Target Populations to Receive PCEC Assistance in Minneapolis, Minnesota

Advanced Geographic Information Systems: Concepts and Applications Class
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In Conjunction with
The Phillips Community Energy Co-operative
The Green Institute
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Suite 110
Minneapolis, MN 55407
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Executive Summary

From October 2005 to December 2005, the Macalester College Advanced Geographic Information Systems: Concepts and Applications class conducted a study in conjunction with the Phillips Community Energy Co-operative (PCEC) to determine target populations in the city of Minneapolis eligible to receive free, energy-efficient refrigerators and air-conditioning units. PCEC previously received a grant from Xcel Energy to distribute these refrigerators and air-conditioners to people who meet the following criteria:

- Recipients must earn less than half of the median income of the state of Minnesota.
- They must own the appliance to be replaced.
- The refrigerator or air conditioner to be replaced must be more than ten years old.
- The recipient must live in a housing structure with less than five units.

The primary goal of the Macalester study was to identify 3,000 homes in Minneapolis that would be likely to meet the above required criteria. A separate component of the project was to create a profile of PCEC’s membership base in the Phillips Neighborhood.

We acquired data from the U.S. Census Bureau and produced maps using a Geographic Information System (GIS). The city was mapped by block group, a Census jurisdiction of about 1,500 residents. To generate maps for the refrigerator/air-conditioner replacement component of the project, we chose a select group of variables that would indicate whether homes in a certain block group were likely to qualify for replacement units and mapped the occurrence of these variables throughout the city.

After mapping these variables we used index values to create a composite map that would depict all four variables on one map. The purpose of this suitability index was to standardize each variable to a range of scores. A block group score is a calculation that includes scores of all four variables, allowing us to determine which block groups match most closely with all of the qualifying requirements for a replacement unit. Each variable was weighted according to its importance determined by PCEC Director Jeff Cook-Coyle. The income index was doubled in weight, housing age weighted 1.5 times, owner occupied units stayed at one, and housing units per structure were half the original value. Therefore, areas with the highest index values are the areas most likely to meet the qualifications for replacement refrigerators and air conditioners. The final map identifies three block groups in Minneapolis that are likely to meet all of Xcel’s specifications, representing approximately 1,266 homes. Block groups in the moderately suitable category are also likely to have homes that qualify for refrigerator replacement.

We created the profiling component of the project from membership lists provided by PCEC and data from the U.S. Census Bureau. We created 13 maps outlining the locations of PCEC members in the Phillips neighborhood and the distribution of racial groups in the neighborhood. The center of the Phillips neighborhood is its most ethnically diverse area, and is also the area that is most likely to qualify for replacement refrigerators. Its racial composition is approximately 30% White, 25% Black, 25% Latino or Hispanic, 15% Native American, 15% Some Other Race, and 10% Asian. It also has a membership rate of approximately 40%.
After analyzing the data, we make the following recommendations to PCEC:

1. Target the following areas for refrigerator replacement: Block Groups 270530001021 and 270531009005 in North Minneapolis and Block Group 270531072001 in the Phillips Neighborhood (see Map 1, page 7).

2. Begin distribution of refrigerator/air-conditioner replacements in the central portion of the Phillips Neighborhood, the area of Phillips most likely to qualify for units.

3. Target block groups that fall just above the median income for Minnesota.

4. Begin a PCEC membership drive in Eastern Phillips, where membership rates are lowest.

5. Expand programming and initiatives into North Minneapolis, an area that qualifies for refrigerator/air-conditioner replacements and would likely benefit from other PCEC assistance.
Map 2

Suitable Target Areas for PCEC Work

- **Phillips Neighborhood**
- **Major Roads**

**Suitability Index**
- **0**, unsuitable
- **1 - 81**, least suitable
- **82 - 240**, moderately suitable
- **241 - 562**, most suitable

The Suitability Index identifies ideal block groups for PCEC to target its work based upon a multiplicative weighted index of individual factors. Four suitability categories, based on final index scores, are identified.

