

Dubuque's Green and Healthy Homes Initiative: A Priority Model and Recommendations for Long-term Success

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EXECUTIVE SUMMARY

This report provides recommendations and two tools (Priority Model and economic feasibility calculator for rental units) for the City of Dubuque to expand its Green and Healthy Homes Initiative (GHHI) and make it a lasting program. We present this report as a guidebook and toolset, rather than a set of directives, for the City to use as GHHI evolves. The report builds on work we began in August 2011 in partnership with City staff and the Community Foundation of Greater Dubuque (Foundation).

Our spring 2012 efforts focused on developing the Priority Model as a long-term planning tool to help Dubuque best direct its limited staff and funding resources for GHHI. We provide and explain this model in the report and recommend how to make the program sustainable through strengthened interdepartmental communication, outreach and funding efforts, and engagement of landlords and renters. For the latter topic, we also provide an economic feasibility calculator. We want to help the City ensure that GHHI is an effective green and affordable program for residents and that the entire community shares in the benefits of improved housing.

Overview of Topics and Recommendations

- **Priority Model:** This model ranks geographic areas based on a defined need for GHHI assistance. We define this need based on socio-economic, physical housing, health, energy and demographic characteristics. The model reveals that nearly 17% of the City falls within areas showing “moderate” (14.3%) and “high priority” (2.5%) GHHI need. City and Foundation staff may adapt the model by using different or new variables as they become available. Our overall recommendations are:
 - Initiate a block-by-block outreach effort based on the model output
 - Enhance data collection, specifically health data, to better refine the Priority Model
 - Incorporate the model into grant funding requests for a competitive advantage in leveraging additional program funding
 - Use the Priority Model along with the Quick App form to increase administrative efficiency by more quickly identifying units with a high probability of GHHI need
 - Address non-floodplain, and potentially, non-historic district households first
- **Renters and Landlord** issues: ways to engage landlords and renters, especially through incentives and mandates
 - Combine incentives and regulation for improving rental housing stock

- Provide marketing assistance to landlords in GHHI
- Increase renter awareness of the benefits
- Update the housing code and adopt a new energy-efficiency code for existing housing

- ***Innovative Funding*** with a focus on leveraging grants and/or using private loan products
 - Work with local financial institutions to offer effective loan products and processes
 - Include landlords' and renters' needs; limit building citations as a requirement for loan qualification
 - Support networking by financial institutions, contractors and other organizations for program marketing, loan servicing and overall program consistency
 - Consider establishing a credit enhancement fund
 - Monitor relevant state legislation

- ***Interdepartmental Cooperation Building*** to expand the increasing proactive interaction between previously siloed departments
 - Strengthen project management
 - Identify a new long-term funding option for GHHI use
 - Streamline data collection systems

- ***Participant Engagement and Outreach*** for a proactive approach to program enrollment and maintenance
 - Track first-point of contact
 - Create new partnerships and deepen existing ones
 - Use public commitments and Internet-based story telling
 - Leverage traditional and new media

INTRODUCTION

Safe, healthy and energy-efficient housing is essential to quality of life for households and communities. The national Green and Healthy Homes Initiative (GHHI) was launched in 2010 to integrate previously separate home repair efforts: weatherization, lead abatement, Healthy Homes and energy efficiency. Dubuque, Iowa, is one of 16 sites participating in the program, joining the effort in 2011. With some of the oldest housing stock in Iowa and a strong commitment to sustainability, Dubuque is an ideal municipality to participate in the program.

Streamlining and combining home repair processes can produce better outcomes for households. The underlying idea of GHHI is to break the cycle of poverty, high energy bills and bad health for income-challenged families. Often, families or individuals may need to make choices between paying for medicine or food or paying for home repairs. A home in disrepair may contribute to asthma or falls, for example. This, in turn, can lead to lost school or work days. Meanwhile, energy bills may be higher for those whose homes are poorly insulated or otherwise in disrepair. This, too, impacts households' ability to pay for repairs that in the long run could reduce energy bills.

Participants in GHHI receive \$8,000 to \$12,000 worth of repairs, based on structures completed to date. City departments and programs involved in GHHI include Housing, Homeowner's Rehabilitation Program, Operation Upkeep, Lead Hazard Reduction Program, and Healthy Homes Program. These City-based entities, along with New View Weatherization and the Community Foundation of Greater Dubuque, coordinate to integrate repair efforts—from assessing the structure and household needs to inspection of completed work. The process also includes interaction with a Home Advocate, who can help the homeowners or renters gain skills in budgeting, safe cleaning, nutritious meal preparation and mental health well-being. These skills increase the chances that a household will be able to maintain improvements achieved through the GHHI process.

While no funding is attached directly to GHHI, some communities, such as Dubuque, are able to leverage Housing and Urban Development (HUD) funds, as well as lead abatement grants. Over the long run, funding needs to be secured in order to sustain the program.

First Semester Overview

Our year-long project meets requirements for the Field Problems coursework in the University of Iowa (UI) School of Urban and Regional Planning and its Iowa Initiative for Sustainable Communities. Two overarching objectives have driven our research and recommendations since we

began our project in August 2011: 1) evaluate Dubuque's current GHHI program in numerous capacities and 2) recommend how to expand the program's efforts and maintain them over time.

Our first semester work included investigating the Green and Healthy Homes Initiative overall, and Dubuque's program specifically. In studying the initiative itself, we contacted the 15 other GHHI sites nationwide. Detailed questionnaires and phone conversations with these sites revealed best practices in administration, funding, data collection and management, and program impacts and evaluation. This information, combined with what our team learned from the GHHI National organization, formed our working knowledge of the program. GHHI National provides overall program direction and policy setting, while also aiding in a technical capacity (data collection and management).

Common best practices include: detailed case management, establishing key external partnerships, and adopting and collecting program indicators or data points. Continual monitoring of units post-intervention via individual case managers is extremely important if accurate and timely data is to be collected at the household level. It is this micro-level data that will make an eventual overall cost-benefit analysis of GHHI possible. Successful GHHI cities also have worked hard to establish and maintain creative partnerships that aid in program administration. For example, the City of Baltimore has partnered with Johns Hopkins University to employ health students as case managers. This provides a free case management service for the program while simultaneously giving valuable experience to students. In addition, successful sites have established consistent and detailed data collection points or indicators as part of their assessment procedures.

When the City of Dubuque was awarded GHHI status, they decided to immediately begin administering the program. This has had the benefit of maximizing time spent on actual home assessments and repairs. However, forgoing program implementation planning has meant learning on the fly and dealing with problems as they arise; in other words, it is a highly reactive and non-targeted process. The most obvious issue has been inconsistency in data collection and management. Without quality assessment data pre- and post-intervention, program evaluation is all but impossible. Data related to occupants' utility use and health, for example, need to be accurately collected and stored. Throughout the first semester, we gathered data metrics used by other GHHI sites, GHHI National and other metric warehousing sources and compared them to Dubuque's own program metrics.

Recap of Recommendations from First Semester

1. We recommended changes to Dubuque's GHHI data collection points (described in 2 and 3 below) and overall assessment process. Streamlining repetitive questionnaires and similar assessment forms will save valuable time for program administrators and participants.
2. Valuable health data was missing due to unavailability at the household level. Instituting a city-wide health monitoring system for collection of appropriate health data on a small scale would be ideal but possibly prohibitive in terms of cost and privacy issues. Thus, we also propose the city partner with other data agencies (e.g., the county) and enter into micro-data agreements.
3. The City should adopt our more detailed program indicators or metrics categorized by health, demographics, socio-economic factors and community impacts. These indicators serve two purposes that align exactly with project goals:
 - a. To evaluate GHHI interventions and the cumulative impact the program is having in Dubuque, and once collected and scaled up to a community level,
 - b. To identify future areas in the most need of program intervention.

