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slipstream **Streetwyze**

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Executive Summary

Minority communities and rural communities are more likely to have high energy burdens that affect their financial resilience (Ross, Drehobl, and Stickles, 2018; Drehobl and Ross, 2016). They are also more likely to experience more negative impacts such as extreme home temperatures, dampness, mold, and humidity than other residential customers (Hernández 2013). Two-thirds of low-income households across the country (with income less than 200% of the Federal Poverty Level) have *high* energy burden, which is defined as those households that spend 6% or more of annual income on energy costs (Ross, Drehobl, and Stickles, 2018). The median low-income energy burden in Minneapolis is 6.6% as compared to the 2.2% average energy burden of the state (Drehobl, Ross, and Ayala 2024). Nearly one in three counties in Greater Minnesota have an energy burden of 5 percent or higher (UMN Extension 2021).

While energy efficiency programs can be beneficial to those that participate, low-income customers have historically been a harder-to-reach segment of a utility customer base. Energy programs based on behavior change principles have been piloted or included in some demand-side management portfolios as a complement to more traditional energy efficiency program models, including behavioral change programs directed towards low-income households (Drehobl, A. et al, 2016). Through Minnesota Department of Commerce-funded research, authors for that report recommended utilizing CARD grant funding mechanisms to pilot and test behavioral programs that may help utilities reach their energy saving goals (Dougherty et al., 2015). In 2019, Slipstream and Streetwyze sought to add to this body of knowledge around behavioral programs, exploring the idea of increased inclusion of low-income minority and rural communities in energy efficiency programs through community-based interventions. Streetwyze is an organization that has developed a cloud-based shared web-platform, originally created to bridge information gaps by collecting community driven-data, applying a train-the-trainer model to help provide two-way feedback and data visualization between neighborhoods and organizations. The train-the-trainer model is defined as ongoing in-person engagement from a community-based trainer.

As the Streetwyze web-based platform, paired with train-the-trainer approach, had not been applied previously to energy efficiency, Slipstream and Streetwyze partnered on this Equity 4 Energy (E4E) project to research if the approach within this project would increase energy savings more equitably and inclusively among low-income households in urban communities of color and rural communities. Through the Streetwyze approach of web-based platform, the E4E project engaged low-income minority and rural residents across three communities in Minnesota: Saint Paul, St. Cloud, and Willmar. In each location, community-based trainers recruited and engaged with participants across four months to provide resources and aid in posting feedback on the community mapping tool regarding energy efficiency in their homes. They provided feedback either via participant training to enter data within the web-based platform or the trainer completed data entry in the web-based platform on behalf of the participant. Monthly community mapping campaigns and data collection offered point level data on how residents were interacting with efficiency in their homes, and what improvements energy efficiency programs needed to best meet the community's needs.

This research underwent modifications from the original scope as a result of project challenges. Initial research design included the use of smart thermostats, a control group, and utility bill analysis to assess energy savings and participation differences between treatment and control. Due to project challenges

less people participated in the project than originally planned, which impacted the study's ability to derive statistically significant results and the project team adjusted the research approach accordingly. The final research design shifted focus to qualitative research methods that still yield valuable insights on engagement strategies as well as energy efficiency perceptions of low-income minority and rural households. Although this project more limitedly responded to parts of the initial research question with some success, the project team generated rich findings regarding lessons learned and future research recommendations for any future related work.

The following research questions were addressed in this final design:

- What impact do community-based trainers utilizing Streetwyze, data collection and mapping platform, have when engaging with low-income minority and rural households on the topic of energy efficiency?
- What impact does a technology-based community-oriented data collection and mapping platform have within this approach? Does this approach create value?
- What kind of information can be gathered that can generate insights for utility energy efficiency program development or implementation?
  - What do people understand about energy use in their homes, energy cost, and energy efficiency?
  - What are current barriers in engaging in energy efficiency actions within the home or accessing or participating in energy efficiency programs?
  - Does this approach increase energy efficiency behaviors in homes?

The project team identified several lessons learned for both the engagement process and the research design approach for others who would embark on work to increase energy savings more equitably and inclusively among low-income households in urban communities of color and rural communities through studying community-based interventions and data collection. These include the following:

- Engage community-based organizations (CBOs) in the project development phase.
- Incorporate a CBO within the core project team that has strong existing relationships with community members, conduct in person recruitment by community-based trainer, and ensure the CBO has capacity, including appropriate compensation, to support their trainers regarding participant needs.
- Before energy efficiency program development, ensure work is conducted to understand the targeted participants.
- Train-the-trainer model, defined as ongoing in person engagement from a community-based trainer, is needed to recruit participants as well as to collect energy efficiency program related data.
- Limit length of participant and trainer engagement.
- Existing low-income energy efficiency programs should incorporate research approaches to more specifically understand barriers and opportunities to support hard to serve low-income minority and rural household market sector related to existing programs.

The project team collected three types of data throughout the duration of project: Streetwyze platform data, survey response data, and monthly electric utility billing data. The primary dataset is the Streetwyze platform data, which includes text posts, categories, ratings, and photos of participants household engagement on household energy efficiency. The project team performed a qualitative evaluation to understand perceptions of energy use in the home, viewpoints on energy savings strategies, and changes in behaviors, habits, and attitudes that could save energy. The survey responses provide demographic data on participants as well as tracked any changes in energy perspectives across the project timeline. The participant monthly electric utility billing data was limited because many participants declined to submit a utility release form, and the project team ultimately had to exclude any energy analysis due to sample size and data quality concerns.

There were 54 participants that completed the entire project including participation in all monthly prompts and completion of at least one post-participation survey. Nine were in the Saint Paul area, 25 were in St. Cloud, and 20 were in Willmar. While participation was lower than expected and the research design was significantly modified to overcome challenges of the original design, engagement and recruitment, the project did provide value to the partnered communities in broadening their awareness, interest, and understanding of energy efficiency generally. Additional value was derived in a deepened qualitative understanding of energy use and energy burden experiences, barriers to engaging in energy efficiency programs, and improvements needed to make energy resources more accessible and equitable for low-income minority and rural customers.

In response to the remaining project research questions, below are the conclusions that the project team believe are relevant to utility Demand Side Management (DSM) programs including Minnesota utilities' ECO Programs:

- Partnering with staff at community-based organizations with strong community relationships as trainers can be a successful way to connect with populations that may require additional assistance in accessing utility programs and services.
- Although the study could not provide data regarding impacts of increased participation or energy savings impact:
  - in-person engagement by a trusted community member that acts as trainer did increase energy efficiency behaviors in participant's home.
  - Enhanced marketing and educational content is an approach to be more accessible and inclusive. Suggestions for improvement include translating program materials into other languages, and developing marketing materials in a variety of platforms and languages on the energy efficiency programs available and tips for energy efficiency.
  - Conduct in-person sessions in partnership with a community-based trainer to provide basic energy efficiency and energy bill information, and support with applications and forms for energy programs.
- The impacts of a community-oriented data collection and web-based mapping platform like Streetwyze are inconclusive.

Introduction

Minority communities and rural communities are more likely to have high energy burdens that affect their financial resilience (Ross, Drehobl, and Stickles, 2018; Drehobl and Ross, 2016). They are also more likely to experience more negative impacts such as extreme home temperatures, dampness, mold, and humidity than other residential customers (Hernández 2013). Energy burden is defined as the percentage of household income spent on home energy bills. Recent research by ACEEE has shown that two-thirds of low-income households across the country (with income less than 200% of the Federal Poverty Level) have *high* energy burden, which is defined as those households that spend 6% or more of annual income on energy costs (Ross, Drehobl, and Stickles, 2018). The median low-income energy burden in Minneapolis is 6.6% as compared to the 2.2% average energy burden of the state (Drehobl, Ross, and Ayala 2024). Nearly one in three counties in Greater Minnesota have an energy burden of 5 percent or higher (UMN Extension 2021).

Energy efficiency programs in Minnesota can offer a way for customers to see reductions in their energy burden through investments in energy upgrades. Utilities in Minnesota are required to allocate a minimum level of funding for low-income customers. With the passing of the Energy Conservation and Optimization Act (ECO) in 2021, this requirement increased from 0.2% to an eventual 0.6% of gross operating revenues for electric utilities and from 0.4% to 1.0% for gas utilities. Municipal and cooperative utilities are required to spend 0.2% on low-income programming (Energy Conservation and Optimization Act of 2021, HF164).

While energy efficiency programs can be beneficial to those that participate, low-income customers have historically been a harder-to-reach segment of a utility customer base. In a recent study analyzing ratepayer-funded utility low-income energy efficiency programs, ACEEE researchers concluded that low-income utility efficiency programs are not providing adequate services to low-income communities (Morales and Nadel, 2022).

As part of their energy efficiency portfolios, utilities have looked at non-traditional energy efficiency program models to reach harder-to-reach customer segments. Energy programs based on behavior change principles have been piloted or included in some demand-side management portfolios as a complement to more traditional energy efficiency program models. Research shows traditional behavioral interventions have varied efficacy (Sussman and Chikumbo, 2016). Programs with feedback and social-norming approaches—like home energy reports—can achieve around 2% annual energy savings (Sussman and Chikumbo, 2016). Technology-based behavioral interventions show even greater energy savings potential; Google's Nest and WeatherBug thermostats saved 4-4.7% for electricity and 7.7% for gas (Apex Analytics, 2014). While face-to-face social interaction tends to be costly, such programs have demonstrated energy savings of 13-31% (Dougherty et al., 2015). While these targeted programs reduce more energy consumption per customer more than blanket approaches, they also require additional effort by implementers. Through Minnesota Department of Commerce-funded research, authors of that report recommended utilizing CARD grant funding mechanisms to pilot and test program behavioral programs that may help utilities reach their energy saving goals (Dougherty et al., 2015)

In 2019, Slipstream and Streetwyze sought to add to this body of knowledge around behavioral programs, exploring the idea of increased inclusion of low-income minority and rural communities in energy efficiency programs through community-based interventions. Streetwyze is an organization that has developed a cloud-based shared web-platform, originally created to bridge information gaps by collecting community driven-data, applying a train-the-trainer model to help provide two-way feedback and data visualization between neighborhoods and organizations. The train-the-trainer model is defined as ongoing in-person engagement from a community-based trainer (Akom, et al., 2018; Akom, et al., 2016; Akom, et al. 2017; D'Silva, et al. 2020). Through Streetwyze programs and prior research conducted by Streetwyze within the areas of food and healthcare access, the Streetwyze team had found that behavior change occurs when community members have access to culturally and community relevant information to support their navigation of the social and structural determinants of health and sustainability (Akom, et al., 2018; Akom, et al., 2016). According to Streetwyze, there are a growing number of Streetwyze studies that show that residents can effectively use mobile technology to record geo-tagged photos, and share digital narratives and ratings that document their experiences. These findings hold for residents of all backgrounds, including those from under-resourced and more affluent communities (Holmes, et. al, 2021). Equipped with such data, residents can collaborate and work together to identify contextually relevant, low-cost solutions to promote individual and community level improvements (Guan et. al, 2023; D'silva et. al, 2021; Akom et. al 2016).

As the Streetwyze web-based platform paired with train-the-trainer approach had not been applied previously in the area of energy efficiency, Slipstream and Streetwyze partnered on this Equity 4 Energy (E4E) project to research if the approach within this project would increase energy savings more equitably and inclusively among low-income households in urban communities of color and rural communities. The E4E project engaged low-income minority and rural residents across three communities in Minnesota: Saint Paul, St. Cloud, and Willmar. In each location, community-based trainers recruited and engaged with participants across four months to provide resources and aid in posting feedback on the community mapping tool regarding energy efficiency in their homes. They provided feedback either via participant training to enter data within the web-based platform or the trainer completed data entry in the web-based platform on behalf of the participant. Monthly community mapping campaigns and data collection offered point level data on how residents were interacting with efficiency in their homes, and what improvements energy efficiency programs needed to best meet the community's needs.