Data: Macalester College; Census 2000
Mapmaker: Emiko Guthe
Date: 12/12/05
Introduction and Background

As fuel prices rise, the cost of powering a house climbs as well. Many residents of Minneapolis struggle to keep up with these costs and find themselves at the mercy of the energy companies. The Phillips Community Energy Co-op (PCEC) is trying to help residents to reduce their energy bills through more efficient home appliances. A self-described urban energy co-op, PCEC works to help members save money on their utility bills by providing affordable, energy-efficient products and services (The Green Institute, 2005). These include distributing compact, long-lasting fluorescent light bulbs and window insulation kits as well as replacing window air-conditioning units and refrigerators with newer, more efficient appliances. Until recently, PCEC has focused on serving residents of the Phillips neighborhood. Now it hopes to extend its services to include all of Minneapolis.

Minnesota state law requires public utilities to invest a portion of their state revenues in projects that encourage reducing energy consumption and improving efficiency of energy use (Minnesota Department of Commerce, 2005). These projects have been aptly named Conservation Improvement Programs. Xcel Energy, one of four electric providers in Minnesota, is required to invest two percent of its revenues in these projects, which it distributes to several different organizations. In 2004, PCEC received 10 percent of Xcel’s Conservation Improvement Programs funds to finance its operations in the Phillips Neighborhood (PCEC Informational Handout, 2005). For 2006 Xcel will consolidate its efforts and put one organization in charge of the entire Conservation Improvement Programs budget. In 2006, Xcel seeks to replace 192 refrigerators and 256 window air conditioner units, and PCEC aims to be the organization to take charge of this project.

As a class of advanced Geographic Information Systems (GIS) students, we have been consultants for PCEC to help them learn more about the Phillips Neighborhood and their members, and to identify likely communities in Minneapolis that could use their help. PCEC Director Jeff Cook-Coyle identified criteria often used to ascertain the potential need of communities to guide our efforts. The objectives of this project were to identify areas likely to have residents who meet these criteria, and thus likely in need of a replacement appliance, and to map the locations of PCEC members and learn more about them. To accomplish these objectives, we used GIS to analyze a variety of demographic data for Minneapolis.
Methodology

Using 2000 Census Data, we gathered indicators that would be used to determine PCEC’s target area for its refrigerator and air conditioner replacement program. These indicators were determined by Xcel Energy’s grant requirements and include income level, housing type, housing age, and housing tenure. To qualify for Xcel’s grant money, the recipients of the new refrigerators and window air conditioning units must meet four conditions:

- The recipients must earn less than half of the median income of the state of Minnesota.
- They must own the appliance to be replaced.
- The refrigerator or air conditioner must be more than ten years old.
- The recipients must live in a housing structure with less than five (5) units.

We examined data from the 2000 US Census of Population and Housing to determine geographic areas in Minneapolis that are best suited for PCEC’s program. We created maps detailing each of these characteristics for the city of Minneapolis, using the Census-defined block groups, a unit that incorporates an average of 1,500 people. By mapping the data, we were able to find the areas that had the highest percentages of people who satisfied each of the individual conditions listed above.

To combine the four maps into one, we created the suitability index, which integrates a series of data into a single value, allowing for the compilation of many characteristics into one output. Indices are commonly used in mapping to incorporate many variables into one final output.

The values for the variables are assigned ordinal numbers, which indicate their relative rank. In this case, each of the variables, with the exception of income, in each block group was assigned values of 1 to 5, with 1 corresponding to the value that least fit our qualifications and 5 corresponding to the value that most fit our qualifications. Income was assigned a value 0 to 5, with 0 corresponding to values greater than 70% of the median household income of the state and 1 to 5 corresponding to the remaining values. Creating a 0 value for income eliminated the block groups that were outside of the income range determined by Xcel and would not qualify to receive a replacement refrigerator under any circumstances.

