

The participation and gross annual savings estimates in Table 25 represent analysis of four Xcel Energy CIP programs targeting gas use – Home Energy Savings Program, Home Energy Squad, Low Income Home Energy Squad, and Multi-family Building Efficiency – using 2019 actual participation and savings (Table 24) as the base case.

Table 25. Actual 2019 Natural Gas Savings (Base Case) for Xcel Energy

Number of Participants	Total Energy Savings in Dth
2,429	23,983

Note: includes the following programs: Home Energy Savings Program, Home Energy Squad, Low Income Home Energy Squad, and Multi-family Building Efficiency

Table 26. Potential Natural Gas Savings for Xcel Energy

Participation Estimates	Estimated Number of Participants	Low Savings Estimates in Dth	Moderate Savings Estimates in Dth	High Savings Estimates in Dth
Low	2,672	26,720	34,736	45,424
Moderate	3,036	30,360	39,468	51,612
High	3,644	36,440	47,372	61,948

Note: savings estimates are additive, but instances are not

In these estimates, energy savings "per instance" (i.e. program participant) were estimated to increase in each successive savings scenario. This room for improvement was assumed because only one of the Xcel low-income programs met its savings goals in the base case and the others fell short of goal - all because programs were facing difficulty convincing building owners to implement measures. The assumption is that changes to program design will help utilities reap greater savings out of each participant.

In the "low savings" estimate, the team assumed no change to savings per participant as a result of these recommendations, with savings held constant at 2019 levels. The other two scenarios assume that the recommendations increase measure uptake among participants and thus increase savings. The "high savings" scenario assumes savings per participant will be equal to the 2019 goals, and the "moderate" scenario assumes savings will be mid-way between the 2019 actual and goal savings.

For example, if the per participant actual savings in 2019 were 2 Dth and the goal savings were 4 Dth, the "low savings" scenario would assume 2 Dth of savings, the "moderate" scenario would assume 3 Dth of savings, and the "high savings" estimate would assume 4th of savings.

In estimating the number of participants that may result from adopting the recommendations in this report, the "low savings" scenario assumes a 10% increase in participation over the 2019 base case. The "moderate" scenario assumes a 25% increase over 2019. The "high savings" scenario assumes a 50% increase over 2019. The research team believes the recommendations in this report can be broadly applied and thus can improve service to customers beyond the narrow study populations. The proposed program design recommendations have the potential to impact other programs too; thus there is potential for even more energy savings.

Electric Savings

The participation and gross annual customer savings estimates in Table 27 represent analysis of five Xcel energy efficiency programs targeting electric use – Home Energy Savings Program, Home Energy Squad, Low Income Home Energy Squad, Multi-family Energy Savings, and Multi-family Building Efficiency – using 2019 actual participation and savings as the base case. In these estimates, energy savings "per instance" (i.e. program participant) are identical for each scenario, because the adoption of the recommendations in this report is expected to impact program participation, rather than increasing savings per participant. This assumption was made because, in the base case year, four of the five programs included in this analysis were already exceeding their savings per participant goals. The exception was the Multi-family Energy Savings program, which in 2019 was 81% below goal.

For the four programs exceeding savings per participant goals in 2019, the actual 2019 savings per participant were used in the estimates below. For the one program that fell short of its savings per participant goal, the goal savings were used in the estimates.

In estimating the number of participants that may result from adopting the recommendations in this report, the "low savings" scenario assumes a 10% increase in participation over 2019. The "moderate" scenario assumes a 25% increase over 2019. The "high savings" scenario assumes a 50% increase over 2019.

The research team believes the recommendations in this report can be broadly applied and thus can improve service to customers beyond the narrow study populations.

Table 27. 2019 Actual Electric Savings (Baseline) for Xcel Energy

Number of Participants	Total Energy Savings in kWh
9,466	10,192,311

Note: includes the following programs: Home Energy Savings Program, Home Energy Squad, Low Income Home Energy Squad, Multi-family Energy Savings, and Multi-family Building Efficiency

Table 28. Potential Electric Savings Estimates for Xcel Energy

Participation Estimates	Estimated Number of Participants	Low Savings Estimates in kWh	Moderate Savings Estimates in kWh	High Savings Estimates in kWh
Low	10,413	8,934,354	8,934,354	8,934,354
Moderate	11,833	10,152,714	10,152,714	10,152,714
High	14,199	12,182,742	12,182,742	12,182,742

Note: savings estimates are additive but instances are not.

CenterPoint Energy

The participation and gross annual savings estimates in Table 29 represent analysis of three CenterPoint Energy efficiency programs targeting gas use – Home Energy Squad, Low Income Rental Energy Efficiency, and Low Income Multi-family Housing Rebates – using actual participation and savings data reported by CenterPoint Energy in its 2019 CIP Status Report as the base case.