As will be described in more detail below, this research underwent modifications from the original scope as a result of project challenges. Although the project goal remained the same, this project was only able to more limitedly respond to parts of the initial research question. However, the project team generated rich findings regarding lessons learned and research recommendations for future related work.

Background on the Streetwyze Platform

Developed in 2012, Streetwyze is a multilingual mobile mapping data collection platform that collects real-time, location-based data on community members' lived experiences and perceptions of their neighborhoods. For a usage fee, organizations can contract with Streetwyze to use their community-

driven peer-to-peer mapping platform that provides easy ways for community members to collect data on important issues and mobilize around potential solutions. As a bi-directional platform, it not only encourages participants to view, but also interact and learn from the experiences of others in the platform. This fosters peer-to-peer interactions and can also create ongoing feedback loops amongst fellow residents, and between residents, as well as organizations or institutions. Although the Streetwyze web-based platform has bi-directional information sharing capabilities, the E4E project was not able to successfully utilize the bi-directional information sharing portion of the platform.

Streetwyze can be accessed on any kind of mobile device or computer without downloading an app, which increases accessibility regardless of tech ownership, or English proficiency; therefore, users are diverse in age, demographics, languages, and technology literacy. The platform allows participants to contribute text, image, audio, or video media to share stories and document their lived experiences within their neighborhood environments. Participant reports can represent a robust, detailed collection of local knowledge on experiences with, for example, land use, social services, transportation, housing, arts, education, and beyond.

Streetwyze has been recognized nationally as a platform that successfully engages and empowers residents of communities of color or low-income to effect positive neighborhood change (Akom et. al, 2016, Akom et. al 2018). Developed originally for use among low-income, multi-ethnic communities across life courses to share their experiences of the social and structural determinants of health in their local communities, to date the Streetwyze real-time community-driven data program has been successfully implemented in at least 35 culturally and socio-economically diverse communities in the US and another eight worldwide (total participants approaching 8,000, with over 40k+ data points collected) (Akom, et. al, 2024).

Streetwyze enables community members to tag locations and experiences as "Good stuff" (blue dots), "Bad stuff" (orange dots), and "Fix stuff" (purple dots) in their community. For purposes of this study, the project team defined "good stuff" as energy related feedback that had positive outcomes (e.g. efficiency actions that worked), "bad stuff" as energy-related issues that could be improved (e.g. efficiency actions that were too difficult), and "fix stuff" as ideas for improving efficiency resources.

Research Goal & Questions

The project goal was to research if the approach within this project would increase energy savings and the resulting benefits more equitably and inclusively. Also, the research focused on energy efficiency program engagement among low-income households in urban communities of color and rural communities. The approach would be evaluated by studying community-based interventions and data collection considering a randomized controlled pilot that integrated smart thermostats and the Streetwyze approach of web-based platform, with a community-based train-the-trainer model.

Research questions initially pursued and investigated as part of this project goal were:

What impact do community-based trainers utilizing Streetwyze, a community-oriented data collection and web-based mapping platform, have when engaging with low-income minority and rural households on the topic of energy efficiency?

- Do people more readily engage and participate?
- What impact does a technology-based community-oriented data collection and mapping platform have within this approach?
    - Does this approach create value?
    - Does this approach lead to more or less energy savings than from the installation of a smart thermostat?
- What kind of information can be gathered that can generate insights for utility energy efficiency program development or implementation?
    - What do people understand about energy use in their homes, energy cost and energy efficiency?
    - What are current barriers in engaging in energy efficiency actions within the home or accessing or participating in energy efficiency programs?
    - Does this approach increase energy efficiency behaviors in the homes?
    - What is the resulting energy savings and cost savings for the household (therefore how is energy burden reduced) of the energy efficiency behaviors that are taken?
    - Does this approach increase energy efficiency program participation?

The remainer of the report discusses the project approach, including project challenges and resulting study modifications, as well as available results, and conclusions – including discussion of results, lessons learned and additional recommended research.

Project Approach

This project was divided into four main parts: research plan development and review, identification of priority communities and participant recruitment to the study, deployment of community-based interventions, and analysis and reporting. Recruitment focused on engagement with community-based organizations (CBOs) around Minnesota. Because the project team did not have CBOs as project partners from the outset of the project, the majority of the first year was spent reaching out to and engaging with CBOs that would benefit from the type of interventions proposed. The second and third year focused on data collection, analysis, and reporting. Described below is the process of organizing an Advisory Group to provide feedback and support recruitment, the process of identifying priority communities, the adjustments the project team made throughout the project to respond to real time learnings, challenges, and local best practices to ensure success.

Advisory Group

The project team invited individuals from key organizations to form an advisory group that would provide feedback on key aspects of project and research design, as well as support community engagement and recruitment efforts. The advisory group played an important role in helping the project team gather localized feedback on our approach, problem solve and discuss alternative solutions, and connect the project team to community-based organizations and potential partners across the state of Minnesota who supported recruitment efforts.

The list of advisory group organizations included:

- Minnesota Clean Energy Resource Teams (MN CERTs), Joel Haskard
- Citizen's Utility Board (CUB), Hannah Hoeger (Brandon Crawford, Carmen Carruthers)
- Fresh Energy, Mari Ojeda
- City of Saint Paul, Russ Stark and Cat Beltmann
- City of Minneapolis, Bjorn Olson and Kelly Muellman
- Minnesota Interfaith Power and Light (MN IPL), Jayda Pounds
- Minnesota Center for Energy and Environment, Rebecca Olson
- Community Stabilization Project, Metric Giles
- COPAL, Francisco Segovia
- Great Plains Institute (GPI), Abby Finis, Diana McKeown
- Neighborhood House, Shellie Rowe
- Minnesota Community Action Partnership, Annie Shapiro

The project team held three meetings with the Advisory Group throughout the duration of the research to receive feedback on approach, program recommendations, and recruitment strategies. The focus of these meetings was to provide updates on research plans, seek guidance for engagement with CBOs, and solicit feedback on preliminary results.

Identifying Priority Communities

At the outset of the project, the team reviewed publicly available data to characterize areas to prioritize outreach. The project team included metrics of Black, Indigenous, and people of color (BIPOC)-identified community members, household income, and energy burden. Additionally, Slipstream reviewed data across the state to include both rural populations (less than 30,000 residents) and urban neighborhoods in the Twin Cities. The project team used three sources of data for summarizing these metrics: the EPA's Environmental Justice Screen Mapping Tool, Low-income Energy Affordability Data (LEAD) Energy Burden Mapping Tool, and US Census Data. This initial research provided insight into possible target locations for community outreach and outlined the data to support the approach. Ultimately, as described in further detail below, the recruitment of communities into the project was primarily driven by relationship building and connections.

Changes in Design Approach

The project team proposed a research design that was iterated on throughout the course of the project in response to project challenges. The decisions to change research methods and approaches were a result of lessons learned throughout the project that responded to real-time needs of the work as well as feedback from the advisory group and engaged CBOs. Challenges with initial research design, engagement and outreach required modifications of approaches. Below is an overview of the changes made.

Initial Design

Participants from both Greater Minnesota and urban communities would be randomly assigned to one of three groups: (A) no intervention, (B) provided a smart thermostat, or (C) provided a smart thermostat and also engaged in the Streetwyze platform through CBOs and the train-the-trainer approach. The project team had originally wanted to assess if Streetwyze engagement would be more or less impactful than the energy savings expected from a smart thermostat. The recruitment goals were 200 participants in Greater Minnesota and 200 participants in an urban area, split equally between the three groups. The cost of the smart thermostats would have been covered but final incentive levels were not determined. The participant energy consumption and costs impacts were planned to be studied and analyzed through energy bill analysis.

Initial Challenge

The smart thermostat delivery installation process was more complex than planned in the initial study approach. Shortly after project launch, Slipstream realized logistical challenges in delivering smart thermostats due to cost and implementation issues that were highly dependent on community members' ability and comfort in installing smart thermostats. Further, the project team expected that participants who lived in rental homes would encounter difficulties in retrofitting to a smart thermostat due to navigating dynamics and communicating between renters and landlords. Finally, the additional research value of studying smart thermostat impacts was low as demonstrated by the inclusion of Tier III

(analytics capable or "smart") thermostats into the Minnesota Technical Resource Manual (TRM) with a heating savings factor of 5.1% and a cooling savings factor of 13.2% (MN DOC, 2023)

As a result, the scope of work was modified to remove use of smart thermostats from the project.

Design Change Modification 1

The updated approach, without the installation of smart thermostats, focused primarily on studying the impact of the community-oriented data collection and mapping platform Streetwyze administered alongside a community-based trainer. Participants from both Greater Minnesota and urban communities would be randomly assigned to one of two groups: (A) no intervention, or (B) the Streetwyze platform through CBOs and the train-the-trainer approach.

The project team planned to recruit in two methods: a community-based approach where trainers from a community organization recruit through their existing networks and a randomized encouragement design (RED), where a greater number of community members are recruited to complete a survey and then a subset of those are encouraged to participate in Streetwyze. This latter method allowed for comparing a treatment group (those recruited through their community networks) to a control group (those that simply completed a survey and were randomly offered to participate in Streetwyze after survey completion) to quantify energy savings impacts. The goal was to recruit 200 participants from each community and invite half to use the Streetwyze platform (treatment) and not invite the other half (control group). The number of participants was determined to ensure statistical significance in evaluating energy changes. The goal was to engage with participants for a full year, and then evaluate energy savings pre- and post-intervention based on data from participant utility bills.

For the community-based approach, the project team planned to find community organizations across Minnesota that would help recruit trainers for the research. To recruit through RED, the project team deployed surveys through CBOs' outreach and used social media to post survey links. This approach avoided bias inherent in phone surveys that would result in a less comparable group to participants.

Additional Challenges

Throughout 2021 and 2022 the project team realized and ran into several challenges. The team adjusted the approach as needed with the goal of staying as close to the initial design as possible. The challenges are summarized below.

- **COVID19 recovery resulted in competing priorities and bandwidth issues for CBOs to partner and participants to participate in study.** Outreach to CBOs and participants occurred when many were still recovering from the impacts of COVID-19. For example, whether CBOs were focused on direct service or infrastructure building, they were balancing higher demand of need, and high priority programing, with a smaller staff. With a smaller staff, many of the CBOs expressed strong interest but were not able to communicate consistently enough to solidify a plan for collaboration. The project team had difficulty in finding trainers that were interested in engaging with the research for an entire year, and many of the trainers had similar challenges with finding participants for the

project and maintaining contact over time. The project team shortened the study period to as short as four months and still had challenges with relying on trainers to recruit participants on their own.

- **Initial study design and strategy to recruit a CBO during the project resulted in challenges. CBOs should have been a project partner at the start.** First and possibly most important, finding community organizations to partner with was more challenging than anticipated. Over a year was spent working on solidifying relationships and partnerships with community organizations, and still there were difficulties getting several organizations engaged and committed to participate. The project team contacted 17 organizations across the first year of the research, leveraging connections from the advisory group for outreach and offering $5000 to $28,000 honorariums to partner. Two CBOs ultimately participated. Further, participants were also incentivized up to $225 depending on their ongoing efforts to participate. Even with this compensation rate and structure, some partners were not able to follow through with ensuring that their trainers were meeting participant recruitment quotas after they received their honorarium. At the end of the project there were 54 participants, or 13.5% participation rate of the original participant goal.
- **Recruitment into a control group did not result in sufficient numbers to assess energy savings and understand differences in participation.** Challenges quickly emerged with recruiting participants through the RED design that was incorporated into the project to develop a control group. Lacking other means to contact residents with geographic proximity to the treatment group, surveys were deployed via social media and CBOs. The social media approach for recruitment was difficult because bots and scammers filled out surveys with no true intent to participate. Those surveys deployed by the CBO did not get a large enough sample for statistical significance to assess energy savings and participation differences between treatment and control group.
- **Minimal receipt of energy data consent forms, and therefore inability to quantify energy savings impacts.** Through the recruitment process, and especially for those recruited through the RED design, Slipstream had difficulty receiving completed energy access consent forms from participants. For those participants in the control group, the project team followed-up 3-5 times and often did not get a response. The project team did work with participants to get consent forms, but there were difficulties accessing account numbers and concerns about sharing the data. Without the energy data, the project team assessed that the ability to confidently quantify energy savings would be severely limited. There was not a large enough control group sample size to measure savings and the shorter time of engagement made it more difficult to compare pre- and post-consumption. Further, without a full set of data and data from a control group, the value of utility data that was received was unusable to provide meaningful results.