These index values were then weighted to indicate the relative importance of each variable. The relative weight of each variable was determined in consultation with PCEC Director Jeff Cook-Coyle. We then combined the four maps that we had created, incorporating income, housing type, tenure, and housing age data together to form a single index map that defined the block groups in Minneapolis whose residents are most likely to qualify for PCEC’s program. (see Figure 1)
Figure 1 – Index Construction

US Census 2000 Data

- Median Income
- Housing Built Between 1980 and 1994
- Owner Occupied Housing
- Housing Stock Fewer than Five Units

Suitability Index
Suitability Index

Indices are often constructed in situations where multiple variables are combined to produce a single output. Earl Babbie (1998, p. G3) defines an index as, “a type of composite measure that summarizes several specific observations and represents some more general dimension.” The specific observations that are of interest to PCEC are the percent of people in Minneapolis that qualify for all of the conditions outlined above, dictated by Xcel Energy’s grant program. By using an index, we were able to indicate which areas of Minneapolis best fit all of the given requirements.

Indices are often used in social science research and policy analysis for several reasons. First, social situations are often complex and best reflected by a combination of variables instead of a single indicator. Second, an index makes it easier to create an ordinal set of values in order to rank objects under some set of criteria. Lastly, indices are good for analyzing data, as it combines several factors into one, instead of simply comparing raw data. (Babbie 1998) In these ways, an index is the best choice to determine which Minneapolis block groups are best suited for PCEC’s program. There are several indicators that need to be combined into one rating of suitability, ranking the block groups allows PCEC to concentrate its efforts to maximize efficiency, and the index will allow the comparison of several data sets at one time.

The individual indicators (income, ownership rates, etc.) were weighted and combined to create a single value that can be used to target areas of interest for PCEC and its refrigerator and air conditioner replacement program. Weighting was done based on recommendations of Jeff Cook-Coyle, who ranked the indicators in terms of relative importance. Weighting determined by policy makers and/or experts in the field is a standard practice in index construction (Booyse 2002; Drewnowski 1972).
**Income (Map 3)**

**Variable:** Because PCEC cannot provide refrigerator replacement to households with more than half the state median income, this variable was included as the first in our index.

**Patterns:** Block groups with the lowest median household income (a score of 5, the darkest blue on our index) are concentrated in the northern center of Minneapolis, but within that area seem relatively dispersed. There is a large collection of block groups around the river next to downtown that do not qualify for inclusion in the index. In the fifth category, all block groups border major roads. It appears that housing with close proximity to a major road tends to have residents with lower median incomes.

**Phillips Neighborhood Patterns:** Most of the Phillips Neighborhood is qualified based on the income requirement for refrigerator replacement.

**Problems:** It was difficult to decide where to make the cut-off, because many block groups have a median household income very near the $23,555.00 figure that is half of the state median household income. Many individual households in such block groups will qualify below $23,555. Also, in order not to discount the other variables that we have, we chose to broaden the range of households to include median income up to 70% of the state median.
Map 3

Median Household Income by Block Group
Minneapolis, MN, 1999

Index values represent the median household income for a block group.
The value 5 indicates a high median income, not exceeding $32,805.
The value 1 indicates a low median income.

Data: US Census
Mappmaker: Jamie Brooks and Elena Bulat
Date: December, 2005
Composition of Housing Stock (Map 4)

**Variable:** Multi-unit housing with more than five residential units per structure is ineligible for refrigerator replacement. This variable was included to exclude multifamily units with more than five households.

**Patterns:** There is a strong concentration of housing structures in the city center that have more than five units per structure. The lightest blue areas indicate that less than 17.3% of the residential properties in these block groups are single family homes, or even duplex properties. That would imply a high rate of renter occupied household in these same block groups, which you can see on the next map. There is a corridor of block groups that have a low percent of housing stock with fewer than five units per structure south west of the city center, neighboring the Phillips Neighborhood.