In these estimates, energy savings "per instance" (i.e. program participant) are estimated to increase in each successive scenario. This room for improvement was assumed because none of the CenterPoint Energy low-income programs met its savings goals in the base case and some fell far short of goal - all because programs were facing difficulty convincing building owners to implement measures. The assumption is that changes to program design will help utilities reap greater savings out of each participant.

In the "low savings" estimate, the team assumed no change to savings per instance as a result of these recommendations, with savings held constant at 2019 levels. The other two scenarios assume that the recommendations increase measure uptake among participants and thus increase savings. The "high savings" scenario assumes savings per participant will be equal to the 2019 goals. The "moderate" scenario assumes savings will be mid-way between the 2019 actual and goal savings.

For example, if the per-participant actual savings in 2019 were 2 Dth and the goal savings were 4 Dth, the "low savings" scenario would assume 2 Dth of savings, the "moderate" scenario would assume 3 Dth of savings, and the "high savings" estimate would assume 4 Dth of savings.

In estimating the number of participants that may result from adopting the recommendations in this report, different assumptions were made for each energy efficiency program. The Home Energy Squad and Low-Income Rental Energy Efficiency programs, which in 2019 reported participation at 7% below goal and 23% above goal respectively, were assumed to perform as follows: the "low estimate" scenario assumes a 10% increase in participation over 2019, the "moderate" scenario assumes a 25% increase

over 2019, the "high estimate" scenario assumes a 50% increase over 2019. For the Low Income Multi-family Housing Rebates, which obtained only a fraction of the intended participation, larger increases in participation are assumed as a result of this project: the "low estimate" scenario assumes a 5x increase in participation (and still 55% below the 2019 goal), the "moderate" scenario assumes a 10x increase (and still 10% below 2019 goal), and the "high estimate" scenario assumes a 15x increase (and 35% above 2019 goal).

The proposed program design recommendations have the potential to impact other programs too, thus there is potential for even more energy savings.

Table 29. 2019 Actual Gas Savings (Baseline) for CenterPoint Energy

Number of Participants	Total Energy Savings in Dth
4,749	22,720

Note: includes the following programs: Home Energy Squad, Low Income Rental Energy Efficiency, and Low Income Multi-family Housing Rebates

Table 30. Potential Gas Savings Estimates for CenterPoint Energy

Participation Estimates	Estimated Number of Participants	Low Savings Estimates in Dth	Moderate Savings Estimates in Dth	High Savings Estimates in Dth
Low	5,259	32,027	50,066	69,156
Moderate	6,015	36,631	57,263	79,097
High	7,245	44,122	68,972	95,272

Note: savings estimates are additive, but instances are not.

Suggestions for Qualitative Assessment and Evaluation of Efficiency Programs

Quantitative and qualitative impacts of the recommended program design strategies can be evaluated using the usual means applied by energy efficiency programs, with two additions. Utilities will want to devote extra evaluation resources to collecting the demographics of participating households and incorporating those variables into their analysis. As mentioned previously, a more detailed market analysis will provide more data in predicting participation levels as well as anticipated energy savings. Utilities will also want to conduct qualitative research (including through open-ended survey questions, interviews, or app-based ethnographic tools) to explore the degree to which participating in the energy efficiency program resulted in any non-energy benefits.

There are many potential non-energy benefits that could result from increasing participation in energy efficiency programs among communities where participation is currently low and need is high, all of which provide rich material for future program evaluations. Future assessment of the non-energy benefits of the recommended program design could measure non-energy benefits documented in other

programs and contexts. These non-energy benefits could accrue to occupants, building owners, and communities.³⁰

For home occupants, non-energy benefits could take the form of improved health, comfort and safety, and financial stability. In terms of health benefits, across a meta-analysis of energy efficiency programs, researchers have found that energy efficiency can have a significant increase in health in the form of reduced cold-related illness and associated stress³¹ but could also have a detrimental effect on health through reduced ventilation and indoor air quality.³² However, on average, energy efficiency improvements have been found to have a positive and statistically significant benefit to health.³³

Energy efficiency also improves home comfort and safety by reducing drafts,³⁴ allowing for more affordable utilization of heating and air conditioning and reducing unsafe heating practices (such as burning trash, using ovens for space heating, and relying on unsafe space heaters³⁵). Low-income and BIPOC homes have been shown to exhibit “energy-limiting behavior,” the reduction in heating and cooling utilization around outdoor temperature changes relative to other households.³⁶

