PHILLIPS COMMUNITY ENERGY COOPERATIVE

Energy Plan 2009

2009

Phillips Community Energy Cooperative Energy Plan

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Introduction

The Phillips Community Energy Cooperative assists the residents of the Phillips community in Minneapolis with saving money on their energy bills by providing energy efficiency programs and resources. Energy efficiency is becoming increasingly important as energy prices are rising, transmission lines are losing capacity, and the threat of climate change is increasingly relevant. This report looks into the importance of energy efficiency in the context of the Phillips community and describes an energy plan that will help increase efficiency in the community by implementing the following programs:

- Weatherization workshops will serve to educate community members about how their homes lose heat and what steps can be taken to minimize drafts. The workshops should be language and culturally sensitive in that choice of location and facilitator is as important as the information that is shared.
- Neighborhood energy audits will help residents to see more clearly where their homes are losing air and how best to repair it.
- A home insulation program is a cost-effective way for residents to save money by tightening their homes.
- Installation of energy efficient heating/cooling infrastructure will greatly reduce energy consumption by replacing outdated equipment.
- Installation of renewable energy technologies will provide clean energy to a community with a history of industrial pollution

This report looks at energy efficiency improvements in the context of the Phillips community. It first identifies the importance of an increased effort in conserving energy and using it more efficiently. The next section provides a background of the Phillips community and demonstrates the challenges inherent in the community given social demographics and housing characteristics. Additionally, a variety of social benefits that can be derived from energy efficiency and conservation measures will be explored. After a stakeholder analysis, two case studies are used to provide guidance for a model that would work for PCEC and its members. Drawing from the case studies, an implementation plan along with evaluation criteria will be laid out to help PCEC determine a course of action. Finally, recommendations are provided that serve as a foundation for a new program.

Finding ways to reduce energy consumption is a challenge that must be met to increase the opportunity for a sustainable future. Implementing a responsible energy plan is the first step towards rising to that challenge.

Importance of Energy Efficiency

Efficiency

The oil embargo in the 1970s forced many Americans to think about using energy more consciously. Utilities began investing in demand side management and used a variety of tools to help their customers save energy. In 1993 the dollars utilities invested in energy efficiency reached its peak at $2.74 billion; there would be a 43% reduction in such spending by 1998 when investments dipped to $1.57 billion (Nadel, 2000). Accordingly, energy savings also decreased substantially. With energy use increasing roughly 2% each year (Brown, 2008), it is becoming more difficult for utilities to maintain a constant energy supply. With peak oil on the horizon, rising energy costs, and the challenge of climate change, the task of reducing energy consumption is as important as ever. It has been concluded by the Western Governors Energy Efficiency Task Force that "it is feasible to reduce electricity in the western US by 20% […] through the application of the best efficiency practices and programs" (Berry, 2008). A reduction of energy use by 20% will have a necessary impact of relieving generation stress, helping to mitigate climate change, as well as increasing a variety societal benefits.

Supply and Generation

An increase in energy use has out paced that of energy production. In the 1990s energy demand in the United States increased roughly 35%, while capacity only increased 18% (Amin, 2005). Further it is projected that the transmission load will grow by 22-25% in the next ten years, while the grid will grow less than 4% (Amin, et al., 2005). With the implication that energy supply will not be able to keep up with demand, necessary measures must be taken to avoid a situation in which demand surpasses supply. Such a scenario could result in a failure of the energy grid. The easiest way to reduce the energy load is through energy efficiency as it is "an effective resource for meeting some of the growth in demand for electric services, enabling utilities to reduce the need for additional generation resources" (Berry, 2008). Reduction in energy consumption through efficiency and conservation measures will help to relieve the stress of the grid and provide time for the utilities to develop a strategy to provide energy in a more efficient, responsible, and cleaner manner.

Climate Change

Mitigating climate change is the biggest challenge of today's society. Greenhouse gases such as Carbon Dioxide (CO_2) heat the atmosphere by trapping radiation from the sun as it is reflected off the earth's surface. Humans have dramatically increased the amount of

greenhouse gases present in the atmosphere since the onset of the industrial revolution through the burning of fossil fuels such as oil, coal, and natural gas. The increased concentration of such gases in the atmosphere consequently increases the amount of radiation that is trapped as it tries to leave the atmosphere, thereby increasing the global temperature. As the temperature increases it is forecasted that there will be future water and food shortages, increased storm events, more intense wildfires, etc. (Solomon, 2007). Stabilizing the emissions of gases is the first step towards reversing this trend. Again, increased energy efficiency and conservation is an easy and cost-effective way to help mitigate the impact of climate change.

Energy use in residential, commercial and industrial buildings account for approximately 43% of US CO_2 emissions (Brown, 2008). Figure 1 illustrates the breakdown of fossil fuel combustion for the purposes of electricity use in residential and commercial buildings. As can be seen from the graph, roughly 67% of fossil fuels are burned in the production of energy (i.e. at power plants) while the remainder is combusted within the household (i.e. furnaces and gas stoves). Purchased and in-home combustion of fossil fuels for energy use combine to emit 313 million metric tones of carbon. It should be noted that that electricity generation in the state of Minnesota consists of 65% coal (EIA, 2008), which is the most carbon intensive fossil fuel, thus resulting in relatively higher carbon emissions during energy production.