**Phillips Neighborhood Patterns:** The Phillips neighborhood has a more diverse housing stock, but no block groups that fall below 17.3%, meaning that all the block groups in Phillips have more than 17.3% multifamily housing units with more than 5 residences per structure.

**Problems:** The data was based on a sample and not a population collection, which is a technique used by the Census collectors that sometimes can lead to misleading data.
Map 4

Housing Units Per Structure Index
Minneapolis, MN

Index Values
(by block group)
1 (0-20%)
2 (21-46%)
3 (47-71%)
4 (72-90%)
5 (91-100%)
No Data

This index was created using the percentage of the housing stock with fewer than five units per structure in each block group. The data was broken into five categories using natural breaks classification. Higher index values indicate a higher percentage of housing with fewer than five units per structure.

Data: Census 2000, SF3
Mapmaker: Sara Nelson
Date: 12/2005
Housing Tenure (Map 5)

Variable: This variable is included in the index because refrigerators can only be replaced in owner-occupied houses. Air-conditioner replacements are targeted at participants who are renters because they are likely to own these appliances.

Patterns: Renter occupied housing units are concentrated in the city center, and owner occupied housing units are concentrated outside of the downtown. Logically, the renter occupied map is very similar to the housing units map, because structures with more than five units are usually renter occupied, with the exception of condominiums. There is a visible outlier in the center of the city, where the income is high and owner occupied percentage is also high. This block group has only 42 households, and very low density of population compared to the surrounding area.

Phillips Neighborhood Patterns: There is a visible diagonal split within the Phillips neighborhood regarding this variable. The north-west side is more renter-occupied, where the southeast has a higher percentage of owner occupied properties.

Problems: The only problem that shows up on the map is the southwest block group by the river that shows up with an index score of 1. According to the Census, all of the residents of that block group live in a group home facility, so it is neither renter nor owner occupied.
Map 5

Percent Owner-Occupied Housing
Minneapolis, MN

Index Values
- 1 (0 - 20%)
- 2 (21 - 40%)
- 3 (41 - 60%)
- 4 (61 - 80%)
- 5 (81 - 100%)

Index Values denote percentage of Owner Occupied Housing Units per Block Group

Data: U.S. Census Summary File 3
Mapmaker: Fay Cleaveland
Date: November 2005
Housing Age (Map 6)

Variable: Refrigerators can only be replaced that are more than ten years old. New houses built between the years 1980 and 1994 should theoretically have refrigerators in them of the target age. Therefore these properties were included in our index.

Patterns: There is a large concentration of block groups in the city center with a high percentage of properties built during these years. There are two distinct areas with an especially high concentration near the city center, and one block group in the southeast corner of Minneapolis with up to 75.2% of the housing stock built during this time. Other than these areas, there is a lack of housing built during this period, most block groups register under 11%. There seems to be a horizontal stripe across the city, with more housing during this time built in an east west direction, than in north.

Phillips Neighborhood Patterns: Most houses in the Phillips neighborhood were built prior to 1980, and the percentage of housing stock built during this period is low, most block groups have less than 11%. There are several block groups in the center that have up to 24.3% housing stock built between 1980 and 1994.

Problems: The main question with the housing age data was whether or not it really is a good indicator of having a refrigerator over 10 years old. This variable does not directly tell us anything about the age of refrigerators, and many scenarios could have an effect on refrigerator age besides age of the house.
Map 6

Housing Age Index

Phillips Neighborhood
Major Roads

Index Values

1  (0-4.9%)
2  (5%-10%)
3  (10.1%-20%)
4  (20.1%-40%)
5  (40.1%-75.2%)

Each index value represents the presence of housing units built between 1990 and 1994.
The presence of housing built in this time period is reflected in the index value and its corresponding percentage range.

Data: U.S. Census 2000
Mapmakers: Andrew Percival and Laura Meinke
Date: 11/28/05
Analysis of Suitability Index and Findings

The Suitability Index describes the most ideal block groups in Minneapolis for PCEC to target its work. It is a compilation of the individual indicators of income, age of housing stock, percent owner occupied units, and number of housing units per structure. Individual indices define a portion of the query as determined by PCEC, but the final index allows all four of the individual indicators to be compiled into one comprehensive map which determines the best locations for PCEC to focus its work.