Design and Goal Change After Modification 2

As a result of these additional challenges, the study approach was modified again to reduce the number of people targeted to participate as well as remove the control group. The number of participants targeted to participate in the project reduced from 400 participants to no less than 50 low-income minority and rural participants. These study modifications changed the ability of the study to gather statistically significant results, as well as draw conclusions based on data gathered from a control group. However, the project could still gather valuable qualitative data on the hard-to-reach ECO market sector

of low-income minority and rural households as well as continue to explore the impact of the Streetwyze web-based platform with a community-based train-the-trainer model within low-income efficiency programs.

Final Design to Conduct Qualitative Research Focus

The final research design removed the use of smart thermostats, a control group, and utility bill analysis to assess energy savings and participation differences between treatment and control. The reduced participant pool impeded the ability to derive statistically significant results. As a result, the final research design shifted focus to qualitative research methods that still yield valuable insights on engagement strategies as well as energy efficiency perceptions of low-income minority and rural households.

Research questions the project team could no longer investigate adequately upon final qualitative research design are ~~struck out~~:

- What impact do community-based trainers utilizing Streetwyze, data collection and mapping platform, have when engaging with low-income minority and rural households on the topic of energy efficiency?
- ~~Do people more readily engage and participate?~~
- What impact does a technology-based community-oriented data collection and mapping platform have within this approach?
    - Does this approach create value?
    - ~~Does this approach lead to more or less energy savings than from the installation of a smart thermostat?~~
- What kind of information can be gathered that can generate insights for utility energy efficiency program development or implementation?
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    - Does this approach increase energy efficiency behaviors in homes?
    - ~~What is the resulting energy savings and cost savings for the household (therefore how is energy burden reduced) of the energy efficiency behaviors that are taken?~~
    - ~~Does this approach increase energy efficiency program participation?~~

Although this project more limitedly responded to parts of the initial research question with some success, the project team generated rich findings regarding lessons learned and research recommendations for any future related work.

Lessons Learned

The project team had to adjust the research approach multiple times to respond to challenges and barriers related to the original design. From these adjustments, the team ultimately was able to respond to parts of the initial research question with some success in three communities. Further, the project team generated rich findings regarding lessons learned and research recommendations for any future related work.

Below is a summary of lessons learned for both the engagement process and the research design approach for others who would embark on work to increase energy savings more equitably and inclusively among low-income households in urban communities of color and rural communities through studying community-based interventions and data collection.

Engage CBOs in the project development phase. This project relied on partnerships with CBOs for recruitment and engagement with participants. Engagement and identification of partners was a challenging aspect of the project, and it took well over a year to find community partners. Connecting with community partners in the proposal process and including them as an official partner on the project could have alleviated several potential challenges. This would have allowed for the development of a project design from stakeholders more closely engaged with Minnesota community members. It may have also alleviated the recruitment challenges and the need for multiple project redesigns throughout the process. Elevating community partners reflects their expertise in community engagement and ensures that they have the ability to form and develop the project and funding needed for success.

Incorporate a CBO within the core project team that has strong existing relationships with community members, conduct in-person recruitment by community-based trainer, and ensure CBO has capacity, including appropriate compensation, to support their trainers regarding participant needs. In the project team's engagement in Saint Paul, the project team had difficulties supporting the trainers in finding participants for the project and keeping trainers and participants engaged. The St. Paul trainers expressed concerns on what information to share with potential participants and the best method for getting people engaged. In Saint Paul, the most successful recruitment was through direct emails and communication through the Payne-Phalen Community Council. In Willmar and St. Cloud, the existing tight relationships that Filsan Talent Partners had with community members improved recruitment. The Filsan team also relied on in-person informational sessions to recruit participants and existing relationships with other local organizations that they could use to help boost participation.

Before energy efficiency program development, ensure work is conducted to understand the targeted participants. Early in the project, the initial project design had to be modified as a result of realizing difficulties with smart thermostat installation in rental properties, which was the primary household type of the low-income minority and rural participants within this study.

Train-the-trainer model, defined as ongoing in person engagement from a community-based trainer, is needed to recruit participants as well as to collect energy efficiency program related data. Early in the project, there were difficulties with getting participants trained on the Streetwyze platform itself, and understanding the importance of posting to the platform regularly as a reminder to think about energy usage within the home. The trainers expressed concerns with keeping track of where each

participant was in the process and what information to be providing to participants and when. The engagement with Filsan Talent Partners did not face the same challenges. Filsan Talent Partners did most of its work within a set number of days in a month and kept each participant on the same timeline to ease the administrative burden of tracking different participant timelines. The Filsan team also often collected data in-person through conversation or with the paired use of the Streetwyze platform due to language barriers. In almost all cases, trainers would write down or record participant responses and add them to the platform later. This also allowed for better explanation of energy resources and prompts in each month. The in-person discussion also built trust and led to more detailed feedback and posts on the Streetwyze platform.

Limit length of participant and trainer engagement. Participants and trainers were generally enthusiastic about the opportunity to provide feedback on energy use within their homes and participate in the research project. However, many were apprehensive about the original one-year timeline for engagement. Although the amount of time needed each month was low, participating for an entire year seemed overwhelming. Engagement from participants and trainers faltered after several months in the project team's original work in Saint Paul. By the end of the project, Filsan Talent Partners was using 4-month engagement periods, which was significantly more successful and resulted in the completion of the research project by all participants.

Existing low-income energy efficiency programs should incorporate research approaches to more specifically understand barriers and opportunities to support hard to serve low-income minority and rural household market sector related to existing low-income programs. The research design focused on increasing energy efficiency behavior change for low-income households due to historically low representation of these demographic groups in standard energy efficiency programs. Though, the initial project design should have engaged with local administrators of federal funding and existing ECO low-income programs to study how this research project could have increased participation of this hard to reach sector in higher impact energy savings programs currently available through existing low-income energy efficiency program offerings within areas of the project.

Final Design & Study Implementation

The communities involved were Saint Paul, St. Cloud, and Willmar (Figure 1). Each presented slightly different engagement strategies based on a few key variables including the challenges described above, the structure of the community partner or organization, and what they thought would work best for recruiting trainers and the target populations. Table 1 shows the community location details and project period duration for each community.

Figure 1: Project locations and partners
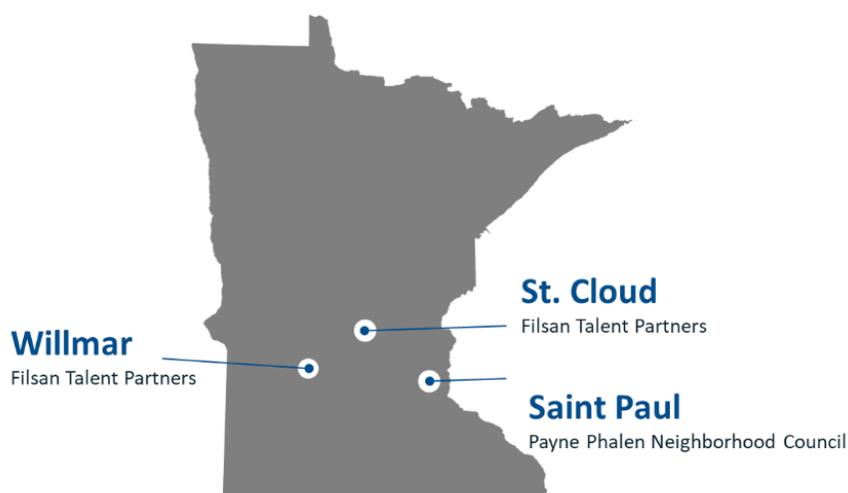
Table 1: Community location details and project period duration

Community	Population	Urban or Rural	Project Period Duration
Payne-Phalen Neighborhood, Saint Paul	33,337 in Payne-Phalen Neighborhood 303,176 in Saint Paul	Urban	July 2022 – December 2023
St. Cloud	69,568	Rural	September 2022 – December 2022
Willmar	21,282	Rural	April 2023 – July 2023

In Saint Paul, Slipstream worked with Payne-Phalen Community Council, and in St. Cloud and Willmar, the project team worked with Filsan Talent Partners, a diversity and inclusion consulting firm that works to connect community members to opportunities and initiatives. The differences in the structure of these organizations, the role they play in residents' lives, and their established engagement models with residents resulted in different recruiting and participation outcomes.

The Payne-Phalen Community Council meets monthly and functions as an advisor to the City of St. Paul government. Through their volunteer network, they work to engage the community in advancing physical, social, and economic development within the neighborhoods and commercial areas. Filsan

Talent Partners is a team of educators and leaders who are part of the St. Cloud and Willmar communities and work very closely with community members to find educational and employment opportunities. The Payne-Phalen Community Council did not meet as consistently in-person with their community members compared to Filsan Talent Partners' who routinely communicated in-person with residents, at their homes and at events related to their ongoing work. The Payne-Phalen Community Council did not have access to the support of a consistent group of committed community members willing to meet residents where they were; therefore, recruitment and engagement was more challenging for trainers and participants to sustain over time. Further, as COVID was still more of a concern during the beginning of this project when the Payne-Phalen Community Council was participating in the project, trainers relied more on online engagement compared to later in-person interactions.

Both organizations received honorariums to partner, but due to the capacity of each organization, their scopes differed. The project team was responsible for recruitment in the Payne-Phalen neighborhood, and was only able to recruit four recruiters in the Payne-Phalen neighborhood. Filsan Talent Partners, on the other hand, wanted to identify, manage and support three recruiters and participants themselves, ensuring their 25-50 participants completed the four-month program. The honorariums for each organization reflected the associated workload: $5,000 for the Payne-Phalen Community Council and $28,000 for Filsan Talent Partners.

The Payne-Phalen Community Council helped identify four trainers to recruit participants. Across the four trainers, one trainer recruited four participants and another recruited one participant. This was significantly fewer participants than the project team anticipated. The project team also deployed surveys and marketing materials directly to the Payne-Phalen Community Council and City of Saint Paul's email distribution lists to recruit another six participants. With four trainers supporting the work, nine out of the 11 participated until the end of the project.

Filsan Talent Partners recruited 25 participants in St. Cloud and 20 participants in Willmar. The project team's relationship with Filsan Talent Partnership was formed through an introduction with the Central Minnesota Community Empowerment Organization (CMCEO); while that original introduction almost resulted in CMCEO becoming a partner organization, ultimately, they introduced the project team to Filsan Talent Partners. Filsan Talent Partners used their existing connections and routine in-person interaction with community members to recruit the participants successfully. Moreover, Filsan Talent Partners broke down language barriers through the translation of monthly prompts and surveys to the native language of community members. The project team compensated Filsan Talent Partners to translate the Streetwyze platform. However, several participants were not able to read or write in any language so the in-person engagement and translation by Filsan Talent Partners became an integral and successful part of engagement with those participants.