Second Semester Aims

Our spring 2012 efforts focused on developing a targeting model as a long-term planning tool to help Dubuque best direct its limited staff and funding resources for GHHI. We also recommend how to make the program sustainable through strengthened interdepartmental communication, outreach and funding efforts, and engagement of landlords and renters. We want to help the City ensure that GHHI is an effective green and affordable program for all residents and that the entire community shares in the benefits of improved housing.

As noted earlier, we present this report as a guidebook rather than a set of directives. We also recognize that report users may seek information on a particular aspect of our research. Thus, the five main sections of the report can be read in isolation, if desired.

- ***Priority Model***: ranks geographic areas based on a defined need for GHHI assistance and may be adapted by City and Foundation staff as different or new variables become available through increased data sharing and availability
- ***Renters and Landlord Issues***: ways to engage landlords and renters, especially through incentives and mandates
- ***Innovative Funding***: a focus on leveraging grants and/or using private loan products

- ***Interdepartmental Cooperation Building***: how to promote interaction between previously siloed departments
- ***Participant Engagement and Outreach***: recommendations for a proactive approach to program enrollment and maintenance

Connections to Other Field Problems Projects

Our work complements research completed by the other Field Problems teams in the University of Iowa School of Urban and Regional Planning.

The *Poverty* team created an Affordable Housing Suitability Model. While their model focuses on new construction in scattered sites, our model is focused on existing structures in non-scattered sites. For more information on the Poverty team model, see [Appendix A](#).

Our work on health indicators in the first semester also complemented work by the *Sustainability Indicators* team on public health and safety within the sustainability framework. Our teams consulted with one another early in the spring semester to share information on health data accessibility and the value of such data to the City of Dubuque. Please see their report for more information on this topic.

Regarding efforts by the *Energy* team, our Priority Model mapping reveals that their alternative energy suggestions will likely not be feasible in the areas that we are targeting. First, wind energy potential is located up on the bluff areas (west part of town), which our model did not show as high or moderate priority areas for GHHI assistance. Second, the Energy team found that the use of ground-source heat pumps will be difficult due to hazardous materials in the ground. Thus, this use of alternative energy is relatively moot. Last, solar may be an option for the higher and moderate priority areas identified by our model. However, the parcels are not large enough to make good individual use of solar options (due to high infrastructure costs). There may be a better opportunity to leverage solar options if parcel owners work cooperatively. Please see the report by the Energy team for more information on alternative energy options in Dubuque.

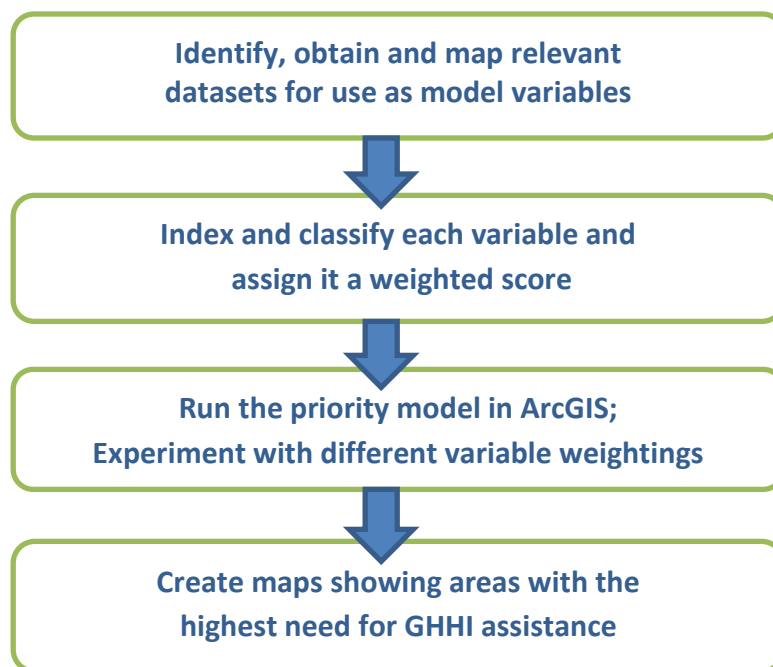
GHHI PRIORITY MODEL

The Green and Healthy Homes Initiative is an ambitious and worthwhile program. However, it has a limited amount of human and financial capital to achieve the goal of comprehensive home repair. We have developed the Priority Model as a tool the city can use to best direct GHHI resources to those community members and homes with the greatest need for assistance. The model allows for more precise identification of the areas in Dubuque that might benefit the most from GHHI projects. Most important, once the high priority areas are identified, the City can proactively engage those households and communicate the message and benefits of participation in GHHI.

Methodology

We gathered several types of data (socio-economic, housing, demographics, energy consumption and health) in order to assess GHHI need in accordance with the program's overall goals of health, safety and energy efficiency. The modeling process included four steps, as indicated by Figure 1 below. Our process was inspired by targeting models used in two recent reports for other municipalities: (1) "Target Populations to Receive PCEC Assistance in Minneapolis, Minnesota" (Macalester College and Phillips Community Energy Cooperative, 2005) and (2) "Piscataquog Watershed Land Conservation Plan, Section 2: Building the Co-Occurrence Model: Identifying and Weighting the Natural Resources" (Southern New Hampshire Planning Commission, 2011).

Figure 1: Modeling Steps



All 10 datasets ([Table 1](#) below) utilized in this model were joined to ArcGIS and symbolized as described in the next subsection. (The next section also details the data sources.) We classified the following variables into different ranks using the natural breaks (Jenks) method:

- housing cost-burdened households
- percentage of population living in poverty
- demographic age variables (age 65 and older; age 10 and younger)

The natural breaks classification method is widely used to partition a distribution. This method can minimize each class's average deviation from the class mean, while maximizing each class's deviation from the means of the other groups. It reduces the variance within classes and maximizes the variance between classes.¹ Less variance within each class makes it a more distinctive classification, which is useful for our purposes.

We classified the remaining model variables using an “either/or” type ranking:

- median household income (below or above the city-wide average)
- refuse and stormwater half-rate program participation (participating or not participating)
- the housing condition rating (average, above average or below average)
- age of housing (pre-1945, 1946-1978, 1979-present day)
- household electricity consumption (above or below average)

Finally, radon levels were classified according to zip code areas, as this is the only level at which radon levels are currently being recorded. After classifying each variable in the model, we ranked each class on an index from 0 to 100.

Next, we converted all variable maps from vector to raster format, with the individual raster size being equal to the average Dubuque parcel dimension of 194 feet by 194 feet. This rasterization ensured a unified unit of analysis for all datasets since some data was available at the parcel level while other data was available at a Census block group level or zip code level. Rasterization also protects individual households' privacy. After converting all raster maps, we combined them and used an ArcGIS model building tool to weight the model variables according to the classification ranks discussed previously.

¹ “Jenks’ optimization,” ESRI Support GIS Dictionary, accessed April 16, 2012, <http://support.esri.com/en/knowledgebase/GISDictionary/term/Jenks%27%20optimization>.

We then assigned these weights to each variable based on a level of importance or influence the variable has on defining GHHI need. Two versions of this variable weighting process were conducted. In the first version, each UI team member rated the final 10 variables with a 3, 2 or 1 correlating to whether we believed the variable was “very important,” “somewhat important,” or “not very important.” The collective results of this ranking process guided our team to a final version of the variable weights. The same process was then conducted using a survey sent out to professionals in Dubuque familiar with the GHHI process. The UI team weighted results and Dubuque weighted results are shown below in [Table 2](#). We mapped the results of that survey separately to illustrate the effect alternative opinions can have on what constitutes an important variable and subsequent weighting. However, due to the similarity in model output displayed by the different weighting systems, the remainder of our analysis and recommendations focus on the UI team weightings only. The slight variations in category weightings between the two versions are shown below in [Tables 1](#) and [2 \(detailed\)](#), and the variations in Priority Model output are shown in [Table 3](#) of the analysis section.