In creating the final index, the individual indicators’ indices were used. With the exception of the income index, each of the four individual indices range from one to five with five being the most suitable for PCEC’s work (see Table 1). The income index also includes a zero category to be able to eliminate block groups which fall above the specified range of half of the state median income. In creating the final index, each of the individual indicators was weighted (see Table 2). The income index was doubled in weight, housing age weighted 1.5 times, owner occupied units stayed at one, and housing units per structure were half the original weight. As mentioned above, this allows income and housing age to factor heavily in the final index.

Table 1

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<th>Index Rankings</th>
<th>Explanation of Rankings</th>
<th>Weight Assigned to Variable</th>
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<tbody>
<tr>
<td>Median Income Level</td>
<td>0 to 5</td>
<td>0= &gt; $32805, which is 70% MN median income</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1= &lt; $13307</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= $13308-20300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= $20301 - 24886</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= $24887 - 29107</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= $29108 - 32805</td>
<td></td>
</tr>
<tr>
<td>%Housing Owner Occupied</td>
<td>1 to 5</td>
<td>1= 0-20%</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>2= 21-40%</td>
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<td></td>
<td></td>
<td>3= 41-60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= 61-80%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= 81-100%</td>
<td></td>
</tr>
<tr>
<td>Age of Housing Stock</td>
<td>1 to 5</td>
<td>1= 0-4.9%</td>
<td>1.5</td>
</tr>
<tr>
<td>(# houses built between 1980 and 1994)</td>
<td></td>
<td>2= 5-10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= 10.1-20%</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4= 21-40%</td>
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<td></td>
<td></td>
<td>5= 40.1-71.2%</td>
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<tr>
<td>Number of Units per Structure (%)</td>
<td>1 to 5</td>
<td>1= 0-20%</td>
<td>0.5</td>
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<tr>
<td>(% housing with &lt;5 units per structure)</td>
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<td>2= 21-46%</td>
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<td></td>
<td></td>
<td>3= 47-71%</td>
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</tr>
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<td></td>
<td></td>
<td>4= 72-90%</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>5= 91-100%</td>
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After the weighted values of the individual indicators were obtained, the weighted values were multiplied together to achieve a multiplicative index. A multiplicative index was chosen to

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1 In a meeting with Jeff Cook-Coyle, he asked that more important indicators be weighted heavily.
easily eliminate the block groups which exceed half the state median income. Thus, block
groups with a final index value of zero fall above the desired median income. The final values of
the multiplicative index comprise the final index. The values range from zero to 562. Table 2
shows what the numbers in the final index describe:

### Table 2

<table>
<thead>
<tr>
<th>Category</th>
<th>Final Index Score</th>
<th># of Block Groups</th>
<th>Average Weighted Indicator</th>
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<tr>
<td>Unsuitable</td>
<td>0 to 0</td>
<td>273</td>
<td>Block Group fails to meet income criteria</td>
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<tr>
<td>Least Suitable</td>
<td>1 to 81</td>
<td>109</td>
<td>3.00 to 3.99</td>
</tr>
<tr>
<td>Moderately Suitable</td>
<td>96 to 240</td>
<td>14</td>
<td>4.00 to 4.99</td>
</tr>
<tr>
<td>Most Suitable</td>
<td>360 to 562</td>
<td>3</td>
<td>5.00 or higher</td>
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<td>TOTAL:</td>
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The final index (see Maps 7-8) shows four categories (unsuitable, least suitable,
moderately suitable and most suitable) which correspond with final index score values. The final
index score values are correlated with the average weighted indicator. After taking the average
of the weighted indicators, the index shows that the three most suitable block groups for PCEC
to target have an average weighted indicator of five or higher. For the moderately suitable block
groups, areas into which PCEC would likely find many of the target population, the final index
score tends to describe a weighted indicator of four. Least suitable areas tend to have an average
weighted indicator of 3, but the variation within the category is much more widespread than
other categories (see Appendix C for detailed data tables).