Participation Steps

Participation in the project took place in three main steps (Figure Figure 25). After the project team's initial recruitment of the trainers, the trainers recruited participants and had each participant take a pre-participation survey and fill out a utility consent form. Trainers also helped participants sign up for the

Streetwyze platform. Over the next four months, the trainers then communicated with participants and provided monthly prompts to the participants, which they used to inform their Streetwyze posts. The last steps were to take a post-participation survey after the four months of participation and then a second post-participation survey approximately four months after the project ended.

Figure 2. Participant and trainer process

Recruitment and Onboarding	Monthly Posts	Project Wrap-up
• Trainers recruit participants • Participants complete pre-participation survey and consent form ($60)	• Trainers responsible for providing monthly prompts • Participants complete 3 posts per month for 4 months ($150)	• Trainers provide survey links or ask questions in-person • Participants complete post-participation survey and 4-month post-participation survey ($15 each)

Survey completion was incentivized with a $60 incentive for completing the pre-participation survey and consent form and a $15 incentive for completing the post-participation survey. There was an additional post-participation survey that was implemented four months after participation ended that also was incentivized through a $15 gift card. Study participants were provided a $150 incentive for their participation in all of the monthly prompts. Total compensation for participants that completed all components of this project was $240.

To develop the monthly prompts for the energy savings tips, Slipstream reviewed sources such as utility websites and resource guides, Minnesota Clean Energy Resource Teams (CERTs), Minnesota Citizen Utility Board (CUB), and additional secondary literature sources. The advisory committee did not review or offer insight on these prompts. Example prompts are shown below in Table 2 and the full set of monthly prompts are included in Appendix B.

Table 2: Example prompts provided by trainers to participants

Month	Example Prompts
Month 1	• How comfortable do you feel in your home? • Estimate how much of your income goes to your utility bills each month. Do you think this is high, low, or normal? • Have you previously taken any actions to lower your energy bill?
Month 2	• Post about something you've done in the past to keep cool. • Post about any barriers you ran into when trying to make changes in your home.

Month	Example Prompts
Month 3	- Post about if the utility online store was easy or difficult to use and why. - Post about any rebates that caught your interest and why or why not you plan to order and install in your home. - How comfortable do you feel in your home? (different season from Month 1)
Month 4	- Post if you have done anything to try to block gaps where cold air is coming in. Which one would you recommend to a friend and why? - What is your initial reaction to the information shared about rebate programs? - What do you wish you had additional information about?

When participants or trainers working with Filsan Talent Partners started use of Streetwyze, the project team also developed and provided educational materials on no- or low-cost strategies that homeowners or renters could implement in their own home to introduce participants to energy efficiency. The educational materials were translated verbally by Filsan Talent Partners to study participants. These strategies included turning off lights, closing blinds during hot days, and setting thermostats higher or lower. The project team estimates that most of these strategies would result in low overall energy savings. As energy consumption data for all participants was not received and total participation levels were low, energy savings impacts of behavior changes in homes were not quantified. However, some strategies, such as adjusting the thermostat, could see 4% savings on heating energy (MN DOC 2023). While these no- or low-cost strategies are expected to yield small savings, especially in the short 4-month window of this project, they are an important way to introduce the participants to ways that they can be empowered to understand the energy use in their home.

In addition, participants were encouraged to explore the options for participation in Minnesota utilities ECO programs, the Energy Assistance Programs, and the Weatherization Assistance Program.

The project team concluded the Streetwyze data collection by providing prompts about any additional energy challenges, asked if they had any questions, and asked which recommended actions they had implemented.

In the Payne-Phalen Community, Streetwyze prompts were delivered in a variety of ways including emails to participants, text messages, virtual phone calls or video calls, and in-person explanation and assistance. The first prompt set often started with in-person or virtual training, while future prompts were provided electronically.

In St. Cloud and Wilmar, Filsan Talent Partners trainers delivered prompts in-person to the majority of participants to overcome language and social barriers. This aspect of their engagement resulted in higher participation in that community which is one of the project's conclusions.

All monthly prompts are available in Appendix A Monthly Prompts and survey text is available in Appendix B: Surveys.

Analysis Methodology

The project team collected three types of data throughout the duration of project: Streetwyze platform data, survey response data, and monthly electric utility billing data. The primary dataset is the Streetwyze platform data, which includes text posts, categories, ratings, and photos. The project team performed a qualitative evaluation to understand perceptions of energy use in the home, viewpoints on energy savings strategies, and changes in behaviors, habits, and attitudes that could save energy. The survey responses provide demographic data on participants as well as tracked any changes in energy perspectives across the project timeline. The participant monthly electric utility billing data was limited because many participants declined to submit a utility release form, and the project team ultimately had to exclude any energy analysis due to sample size and data quality concerns.

Survey analysis

Both pre- and post-participation surveys were administered to all 54 participants. The pre-participation survey provided a benchmark of participants' energy saving behaviors, awareness of programs or rebates for energy savings, knowledge of technologies such as lighting and thermostats, as well as demographic information and home ownership status (Appendix B). The post-survey was adapted from the pre-survey but also included questions about satisfaction with the project and additional resources needed to address energy use in their homes (Appendix B). The 4-month post-participation survey largely mirrored the immediate post-participation survey and was implemented to identify if additional action was taken after the project was complete. All surveys were 5-10 minutes in length and were conducted online via a survey link emailed to participants or conducted in-person for participants with language or technology barriers.

Slipstream calculated basic descriptive statistics from the survey responses and also calculated the frequency of response. Additionally, how responses to certain questions changed over the project period of four months across participants and how responses varied across communities was reviewed to evaluate project impact.

Streetwyze post analysis

Throughout the project, the Streetwyze platform data was exported and reviewed, which included qualitative text responses, ratings, categories (e.g. thematic tags that users can assign to data points like "energy efficiency"), and photos. The research team reviewed data on a regular basis to perform quality checks for relevance and completeness. The quality checks allowed us to provide timely feedback to participants and trainers, ensuring they understood the prompts and posted items that were relevant to the study. The final clean dataset was organized by location and included username information and participating organizations.

The project team developed a coding scheme to categorize posts and photos into relevant themes and subthemes based on categories provided in the Streetwyze platform and the posts themselves. Team members worked together to continuously update the codebook as the team reviewed additional posts to ensure the team had an exhaustive list of themes. Once the codebook was developed, two researchers reviewed each post and photo independently, and categorized the post into themes and subthemes.

Once all posts were coded and organized by the coding scheme, coded posts were examined for patterns related to the project team's research questions, and the project team looked for any new patterns or topics that emerged. The project team calculated frequency of theme and subtheme across all posts and by community.

Results

There were 54 participants that completed the entire project including participation in all monthly prompts and completion of at least one post-participation survey. Nine were in the Saint Paul area, 25 were in St. Cloud, and 20 were in Willmar.

All participants were responsible for paying their electricity bills while some paid natural gas directly and some had natural gas costs integrated into rental payments. Most participants report that they participated in the research project to save energy, lower their utility bills, or to improve the comfort of their homes.

Below is a summary of the main observations and trends identified through analysis of the Streetwyze posts and the surveys.

Streetwyze Post Analysis

Over the project period, participants posted roughly 700 data points on Streetwyze in response to the approximately 15 prompts asked electronically and in-person during the project period for each community. The team reviewed each post and catalogued responses based on primary themes listed in Table 3. In some cases, a post would be categorized into multiple themes so the total counts of posts exceed 700. Table 3 details the number of posts within each theme by community.

Table 3: Overview of main themes identified in Streetwyze posts.

Main Theme	St Paul	St Cloud	Willmar	Total
Reflections on energy efficiency behavior change	100	133	106	339
Energy efficiency program experience	48	147	119	314
Perception of energy bills	18	87	65	170
Energy tips	39	38	22	99
Saving money on energy bills	15	40	24	79
Housing stock	20	49	19	88
Comfort in home	17	35	24	76
Community characteristics	3	47	19	69

The above themes are combined below in a summary of key observations derived from the thematic analysis of the Streetwzye posts. As with qualitative research with a lower number of participants, the summary provided below should not be considered extrapolatable to the entire Minnesota population.

Energy Efficiency Behavior Change and Program Experience

The largest trend that emerged from the data were reflections on energy efficiency behavior change during the project. These reflections were often in response to questions around whether participants tried to implement any of the low or no-cost strategies the trainers described. The project team

categorized these reflections into types of energy efficiency: HVAC/thermostats, lighting, appliances, insulation, and water (Figure 7).

Figure 7: Frequency of responses related to energy efficiency behavior changes by category and location
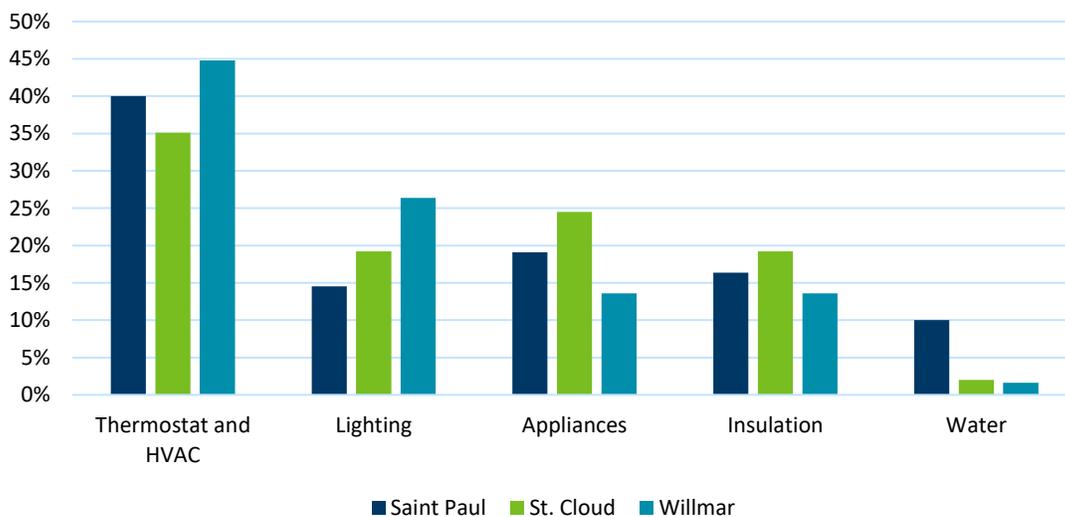
Participants noted these main behavior changes:

- **Thermostats and HVAC:** Setting constant temperatures, using programmable thermostats, using fans for cooling, and employing do-it-yourself (DIY) solutions for window sealing to keep it cool or warm in the home.
- **Lighting:** Turning off lights, using natural light, and purchasing light emitting diode bulbs (LEDs).
- **Appliances:** Trying to unplug items when they weren't in use and interest in efficient appliances and smart power strips.
- **Insulation**: Wanting to know more about insulation or using blankets or sheets to try to insulate by covering windows or gaps.
- **Water consumption:** Taking shorter showers and minimizing water use where possible.

Participants also posted about their energy efficiency program experience, reactions to resources about energy programs or assistance, and needs for help managing energy use in their homes. Most participants expressed interest in trying to save energy in their home or participating in existing programs. Several noted that they wished they had known about energy efficiency programs sooner.

Multiple participants noted barriers to participation, such as technology (including mobile phones and computers) and language barriers, lack of awareness of the existing programs, difficulty in completing the application without assistance, finding the suggested materials in a store, and correctly installing them. Many renters mentioned difficulty in making changes to their homes or apartments. For example, one person noted "a big barrier in reaching out to Xcel and my landlord, is language" and that the "[energy efficiency] tips are difficult to try if there is no one to help me understand how to use them exactly."

Several participants provided feedback on what they would like to see in energy efficiency programs in the future. They mentioned the value of having videos in their language that illustrate how to install energy efficiency items and local support on filling out and submitting applications. For example, one person mentioned "I like the idea of workshops in the community for energy savings. My neighbors and I could learn together and help each other. We are very communal." They also suggested that videos in their language could be shared via social media, stating that "videos in my language that show us how to do things would be helpful. A lot of people in my community are in certain social media groups."