Last, each raster cell score was determined by multiplying the ranking by the weight for each variable, and then all variable values were summed. The final score, which could range from a low of 13.5 to a high of 100, determined whether the cell was assigned to the very low, low, moderate or high priority category. The final breakdown of cells and their category had to include a range of 0 to 100. However, we found that approximately 3% of the cells were missing some data. This missing data allowed for final scores lower than 13.5. As such, the final score categories range from 0–25 for the very low priority, 26–50 for the low category, 51–70 for the moderate category, and 71–100 for the high priority category.

Table 1: Priority Model Variables and Category Weights Overview

| Category | Model Variable | Category Weights | |
|--------------------|--|------------------|---------|
| | | UI Team | Dubuque |
| Socio-Economic | Median Household Income | 44% | 38% |
| | Cost-Burdened Households | | |
| | Population Living In Poverty | | |
| | Refuse and Stormwater Half-Rate Program Households | | |
| Housing | Housing Condition Rating | 19% | 18% |
| | Age of Housing | | |
| Demographic | Population Age 65 and Older | 20% | 20% |
| | Population Age 10 and Younger | | |
| Energy Consumption | Electricity Consumption | 11% | 11% |
| Health | Radon Level | 7% | 13% |

Priority Model Variables and Contributing Datasets

This section details and shows an individual map for each of the 10 variables as shown in [Table 2](#).

Table 2: Priority Model Variables and Rankings/Weight Information Detailed

| Variables | Index of Rankings | Ranking | Explanation of Rankings | UI Weight | Dubuque Weight | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------|---------|---|-----------|----------------|--------------------------|-----------|-----|---------------------|-------|------|----|-------------------------|----|---------------------------|----|---------------------|------------------------------|----------|-----|-------|-------|-------|----|-------------|----|---------------|----|--------------|---|---------|--|----------|-----|---------------|------|------|---|-------------------|--------------------------|----------|-----|---------------|------|-------|----|---------|---|---------------|----------------|----------|-----|----------|-------|------|----|-----------|---|-----------------|-----------------------------|-----------|-----|---------|------|------|----|----------------|----|---------------|----|---------|-------------------------------|-----------|-----|---------|-------|-------|----|----------------|----|---------------|----|---------|-------------------------|----------|-----|---|-------|-------|---|---|-------------|-----------|-----|--|------|-------|
| Median Household Income | 0 or 100 | 100 | < Median Household Income | 11.1% | 11.1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | > = Median Household Income | | | Cost-Burdened Households | 25 to 100 | 100 | > 50% Cost Burdened | 13.0% | 8.9% | 75 | 25 to 50% Cost Burdened | 50 | 10 to 24.9% Cost Burdened | 25 | < 10% Cost Burdened | Population Living In Poverty | 0 to 100 | 100 | > 35% | 11.7% | 11.1% | 75 | 18.5 to 35% | 50 | 10.0 to 18.4% | 25 | 3.3 to 9.9 % | 0 | < 3.3 % | Refuse and Stormwater Half-Rate Program Households | 0 or 100 | 100 | Participating | 7.8% | 6.7% | 0 | Non-Participating | Housing Condition Rating | 0 to 100 | 100 | Below Average | 7.1% | 11.1% | 50 | Average | 0 | Above Average | Age of Housing | 0 to 100 | 100 | Pre-1945 | 11.7% | 6.7% | 50 | 1946-1978 | 0 | 1979 to Present | Population Age 65 and Older | 25 to 100 | 100 | > 30.8% | 9.1% | 8.9% | 75 | 15.9 to 30.8 % | 50 | 9.8 to 15.8 % | 25 | < 9.8 % | Population Age 10 and Younger | 25 to 100 | 100 | > 17.2% | 11.1% | 11.1% | 75 | 11.8 to 17.2 % | 50 | 7.3 to 11.7 % | 25 | < 7.3 % | Electricity Consumption | 0 or 100 | 100 | > Average Monthly kwh/sq. ft. Consumption | 11.1% | 11.1% | 0 | < = Average Monthly kwh/sq. ft. Consumption | Radon Level | 80 to 100 | 100 | Zip code 52003 - 42% Testing Above 4.0 | 6.5% | 13.3% |
| Cost-Burdened Households | 25 to 100 | 100 | > 50% Cost Burdened | 13.0% | 8.9% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75 | 25 to 50% Cost Burdened | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 10 to 24.9% Cost Burdened | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 25 | < 10% Cost Burdened | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Population Living In Poverty | 0 to 100 | 100 | > 35% | 11.7% | 11.1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75 | 18.5 to 35% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 10.0 to 18.4% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 25 | 3.3 to 9.9 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | < 3.3 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Refuse and Stormwater Half-Rate Program Households | 0 or 100 | 100 | Participating | 7.8% | 6.7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | Non-Participating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Housing Condition Rating | 0 to 100 | 100 | Below Average | 7.1% | 11.1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | Average | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | Above Average | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Age of Housing | 0 to 100 | 100 | Pre-1945 | 11.7% | 6.7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 1946-1978 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 1979 to Present | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Population Age 65 and Older | 25 to 100 | 100 | > 30.8% | 9.1% | 8.9% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75 | 15.9 to 30.8 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 9.8 to 15.8 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 25 | < 9.8 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Population Age 10 and Younger | 25 to 100 | 100 | > 17.2% | 11.1% | 11.1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75 | 11.8 to 17.2 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 7.3 to 11.7 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 25 | < 7.3 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electricity Consumption | 0 or 100 | 100 | > Average Monthly kwh/sq. ft. Consumption | 11.1% | 11.1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | < = Average Monthly kwh/sq. ft. Consumption | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radon Level | 80 to 100 | 100 | Zip code 52003 - 42% Testing Above 4.0 | 6.5% | 13.3% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 90 | Zip code 52001 - 38% Testing Above 4.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 80 | Zip code 52002 - 33% Testing Above 4.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Socio-Economic