Energy efficiency can also increase the financial stability of residential occupants by reducing energy costs and the fluctuations in energy costs across seasons. If program participation results in lower energy bills, households would be able to reallocate scarce resources to other purposes, including basic necessities (food, clothing, housing, etc.), education, recreation, and long-term savings. In 2020, nearly one-in-five U.S. households reported reducing or forgoing basic necessities to pay their energy bill, with higher rates for BIPOC households, households with low income, households with children, and renters.³⁷ Recent experience from the Child Tax Credit showed that the most common use for additional

³⁰ Norton, Ruth Ann, Brendan Wade Brown, Kiki Malomo-Paris, and Elizabeth Stubblefield-Loucks. “Non-Energy Benefits, the Clean Power Plan, and Policy Implications for Multifamily Housing,” n.d., 17.

³¹ Midwest Energy Efficiency Alliance. “[Health Benefits of Energy Efficiency](https://www.mwalliance.org/sites/default/files/meea-research/health-fact-sheet-final.pdf).” Midwest Energy Efficiency Alliance, February 12, 2019. (<https://www.mwalliance.org/sites/default/files/meea-research/health-fact-sheet-final.pdf>).

³² Maidment, Christopher D., Christopher R. Jones, Thomas L. Webb, E. Abigail Hathway, and Jan M. Gilbertson. “[The Impact of Household Energy Efficiency Measures on Health: A Meta-Analysis](https://doi.org/10.1016/j.enpol.2013.10.054).” *Energy Policy* 65 (February 1, 2014): 583–93. (<https://doi.org/10.1016/j.enpol.2013.10.054>).

³³ *Id.*

³⁴ U.S. DOE. “[Why Energy Efficiency Upgrades](https://www.energy.gov/eere/why-energy-efficiency-upgrades).” Energy.gov. Accessed April 15, 2022. (<https://www.energy.gov/eere/why-energy-efficiency-upgrades>).

³⁵ Hernández, Diana. “[Understanding ‘Energy Insecurity’ and Why It Matters to Health](https://doi.org/10.1016/j.socscimed.2016.08.029).” *Social Science & Medicine* 167 (October 2016): 1–10. (<https://doi.org/10.1016/j.socscimed.2016.08.029>); Carley, Sanya, and David M. Konisky. “[What the U.S. Government Can Do to Address Energy Insecurity](https://scholars.org/contribution/what-us-government-can-do-address-energy).” *Scholars Strategy Network*. Accessed April 15, 2022. (<https://scholars.org/contribution/what-us-government-can-do-address-energy>).

³⁶ Cong, Shuchen, Destenie Nock, Yueming Qiu, and Bo Xing. [The Energy Equity Gap: Unveiling Hidden Energy Poverty](https://doi.org/10.21203/rs.3.rs-712945/v1), 2021. (<https://doi.org/10.21203/rs.3.rs-712945/v1>).

³⁷ U.S. EIA. “[In 2020, 27% of U.S. Households Had Difficulty Meeting Their Energy Needs](https://www.eia.gov/todayinenergy/detail.php?id=51979).” Accessed April 15, 2022. (<https://www.eia.gov/todayinenergy/detail.php?id=51979>).

funds among families with young children were education and childcare³⁸. Research on eviction suggests that even modest increases in a household's disposable income can help stave off evictions, as many households facing eviction owe less than \$600.³⁹ Further, reducing the energy bills of lower-income households, who are more likely to qualify for and receive Energy Assistance, will likely reduce these households' reliance on the program – and can help the state's limited Energy Assistance Program funds go farther, so that more households can receive funding and/or grant amounts can be increased.

Further quantitative and qualitative analysis of the impacts of the recommended program design strategies in pilot deployments could also provide valuable information for stakeholders other than home occupants whose support could enable scaling pilot deployments. In particular, assessment and evaluation of non-energy benefits could be important for providing information for building owners and community planners, as non-energy benefits can also accrue to building owners and communities at large. For example, recommended program design strategies could be more broadly supported by building owners if pilot implementation of the recommendations demonstrated non-energy benefits accruing to building owners, such as decreased operations and maintenance costs in excess of implementation costs. Other non-energy benefits that could accrue to building owners include lower operations and maintenance costs, increased property value,⁴⁰ and decreased vacancy. And for communities as a whole, non-energy benefits could include creating jobs and economic opportunity,⁴¹ community stability (if gentrification-based displacement can be minimized⁴²), and improved environmental quality.⁴³

To evaluate the impact of the equitable approaches recommended in this report, utilities are advised to consult and coordinate with a variety of stakeholders who would be impacted by program changes and/or influence how program changes are implemented. Many organizations, including but not limited

³⁸ Perez-Lopez, Daniel J., and Yeris Mayo-Garcia. "[Parents With Young Children Used Child Tax Credit Payments for Child Care](https://www.census.gov/library/stories/2021/10/nearly-a-third-of-parents-spent-child-tax-credit-on-school-expenses.html)." US Census Bureau. Accessed April 15, 2022. (<https://www.census.gov/library/stories/2021/10/nearly-a-third-of-parents-spent-child-tax-credit-on-school-expenses.html>).