Many noted their background and highlighted the need for energy saving information to be in their native language and support agents who speak their language to effectively communicate energy saving options for residents. Several participants brought up a desire to not only have materials in their native language, but have bilingual representatives from their community hired to do outreach on behalf of the local utility.

They also specifically mentioned the need for improved outreach for energy efficiency programs, including more detailed information on the different energy savings strategies, and increased information about how to talk to landlords about increasing efficiency in their properties.

Perceptions of Energy Bills, Energy Tips, and Comfort in the Home

Participants shared their experience of facing high bills, noting the rising costs in their electricity bills, especially during winter and summer months. Many also shared their experiences about how they feel when they face overdue bills and/or disconnect notice. Some expressed confusion about why their bill is so high; for example, despite trying to implement energy saving behaviors, some find that their bills are still high. As one participant who changed lightbulbs and who upgraded to an energy efficient clothes dryer stated, "Bills are still high though. I am not sure there is much we can do to offset rising costs. I would like to spend time saving energy with something that would really save me money, cost is the most important thing for me" (St. Cloud). Another participant who already uses LED bulbs asked, "What are some more complicated tips but tips that really save some money? Those are what I want to see."

Through the prompts and suggestions from the trainers, participants posted on how they had previously addressed energy use or comfort in their home and their thoughts on which strategies are useful in managing comfort. The tips were split across: cold weather, hot weather, and non-weather-related tips. The tips were largely do-it-yourself (DIY) tips for managing energy use within the home, and most participants did not mention participation in energy efficiency programs. Participants mentioned the importance of covering windows and sealing any gaps. They discussed doing it with makeshift solutions, such as old sheets, blankets, or duct tape. One participant remarked, "We always take stock of the old sheets we have and plug up holes with them in the winter." A few participants also mentioned not previously knowing about the cold-weather rule in Minnesota that stipulates that utilities cannot turn off energy for overdue bills during the winter months.

Common strategies for saving energy during hot weather included relying on fans rather than air conditioning (A/C), blocking sunlight from windows with blankets or curtains, or cooking outside when possible. Respondents noted that they try to "turn A/C on for the hottest part of the day, then just use fans and not let anyone leave windows or doors open."

Some participants could not see a difference in energy bills after making changes or could not see their full energy bill due to apartment payment structure. For example, one person remarked that people in apartments are limited in saving energy because they "are charged by landlords a fixed cost for things like heating, water, trash." Others mentioned that bills seem "wildly inconsistent" and that they are "not overly impressed with energy saving stuff because I cannot see a huge difference."

Several participants mentioned that it would be helpful to have more specific information about how much money each action takes to determine if it is worth investing in upgrades. For example, one participant noted "I need to know how much the energy saving equipment would save a month on my bill before I spend money. Our bill is already so high, to spend more hurts the budget."

Many participants shared information about the quality of their housing and made the connection between older or poor housing stock and the barrier to energy efficiency and comfort. Almost two thirds of posts were categorized as having poor housing stock. Participants cited issues with window sealing, challenges with existing heating systems, concerns for building maintenance, and a desire for home upgrades and more attentive/responsive landlords.

People who rent expressed frustration that they have no control over the major appliances in their units as well as poor responsiveness of landlords or property management in addressing maintenance and energy-related issues. Tenants desired greater accountability and better communication with property managers/owners. For example, one participant noted "I have asked my landlord some questions, but we don't get good answers. We need some of these properties to be held accountable for leaving the structural conditions to get as bad as they are."

Most participants that cited being comfortable in their home noted that they had to pay more for homes heating and cooling to get stable and comfortable temperatures. Additionally, they used tips like closing the blinds or putting blankets over the windows to improve the temperature of their homes in the winter. For example, one person noted "I am comfortable in my apartment, but I feel like it comes at a high cost" and another noted "I have been able to reduce the loss of heat by closing drapes in the evening, so that when I turn down my thermostat, it doesn't make my home too cold." Many also associated better windows, and newer buildings, with better comfort in their home.

It was common for participants to mention concerns with comfort in their home, including temperatures in the winter or summer and air distribution. People specifically mentioned drafty homes and issues with thermostat control in rental housing. One person noted that "My house is only comfortable when no heat or air are needed" and another noted that "management does not give many solutions…we are up and down constantly adjusting the temperature." The participants also often linked old homes to draftiness due to older windows or lack of insulation.

Survey Results

The survey results from the project provide an indication of perception of energy bills and energy actions taken pre- and post-participation. The post-project surveys also provide information about additional resources needed and overall satisfaction with the research project. There were 54 participants that completed the entire project including participation in all monthly prompts and completion of at least one post-participation survey. Nine were in the Saint Paul area, 25 were in St. Cloud, and 20 were in Willmar.

Table 4 provides responses on perception of energy bill expense relative to other expenses both pre-participation and post-participation. The project team asked participants: Compared to other monthly expenses, do you think the amount you spend on monthly energy costs is A) not a lot, B) similar to other expenses, or C) seems like a lot? The decrease in the responses "it seems like a lot compared to…" is primarily from a change in St. Cloud with people in Willmar and Saint Paul generally reporting the same answer.

Table 4: Responses to question "Compared to other monthly expenses, do you think the amount you spend on monthly energy costs is not a lot, similar to other expenses, or seems like a lot?"

Community	St. Cloud		Willmar		St. Paul		Total	
Response	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Seems like a lot compared to other expenses	14	8	16	16	8	4	38	28
Similar to other expenses	4	15	3	4	1	4	8	23
Not a lot compared to other expenses	4	2	0	0	0	0	4	2
N/A	3	0	1	0	0	1	4	1

The surveys asked participants what actions they had taken to save energy in their home pre-and post-participation. Table 5 shows the results and indicates that many participants did take more actions after being engaged in the project. There was an increase in self-reported actions related to replacing lightbulbs with LEDs, turning off lights when not in rooms, and putting weatherstripping around doors and windows. The survey also asked participants about applying for a rebate to which the results (not listed below) showed a small increase between the pre- and post-participation survey.

Table 5. Responses to question "Please provide some brief details about what things you have done to save energy at home in last few months (or years)."

Community	St. Cloud (n = 25)		Willmar (n = 20)		St. Paul (n = 9)		Total (n=54)	
Response	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Replace lightbulbs with LEDs	21	24	18	18	8	6	47	48
Turn off lights when not in rooms	1	23	1	20	6	8	8	51

Community	St. Cloud (n = 25)		Willmar (n = 20)		St. Paul (n = 9)		Total (n=54)	
Response	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Use or install a programmable thermostat	4	2	0	0	6	5	10	7
Put weatherstripping around doors and windows	3	17	1	5	6	6	10	28
Wash clothes in cold water	4	6	0	1	5	6	9	13
Replace furnace filters	2	3	0	0	3	4	5	7

The post-participation survey as well as the 4-month post-participation survey asked questions on what additional resources would be helpful for learning about home energy use. Table 6 shows the responses of those that responded a resource would be "extremely helpful or very helpful." Videos in different languages, images or diagrams, and one-on-one assistance all ranked high, though generally the ranking decreased over time in the 4-month post-participation survey.

Table 6. Summary of resources rated "extremely helpful or very helpful" for the question "rate how helpful the following resources would be for learning about home energy use."

Community	St. Cloud (n=25)		Willmar (n=20)		St. Paul (n=7)		Total	
Resource	Post	4-month post	Post	4-month post	Post	4-month post	Post	4-month post
Videos in your language	92%	72%	70%	70%	63%	63%	79%	70%
Printed material in your language	40%	20%	0%	0%	63%	50%	28%	17%
A newsletter delivered by email	0%	0%	0%	0%	25%	38%	4%	6%
One-on-one assistance	96%	64%	0%	0%	50%	25%	53%	34%
Website	0%	0%	5%	35%	75%	50%	13%	21%
Images or diagrams	60%	36%	80%	80%	50%	25%	66%	51%
A visit from a professional (energy audit)	60%	36%	0%	0%	63%	38%	38%	23%

In general, participants were either satisfied with or were neutral about the research project. Most participants stated they could understand the monthly prompts and all stated that they had someone they could reach to answer any questions they had. Ninety-eight percent of participants noted that they liked having someone in their community teach them about energy efficiency.

Lastly, participants were asked about how informed they felt they were about energy (Table 7). Participants in Saint Paul generally reported being either "pretty informed" or "extremely informed." Participants in Willmar and St. Cloud on the other hand reported more of being either somewhat informed or a little informed with fewer feeling as though they were "pretty informed."

Table 7. Responses to question "Since participating in the [Equity 4 Energy] program, how informed would you say you are about how to minimize energy use?"

Community/Response	St. Cloud (n=25)	Willmar (n=20)	St. Paul (n=8)	Total
Extremely informed	0	0	2	2
Pretty informed	7	1	5	13
Somewhat informed	12	12	0	24
A little informed	6	7	1	14

Conclusions

While participation was lower than expected and the research design was significantly modified to overcome challenges of the original design, engagement and recruitment, the project did provide value to the partnered communities in broadening their awareness, interest, understanding of energy efficiency generally. The results also provided a deepened qualitative understanding of energy use and energy burden experiences, barriers to engaging in energy efficiency programs, and improvements needed to make energy resources more accessible and equitable for low-income minority and rural customers.

In response to the remaining project research questions, below are the conclusions that the project team believe are relevant to utility Demand Side Management (DSM) programs including Minnesota utilities' ECO Programs.

Partner with community-based organizations staff with strong community relationships as trainers can be a successful way to connect with populations that may require additional assistance in accessing utility programs and services. CBOs approached for partnership should be organizations that share cultural, ethnic, and/or religious backgrounds and have trusting relationships with the hard-to-reach low-income minority or rural community members that are needed to be engaged with. The community-based trainer approach remained the foundational approach for recruitment and community involvement within this project. This success was a result of that CBO's strong foothold in the community. Ultimately the most effective train-the-trainer approach to collect community data was through the one-on-one engagement connecting community members to trusted community leaders who helped them onboard onto the platform and/or collect data together. Local organizations across Minnesota already have trusted relationships with residents and could market these programs if given adequate resources.

Although the study could not provide data regarding impacts of increased participation or energy savings impact, in-person engagement by a trusted community member that acts as trainer did increase energy efficiency behaviors in participant's home. Participant surveys showed that there was an increase in self-reported actions related to replacing lightbulbs with LEDs, turning off lights when not in rooms, and putting weatherstripping around doors and windows.

Enhanced marketing and educational content can create an approach that is more accessible and inclusive. Many participants had not previously received any education on energy use within their homes or heard of existing resources or programs. This suggests the need for improved outreach and marketing materials to reach a wider audience across the state of Minnesota. Recommendations for improvements are below:

- *Translate program materials to other languages.* Twelve percent of Minnesota residents speak a language other than English at home (Minnesota State Demographic Center 2024). Materials that are available in multiple languages are important for reaching participants in energy efficiency programs. This should include websites, program materials, any energy efficiency tips, and the online stores. This also includes language support at call centers and help lines.
- *Develop marketing materials in a variety of platforms and languages on the energy efficiency programs available and tips for energy efficiency.* Filsan Talent Partners noted that several

participants are not literate. Therefore, create videos in a variety of languages promoting energy efficiency programs, program materials to access programs, and energy savings tips. Having one on one in-person translators that are also able to fill out written program required paperwork or to help someone navigate online resources would help to reduce literacy barriers. Additionally, several participants noted that having someone show them how to install items in their home would be helpful. Creating a series of videos to both market existing programs and as a DIY series could increase participation in programs.