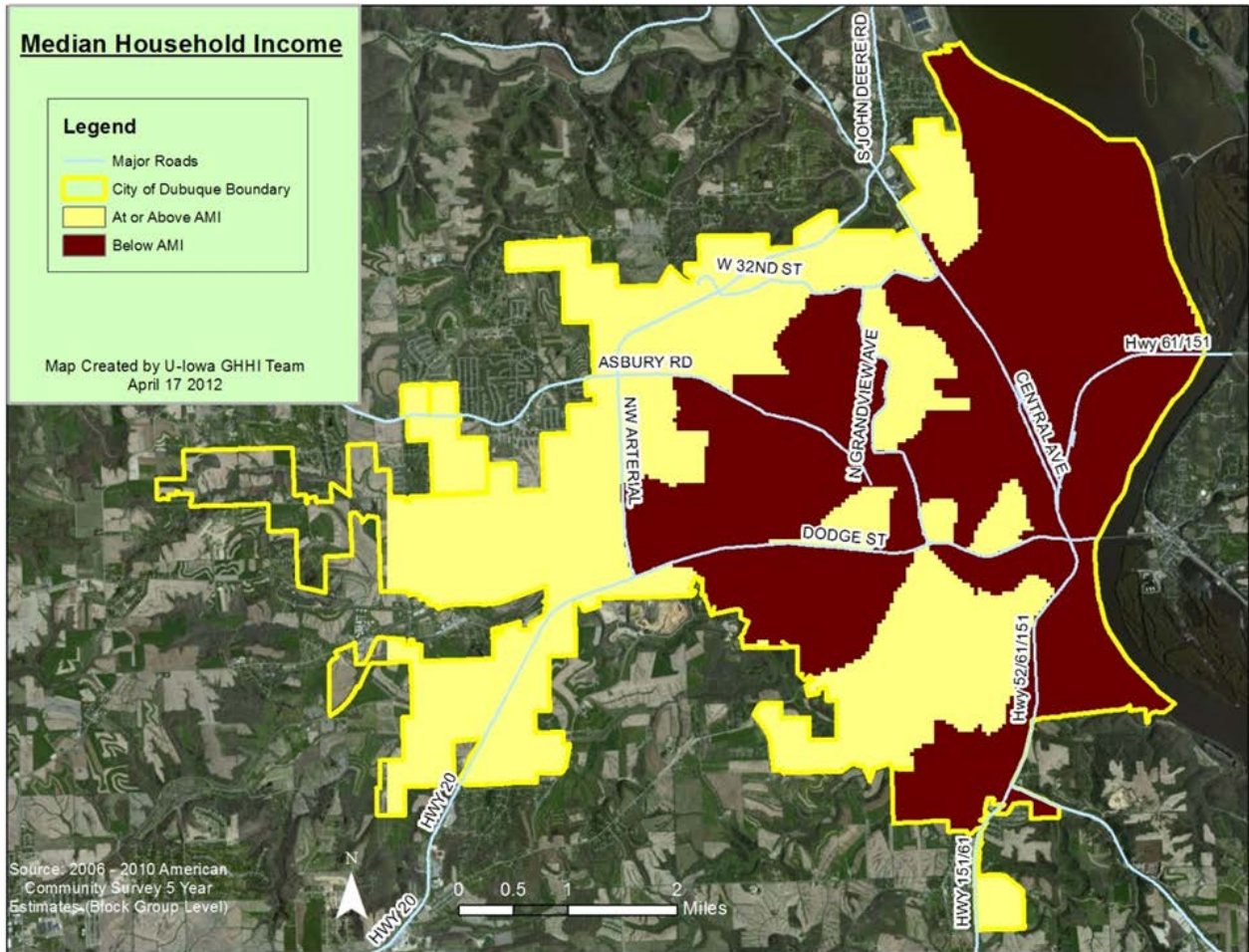
Median Household Income (data source: American Community Survey (ACS) '06-'10 estimates)

- < Median Household Income (city-wide mean); rank = 0
- > = Median Household Income (city-wide mean); rank = 100
 - Variable Weight = 11.1%

This variable was gathered for all block groups in Dubuque. We computed the city-wide average and classified block groups as either falling below or above that average. Block groups falling below the city-wide median household income average received a ranking of 0, while those above received a ranking of 100. The variable is assigned a weight of 11.1%. (Map 1.)

We believe below-average median household income is one measure for identifying cost-burdened families, or in other words, homes where people are struggling to meet their daily needs, much less able to afford costly energy-efficiency upgrades, repairs or required maintenance. Below-average median household income also helps identify areas where more homeowners can qualify for Green and Healthy Home funding assistance.

Map 1: Dubuque Median Household Income



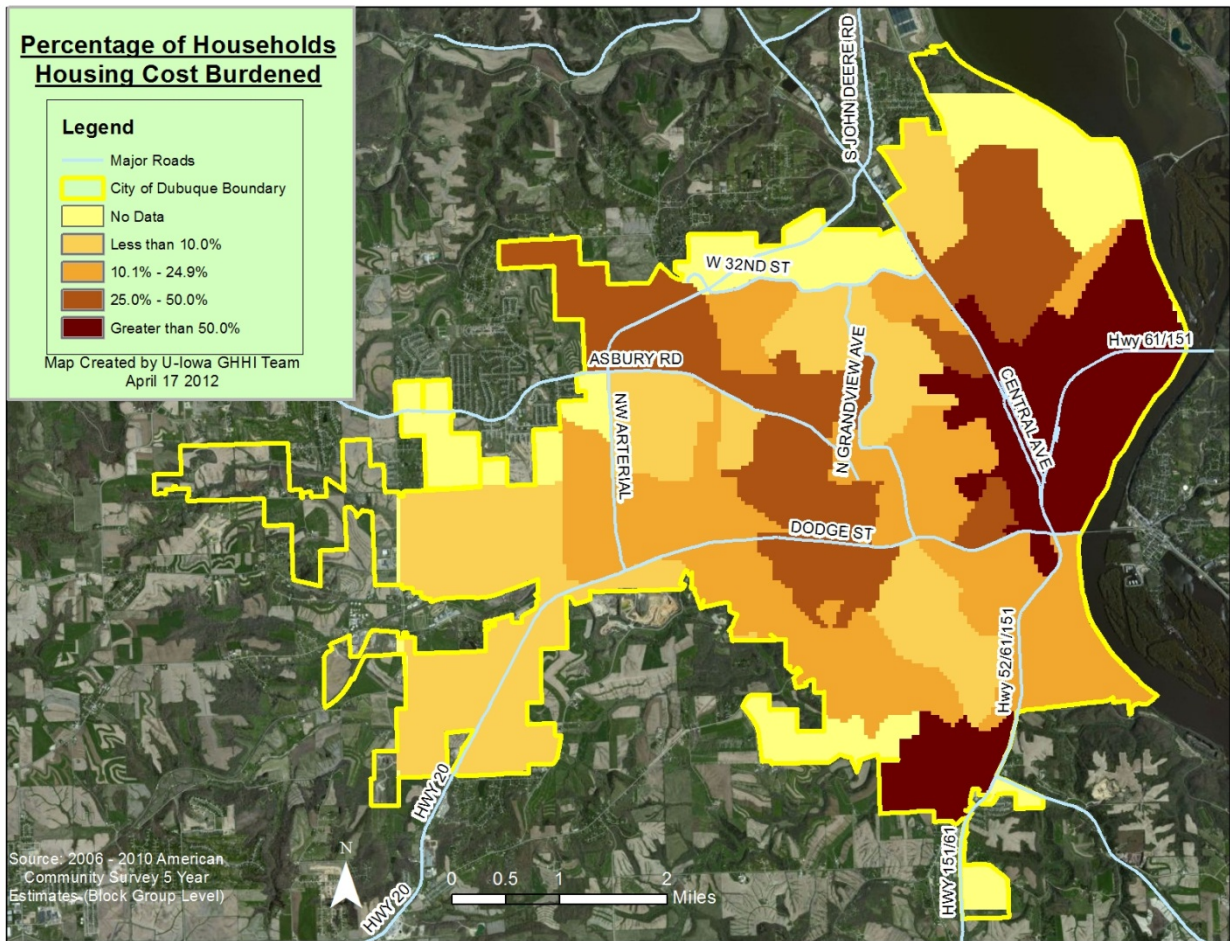
Cost Burdened Households (data source: ACS '06-'10 estimates)

- > 36% of Census Block Group households Cost-Burdened; rank = 100
- 26 to 36% of Census Block Group households Cost-Burdened; rank = 75
- 17 to 25.9% of Census Block Group households Cost-Burdened; rank = 50
- < 17% of Census Block Group households Cost-Burdened; rank = 0
 - Variable Weight = 13%

This variable (Map 2) shows the percentage of units, per block group, that are spending 30% or more of monthly household income on housing costs, computed as a ratio of monthly housing costs to monthly income. The ACS defines housing costs for homeowners as the sum of payments for mortgages, deeds of trusts, contracts to purchase, home equity loans (and other similar property debts), real estate taxes, insurance (including fire, hazard and flood), utilities, fuels and association fees (where applicable). For renter-occupied units, monthly gross rent is compared to monthly income to determine burdened units. Gross rent is contract rent plus the estimated cost of utilities. Utilities are estimated if the tenant pays as well as if the landlord pays; both scenarios are covered.