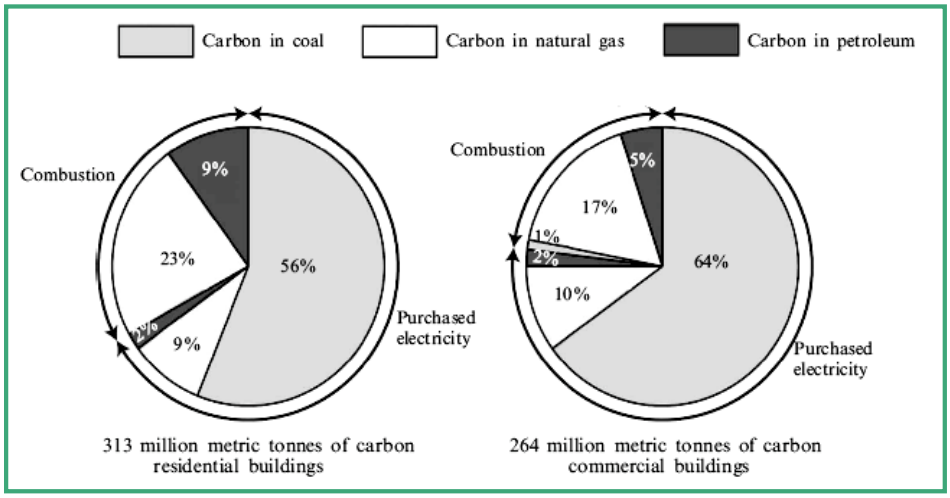


Figure 1: CO_2 from US residential and commercial buildings (Brown, 2008)

In the home, space-heating uses 30% of electricity and 11% is used for cooling (Brown, 2008). As seen in Figure 2 water heating, lighting and refrigeration also use up significant amounts of energy (12%, 12%, and7%, respectively). Behavioral changes along with more efficient appliances can greatly reduce the amount of energy

consumed in residential buildings. Single-family detached units account for 73% of residential energy consumption, and therefore have the greatest potential for reducing CO_2 emissions.

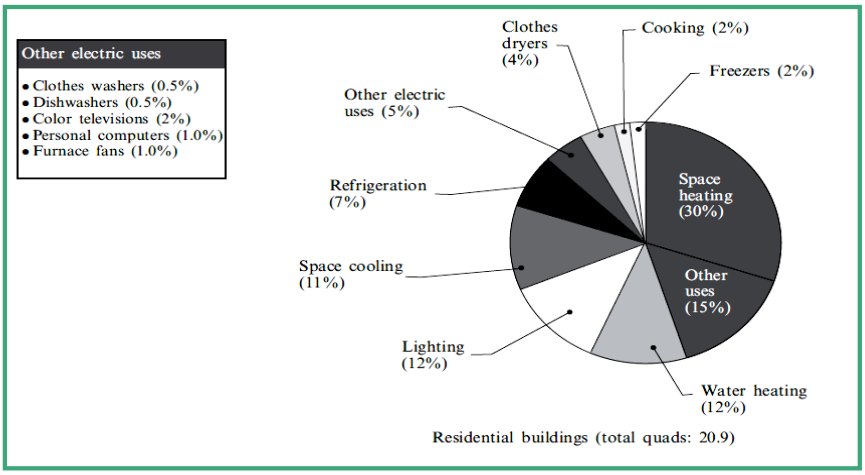


Figure 2: Residential Energy Use (Brown,

It is estimated that 60% of residences are not well insulated and that 90% of rooftops absorb heat rather than reflect it (Brown, 2008). Inefficiencies like these lead to unnecessary energy use. Improving residential homes through weatherization, retrofitting, and new appliances can substantially reduce energy consumption and consequently carbon dioxide emissions.

In conjunction with increasing building efficiencies, it is important to consider the opportunities for renewable energy and the impact they can have on home energy use. Photovoltaic, solar heating, and combined heat are capable of meeting remaining energy loads for individual homes and community-wide systems (Brown, 2008).

Social Benefits of Energy Efficiency

Steps taken to reduce energy consumption through efficiency measures like weatherization or appliance trade-ins can have significant economic, health, environmental, and societal benefits. Low-income families who depend on assistance may be able to reduce their monthly bills through weatherization to a more affordable price, which can sometimes reduce their need for financial assistance. (Tonn, 2003). Weatherization is especially important for homes occupied by low-income residents since they tend to live in the least energy efficient housing stock. As a result low-income households spend 14%, on average, of their income on energy needs, compared with 3.5% of income spent by other households (Brown, 2008). Low-income homes that have been weatherized through the Department of Energy's Weatherization Assistance

Program have achieved average savings of an estimated $218 per household, which translates into .25 metric tons of CO_2 (Brown, 2008). Money saved through weatherization and other efficiency measures can provide relief to some families and allow them to use the saved money for other goods and services. Low-income residents and their landlords may also benefit from the energy and money saved from energy efficiency measures as it "has been hypothesized that low-income tenants can save enough money on energy bills to better be able to pay their monthly rents" (Schweitzer, 2003).

Health benefits may also result from energy efficiency and weatherization. It has been suggested that people living in homes with sufficient heat in the wintertime are less likely to suffer from illnesses (Schweitzer, 2003). Fewer illnesses in a household allows children to attend more school days and adults to attend more workdays, which has added economic benefits with more pay days (Schweitzer, 2003).

Environmental benefits come from a reduction of air pollutants due to the reduction in the burning of fossil fuels. The air emissions, including but not limited to greenhouse gases, from such combustion have a wide range of health effects from particulate matter in the air, to water pollution from the settled contaminants.

Increasing residential energy efficiency has a variety of benefits at little cost. Weatherization of homes in a neighborhood with an old housing stock has the potential to increase jobs in a community as well as save residents money. Additionally, energy efficiency measures help to alleviate monthly bills and allow people to spend money elsewhere. Reduced energy consumption decreases the stress on transmission lines, which helps utilities to continue to provide reliable service. The environmental benefits are substantial and not to be overlooked.

Individuals, households, and communities have the ability and responsibility to reduce energy consumption using a variety of energy efficiency measures in order to achieve more reliable service, a healthier society, and to mitigate environmental concerns associated with climate change.