Conduct in-person sessions in partnership with a community-based trainer to provide basic energy efficiency and energy bill information, and support with applications and forms for energy programs. Many participants stated that they were concerned about paying their energy bills or that they had to make sacrifices with comfort to pay their energy bills. Participants felt the higher cost of consumption was related to living in older housing stock with leaky windows, old heating systems, and less insulation. Feedback in the Streetwyze posts and response in the surveys suggested that people enjoyed being able to receive assistance in-person. Furthermore, participants noted that they wished they better understood their energy bills, why it seemed like energy costs are always increasing, and what actions they could take to lower their energy bills.

In-person workshops where utilities and community organizations partner to provide basic energy efficiency education and demonstrations could help program participation and successful implementation of DIY measures, especially during fall and early winter when people are eligible to sign up for energy assistance. This approach of meeting people where they live was part of Filsan's successful engagement approach and should be replicated where possible. These could be conducted by trained community members, as participants in this study noted the value in having someone with shared lived experience serve as the main point of contact, which creates more trust of the providers and better understanding of cultural norms.

Explore additional ways to address rental housing energy efficiency. Most participants in the research study were renters. Renters continue to face difficulties in requesting permission or action by their landlords to make energy efficiency updates. Potential energy efficiency program enhancements and future research could include expanded funding for existing rental and multifamily efficiency programs, partnerships with housing industry and trade allies to market programs; and resources that specifically address how tenants may be able to talk to landlords about high energy costs.

The impacts of community-oriented data collection and web-based mapping platform, like Streetwyze are inconclusive. In St. Cloud, where half of the study participants were located, Filsan Talent Partners trainers delivered prompts in-person to the majority of participants to overcome language and social barriers. Further, two researchers reviewed the 700 posts and photo data points collected independently, and categorized the post into themes and subthemes to generate insights on the information. This study was not able to deliver results regarding the use of Streetwyze to increase participation of low-income minority and rural people into energy efficiency programs as there was no control group or its impact on energy savings as energy savings was not quantifiable due to the inability to collect utility bills or install smart thermostats.

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Saint Paul Prompts

Month 1

Post 1: Post about comfort in your home

- How comfortable do you feel in your home?
- Post about if your home feels drafty, stuffy, too hot or too cold.

Post 2: Post about your utility bills

- Estimate how much of your income goes to your utility bills each month. Do you think this is high, low, or normal?
- Are you responsible for paying your utility bills?
- Do you regularly look at your utility bills?
- Does anything on your utility bill confuse you?

Post 3: Post about previous energy efficiency actions you've taken in your home.

- Have you previously taken any actions to lower your energy bill?
- If you have taken actions, post what action you took and what results you saw.

Month 2

Keeping cool: no cost options

1. **Windows:** keep windows closed during the day and open at night when air is cooling
2. **Ceiling fans:** make sure they are blowing in the correct direction; check for a switch on the fan
3. **Blinds:** keep blinds closed during the day to avoid sunlight heating up the home
4. **Cooking:** avoid using the oven as much as possible; cook outside or prepare cold dishes

Keeping cool: A/C tips

1. **Use thermostat setups**: when away from the home or asleep, set the temperature up by a few degrees to save energy
2. **Buy a smart or programmable thermostat:** this will allow you to set a schedule to set up the temperature while gone or asleep.
3. Check out rebates at Xcel Energy Store: https://www.poweredbyefi.org/xcelenergymn
4. **Coil cleaning:** clean your air conditioning coils to improve how well the system runs
5. **Open doors:** keep interior doors open to help air circulate more

Post 1: Post about no-cost strategies you use to keep cool.

- Post about something you've done in the past to keep cool.
- Post about a change you made this month and how it changed your comfort. Include a picture if possible.

Post 2: Post about your AC.

- Post a picture of your thermostat. Include if you can control it and what you typically set it on.
- Post about a change to your AC you made this month and how it changed your comfort. Include a picture.

Post 3: Post about your frustrations and successes over the last month.

- Post about any barriers you ran into when trying to make changes in your home.
- Post about successes you had with making your home more comfortable in the summer.
- Post about items you want to learn more about.

Month 3

Explore rebate programs

Rebates: opportunities to receive a discount or a portion of your money back on energy efficient products

Check out the Xcel Energy Store: check out energy saving tools and discounts at Xcel Energy Store: https://www.poweredbyefi.org/xcelenergymn

- Receive free or discounted products including lightbulbs, low-flow showerheads, thermostats, dehumidifiers
- Check out all the different categories in the site – "Smart Thermostats", "Energy Efficient Home", "Lighting", etc.
- Check out the "Buyer's Guide" to get tips
- No purchases required – just check it out and see what you think

Shoulder season comfort

1. **Open windows:** open windows to help with natural cooling as the weather starts to cool down
2. **Use fans:** fans use less energy than air conditioning and provide directed cooling.
3. **Adjust blinds:** to keep your home warmer, open your blinds on sunny days. On warm days, close the blinds. This is a small way to manage comfort without the thermostat.

Post 1: Post about whether you found the Xcel Energy online store easy or hard to use

- Post about if the online Xcel Energy store was easy or difficult to use and why.

Post 2: Post about your interest in rebates and if you installed any tools.

- Post about any rebates that caught your interest and why or why not you plan to order and install in your home.
- If you purchased something, let us know how it worked!

Post 3: Post about comfort in your home

- How comfortable do you feel in your home?
- Post about if your home feels drafty, stuffy, too hot or too cold.
- Post if you tried any of the strategies and if they worked.

Month 4

Sealing Winter Drafts

Weatherstrip: tape-like material that can be applied in window or door gaps

Door snakes: fit around the bottom of any door. Can use a blanket or towel too

Window film: add plastic to your window to reduce cold air coming in during the winter

Where to buy:

- Any hardware store can help you find these items
- Xcel Energy has an online store where you can get discounted items: https://www.poweredbyefi.org/xcelenergymn/energy-efficient-home/weatherization.html?cat=577

Explore energy programs

Xcel Energy
 	
Insulation + Heating Rebates
 	
Covers:
    -Air Sealing
    -Attic Insulation
    -Wall Insulation
    -New furnaces
Hire a participating contractor and then get portion of cost rebated.
 	
Look online for <u>insulation</u> or <u>heating</u>
 	
Or call 800-895-4999
	Xcel Energy and CNP
	
	Home Energy Squad
	
	Experts do a virtual visit followed by an in-home visit to review energy savings. Open to renters and home-owners
	
	In-home visit: install thermostats, LEDs, water-saver measures. Give recommendations for next steps
	Look online at <u>Xcel Energy</u>
	
	Or call 651-328-6220
		Community Action Partnerships of Ramsey and Washington Counties
		This agency provides energy assistance and weatherization services for income-eligible households.
		
		The Energy Assistance Program (EAP) helps pay home heating costs. Available for homeowners and renters at certain income. Weatherization provides audit and installation services in the home.
		
		<u>Online site</u> has more information

Post 1: Post about the cold weather tips we recommended- this month

- Post if you have done anything to try to block gaps where cold air is coming in. Which one would you recommend to a friend and why? Take a picture of your solution and post on Streetwyze.
- Post about any other successes you've had in reducing cold air drafts in your apartment.

Post 2: Post about the rebate programs and opinions on them

- What is your initial reaction to the information shared about rebate programs?
- Do you think you will reach out to participate in any of the programs? Why or why not?

Post 3: Post about what you wish you still knew more about.

- What barriers still exist to reducing your energy use?
- What do you wish you had additional information about?

Month 5

Post 1: Post about which strategies during the project were your favorite

- Which of the strategies over the past 5 months have you tried? Did you notice an impact on comfort in your home?
- Which of the strategies do you think would be the most helpful in the long-term?

Post 2: Post about which of the rebate programs seem most helpful.

- Post about which of the utility programs seem most helpful (online store, Home Energy Squad, insulation and HVAC rebates).
- What questions do you still have about the programs?

Post 3: Post about what you wish you still knew more about.

- To manage energy use within your home, what other information or resources do you need?
- Are there barriers that still exist after receiving this information over the last few months?
- What is still unclear about home energy use?
- What resources would be most helpful to help in this area? (videos, community workshops, reading material (like pamphlets or books), one-on-one assistance, a website, images, etc.)

St. Cloud Prompts

Month 1

Post 1: Post about comfort in your home

- How comfortable do you feel in your home?
- Post about if your home feels drafty, stuffy, too hot or too cold.

Post 2: Post about your utility bills

- Estimate how much of your income goes to your utility bills each month. Do you think this is high, low, or normal?
- Are you responsible for paying your utility bills?
- Do you regularly look at your utility bills?
- Does anything on your utility bill confuse you?

Post 3: Post about previous energy efficiency actions you've taken in your home.

- Have you previously taken any actions to lower your energy bill?
- If you have taken actions, post what action you took and what results you saw.

Month 2

Here are some ways you can save money on your energy costs, without spending any money:

Lighting + Outlets Tips

Lights

Turn off lights when not in the room and when you can use natural light instead.

Blinds

Open up your blinds or curtains during the day instead of using lights.

Outlets

Unplug chargers, computers, or other equipment in your home when not using

Cold Weather Tips

Thermostat setting

Set your thermostat at 68 and lower it by a few degrees when sleeping or away from the home.

Change fan direction

If you have ceiling fans, you can switch the direction of your fan to run clockwise to push warm air down.

Use sunlight

Keep curtains open during day to warm home with sunlight. Close curtains at night to keep heat in.

Questions to Help Facilitate Posts

Encourage participants to post about their current habits:

- ☐ Post how often you turn off lights in rooms that you are not in.
- ☐ Post a picture of devices (TV, alarm clock, microwave) plugged in that aren't being used. How many can you find in your home?
- ☐ Post a picture of your thermostat and share your recent actions for setting temperatures.

- ☐ What rooms in your home have the blinds open or closed? Take a picture of these and post on Streetwyze.
- ☐ If you do any of these actions in your day-to-day life, which one do you think is the easiest? Which one would you recommend to a friend and why? Share a post on Streetwyze describing your answer.

Encourage participants to post about changes they made:

- ☐ Post about each change you made. Share a picture if possible.
- ☐ Did you have difficulty trying these tips? If so, how/why?
- ☐ Did you notice a change in the comfort in your home? If so, how?

Month 3

Here are some ways you can save money on your energy costs and get help paying bills

Heating Tips

Heating and cooling makes up over half your household energy use. Remember the tip to set back your thermostat – even changing it a couple degrees when you're away or at night can save energy! Check out ways to reduce cold air from doorways or windows below.

REDUCING COLD DRAFTS

Weatherstrip: tape-like material that can be applied in window or door gaps

Door snakes: fit around the bottom of any door. Can use a blanket or towel too

Window film: add plastic to your window to reduce cold air coming in during the winter

Where to buy:

- Any hardware store can help you find these items
- Xcel Energy has an online store where you can get discounted items: https://www.poweredbyefi.org/xcelenergymn/energy-efficient-home/weatherization.html?cat=577

Electronic + Lighting Tips

Advanced power strip: Allows you to save energy by automatically turning off items when not in use.

LED lightbulbs: Look for any package that says LEDs. LEDs are the most efficient and don't cost more than other bulbs.

EnergyStar appliances: If purchasing new appliances, look for these labels.

Where to buy:

- Any hardware store can help you find these items

- Xcel Energy has an online store with these items: https://www.poweredbyefi.org/xcelenergymn/

Helping Paying Your Bill

There are several ways to get assistance paying for energy bills. One way to get help is to call Xcel Energy directly.

Xcel Energy Average Monthly Payment	Xcel Energy Minnesota Cold Weather Rule	TRI-Cap (Tri-County Action Program) Federal Energy Assistance
This program sets a fixed amount for your bill each month. Can help with budgets as it's consistent instead of it changing each month Look online at Xcel Energy Or call 800-895-4999	Your utility is not legally allowed to disconnect your energy from October 1 through April 1. Call your utility to get help: 800-895-4999	The Energy Assistance Program (EAP) helps pay home heating costs. Available for homeowners and renters at certain income. Online site has application in Somali Or call 320-251-1612

Questions to Help Facilitate Posts

Post about any of these you have tried:

- ☐ Post if you have done anything to try to block gaps where cold air is coming in. Which one would you recommend to a friend and why? Take a picture of your solution and post on Streetwyze.
- ☐ Post about any other successes you've had in reducing cold air drafts in your home.