In GIS, we distributed the rankings across four categories (as shown above) based on percent of a block group that was housing cost-burdened, with the rank increasing as the percentage of cost-burdened households increases. This variable has a model weight of 13%. This data is applicable to the Priority Model as it also indicates areas of Dubuque where homeowners are unable to afford regular home maintenance, rehabilitation, weatherization or healthy home improvements. These households are potentially substituting preventative health care needs or home energy-efficiency upgrades in favor of the household living costs cited above.

Map 2: Percentage of Households Housing-Cost Burdened

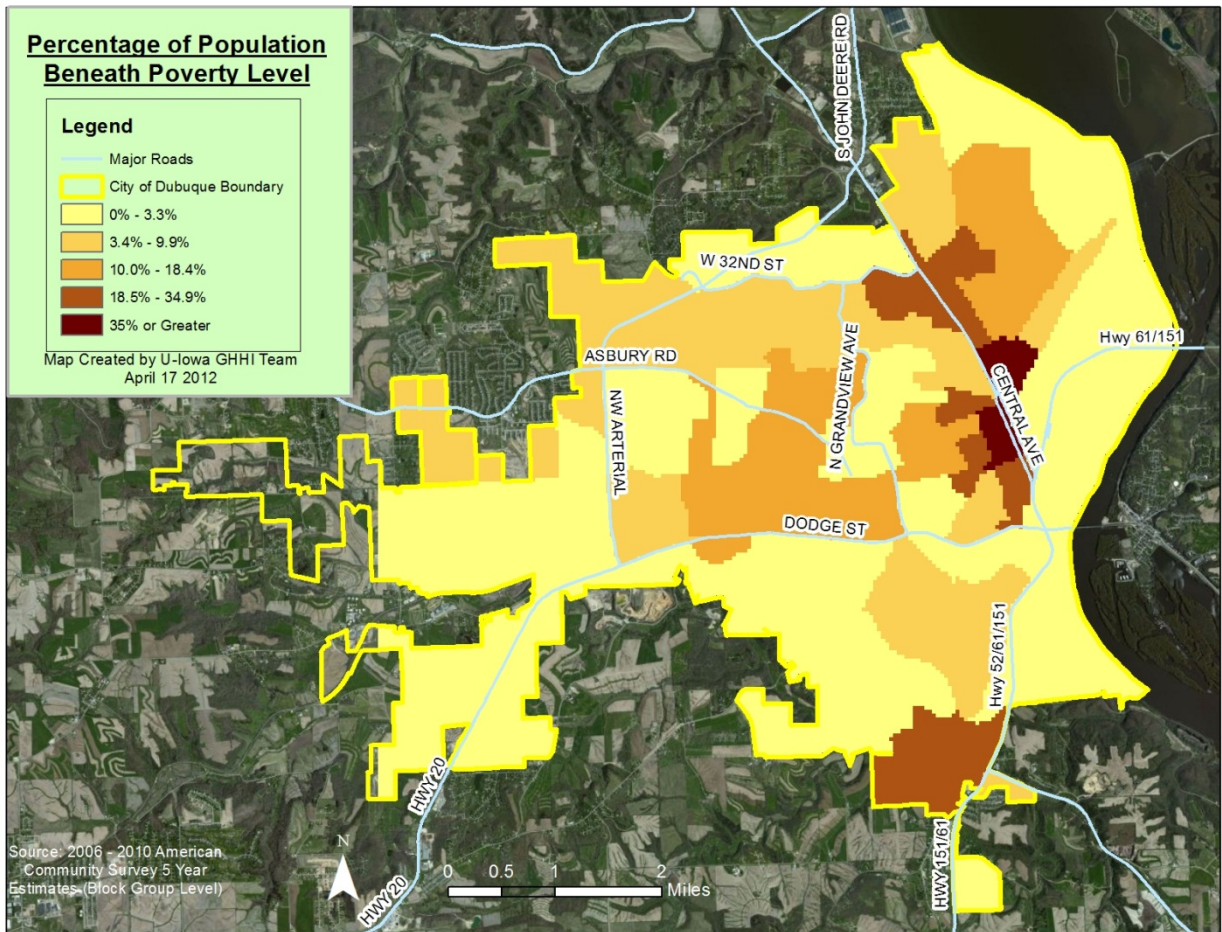


Population Living in Poverty (data source: ACS '06-'10 estimates)

- $\geq 35\%$; ranking = 100
- 18.5 to 34.9%; ranking = 75
- 10.0 to 18.4%; ranking = 50
- 3.4 to 9.9 %; ranking = 25
- $< 3.3\%$; ranking = 0
 - Model Weight = 11.7%

The U.S. Census Bureau sets income thresholds for poverty that vary with family size and composition. These thresholds calculate income before taxes and do not include capital gains or non-cash benefits. The numbers are updated for inflation. This is a highly important variable in the model because poverty status gives an indication of the inability, or difficulty, to afford healthy home improvements. In other words, areas with higher percentages of the population living in poverty indicate a subset of households where home maintenance, weatherization and health-related improvements are being forgone in order to pay for basic living expenses. Poverty status also serves to target areas with homes that are likely to qualify for GHHI programs in Dubuque, based upon income. (Map 3.)