Using the average weighted indicator to describe the final index score gives a clear
pattern to the study’s findings. The three most suitable block groups are in North Minneapolis or
the Philips neighborhood. The fourteen moderately suitable block groups identified by the final
index cluster in North Minneapolis and just south of the Philips neighborhood. The final index
shows demand for PCEC’s services within and south of the Philips neighborhood as well as in
North Minneapolis.
Map 7

Target Area Reference Map
Minneapolis, MN

- Moderately Suitable
- Most Suitable
- Phillips Neighborhood

Group FIPS
1 270530001021
2 270531009005
3 270531072001
4 27053107004
5 270531015001
6 270530084003
7 270530120001
8 270531028003
9 270531028001
10 270531072003
11 270530085001
12 270530033002
13 270531016003
14 270531031001
15 270531048003
16 270531100002
17 270530027001

Data: Macalester College: Census 2000
Mapmaker: Sara Nelson
Date: 12/2005
Map 8

Suitable Target Areas for PCEC Work

- Phillips Neighborhood
- Major Roads

Suitability Index
- 0: unsuitable
- 1 - 81, least suitable
- 82 - 240, moderately suitable
- 241 - 562, most suitable

The Suitability Index identifies ideal block groups for PCEC to target its work based upon a multiplicative weighted index of individual factors. Four suitability categories, based on final index scores, are identified.

Data: Macalester College; Census 2000
Mapmaker: Emiko Guthe
Date: 12/12/05
Recommendations for PCEC

The following are our recommendations to PCEC based on the data we collected and patterns we found over the course of completing this project.

1. **Target the following areas for refrigerator replacement:**
The areas in which PCEC is likely to find the most eligible candidates for its refrigerator replacement program are in the moderately suitable and most suitable categories of the suitability index, as these have the highest average weighted index values. As Table 1 indicates, the block groups in the most suitable category contain 1,266 housing units that are likely to be within the target population. Because this number of homes is under our target goal of 3,000, we chose to include the moderately suitable category because it is likely that these block groups contain many individuals who are eligible for refrigerator/air-conditioner replacement because all are low income and have moderate to high rates of home ownership.

The block group with the highest index value, 270530001021, is located in North Minneapolis. The Mississippi River borders it and I-94 passes through it. Its suitability index value is 562, meaning it ranks high in all of the indicator categories. According to the 2000 Census, this block group has a total population of 1,134. The largest racial group is white, but there are also sizable Black and Asian populations here. A high percentage (79%) of this block group’s total housing units are owner occupied and the average household income is about 60% of the median for the state of Minnesota (U.S. Census, 2000), meaning that it is likely this block group will contain a number of individuals who meet the criteria for refrigerator replacement.

The next two highest block groups both had index values of 360. The main difference between these two block groups and the highest block group is that these two have lower percentages of owner occupied housing. One block group, 270531009005, is also located in North Minneapolis. As of 2004, it had a total population of 1,977, of which almost half is Black. About 68% of its housing units are owner occupied and the average income is also about 60% of the median for the state of Minnesota (U.S. Census, 2000), meaning that there are likely many low income individuals in this block group who are also home owners.

Block group 270531072001, located in the central part of the Phillips neighborhood, is among Phillips’ most diverse. It is 9% Asian, 32% White and 28.2% Black, with about 20% of those individuals being foreign born (U.S. Census, 2000). Thirty nine percent of this block group’s residents are PCEC members. It has a high percentage of single family and smaller multifamily units and a moderate percentage of home owners.