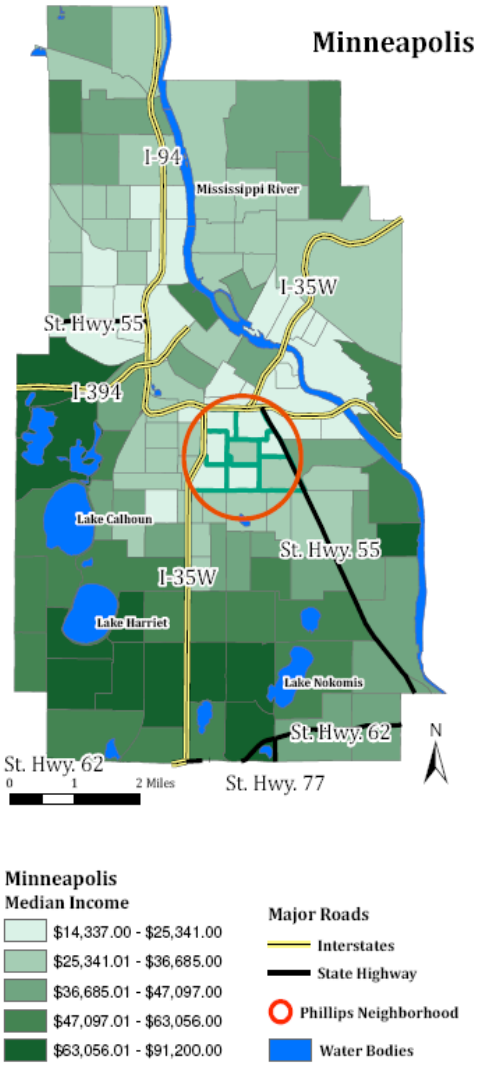
Phillips Community

The Community

The Phillips community is located in South Minneapolis. It is home to the most diverse population in the city as far as income, ethnicity, language, age, and home occupancy. The community is comprised of four neighborhoods: Phillips West, East Phillips, Midtown Phillips, and Ventura Village. According to the City of Minneapolis, nearly 20,000 people live in Phillips as of the year 2000. Of those 20,000, slightly less than 5,000 live in each Phillips West, East Phillips, and Midtown, while nearly 7,000 people live in Ventura Village.

Income

In 1999, the median household income in the Phillips community was $22,044, more than $15,000 below the median income of the city (City of Minneapolis, 2008). This disparity is illustrated in Map 1. As an established low-income community, Phillips is a prime community in need of increased savings through energy efficiency. It was previously estimated that low-income households could spend 14% of their income on energy; this is significant for Phillips residents, particularly for those who make less than the neighborhood median. A weatherization program established in this community would have a tremendous impact on the community, as households are able to save more money.



Map 1 Produced by Author.
Data Source: US Census Bureau 2000

Housing Occupants

A significant number of Phillips residents are renters. In 2000, 78% of homes were rented. However the number of owner occupied homes increased from 17% to 22% from 1990 to 2000 (City of Minneapolis, 2008). Figure 3 illustrates the contrast of owner-occupied versus renter occupied units

in the community. A high renter population increases the difficulty of improving energy efficiencies. When utilities are included in rent it is difficult for renters to see how much energy they are consuming. Alternatively, a renter who pays utilities may be limited in what kind of energy efficiency measures he can take. In order to achieve maximum efficiency it is necessary for landlords to be involved in increasing the efficiencies of their properties since it is in their interest as well as the renters.

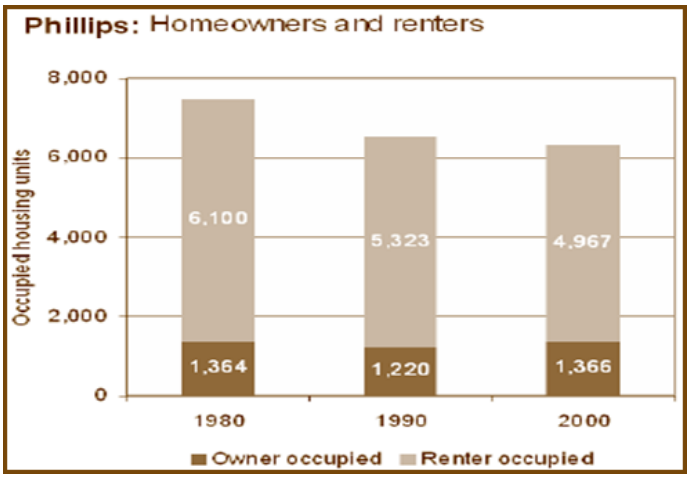
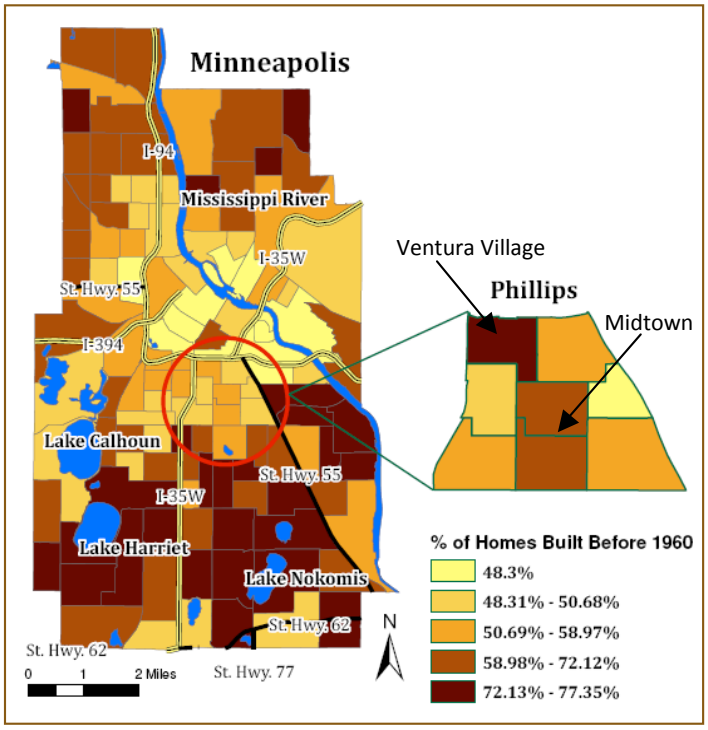


