



Final **Report**

MNIPL Interns





Welcome to MNIPL Interns Final Report 2024

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Summary

Visit MNIPL website: www.mnipl.org/ Visit our Web Application: https://shorturl.at/QvfOw

Introduction

Over the course of eight weeks this summer, we (a group of five students from UNC Chapel Hill) interned with Minnesota Interfaith Power and Light (MNIPL). Our team's main objective was to help MNIPL in its efforts to improve energy efficiency and electrification amongst households in the Minneapolis metropolitan area. Our work in Minneapolis was focused on specific goals within this area of concern. In the process, we consulted with a variety of local stakeholders, including congregations, homeowners, and representatives from sustainability organizations.

Our work comprises two aspects: the development of a web application and electrification research. For our research component, we compiled a significant amount of information regarding energy efficiency and electrification in general. Further, we attempted to determine the role that MNIPL can fill in the landscape of all the organizations working to promote sustainability in the Minneapolis area. We also received feedback from many of these constituents we consulted with regarding presentations by MNIPL, and we have summarized and outlined some of these findings. For our other main focus area, we developed a recommendation-based web app. This app will provide homeowners with suggestions on how to best incorporate energy-efficient technology.



General Information

This section of the report summarizes some of the information we collected during meetings with area stakeholders with regard to energy efficiency and electrification.

In our first weeks in Minneapolis, we familiarized ourselves with the concepts of clean energy and electrification. We began with a presentation from the Citizens Utility Board (CUB) about electrification followed by interviews with local community members pertaining to solar panels, utilities, and climate action plans. To round out our understanding, we toured already electrified homes and conversed with their owners. Additionally, we further spoke to a variety of congregations to gain perspective on the electrification process.

In our interviews, we discovered several of the motivating factors for people to electrify their homes. We grasped that a concern for the environment and a desire to contribute to progress in sustainability were commonly provided as reasons for electrification. This motivation allowed homeowners and congregations to start making changes toward clean energy. With congregations, we noticed a common thread of beginning their sustainability journey by making smaller changes. They tended to switch to reusable and compostable materials and similar adjustments as an initial commitment to making their congregation more energy and environmentally conscious. Our research also revealed that the congregations we met with were all in different places in their electrification journey. Several were just beginning, while others had already installed solar panels or other electric/energy-efficient technology. Despite the various stages of the electrification process that these congregations were in, the concerns they expressed were similar to the concerns expressed by the homeowners we spoke with.

Though environmental concerns were the primary motivator, health concerns were also a key reason for people choosing to electrify. Worries regarding the impacts of natural gas and propane served as a powerful motivator for various individuals. Several studies have demonstrated a correlation between gas stoves and an increase in asthma symptoms, which also served as an incentive for homeowners to institute electric appliances. For example, we heard the story of a doctor who listened to a presentation about the importance of electrification and the reasons to begin electrifying. As a doctor, what stood out most strongly to him was the story about the negative consequences of gas stoves and the damage that similar appliances can cause to a person's health. This further exemplifies the importance of MNIPL's core pillars of narratives and shared experiences. available information can make electrification

seem more convoluted than it actually is.

We noticed several recurring barriers people encountered when electrifying their homes. Firstly, there seemed to be a general concern about the upfront cost of many recommended technologies. Many of the congregations we talked to indicated that getting their board of directors to greenlight such costly projects had been a struggle despite the variety of grants and rebates available. This concern was mirrored by the homeowners we spoke to who also indicated that funding was an initial concern of theirs. However, everyone concerned about initial funding also knew of the cost benefits of electrification in the long run. Secondly, we noticed that there was an overwhelming amount of information available regarding steps that could be taken to make changes in electrification.

We spoke to several individuals who were interested in electrification after attending a presentation by MNIPL, yet were unsure where they should get started. While seemingly an odd barrier. Nonetheless, it remains a concern, especially due to the vitality of the information. Understanding electrification is necessary for taking action but at first glance, available information can make electrification seem more convoluted than it actually is. Thirdly, though not as prevalent, we noticed a concern from homeowners about a need for more contractor knowledge about certain aspects of clean technology, especially heat pumps. We had several people indicate that they faced challenges when getting an estimate for a heat pump that accurately reflected the cost of implementing such technology. Furthermore, it was mentioned that some contractors claimed that heat pumps were ineffective in Minnesota due to the temperature. While some kinds of heat pumps are ineffective below a certain temperature, there are also cold-weather heat pumps designed to operate at truly frigid temperatures. This confusion and misunderstanding of heat pumps can make it challenging for consumers to implement the

technology. Moreover, contractors specializing in heat pumps often serve a limited area, making it harder for people in more remote areas to install a heat pump. Fortunately, an already existing coalition known as the Air Source Heat Pump Collaborative is designed to help combat this barrier. This resource would be valuable as a contact point and beneficial to point homeowners in their direction when making the transition to heat pumps as a heating source. There are drawbacks as the focus of the *Air Source Heat Pump Collaborative* is on heat pumps and not other aspects of electrification. However, it is still an invaluable resource for homeowners.