Post about if these strategies seem like good opportunities, or barriers that exist:

- ☐ What is your initial reaction to the cold weather drafts and lighting tips?
- ☐ Do you plan to pursue any of the cold weather energy savings tips? Why or why?
- ☐ What is your initial reaction to the ways to get help with your bill?
- ☐ What barriers still exist to get help paying your bill? Do you think those barriers will keep you from reaching out to Xcel Energy or Tri-Cap?
- ☐ What other information do you wish you had?

Month 4

Here are some ways to get additional help from outside resources for your home:

No-Cost Home Energy Evaluations

Tri-Cap (Tri-County Action Program)	Xcel Energy
Low-Income Weatherization	**Home Energy Squad**
The Low-income Weatherization program is free of cost. If you apply, you can get a professional visit to learn about your energy use and receive free installations at your home. Available for homeowners and renters at a certain income.	This program will come to your home and install energy saving tools or products. The program will also provide recommendations for other energy saving steps. It is available for renters and homeowners, and free for certain income levels.
Online site has application in Somali or call 320-251-1612. If you visit in-person, they can provide resources to help with Somali translation.	Look online at CEE or call 651-328-6220

Questions to ask your Landlord

Ask:

- Has there ever been an energy assessment completed here at any point?
- What energy saving items can I install in my home – such as a new thermostat?
- Who is responsible for changing the furnace filter monthly?
- Have you looked into utility programs and rebates to replace furnaces or water heaters?
- Can you turn down the water heater to 120 F to reduce energy use and prevent burns?

Questions to Help Facilitate Posts

Post about these strategies for this month:

- ☐ What barriers exist in reaching out to your landlord?
- ☐ Did you try to reach out to Tricap or Xcel Energy? Why or why not?
- ☐ What barriers exist in you reaching out to Xcel Energy or Tricap for additional services?

Post about the strategies over the past four months:

- ☐ Which of the strategies have you tried? Did you notice an impact on comfort in your home?
- ☐ Which of the strategies do you think would be the most helpful in the long-term?

Post about what you would still like to know and what additional resources would be helpful:

- ☐ To manage energy use within your home, what other information or resources do you need?
- ☐ Are there barriers that still exist after receiving this information over the last few months?
- ☐ What is still unclear about home energy use?
- ☐ What resources would be most helpful to help in this area? (videos in your language, community workshops, reading material in your language (like pamphlets or books), one-on-one assistance, a website, images, etc.)

Willmar Prompts

Month 1

Thanks for participating in our project. To start, we want to understand comfort in your home and how much you know about energy use.

Energy Use Basics

Energy Use in Home

- Energy powers your phone, computer, TV, refrigerator, and other items. In most homes, the majority of energy use goes to heating and cooling your home. Your water heater is another large use of energy followed by all lighting, plugged-in electronics, and miscellaneous items.

Energy Efficiency (EE)

- Energy efficiency is any action that lowers the amount of energy used in your home and lowers your energy costs.

Stories Fall into Three Categories

Streetwyze posts can fall into one of three categories:

Good	Bad	Fix It
♦ EE actions you have taken that **worked** ♦ EE actions you felt were easy to do ♦ Good things about energy use in your home ♦ Resources that were helpful	♦ EE actions you have taken that **did not work** ♦ EE actions you felt were hard to do, or frustrations with managing energy in your home ♦ Resources that were not helpful	♦ EE actions you took **that fixed an issue** ♦ Resources that would help you learn more or that you want to see in your community ♦ Resources that didn't exactly meet your needs, but you have ideas for improvements

Questions to Help Facilitate Posts

Post about your comfort in your home:

- ☐ How comfortable do you feel in your home?
- ☐ Post about if your home feels drafty, stuffy, too hot, or too cold.

Post about what you already know about energy use in your home and energy saving equipment:

- ☐ Have you previously heard or read anything about energy saving equipment or tools? What about energy use in your home and how to manage it?
- ☐ Have you taken any previous actions to reduce your energy use in your home?
- ☐ How do you like to receive information about new topics?

Post about utility bills at your home:

- ☐ Are you responsible for paying your utility bills?

    ☐   Do you regularly look at your utility bills?

    ☐   Does anything on your utility bill confuse you?

Month 2

Here are some ways you can save money on your energy costs through simple no-cost or low-cost strategies.

No Cost Tips

Lights

Turn off lights when not in the room and when you can use natural light instead.

Blinds and windows

Keep blinds closed on warm days to avoid sunlight heating up your home. Open windows at night for natural cool air.

Outlets

Unplug chargers, computers, or other equipment in your home when not using. They can still use energy even if your computer or phone are not plugged in.

Thermostat setting

Set your thermostat at 78 degrees to balance comfort and energy savings. Use fans to help with staying cool. Any degree above 72 can save 3 percent on bills. And increase the setting by a few degrees when away from the home.

Low-Cost Tips

Advanced power strip: Allows you to save energy by automatically turning off items when not in use.

LED lightbulbs: Look for any package that says LEDs. LEDs are the most efficient and don't cost more than other bulbs.

Fans: Using fans can save energy by reducing air conditioning use. It's best to use the fans while someone is in the room and turn off after use.

Questions to Help Facilitate Posts

Encourage participants to post about their current habits:

- ☐ Post how often you turn off lights in rooms that you are not in.
- ☐ Post a picture of devices (TV, alarm clock, microwave) plugged in that aren't being used. How many can you find in your home?
- ☐ How do you currently stay cool in your home? (post a picture of what you are using)
- ☐ Post a picture of your thermostat and share your recent actions for setting temperatures.
- ☐ What do you currently do to save energy? Which one would you recommend to a friend and why? Share a post on Streetwyze describing your answer.

Encourage participants to post about changes they made:

- ☐ Post about each change you made. Share a picture if possible.
- ☐ Did you have difficulty trying these tips? If so, how/why?
- ☐ Did you notice a change in the comfort in your home? If so, how?
- ☐ What additional information or resources would you need to make these tips easier to try?

Month 3

Here are some ways you can save money on your energy costs

Cooling Tips

Heating and cooling makes up over half your household energy use. Remember the tip to set your thermostat at 78 and adjust when leaving the home – even changing it a couple degrees when you're away or at night can save energy! Check out ways to keep cool air in below.

HOW TO KEEP COOL AIR IN

Weatherstrip: tape-like material that can be applied in window or door gaps to keep cold air from fans or AC from leaking outside. In winter, it helps keep warm air in.

Door snakes: fit around the bottom of any door. Can use a blanket or towel too to keep cold air from leaking outside. In winter, it helps keep warm air in.

Questions to ask your Landlord

Your landlord controls the items that use the most energy in your home – heating and cooling equipment and water heating equipment. Air conditioning, heating, and water heating uses up to 70 percent of all energy use in a home. Talk to your landlord and ask questions about what they are doing.

Ask:

- Has there ever been an energy assessment completed here at any point?
- What energy saving items can I install in my home – such as a new thermostat?
- Who is responsible for changing the furnace filter monthly?
- Have you looked into utility programs and rebates through Willmar Utilities: https://www.brightenergysolutions.com/media/3332/2023-bes-residential-brochure-1.pdf ?
- Have you looked into the weatherization program through Tri-Cap to replace furnaces or water heaters?
- Can you turn down the water heater to 120 F to reduce energy use and prevent burns?

Additional Energy Saving Tips

EnergyStar appliances: If purchasing new kitchen appliances, dehumidifiers, lights, or window air conditioners, look for these labels. The equipment will use less energy and you can get money back from Willmar Utilities: https://www.brightenergysolutions.com/media/3332/2023-bes-residential-brochure-1.pdf

Save water heating costs: lower your use of water and water heating in multiple ways:

- Take shorter showers
- Wash clothes with cold water
- Make sure to tell your landlord about any leaks

Alter kitchen habits to save energy:

- Try cooking early or late in the day to avoid heating up home in middle of day
- Use microwave or cook outside when possible

Questions to Help Facilitate Posts

Post about any of these you have tried:

☐ Post if you have done anything to try to block gaps where cold air is leaving. Which one would you recommend to a friend and why? Take a picture of your solution and post on Streetwyze.

☐ Post about any other successes you've had in keeping your home cool in the summer, saving water, or buying EnergyStar equipment.

Post about if these strategies seem like good opportunities, or barriers that exist:

☐ What barriers exist in reaching out to your landlord?

☐ Do you plan to pursue any of the energy savings tips? Why or why?

☐ What other information do you wish you had?

Month 4

As it gets closer to fall and cold weather, there are several resources to be aware of that can help pay heating bills or weatherize your home.

Helping Paying Your Bill

There are several ways to get assistance paying for energy bills. One way to get help is to call Willmar Utilities directly.

Willmar Municipal Utilities	**Salvation Army HeatShare**
Your utility is not legally allowed to disconnect your energy from October 1 through April 1. Call your utility to get help: 320-235-4422	Salvation Army HeatShare provides money to help pay utilities. It applies for anyone who has the need and has been denied from other sources for utility assistance. Call to get help: 320-235-2033.

Tri-Cap Resources

Tri-Cap provides energy assistance and other benefits for households in Willmar.

Tri-Cap (Tri-County Action Program) **Low-Income Weatherization**	Tri-Cap (Tri-County Action Program) **Federal Energy Assistance**
The Low-income Weatherization program is free of cost. If you apply, you can get a professional visit to learn about your energy use and receive free installations at your home. Available for homeowners and renters at a certain income. Online site has application in Somali or call 320-251-1612. If you visit in-person, they can provide resources to help with Somali translation.	The Energy Assistance Program (EAP) helps pay home heating costs. Available for homeowners and renters at certain income. Online site has application in Somali Or call 320-251-1612

Questions to Help Facilitate Posts

Post about these strategies for this month:

☐ What barriers exist in you reaching out to Willmar Utilities, Salvation Army, or Tricap for additional services?

Post about the strategies over the past four months:

☐ Which of the strategies have you tried? Did you notice an impact on comfort in your home?

☐ Which of the strategies do you think would be the most helpful in the long-term?

Post about what you would still like to know and what additional resources would be helpful:

☐ To manage energy use within your home, what other information or resources do you need?

☐ Are there barriers that still exist after receiving this information over the last few months?

☐ What is still unclear about home energy use?

☐ What resources would be most helpful to help in this area? (videos in your language, community workshops, reading material in your language (like pamphlets or books), one-on-one assistance, a website, images, etc.)

Appendix B: Surveys

Pre-Participation Survey

For this study, we are working with communities in Minnesota to learn about individual experiences with high energy costs. Our goal for this project is to understand the challenges people face to reduce energy usage, and what opportunities exist, if any, to help them. The findings from the project will support future programs to help more Minnesota residents reduce energy use, based on their needs.

This project is funded through the Minnesota Department of Commerce's Conservation and Applied Research and Development (CARD) grant. For more information, see here: https://slipstreaminc.org/research/equity4energy.

This survey serves as a baseline data collection method to gain a basic understanding of household energy use patterns and behavior. This is a required step for participation in the Streetwyze pilot and to receive the $150 incentive.

What does this survey include?
- Complete a 10-minute survey on household energy use
- Provide consent for us to access your energy (natural gas and electricity) data. Keep an eye out for an email that will arrive in the next 3 days about utility consent form(s).

P1. To start, please provide:

      Full name: _____

      Email address: _____

P2. What is the name of the trainer who recruited you to use Streetwyze?

      Trainer full name: _____

To start, we are interested in any previous actions you have taken to save energy and your willingness to save energy.