Figure 3 Source: City of Minneapolis 2008

Housing Stock

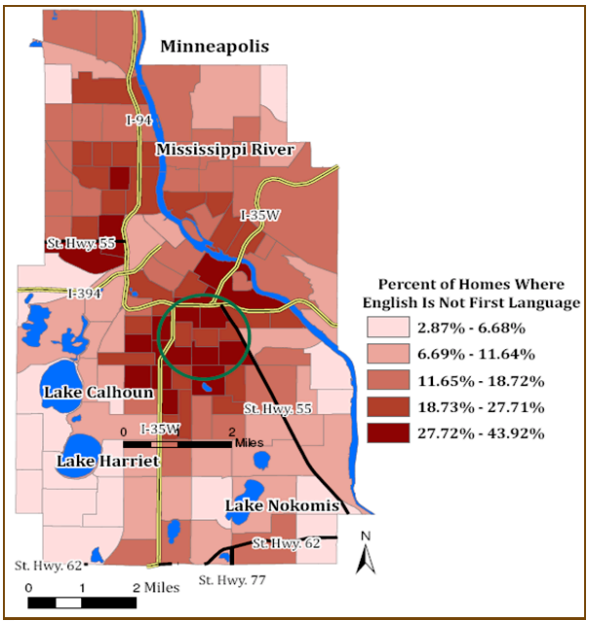
The housing stock in Minneapolis is generally old. As can be seen in Map 2, over 50% many of the city's neighborhoods have a housing stock with homes built prior to 1960. Since there are fewer homes in the Phillips community, it appears that there are fewer older homes in the community. However, as the close-up map of the community shows, there is a significant portion of Phillips that was built before 1960. It can be seen that the highest percentage of older homes are found in the Ventura Village and Midtown neighborhoods, as indicated by the arrows. The implication of an older housing stock is that these homes will be less efficient than homes built more recently. This is especially true in a low-income community like Phillips where the residents cannot afford to upgrade their homes.



Map 2 Produced by Author. Data Source: US Census Bureau 2000

Immigrant Population

Phillips is home to a large number of immigrants. Map 3

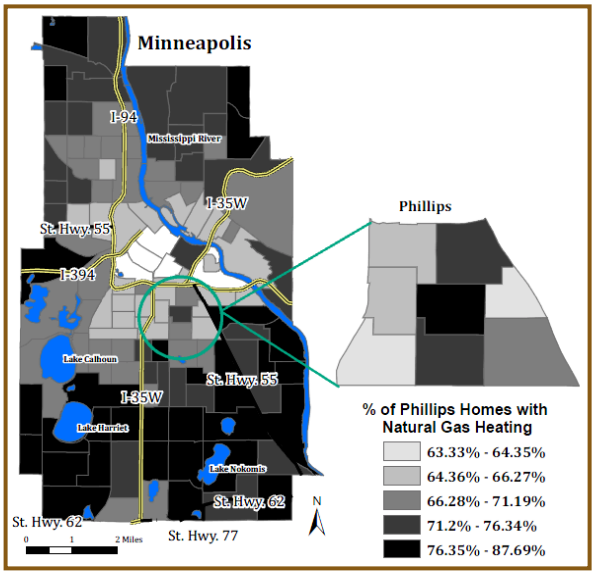


Map 3 Produced by Author. Source: US Census Bureau 2000

illustrates a concentration of immigrants in and around the Phillips community. The map represents the immigrant population using the number of people who do not speak English as a first language. Many of the immigrants come from warmer climates than Minnesota and have a difficult time adapting to the harsh winters. Additionally, lack of information available to people in their native language is difficult to find. Although information is becoming more widely available in Spanish, there is a growing Somali population to consider. Workshops and dissemination of information in peoples' native tongue will help increase the knowledge of improving home energy efficiency and conservation throughout the entire community.

Energy use

According to the Department of Energy's Energy Information Administration, households in the west north central area of the Midwest (i.e. Minnesota, North Dakota, etc.) use 10,930 kWh annually for electricity. The price for electricity in Minnesota is 10.02 cents/kWh as of August 2008 (EIA, 2008). At that price it can be calculated that the average Minnesotan spends $1,095 annually for electricity. Additionally, as 68% of Minnesota homes use natural gas for heat (EIA, 2008), it is necessary to consider that Minnesotans consume 107.8 million BTUs of natural gas. Map 4 illustrates that this is true for the Phillips community as well. In fact the average percent of homes using natural gas is 71%; slightly higher than the state average. It can further be



Map 4 Produced by Author. Data Source: US Census Bureau

calculated, at a price of $1.03/therm (MN Energy Challenge, 2008) that Phillips residents spend roughly $1110 a year on natural gases. In considering both electricity consumption and natural gas for heating and cooking, Phillips residents can expect to pay as much as $2,200 on their energy needs. As previously stated, Phillips residents earn a median income of $22,044, thus Phillips residents spend who earn at this level or below spend at least 10% of their income for energy purposes.

Challenges

The Phillips community poses many challenges for increasing energy efficiency community-wide. Many residents are renters, which has the implication of high turn over and ambiguities over who is responsible for the energy bills (renter or landlord). Many families are low-income and cannot afford to pay to have major repairs on their home to increase efficiency. There are also cultural and language barriers that make communication and education difficult. A neighborhood energy plan that considers these factors and creates a strategy for implementing a strong efficiency and conservation plan would be beneficial to all members of the community. The next section of this report will explore what the Phillip Community Energy Cooperative already does for the community and things that it can do in the future to help residents decrease energy use and increase savings, while creating jobs and working towards a more efficient and greener community that will serve as a model for the rest of the city.