Map 3: Population Living in Poverty

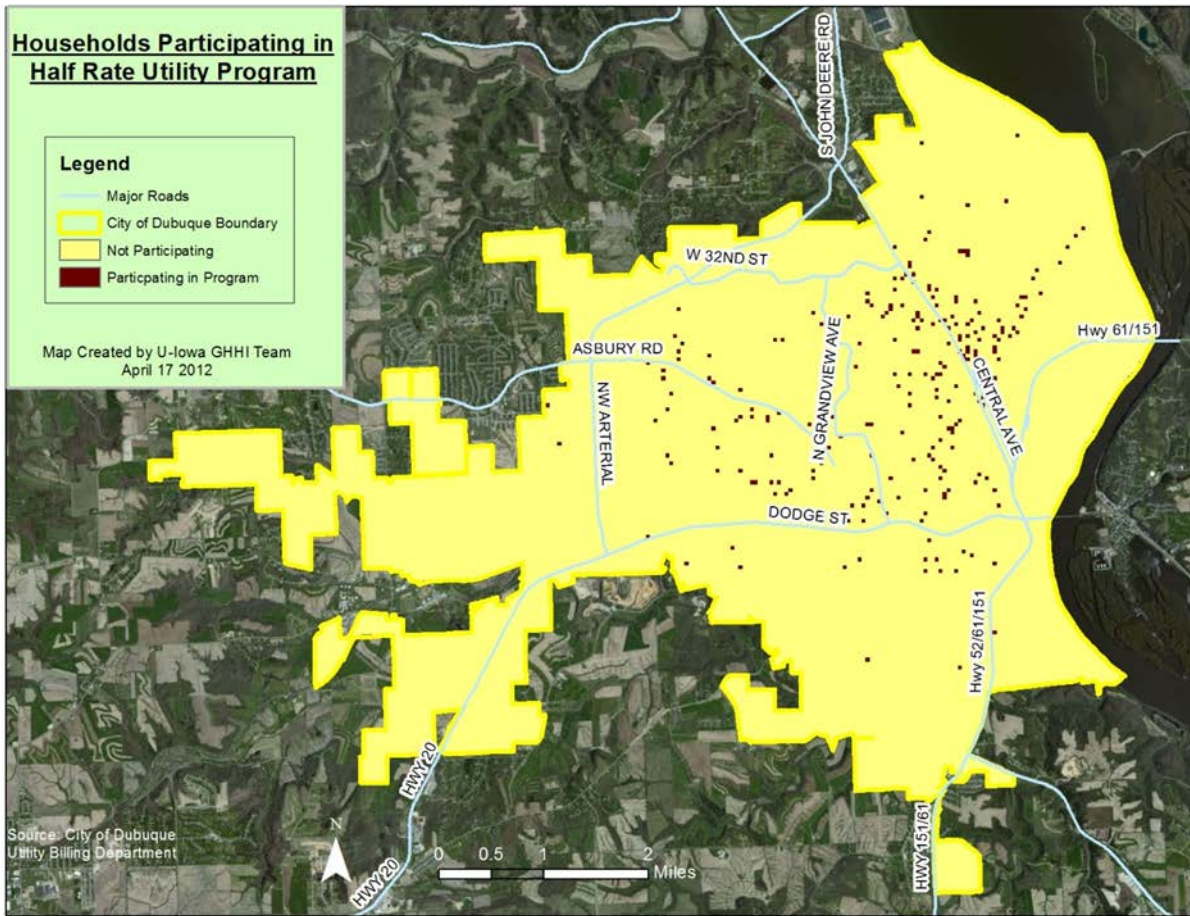


Refuse and Stormwater Half-Rate Program Participants (source: City of Dubuque Utility Billing, January 2012)

- Participated in program over last two years; ranking = 100
- Non-Participating; ranking = 0
 - Model Weight = 7.8%

Participation in this program indicates the inability of a household to pay utility bills. We believe this variable is yet another valuable proxy for determining cost-burdened households. Customers may qualify for this program based on previous year's income and consideration of extreme financial hardship, whether the head of household is age 65 or older, and families with five or more members that meet current housing Section 8 guidelines. The stormwater fee reduction is covered by a grant, and the refuse fee difference is paid for by the solid waste department. As fall 2011, there were 273 participants in this program, and we believe the GHHI program can help reduce this number over time by enabling homeowners or tenants to keep a larger percentage of their disposable income and reduce energy consumption. This variable currently serves to highlight areas of Dubuque where GHHI efforts should be concentrated. Participants in this program receive a 100 ranking, and non-participants a zero. (Map 4.)

Map 4: Household Participation in Half-Rate Utility Program



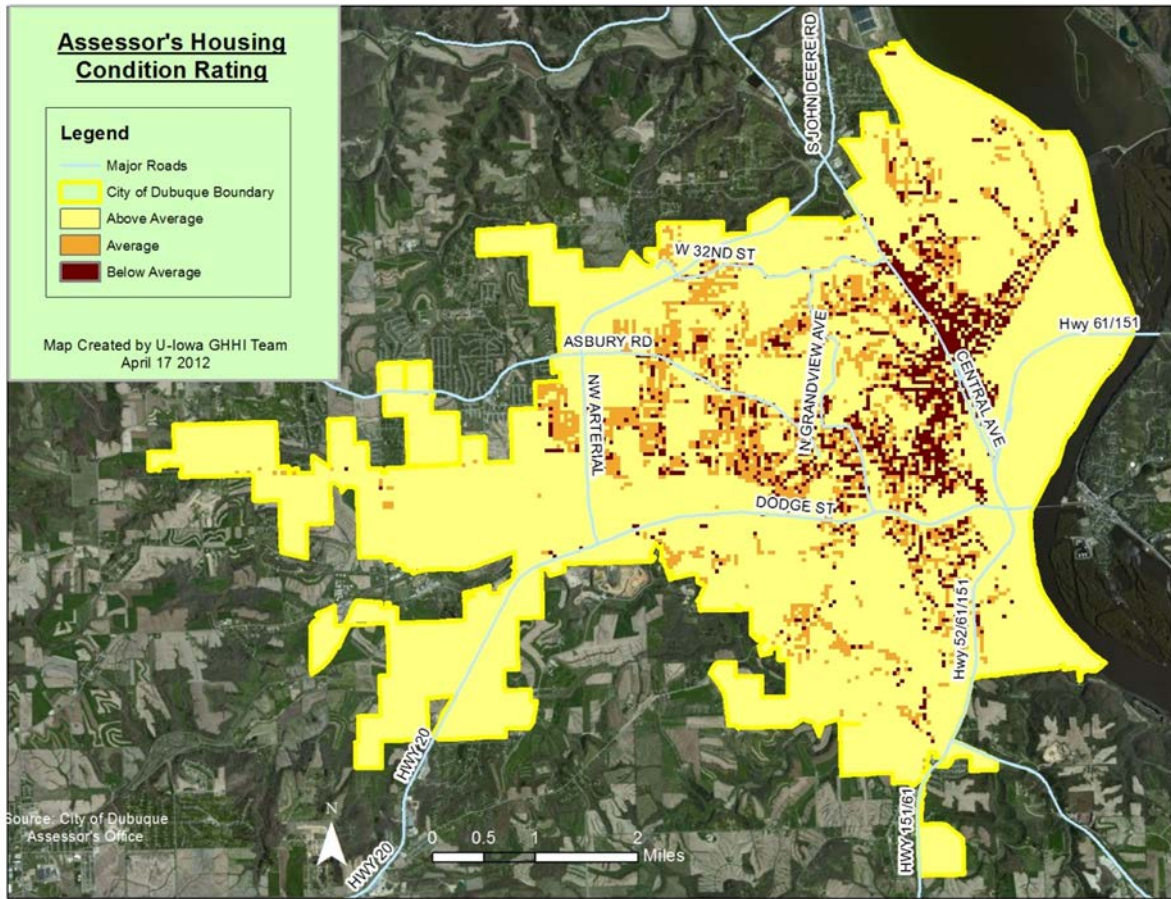
Housing

Housing Condition Ratings (source: City of Dubuque Assessor, November 2011 – February 2012)

- Below Average; ranking = 100
- Average; ranking = 50
- Above Average; ranking = 0
 - Model Weight = 7.1%

For assessment purposes, the City of Dubuque assigns a condition grade ranging from Executive to Sub-Standard for every owner-occupied property. There are seven available grades in this range. The grading criteria is based on several factors including the building code violations at time of construction, quality of construction, quantity of construction, fire-rated construction, framing, mechanical items, fenestration and shape. Our team grouped the condition ratings into three classes including above average (grades 1–3), average (grade 4), and below average (grades 5–7) ratings. This variable emphasizes homes with the potential of having substandard or below minimum code construction. These substandard quality homes are where we feel that rehabilitation, energy efficiency, weatherization and healthy home GHHI interventions will have the most impact on the well-being of the inhabitants. (Map 5.)