H1. Are you responsible for paying utility bills for your home?

      1. Yes
      2. No

H2. Compared to other monthly expenses, do you think the amount you spend on monthly energy costs is not a lot, similar to other expenses, or seems like a lot?

      1. Not a lot compared to other expenses
      2. Seems like a lot compared to other expenses
      3. Similar to other expenses

H3. Have you taken any specific steps in the past few years to save energy?

      1. Yes
      2. No

H4. Please provide some brief details about what things you have done to save energy use at home?

1. Replace lightbulbs with LEDs
2. Turn off lights when not in rooms
3. Use or install a programmable thermostat
4. Put weatherstripping around doors and windows
5. Wash your clothes in cold water
6. Take short showers
7. Replace furnace filters
8. Upgrade your furnace to a more efficient model
9. Other:

H5. Are you aware of programs that offer incentives or rebates for installing energy saving equipment (such as lightbulbs, thermostats, or a new furnace)?

1. Yes
2. No
3. (Don't Know)

H6. Have you ever received a financial incentive or a rebate for installing energy saving equipment or making your home more efficient?

1. Yes
2. No
3. (Don't Know)

H7. If saving energy resulted in saving money, choose which best describes the actions you would take to save energy? I would…

1. Not do anything differently to reduce your energy consumption
2. Reduce consumption only if the cost savings are very high
3. Reduce consumption only when it is convenient
4. Put up with a little inconvenience to reduce your consumption
5. Go out of your way to cut down your energy consumption
6. Other:

Next we are interested in learning more about energy equipment in your home and how you use the equipment.

B1. Thinking about the light bulbs inside your home, how often are they on when someone is not in the room?

1. Most of the time
2. Sometimes
3. Rarely
4. Never

B2. What fuel does your main heating equipment use?

---

1. Electricity
2. Natural gas
3. Propane
4. Fuel oil
5. Wood
6. OTHER: (please specify)
7. (Don't Know)

B3. Which of the following best describes how you control your thermostat during the winter?

1. Set one temperature and leave it there
2. Manually adjust the temperature at night or when no one is at home
3. Program the thermostat to automatically adjust the temperature
4. Turn equipment on or off as needed
5. Our household does not have control over the equipment
6. OTHER (please specify):

B4. What is the main type of air conditioning system that you have?

1. Central air
2. Room air conditioner (window unit air conditioner)
3. My household does not have air conditioning
4. Don't know

B5. Which of the following best describes how you control your thermostat during the summer?

1. Set one temperature and leave it there
2. Manually adjust the temperature at night or when no one is at home
3. Program the thermostat to automatically adjust the temperature
4. Turn equipment on or off as needed
5. Our household does not have control over the thermostat
6. OTHER (please specify):

Next, because we are trying to get response from different people, we would like to ask you a few questions that help us to reach people of different neighborhoods, home types, and ages.

A1. How long have you lived in your current home?

1. Less than a year
2. 1 to 3 years
3. 3 to 5 years
4. More than 5 years
5. Prefer not to answer

A2. Which of the following best describes this home?

1. Single-family detached home
2. Single-family attached home such as townhouse or row house

1. Apartment or condominium with less than 4 units
2. Apartment with 5 or more units
4. Mobile (manufactured) home
5. Other, please specify:

A3. Do you…

1. Own your home
2. Rent your home
3. Live in your home rent free
4. OTHER (please specify)

A4. What zip code is your home located in?

Zip code: _____

A5. Including yourself, how many people lived in your home during the past 12 months?

1. Number of people: _____

A6. In what year were you born?

1. Year born (1900-1999): _____

A6. What is the last grade of school you completed?

1. Grade school or less
1. Some high school
2. Graduated high school
4. Vocational/technical school
5. Some college
6. Graduated college
7. Post graduate education
8. Prefer not to answer

A7. Which of the following income categories best describes your total annual household income in 2021, before taxes?

1. less than $20,000
2. $20,000 to less than $35,000
3. $35,000 to less than $45,000
4. $45,000 to less than $55,000
5. $55,000 to less than $65,000
6. $65,000 to $80,000
7. More than $80,000
8. Prefer not to answer

A8. How would you describe your race or ethnicity?

[OPEN ENDED]

Thank you for your answers.

Post-Participation Survey

Thank you for participating in the Equity 4 Energy research project. Our goal was to understand the challenges people face to reduce energy usage and what opportunities exist to help them. Now that you have completed the project, we would appreciate your feedback in a brief survey. Your responses will support future programs to help Minnesota residents reduce energy use. You will get a $15 gift card for completing this survey.

What does this survey include?
- Questions on household energy use and program experience

How long will this survey take?
- About 7 minutes

P1. To start, please provide your full name and email address.

        Full name: _____

        Email address: _____

First, we are interested in your perspectives on your household energy bill and any recent actions you have taken to save energy.

H1. How concerned are you about the amount of your monthly electric bill? (Select one)

        1 – Not at all concerned
        2 – Slightly concerned
        3 – Somewhat concerned
        4 – Very concerned
        5 - Extremely concerned

H2. Compared to other monthly expenses, do you think the amount you spend on monthly energy costs is not a lot, similar to other expenses, or seems like a lot? (select one)

2. Not a lot compared to other expenses
3. Similar to other expenses
4. Seems like a lot compared to other expenses

H3. Have you enrolled in any programs that offer incentives or rebates for installing energy saving equipment (such as lightbulbs, thermostats, or a new furnace)?

4. Yes
5. No
6. (Don't Know)

H4. Please provide some brief details about what things you have done to save energy at home during the months of the project? (Select all that apply)

10. Replaced lightbulbs with LEDs
11. Turned off lights when not in rooms
12. Use a programmable thermostat

13. Installed a programmable thermostat
14. Put weatherstripping around doors and windows
15. Washed your clothes in cold water
16. Took short showers
17. Replaced furnace filters
18. Upgraded your furnace to a more efficient model
19. Other (please specify):
20. None of these

B1. Thinking about the light bulbs inside your home, how often are they on when someone is not in the room? (select one)

2. Most of the time
3. Sometimes
4. Rarely
5. Never

B2. Which of the following best describes how you control your thermostat? (select one)

7. Set one temperature and leave it there
8. Manually adjust the temperature at night or when no one is at home
9. Program the thermostat to automatically adjust the temperature
10. Turn equipment on or off as needed
11. Our household does not have control over the equipment
12. Other (please specify):

Next, we are interested in learning more about what you gained from participating in the program and what more you would like to learn about.

I1. Since participating in the Equity 4 Energy] program, how informed would you say you are about how to minimize energy use? (select one)

1. Not at all informed
2. A little informed
3. Somewhat informed
4. Pretty informed
5. Extremely informed

I2. On a scale from one to five, with 1 being "not at all helpful" and 5 being "extremely helpful," rate how helpful the following resources would be for learning about home energy use (check one of the boxes for each option):

	Not at all helpful	Slightly helpful	Somewhat helpful	Very helpful	Extremely helpful
Videos in your language					

Printed material in your language (like pamphlets or books)					
A newsletter delivered by email					
One-on-one assistance					
Website					
Images or diagrams					
A visit from a professional (energy audit)					

I3. What additional information or resources would be useful to best manage your household's energy use?

[OPEN ENDED]

I4. After participating in this project and receiving information over the last few months, what challenges do you still have when managing energy use in your home?

[OPEN ENDED]

Finally, we are interested in learning more about your experience in the project overall.

S1. Using a scale of one-to-five with 1 being "very dissatisfied" and 5 being "very satisfied," please rate your overall satisfaction with this project:

1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very satisfied

S2. Based on answer in S1, please tell us a little more about what made you satisfied or dissatisfied with the project.

[OPEN-ENDED]

S3. We'd like to understand what motivated you to participate. Please indicate how important the following factors were in your decision to participate (check one box for each row)

	not at all important	slightly important	neutral	very important	extremely important

Increase the comfort of my home					
Decrease noise					
Save energy					
Lower my utility bills					
Keep my home warmer in the winter					
Keep my home cooler in the summer					

S3. Based on your experience with participation in the program, how much do you agree with the following:

	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
I understood the monthly prompts and questions					
I could complete the mapping on Streetwyze					
I could reach someone to answer my questions					
I liked having someone in my community 'teach' me about energy efficiency					

S4. If you had difficulty with any of these aspects, what would have made it easier for you?

[OPEN ENDED]

S5. Is there anything else you would like to share about your experience?

[OPEN ENDED]

4-Month Post-Participation Survey

Thank you for participating in the Equity 4 Energy research project earlier this year. Our goal was to understand the challenges people face to reduce energy usage and what opportunities exist to help them. Now that you have completed the project, we would appreciate your feedback in another brief survey. Your responses will support future programs to help Minnesota residents reduce energy use. You will get a $15 gift card for completing this survey.

What does this survey include?
- Questions on household energy use and program experience

How long will this survey take?
- About 5 minutes

P1. To start, please provide your full name and email address.
Full name: _____
Email address: _____

First, we are interested in your perspectives on your household energy bill and any recent actions you have taken to save energy.

H1. How concerned are you about the amount of your monthly electric bill? (Select one)

1 – Not at all concerned
2 – Slightly concerned
3 – Somewhat concerned
4 – Very concerned
5 - Extremely concerned

H2. Compared to other monthly expenses, do you think the amount you spend on monthly energy costs is not a lot, similar to other expenses, or seems like a lot? (select one)

5. Not a lot compared to other expenses
6. Similar to other expenses
7. Seems like a lot compared to other expenses

H3. Have you enrolled in any programs that offer incentives or rebates for installing energy saving equipment (such as lightbulbs, thermostats, or a new furnace)?

7. Yes
8. No
9. (Don't Know)

H4. Please provide some brief details about what things you have done to save energy at home during the months since the project? (Select all that apply)

21. Replaced lightbulbs with LEDs
22. Turned off lights when not in rooms
23. Use a programmable thermostat
24. Installed a programmable thermostat
25. Put weatherstripping around doors and windows
26. Washed your clothes in cold water
27. Took short showers
28. Replaced furnace filters
29. Upgraded your furnace to a more efficient model
30. Other (please specify):
31. None of these

B1. Thinking about the light bulbs inside your home, how often are they on when someone is not in the room? (select one)

6. Most of the time
7. Sometimes
8. Rarely
9. Never

B2. Which of the following best describes how you control your thermostat? (select one)

13. Set one temperature and leave it there
14. Manually adjust the temperature at night or when no one is at home
15. Program the thermostat to automatically adjust the temperature
16. Turn equipment on or off as needed
17. Our household does not have control over the equipment
18. Other (please specify):

Next, we are interested in learning more about what you gained from participating in the program and what more you would like to learn about.

I1. Since participating in the [Equity 4 Energy] program, how informed would you say you are about how to minimize energy use? (select one)
6. Not at all informed
7. A little informed
8. Somewhat informed
9. Pretty informed
10. Extremely informed

I2. On a scale from one to five, with 1 being "not at all helpful" and 5 being "extremely helpful," rate how helpful the following resources would be for learning about home energy use (check one of the boxes for each option):

	Not at all helpful	Slightly helpful	Somewhat helpful	Very helpful	Extremely helpful
Videos in your language					
Printed material in your language (like pamphlets or books)					
A newsletter delivered by email					
One-on-one assistance					
Website					
Images or diagrams					
A visit from a professional (energy audit)					

I3. What additional information or resources would be useful to best manage your household's energy use?

[OPEN ENDED]

I4. After completing this project and no longer receiving regular information from us about energy, what challenges do you still have when managing energy use in your home?

[OPEN ENDED]

Thank you for your time! If you have any questions about this survey please contact Maddie Koolbeck at mkoolbeck@slipstreaminc.org
This project was funded through the Minnesota Department of Commerce's Conservation and Applied Research and Development (CARD) grant. For more information, see here:
https://slipstreaminc.org/research/equity4energy