2. **Target block groups that fall just above the median income for Minnesota.**
Because the block group level is the smallest scale at which one can obtain Census data, many low-income individuals who would benefit from PCEC’s services may be missed because the block group in which they live has too high a median income. People whose income falls at or just above the state median are much more likely to own homes than those whose income is much lower than the state median. Thus, it is likely that block groups whose median income is slightly above the state average contain a high percentage of low-income homeowners who would qualify for PCEC assistance.
3. Expand Programming and Initiatives into North Minneapolis:
PCEC is committed to making energy efficient appliances accessible to low income residents of the Phillips Neighborhood in South Minneapolis. When making maps for this project, we noticed that many block groups in North Minneapolis ranked highly in many of the indicators as well. North Minneapolis would be an appropriate place for PCEC to expand, if resources are available.

Most of the block groups in North Minneapolis fall into the most suitable category, meaning that they have low average incomes, moderate to high rates of ownership and many single family and smaller multiunit buildings that fall within the appropriate age range. North Minneapolis also has a high percentage of Black Population, which is a group that PCEC might consider targeting (see Map 20).
Detailed Description of Data and Methods

After several introductory planning meetings with PCEC representative Jeff Cook-Coyle, we identified the concepts that would define this project. We agreed that income, housing age, single-family versus multi-family housing, and renters versus owners were all going to be determining variables in aiding PCEC locate target areas to receive energy-reducing assistance. The most readily available data source for these variables was the 2000 U.S. Census. Individual variables were assigned to small groups in our class.

Through this initial mapping process and further conversations with our client, we realized our focus need only be on the city of Minneapolis. There simply was not a concentration of people in suburban Hennepin County meeting the established PCEC criteria that recipients have an income below half of the state median. Through familiarity with their maps and data, the group decided upon the best classification system for the maps. Data familiarity also empowered small groups to determine the method in which their variable was to be indexed.
Findings Within PCEC Membership and the Phillips Neighborhood

Maps and Metadata
The maps created for the profile of the Phillips Neighborhood of Minneapolis have two different data sources. Thirteen maps came from the 2000 U.S. Census. These maps include race (6), ethnicity (1), median income (3), vacancy (1), owner-occupied housing (1), and foreign born (1). Two maps came from the PCEC membership data. These maps include members per block group (1) and percent of households that are members per block group (1).

The two PCEC membership maps (see Maps 9-10) came from geocoding all unique addresses in the provided membership database. A separate field was created for the number of members that shared the same address. This was to account for all of the apartment buildings, duplexes, and other multi-family dwellings in the Phillips Neighborhood. The members’ locations were aggregated to the block group level. This was done through the overlay method. One map was made to show the number of members per block group and another map normalized members by the number of households. The household data came from Summary File 3 of the 2000 Census. The idea to normalize by households came from conversations with PCEC stating that members were only allowed one membership per family.

General Trends in the Phillips Neighborhood
The general theme of the Phillips Neighborhood is one of remarkable diversity. The heart of the neighborhood is among the city’s most diverse racially, ethnically, and economically. Racially, the Black/African American population lives toward the west and more specifically toward the northwest nestled against Interstate 35-W (see Map 11). The American Indian population lives on the eastside of Phillips up against Hiawatha and radiating out from the 64% American Indian block group that contains the Little Earth of United Tribes housing project (see Map 12). The Asian, Some Other Race, and Latino/Hispanic populations live in the southern section of Phillips, near their respective businesses communities along Lake Street (see Maps 13-15). The White population lives in high concentrations in the northeast near the West Bank (see Map 16).

Economically, the wealth seems to be with the White population in the northeast and in the highly diverse center (see Map 17). The nature of this center is quite intriguing. The center can be defined as Census tract 1072. The average household income is roughly $30,000. There is a 45%/55% split between owner and renter. The racial composition is roughly 30% White, 25% Black, 15% Native American, 15% Some Other Race, and 10% Asian. Twenty-five percent of the community identifies as Latino or Hispanic. This Census tract also has a 40% membership rate. Census tract 1072 seems to be a stable environment for the working class minorities of the area that have experienced relative degrees of upward mobility, and thereby moved to the center of Phillips from their nearby quasi-enclaves.