Phillips Community Energy Cooperative

Phillips Community Energy Cooperative

The Phillips Community Energy Cooperative (PCEC) exists to significantly lower energy costs and increase the use of clean energy throughout the Phillips community. The program has been in place as its own organization since 2005. In that time it has helped more than 2,000 community members save money on their energy bills. It recently signed more than 700 community members up for the Minnesota Energy Challenge, which has helped save an additional 682 metric tons of CO_2 and more than $130,000 (MN Energy Challenge Team Standings, 2008). Those who signed up for the energy challenge pledged to make small behavioral changes that can make a large cumulative impact. Other programs offered by the Coop are discussed below.

Current Programs

PCEC is contracted by Xcel Energy as part of its low-income Conservation Improvement

Program. As negotiated in the contract, PCEC trades-in old appliances including air conditioners, refrigerators, and dehumidifiers, for new energy efficient appliances at a reduced price. While this program has been successful, it is not one that can sustain the Coop on its own but would serve as a good component as part of a larger efficiency program.

More recently, the cooperative has begun holding free energy efficiency workshops, which serve to inform residents about simple weatherization actions that can make a big impact on energy use. These workshops have had low attendance in the first run, however, as the need for energy efficiency increases and word spreads about these classes, it can be expected that they will become an important resource for Phillips residents.

Expanding the Cooperative

In order to truly impact the community and increase energy savings in the community, PCEC must expand its programs in a way that confronts the challenges posed by the community and implements a plan that successfully reduces energy consumption across the community.

Weatherization

Currently, PCEC distributes weatherization kits that include CFLs, plastic for sealing windows in the winter, and door sweeps to prevent cold air from getting in and warm air from getting out. These materials are the basics for simple winter weatherization. However, it is only enough to get a family started. There are many tools available for properly sealing a home that people are not aware of. It is estimated that drafty windows can account for up to 25% of a households heating bill (EERE, 2008). It is therefore important that community members understand how to properly weatherize their windows in the coldest months. Increasing the number of energy efficiency workshops in the fall will help community members be better prepared for the winter. Further, it is important to develop a feedback tool that helps residents see how much they are saving through their actions.

Energy Audits

Energy audits are a useful and tangible way to help residents understand how air moves throughout their homes and what measures, specific to their home, would be best to take. Additionally, as PCEC expands to meet the needs of the community, residents could be trained to become energy auditors, which would further benefit the community with job creation.

Insulation

According to the Department of Energy, only 20% of homes built before 1980 are well insulated (EERE, 2008). As was previously seen, a majority of the homes in the Phillips community were built prior to 1960, therefore, a program that helps to insulate the older homes in the neighborhood would be highly beneficial. A well insulated home reduces heating and cooling needs by up to 10% (EERE, 2008). A well insulated home also has the benefit of muffling outdoor noise making it quieter and cozier inside.

Creating a program that brings together energy education, energy audits, weatherization, and insulation will have tremendous impact on a low-income neighborhood with an old housing stock. Energy savings could be further increased with the installation of a variety of renewable energy technologies.

Renewable Energy

Energy efficiency is an important step towards reducing greenhouse gas emissions, but will not be enough on its own to meet the challenge of stabilizing emissions and reducing the concentration of greenhouse gases to a safe level. Beyond the threat of climate change the transition to renewable energy will have environmental and health benefits by eliminating the need for burning dirty fossil fuels. Installing solar panels on the roofs of Phillips residences, using geo-heat-exchange, and urban wind turbines would transform the way in which the community receives energy and reduce the need for more transmission. Taking the lead in urban renewable technology would help to provide a community that has seen its share of pollution with clean energy and hope for a brighter future.

Next Steps

As the Coop moves forward and considers what programs to offer its members, it needs to evaluate what programs will be the most beneficial and have the greatest impact on the community at large. In order to do so, there needs to be an evaluation of community stakeholders and how their needs can be met. Further, an analysis of what other organizations have tried could be useful in providing an example of what may or may not work in a community like Phillips. Finally, an implementation plan that includes an evaluation component to provide guidance will be key to the success of the Coop. The remainder of this report looks at stakeholders from the community perspective and offers ideas for how to meet the needs of various groups. An analysis of what has been proposed in Milwaukee, Wisconsin with the Me2 program, and the PAYS program piloted in communities throughout the nation will be provided. Next suggestions will be

made for how to implement a successful plan. Finally recommendations will be made on how to move forward.

Stakeholders

Involving the key stakeholders in the energy planning process is important. An evaluation of who are significant players and what needs have to be met is crucial for the implementation of a successful plan. Included as key stakeholders, are: PCEC members, Phillips residents, neighborhood organizations, public housing, Little Earth of United Tribes, as well as the Department of Commerce and the local utilities; Xcel Energy, and Center Point. Understanding how each stakeholder is currently being served and how their needs could be better be met through Coop programs will discussed for each of the stakeholders in this section.

PCEC Members

There are currently more than 1,800 PCEC members who have signed up since 2003. Each member, upon signing up, receives an energy kit, which includes compact fluorescent light bulbs, window insulation kits, and educational materials with tips on how to save energy, all inside a canvas tote bag. Additionally, members are eligible to take advantage of the appliance trade-in program mentioned previously. Although getting community members to sign-up for the Coop has been successful, often follow-up and evaluation of energy savings have been lacking.

Currently, there is not a system for members to track their savings or for PCEC to know if steps have been taken to reduce in-home energy consumption. There is limited interaction between the Coop members and PCEC after the member is signed up beyond a quarterly newsletter and the annual meeting.

The relationship between PCEC and its members has significant room for improvement. Increased communication and opportunities for more energy services including educational workshops, energy audits, and home weatherization would allow for more interaction and the possibility of an evaluation system, which would provide members with tangible feedback. Such an increase in member involvement would strengthen the base of the Coop and would help give PCEC visible progress as it implements new programs. As a cooperative, the existence of PCEC is driven largely by its members. Therefore, increased focus on membership involvement is essential to the future of PCEC.