Map 5: Housing Condition Ratings

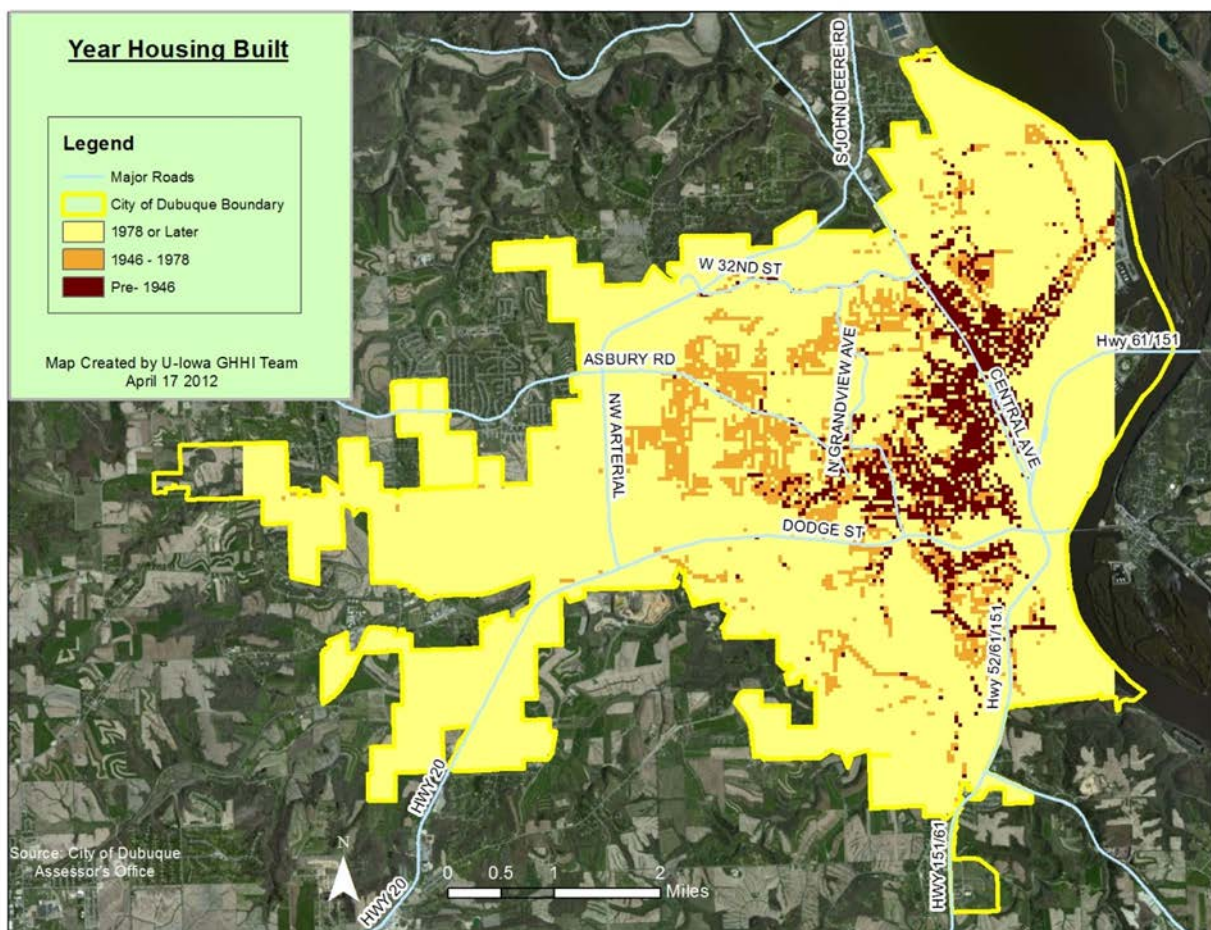


Age of Housing (source: City of Dubuque Assessor, November 2011 – February 2012)

- Pre-1946; ranking = 100
- 1946–1978; ranking = 50
- 1978 to present; ranking = 0
 - Model Weight = 11.7%

Age of housing was included as a model variable because older homes are more likely to have higher maintenance costs, lower energy efficiency and a greater likelihood of containing lead-based paint. The variable rankings were broken into three classes including pre-1946, 1946 to 1978, and post-1978. These breaks are associated with the introduction of fiberglass insulation in the late 1940's (thereby reducing energy costs for new housing), and the banning of lead-based paint in new home construction in the late 1970's. The highest ranking was given to the oldest housing stock due to its probability of having the poorest insulation, highest potential for the presence of lead-based paint, and more deferred maintenance needs. (Map 6.)

Map 6: Age of Housing



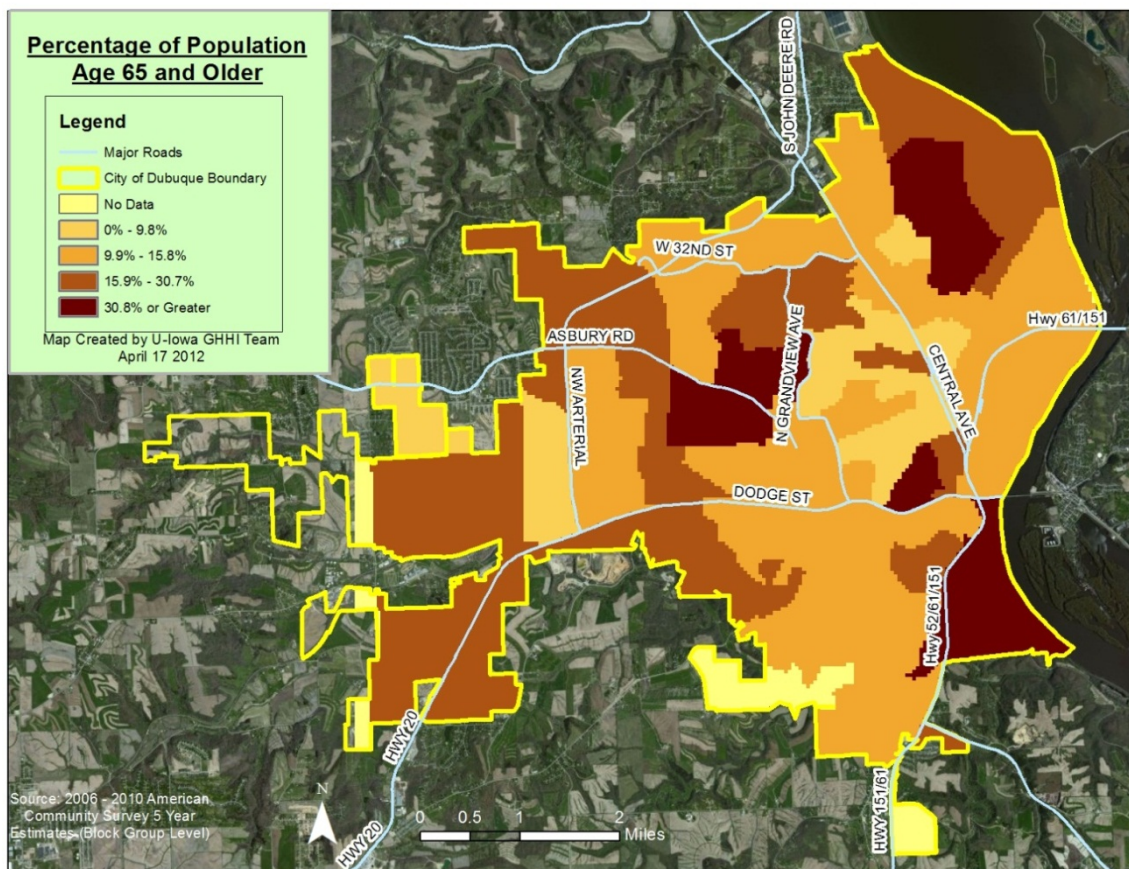
Demographics

Population Age 65 and Older (data source: ACS '06-'10 estimates)

- $\geq 30.8\%$; ranking = 100
- 15.9 to 30.7 %; ranking = 75
- 9.9 to 15.8 %; ranking = 50
- $< 9.8\%$; ranking = 25
 - Model Weight = 9.1%

One of GHHI's main goals is to increase the level of home safety. Seniors or the older proportion of a community's population are most susceptible to in-home injuries. Focusing on this group funnels GHHI resources to those in the most need of safety interventions. Census block groups with slightly greater than 30% of the population age 65 and older were given the most weight. However, the team did not want to entirely exclude block groups with lower percentages of age 65+ populations. Therefore, four classes of age 65 and older populations were created, with rankings decreasing as the percentage of senior-aged residents decreases. (Map 7.)