³⁹ Badger, Emily. "[Many Renters Who Face Eviction Owe Less Than \\$600](https://www.nytimes.com/2019/12/12/upshot/eviction-prevention-solutions-government.html)." *The New York Times*, December 12, 2019, sec. The Upshot. (<https://www.nytimes.com/2019/12/12/upshot/eviction-prevention-solutions-government.html>).

⁴⁰ International Energy Agency. "[Asset Values – Multiple Benefits of Energy Efficiency – Analysis](https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/asset-values)." IEA. Accessed April 15, 2022. (<https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/asset-values>).

⁴¹ E4TheFuture, and E2. "[Energy Efficiency Jobs in America](https://e4thefuture.org/wp-content/uploads/2018/09/EE-Jobs-in-America-2018.pdf)," September 2018. (<https://e4thefuture.org/wp-content/uploads/2018/09/EE-Jobs-in-America-2018.pdf>).

⁴² Hart, Skye, and Sam Magavern. "PUSH Buffalo's Green Development Zone: A Model for New Economy Community Development," n.d., 44.

⁴³ U.S. EPA. "[Public Health Benefits per KWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report](https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf)." U.S. EPA, May 2021. (https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf); Abel, David W., Tracey Holloway, Javier Martínez-Santos, Monica Harkey, Madankui Tao, Cassandra Kubes, and Sara Hayes. "[Air Quality-Related Health Benefits of Energy Efficiency in the United States](https://doi.org/10.1021/acs.est.8b06417)." *Environmental Science & Technology* 53, no. 7 (April 2, 2019): 3987–98. (<https://doi.org/10.1021/acs.est.8b06417>); Beadle, Richard. "[Benefits of Energy Efficiency Go Beyond Saving Energy and Money](https://www.resource-innovations.com/resources/benefits-energy-efficiency-go-beyond-saving-energy-and-money)." Resource Innovations, May 6, 2019. (<https://www.resource-innovations.com/resources/benefits-energy-efficiency-go-beyond-saving-energy-and-money>).

to those identified below, will play a role in promoting program changes as well as providing feedback on proposed changes and impact of changes once implemented.

- Community and neighborhood-based organizations. These could include a wide variety of locally focused organizations that provide services that would touch on energy issues. These may be organizations that provide social service type assistance within a neighborhood or community or that are a hub of information or gathering spot, such as a community center. Libraries or houses of worship could also be included in this category. These organizations have multiple opportunities to interact with neighborhood residents and may be able to share information about programs and provide program feedback on a formal or informal basis.
- Governmental agencies. Local municipal governments and county agencies provide a variety of resources to their residents and are in a great position to share information about energy efficiency programs. Efforts can be made to make sure that social service-based departments of government offices are well informed about program offerings and changes.
- Building trade allies and vendors. The companies that install energy equipment and energy efficiency measures will need to be aware of program changes and be in a position to promote programs to their customers. The individuals making the physical improvements to a home provide valuable insight into what options are practical and feasible as well as attractive to a building owner.
- Program implementers. These are the non-profit and for-profit organizations hired by utilities to implement conservation improvement programs. Current examples include the Energy CENTS Coalition, Center for Energy and Environment, Sustainable Resources Center, and Franklin Energy. They have significant insight into existing programs and notable influence through their outreach efforts in influencing program participation depending on their marketing budgets and efforts.
- Energy Assistance and Weatherization providers. These organizations work in partnership with utilities to help customers better afford energy bills and make their homes more efficient, comfortable, and healthy. These organizations should be aware of utility program offerings so there can be referrals to programs that best suit the needs of their clients. There is already some built in coordination (e.g. in Hennepin County), and additional coordination and updates should be encouraged.
- Energy organizations and advocates. Several nonprofit organizations, beyond those involved in this project's Steering Committee, are working on energy and equity issues and conducting research to improve energy efficiency. They also have insight and influence regarding program design and participation through their partnership networks and their involvement in policy development and adoption.

Involvement of a wide variety of stakeholders will be a critical component in successfully designing and implementing changes and additions to CIP that will benefit BIPOC, low-income and renter communities. Continual evaluation and appropriate modifications should be expected. However, it is also necessary to give programs sufficient time to gain traction and be thoughtful in determining when, if, and what type of modifications may be warranted.