Phillips Residents

To become a member of PCEC a person must live, work or own property in the Phillips community. Since there are nearly 20,000 people residing in the Phillips community, with fewer than 2,000 signed up as members, there is considerable potential for the Coop to expand its member base. However, as previously mentioned, the fact that the community is low-income, has a high renter population (suggesting a transient population), and is prone to language barriers are challenges that will make it difficult to build and maintain a strong and consistent membership. In order to meet the needs of residents, these challenges must be factored into any plan moving forward. There is great opportunity to reduce the energy consumption in Phillips, whether it is through education and behavioral changes, or energy efficiency through more permanent weatherization of buildings, or both. Increasing membership among local landlords will be key when addressing structural improvements, and easing reach out efforts to help educate tenants about how reductions in energy consumption can be beneficial.

Little Earth of United Tribes

Little Earth of United Tribes is an urban housing complex that provides affordable homes to primarily Native American residents. In the past year, Little Earth has become a local leader in urban renewable energy use by installing solar panels on the roof of its principle building.

Little Earth is home to more than 900 people living in 212 housing units. Many Little Earth residents are currently members of the Coop, however a broader membership from the community and better and more concentrated outreach efforts on behalf of PCEC would be mutually beneficial. As Little Earth moves forward with the installation of renewable technology and energy conservation measures, PCEC can provide educational assistance for conservation measures and learn what renewable practices work best from Little Earth. Increasing efforts in a community like Little Earth of United Tribes will allow PCEC to have a positive relationship with a valuable community asset.

Neighborhood Organizations

There are four neighborhoods that comprise the Phillips Community: East Phillips, West Phillips, Ventura Village, and Midtown Phillips. Currently, there is a loose relationship between PCEC and the neighborhood organizations; information about the Coop is funneled through these organizations, usually at monthly meetings. Since, the Phillips community is rather large, it would be helpful for the Coop to build a stronger relationship with the smaller neighborhood organizations and to push for representation within each of these neighborhood groups.

Public and Affordable Housing

There are several public housing high rises in the Phillips community including the three Hiawatha Towers the two Fifth Avenue High Rises. Energy audits and education would benefit residents as well as the City of Minneapolis. Lower energy costs as a result of behavioral changes and more energy efficient appliances would lower the cost of maintaining these units and help residents better understand personal energy consumption. Holding on-site informational sessions would help build a relationship with residents in the community and would allow important information to be more accessible for a wider range of people. It will be important to offer classes in a variety of languages depending on to whom the classes are directed. There will also need to be various times offered to accommodate for differing schedules. It would be useful to train building residents to lead the classes. This will help to provide a more comfortable setting for the classes and increase the likelihood of higher participation and increased resident investment in conservation. Similar opportunities are available through partnerships with Hope Community, PPL, and other neighborhood affordable housing organizations.

Local Schools

Educating students is one of the best ways to get out information about energy efficiency. Working with neighborhood schools to help educate the younger population will not only improve energy related behavior now, but will help to get kids interested in energy issues and better prepare them for the future. Engaging students through in class presentations and getting them involved in neighborhood projects will help increase their knowledge and willingness to participate.

Department of Commerce

Minnesota State Statute 216B.24 gives the Department of Commerce the authority to ensure the low-income conservation improvement programs (CIP) are executed by the utilities in the State of Minnesota. Currently utilities providing customers with natural gas are required to spend at least .2 percent of its gross operating revenue on low-income programs. Additionally, electric utilities must spend at least .1 percent (.2 percent by the year 2010) on low-income programs (MN Statutes Subd. 7a, 2008).

In order to meet the requirements described above, “a utility or association may contribute money to the energy and conservation account” (MN Statutes Subd. 7b, 2008). For the purpose of establishing a low-income program, “the commissioner shall consult […] organizations engaged in providing energy and weatherization assistance to

low-income persons" (MN Statutes 7c, 2008).

PCEC has been able to receive funding from Xcel Energy through the low-income CIP program, as enforced by the Department of Commerce, to do energy efficient appliance trade-ins. However, the program has limited potential and a more comprehensive and intensive program would be better worth the funding and more beneficial to the neighborhood. Working with the Department of Commerce to create a plan that better serves the community through home insulations, heating system upgrades, and other retrofitting improvements would serve as a better and more efficient use of the CIP funding. Further neighborhood benefits would come from the potential jobs that could be created through program expansion. Additional collaboration between the Department of Commerce, PCEC, and the major utilities is necessary before any project moves forward.

Utilities

Xcel Energy

To date, Xcel Energy has been the major source of funding for PCEC. For that reason there has been limited flexibility as far as the variety of programming that can be carried out by PCEC. The primary program at PCEC has been the appliance trade-in program, previously discussed. Although the trade-in program is a good way to get inefficient units out of people's homes and more energy efficient appliances in, it is not sustainable, nor does it address the larger problem of old, leaky-air homes in the South Minneapolis community.

Much of the energy needs of the community could be addressed through more intensive energy conservation as well as behavioral changes through increased education and communication. In an effort to improve the relationship between Xcel and the Phillips community, PCEC can implement a program that both addresses the needs of the community as well as fulfills the Xcel's low-income CIP requirement.

Center Point

Although Center Point and PCEC have not worked together much in the past, there is significant room for future relations. Nearly two-thirds (or more in some parts of the community) of the housing stock uses natural gas as the primary source for heat. As mentioned earlier, heat is a major user of energy and working with Center Point to help residents reduce their consumption of natural gas would benefit community members with lower bills and will help Center Point meet its low-income CIP agreement.

Case Studies

This section looks at what other communities are doing around the country to address energy problems through conservation and home improvements. The programs looked at here include: the Pay-As-You-Save program implemented in several states throughout the nation and the Me2 program in Milwaukee.