Recommendations for the PCEC
The central portion of the Phillips Neighborhood seems to be the perfect place to distribute refrigerators and air conditioners to the community. This area would capture the community that has financially stable renters who might own their air conditioners and impoverished homeowners who may qualify for refrigerators.

As far as membership recruitment, the eastern part of Phillips is the best place to start. Membership could be improved by an effort to solicit membership on both Park and Portland
Avenues between Lake Street and I-94. As far as distribution of PCEC membership information, it might be helpful to distribute information in Spanish as there are many Latinos in the southeast portion of the neighborhood.

Table 3: Index Values for Most Suitable and Moderately Suitable Block Groups

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<th>Type Weight</th>
<th>Age Weight</th>
<th>Owner Weight</th>
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Map 9

PCEC Membership in the Phillips Neighborhood

Map 10

PCEC Membership in the Phillips Neighborhood

Membership by Household Percent by Block Group

- 5.13 - 14.37
- 14.38 - 23.46
- 23.47 - 34.83
- 34.94 - 46.72
- 46.73 - 65.43

These numbers represent the actual amount of members per block group.
Appendix A - Additional Maps

Map 19

White Population in Minneapolis, 2000

Percent White
(City Average = 65.1)

- Phillips Neighborhood
- 5.3 - 24.12
- 24.13 - 41.21
- 41.22 - 57.91
- 57.92 - 74.18
- 74.19 - 86.49
- 86.47 - 100

Area Units: Block Group
Classification: Natural Breaks

Data: 2000 U.S. Census
Mapmaker: Andrew Percival
Date: 11/28/2005

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Native American Population in Minneapolis, 2000

Percent Native American (City Average = 2.2)

Phillips Neighborhood
0 - 1.13
1.14 - 2.81
2.82 - 5.50
5.51 - 13.46
13.47 - 27.75
27.76 - 64.21

Major Roads

Data: 2000 U.S. Census
Mapmaker: Andrew Percival
Date: 11/28/2005

Area Units: Block Group
Classification: Natural Breaks
Map 24

Foreign Born Population
Minneapolis, MN

Percent Foreign Born, by Census Tract
- 2.08 - 6.32
- 6.33 - 11.58
- 11.59 - 20.00
- 20.01 - 30.87
- 30.88 - 45.04

Data Source: US Census 2000
Mapmaker: Emiko Guthe
Date: November 2005
Appendix B - Data Sources

All race data came from Summary File 1 of the 2000 Census and was at the block group level. The race data was for Black/African-American alone, American Indian/Alaska Native alone, Native Hawaiian/Other Pacific Islander alone, Asian alone, White alone, and Some Other Race alone. Race data were normalized by the total population to give a percentage of overall presence within each block group. These race maps exclude all people who consider themselves Bi-racial or Multi-racial.

The Latino or Hispanic data came from Summary File 1 of the 2000 Census and was at the block group level. This data was normalized by the total population to produce the percent Latino or Hispanic. This data is separate from the racial data as the U.S. Census Bureau defines Latino/Hispanic as an ethnicity separate from race.

The Median Incomes data is from Summary File 3 of the 2000 Census and was at the block group level. This data includes Median Household Income, Median Family Income, and Median Non-family Household Income.

The Vacancy and Owner-Occupied data came from Summary File 1 of the 2000 Census and was at the block group level. The number of vacancies and the number of owner-occupied housing units were both normalized by the total number of housing units to yield the vacancy rate and owner-occupied rate for each block group.

The Foreign Born data was from Summary File 3 of the 2000 Census and was at the Census tract level. The number of foreign-born residents was normalized by the total population to give a percentage foreign born.
## Appendix C – Index Values for all Minneapolis Block Groups

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<th>FIPS Code</th>
<th>Population (2000)</th>
<th>Index Values</th>
<th>Weighted Index Values</th>
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Appendix D – References

The Green Institute, 2005, “About PCEC.”