Web Application

The main objective of our research in Minneapolis was to figure out what could be done to facilitate the adoption of energyefficient technology (heat pumps, induction stoves, etc.) by homeowners. Through our research, we determined that financial constraints are one of the most significant barriers homeowners face in electrifying their homes. This issue was compounded by an overabundance of decentralized information on the subject, culminating in many homeowners' struggle to take a first step toward improving their homes. As such, we focused on these issues.

With the current state of home electrification solutions, the first step that most homeowners took before making changes to their homes was conducting an energy audit. Conducting such an audit allows homeowners to understand where their homes are wasting energy, thus allowing them to consider changes that can be made to prevent this waste. Despite being an efficient solution, audits pose financial challenges since they require homeowners to pay upfront for the service. In addition, a homeowner would have to allow an expert (generally from the Center for Energy and Environment) to enter their home and use equipment to make various measurements in their homes. Research shows that the cost and inconvenience of conducting such an energy audit can often make them reluctant to take the steps to do so.

Our solution attempts to digitize the home

energy audit process-providing a lowcost, non-invasive alternative to current solutions. We decided to create a free, online recommendation-based web app that would provide homeowners with suggestions about changes that could be employed to help electrify their homes. Our app aims to provide an easy first step for homeowners to take through which they could learn more about the process of retrofitting their homes. The web app asks homeowners a series of questions regarding their homes, such as the types of systems they currently have installed and the specifications of these systems. We focused on five main aspects of a home: the stove system, washer and dryer, insulation, heating, and water heating. Once the information is inputted, the app provides the homeowner with a set of recommendations on how to enhance their home's energy efficiency and switch to electrification. Throughout the web app, we also provide definitions for terms

the homeowner may not be familiar with. Ultimately, along with the app's personalized recommendations, it provides resources for the homeowner to learn more about the proposed changes and the necessary steps to implement them. Our hope is that this aspect of our web app helps centralize and narrow down the overwhelming amount of information available for the subject matter.

Project Limitations

Despite our web app having the ability to provide people with suggestions about how they can make their homes more energy efficient, there are some limitations to our product. Firstly, the app is less effective for renters and subleasers. Since they do not own their homes, they are restricted in their abilities to make large-scale decisions regarding their appliances (stove, water heater, etc.). They can make an impact in other ways, but due to the time constraints of our project, we were unable to address those concerns. This restricts the scope of our project and is an area that MNIPL can continue to address.

Secondly, the app still cannot fully eliminate financial constraints from the electrification process. As aforementioned, the main barrier we observed was concern over implementation costs. Though reducing the upfront cost of an audit, the cost of implementation remains. There are a variety of rebates, incentives, and other tax credits designed to help ease the burden; though this issue will still likely interfere with some homeowners adopting the recommended changes. This concern limits the scope of our project, and while we provided some resources with further information, it is important to recognize the impact of individual financial circumstances on the effectiveness of our platform.

MNIPL Presentation Recommendations

We conducted over 20 meetings for the information-gathering stage of our project. Several types of local stakeholders were engaged, including churches, non-profits, etc. In this section of the report, we summarize and outline some of the lessons we learned from these constituents.

The representatives we consulted had significant positive sentiments regarding the presentations received from MNIPL. It seemed a common consensus that sermons and presentations were a great way to help their congregations become aware of the necessity of climate consciousness. Specifically, congregations noted liking to learn about ways in which they could make changes to their homes to improve energy efficiency and electrification.

However, our team noticed a disconnect between the congregations' receiving and implementing information. None of these representatives could tell us how many congregation members actually implemented the recommended changes. We heard several times that the representatives assumed that members were making changes to their homes, but they did not have any concrete knowledge of how their members responded to the information they received.

To improve MNIPL presentations, we believe learning more about how congregation members implement what they learn is crucial. While we can make assumptions about what congregation members are doing with the information they receive, having more concrete data can be beneficial in determining their effectiveness. We recommend this step be taken by developing a follow-up survey that can be sent out to congregations after they receive an MNIPL presentation. This survey can ask questions about the members' thoughts on the presentation, as well as, the next steps they plan to take based on the information they have received. We also recommend another followup several months after the presentation to learn if any members have taken steps to implement changes to their homes. This step could also help MNIPL identify roadblocks that members might be facing as they attempt to make their homes more energy efficient.