Pay As You Save (PAYS)

Pay As You Save (PAYS) pilot programs have been implemented in several states throughout the country. The way in which PAYS works is described here: The upfront costs for the purchase and installation of an energy efficient product is provided by a customer's electricity distribution company and is repaid through the a service charge on the customer's monthly bill (Cillo, 1999). In order for PAYS to be successful, it must be determined that the product and/or infrastructure installed will save more money than it will cost. In order for this to be beneficial to the customer, the monthly charge for such a product must be set so that the annual costs are less than the annual savings (Cillo, 1999). Further, for any permanently installed measures (i.e. those that stay with the structure), such as geothermal heat pumps (opposite page), the energy charge is assigned to the meter location. Therefore, a customer's obligation to pay an energy service charge for a permanent product ends when that customer's occupancy ends. The charge is then passed on to the next customers occupying that location, who will still be paying less than they otherwise would have without the product installation. In the case of shorter life and removable measures, such as compact fluorescent light bulbs or room air conditioners, customers will be required to pay any remaining balance or have it transferred to their new location when they move (Cillo, 1999).

There are several barriers preventing consumers from installing energy efficiency products or making major investments in energy saving infrastructure. Some barriers include a lack of money, lack of technical expertise, and uncertainty about one's continued occupation at a particular location. Often, because of these obstacles people do not feel comfortable making major purchases to upgrade their homes. Additionally, renters have very little incentive to make any changes as the time of their occupancy tends to be much shorter than those who own their homes and they are not willing to invest in property they do not own.

PAYS programs seek to eliminate many of those barriers by eliminating the burden of upfront costs for the consumer, relieving any worries about continued payment upon changing residences, and making the payback virtually invisible through savings measures.

Milwaukee Energy Efficiency (Me2)

The Center of Wisconsin Strategy (COWS) and the City of Milwaukee have been working on a citywide building retrofit project, Milwaukee Energy Efficiency (Me2). This program eliminates upfront costs on home retrofit projects for owners and renters through a pay as you save system. Extra benefits resulting from the project are cost savings for consumer, a reduction in greenhouse gases, and the creation of jobs.

The project works like this: Me2 would receive capital for the cost of the work from public and private sources. An energy audit is performed to determine how much energy is consumed before and after the retrofit. A portion of the dollars saved are then used to payback the cost of construction. The money will either be paid back as a service charge on the utility bill or on a municipal service bill, which will be collected by Me2 and repaid to the lender. The money flow can be seen in Figure 4. In the end, the renter or homeowner will not have had to pay the upfront cost and will pay less on their energy bills. Further, the program eliminates the risk a renter or homeowner might take by participating in this program, in that the payback stays with the building rather than the occupant. Therefore, if a renter participates in this project, then moves, the surcharge on his or her energy bill does not follow to the new place of residence, but rather stays where the retrofit occurred and the new tenant inherits the charge as well as the savings.

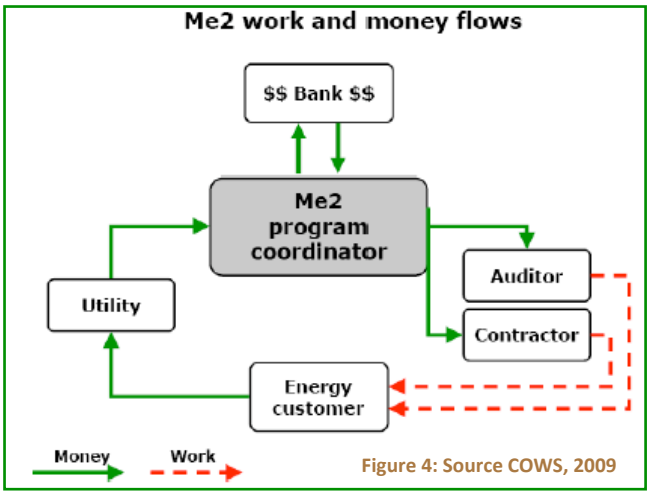


Figure 4: Source COWS, 2009

As demand grows for this project, so too will the need for workers to fill positions as contractors, energy auditors, and construction workers. Me2 estimates that thousands of jobs will be created as a result of this project. Further, these jobs will be available to those who are often excluded from the workforce, provide local employment, and room for advancement (COWS, 2009).

Implications for PCEC

The two case studies discussed in this section, ME2 and PAYS, each set out to eliminate common barriers to the installation of energy saving measures: cost, knowledge, and certainty of where one is going to live. These are helpful models, particularly in a

community like Phillips, where there is a high renter population (uncertainty), low-income (inability to pay), and lack of information and language barriers (limited knowledge).

Particularly important for the Phillips community is the emphasis the ME2 program places on job creation. The creation of good local jobs in the Phillips community will have tremendous positive social impacts and will help to build a stronger community as neighbors increase interaction.

By implementing a program that contains some of the elements of ME2 and PAYS, PCEC can tackle problems associated with a high renter occupancy, low-income, social diversity, and an aged housing stock community. Retrofitting homes, providing jobs, and increasing community awareness will help create a neighborhood the City of Minneapolis can be proud of. The next section will layout the foundation of a program suitable for PCEC using ME2 and PAYS as models. Included in the plan will be an implementation strategy along with evaluation criteria that will help demonstrate project success.

Implementation and Evaluation

Program

The ME2 and PAYS programs have been very useful for identifying and overcoming barriers to implementing major energy efficiency improvements in residential areas. The model described in this section was inspired by various components of these case studies and adapted to fit the environment of the Phillips Community Energy Cooperative.

To date, PCEC has received funding from Xcel Energy as part of a low-income CIP contract. The funding has been used primarily for the appliance trade-in program. Although the replacement of energy-efficient appliances for inefficient units has its benefits, it is not ideal for sizeable reductions in energy consumption. A plan that targets the largest area of residential energy waste (e.g. heating and cooling) is a plan that will achieve visible results. Retrofitting homes and the installation of energy efficient infrastructure along with renewable energy systems will result in real savings that can be seen by the customers on their monthly bills, and by the utility companies as they report savings acquired through conservation investments. The plan described below will demonstrate how the CIP funding can be better utilized to achieve substantial energy consumption reduction.

Step 1:

As illustrated in Figure 5, the major funding for PCEC will continue to come from the low-income CIP programs mandated by the State. The amount will be determined through negotiation and collaboration with the Department of Commerce and the appropriate utility (Xcel or Center Point). The CIP funding will go into a revolving account managed by PCEC. The funds will then be used by PCEC to pay for the upfront costs of

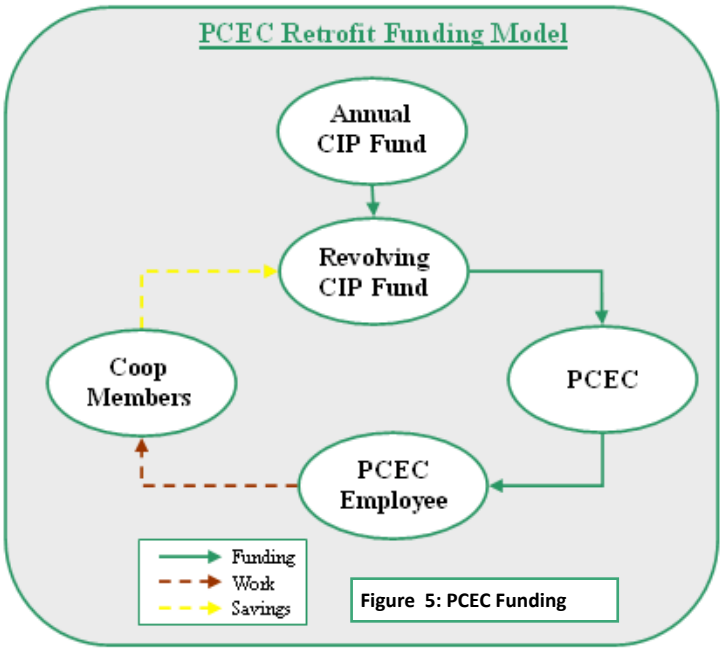


Figure 5: PCEC Funding

home improvements made as determined by energy audits and potential renewable energy systems.

Step 2:

PCEC will be responsible for the incoming funds, setting up home energy audits and retrofit projects. PCEC will use the CIP funding to pay for energy audits and the work involved in the home improvement projects. Additionally, PCEC will need to keep strict track of spending and savings in both dollars and energy savings (i.e. kilowatt-hours, or therms)

Step 3:

Low-income users must occupy homes that are eligible for energy improvements if low-income CIP funds are paying for the improvements. Additionally, homes that require such improvements will be approved upon energy audits. Work will be performed on homes that meet all criteria and all work performed on eligible homes will be paid for upfront by PCEC with the CIP funding. Initially, the work may need to be contracted out, however, as PCEC expands, it should hire and train people from the community to

perform the work.

Step 4:

PCEC members will benefit from not paying the upfront costs and by realizing the savings resulting from these home improvements. Similar to ME2 and PAYS, a portion of the money saved will be used to payback the project costs. The portion that will be paid back will show-up as separate line item (similar to purchasing wind credits) on the appropriate utility bill. That money will then be put into the revolving account.

In order to avoid problems associated with the high renter population in the community, the bill for permanent projects will remain with the property and will be transferred to the next tenant. It will also be important for different members of the community to be represented among the PCEC workforce in order to reach all populations in the community and to not leave anyone out due to language or cultural barriers.

Evaluation

In order for this program to be successful, proper and precise evaluation of customers' savings must be tracked and reported to the utilities. A quality record of these numbers will also be useful to demonstrate in what areas the program is having success and where it might be inefficient. This will allow PCEC to make improvements to the program and increase its efficiency. Table 1 provides a sample form that could be used to track savings. Creating a database will be useful not only to demonstrate project success, but also to be able to show residents how much they are saving through energy improvement measures.

Table 1. Sample Evaluation Form

Audit			Post-Retrofit Cost Savings Analysis				Utility Bill
Member Info	Use (Kw-h)	$	Kw-h	$	Monthly Surcharge	Savings	Remaining Balance
Date							

Recommendations and Conclusion

The implementation of a program as described is ambitious and will require a lot of work. In order to ensure the program is successful the following is recommended:

1. Prepare a proposal to present to key stakeholders and be open to feedback and suggestions.
2. Work with the Department of Commerce, Xcel, and Center Point to determine program viability.
3. Hire additional staff to assist in the development of this plan.
4. Develop a program that includes simple home energy kits, home energy and conservation workshops, larger home energy improvement projects, and eventually neighborhood renewable energy projects.
5. Work with key community leaders to gain community support and participation.
6. Initiate and plan for a pilot program of 10-25 homes. Determine exactly what projects are to be implemented in these homes (i.e. weatherization or heating and cooling systems). The pilot project should focus on one or the other in order to produce the most accurate results.
7. Develop and employee training program to recruit individuals from the community to perform necessary work.
8. Develop long-term strategies to incorporate renewable energy projects into home improvement plans.

Conclusion

Implementation of a clean community energy plan is consistent with the goals of the City of Minneapolis as stated in the Minneapolis Greenprint 2008 Environment Report. The report states that the city is committed to reducing carbon dioxide emissions by 20% by 2020 (Minneapolis Greenprint, 2008). Saving energy through home energy improvements, conservation education, and the installation of renewable technologies will help the city reach its goal.

Supplementing this program with educational workshops on-site, at homes and in schools will further help save energy by going beyond technological improvements to behavioral change. Further, accurate records and diligent execution of this project will demonstrate how intensive energy efficiency programs can impact energy savings and benefit a community in need.

The Phillips Community Energy cooperative is in a position to change not only the Phillips community, but to lead the way for changing communities around the city, state and the world by creating an energy responsible model for all to follow. Implementing such an energy plan would allow the Phillips community to be the center for home energy efficiency programs that provide relief on energy bills, create jobs, spread knowledge, build a community and help work towards mitigating the effects of global climate change.

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