The congregation representatives also provided some further feedback on modifying and improving the presentations. Their general belief was that the best way to talk with people is to get to know them personally. For example, one of the representatives mentioned a workshop Buffheld with congregation members after his sermon and thought that this part of the event was particularly beneficial since it involved working directly with the members. Another detail mentioned to us was the amount of data and statistics in the presentations from MNIPL. While congregation representatives thought this information could be helpful, they also thought it was overwhelming for members looking to learn more about sustainability and energy efficiency. A possible solution could be providing the statistics in a different format, such as a handout given to the members who hear the presentation. Furthermore, we learned that in some cases, perhaps due to politics, individuals do not want to discuss climate change and are less willing to respond to a message that revolves around protecting the environment. In these cases, it can be important to explore other benefits of making changes to be more energy efficient. For instance, we learned that in several situations, congregation leaders found more success in convincing members when they focused on the economic and health benefits of various technologies rather than climate change and sustainability.

Overall, all the representatives we talked to agreed that the presentations by Buff and

MNIPL were helpful in conveying climate action's importance to their congregations. We heard many positives during our meetings, and feel these sermons and presentations are great ways to help individuals become interested in becoming more energy efficient and electrifying their homes. MNIPL does a great job of connecting with individuals through stories, which we have heard from congregation leaders has been successful in reaching members and making the idea of retrofitting their homes more appealing.

MNIPL's Niche

Numerous organizations in the Minneapolis area are all working towards climate action and sustainability. In this overall landscape, it can be a challenge for organizations to work together without overlapping too much on their efforts. We have looked at some of the organizations in the area and their work, and have attempted to identify an area in which MNIPL can fit in and offer a service that differs from those offered by other organizations. Some of the organizations that we considered when making this evaluation were the Center for Energy and Environment (CEE), Minify Energy, EnerChange, and Citizens Utility Board (CUB).

One of the main advantages that MNIPL has when working to convey to individuals the importance of energy efficiency and climate action is its network of religious organizations in the Minneapolis area. Talking to people at their place of worship can help MNIPL form a personal connection with individuals in a way that many other organizations do not have the opportunity to. MNIPL can take advantage of this personal connection to better form relationships with the individuals they interact with, thus allowing them a unique avenue through which to spread their message. We think this is one way in which MNIPL can fit in among all the organizations working towards climate action-they can focus more on the individual than the group, and provide more personal support to those interested in making changes to be sustainable.

Similarly, when looking at some of these

organizations in the area, we noticed that many of these organizations are less focused on outreach, instead providing resources when people come to them with problems or questions. We think this gap can be filled by MNIPL—they can be more of an outreach organization that contacts people and gets them interested in making changes and being more sustainable overall. As mentioned previously, MNIPL can also leverage the numerous connections they have through congregations to reach out to homeowners.

Finally, based on our meetings with constituents in the area, we realized that one of the most important steps for people making changes to their homes is the planning process they go through before taking any concrete action. However, there do not appear to be many resources or organizations that could help with this planning process - all the organizations that we have highlighted provide support during certain steps of the process, but none walk through the whole picture with the homeowner. This is another area where we think MNIPL can play an important role - it can be an organization that looks at the bigger picture and is available before a homeowner has to take any concrete steps. Furthermore, we think the web application tool we have developed can be used to help a homeowner with the planning process. Taking the web app can help them gain a rough understanding of the changes they could make to their homes to improve energy efficiency and an idea of what aspects of their home they need to focus on in the future.

Summary and Conclusion

Our team's external perspective, coming from North Carolina, gives us a unique lens to analyze the vast opportunities available to MNIPL. We have examined the plethora of paths and networks that MNIPL uses to combat climate change. This has contributed to our understanding of this issue and our notion of how to tackle the challenges posed by climate change. As such, we focused the scope of our project to center on the pathway of electrification.

Our project started eight weeks ago with little understanding of what electrification was and how it worked. Through numerous meetings, presentations, home visits, and events, we were able to garner a significant understanding of the motivations behind electrification, the process of retrofitting homes, and barriers for both homeowners and congregations. The most common motivators promoting electrification that we found were cost-effectiveness and concerns for health and the environment. The most common barriers we encountered were the upfront cost of electrification, a lack of consolidated information about clear-cut next steps, and a lack of knowledge from contractors.

To combat some of these barriers, we designed a web application tool that would allow homeowners to receive personalized feedback about how they could electrify their homes. The recommendations we provide after this web app is taken give homeowners advice about the next steps of their home electrification journey. While our web app provides clear steps for homeowners, it is limited in its ability to provide recommendations for nonhomeowners.

During our meetings and conversations in the Minneapolis area, we were able to gain an understanding of where we believe MNIPL fits in with other nonprofit climate-based organizations. MNIPL has a strong network of connections and communities that make it the perfect contact point for people who need help when looking to electrify their homes. Additionally, our perspective allowed us to understand that it could be beneficial for MNIPL to follow up their presentations and sermons with a questionnaire/survey several weeks later to gain a better understanding of how many people take steps to electrify after listening to a presentation.

While our time at MNIPL has come to an end, we hope our work, tool, and project can be used by MNIPL in the future to jumpstart people's electrification journeys.



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