Map 7: Population Age 65 and Older

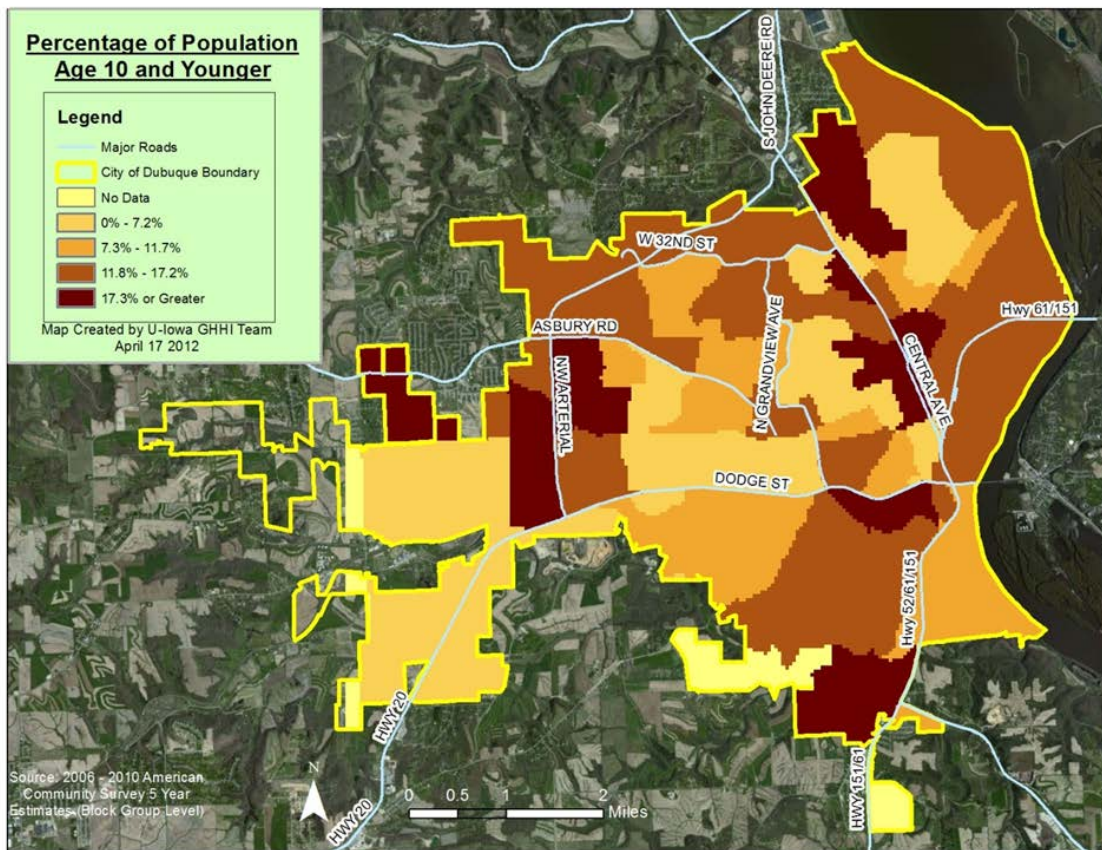


Population Age 10 and Younger (data source: ACS '06-'10 estimates)

- $\geq 17.3\%$; ranking = 100
- 11.8 to 17.2 %; ranking = 75
- 7.3 to 11.7 %; ranking = 50
- $< 7.2\%$; ranking = 25
 - Model Weight = 11.1%

GHHI attempts to improve the health of the home environment for all occupants, but children are of particular concern due to their susceptibility to indoor pollutants. Furthermore, young children are the most susceptible to lead poisoning from lead-based paint, which can cause serious developmental issues. The team used the Population Age 10 and Younger variable to focus attention on Census block groups with higher numbers of children. As with the age 65 and older variable, the team did not want to exclude block groups with smaller numbers of children; weightings were adjusted downward for those block groups with smaller percentages. (Map 8.)

Map 8: Percentage of Population Age 10 and Younger



Energy Consumption

Average Electricity Consumption per Square Foot of Living Space

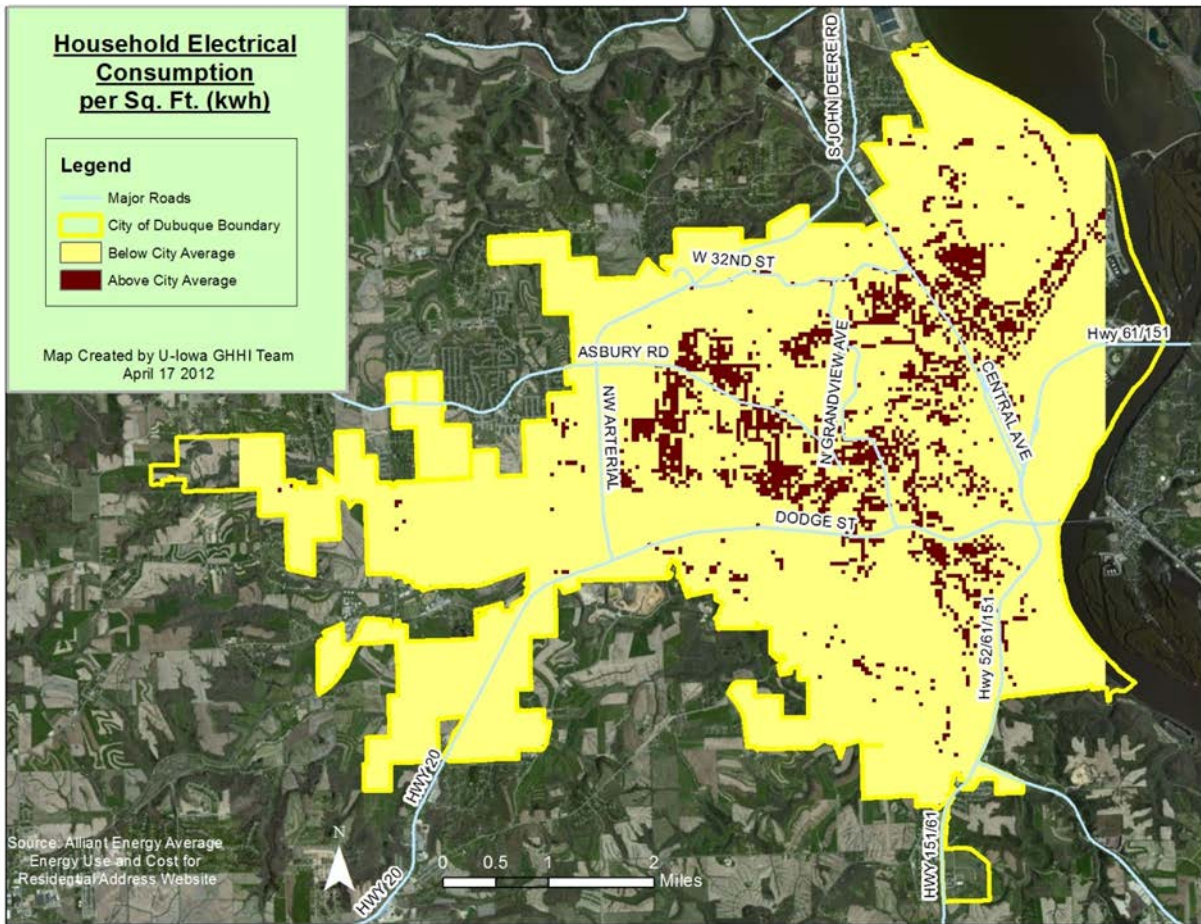
- > Average Monthly kwh/sq. ft. consumption; ranking = 100
- < = Average Monthly kwh/sq. ft. consumption; ranking = 0
 - Model Weight = 11.1%

Weatherization and energy efficiency are two important GHHI goals. The city's weatherization program performs work for families that are among the poorest in Dubuque. This part of the GHHI approach improves the living environment and increases disposable income for low-income families through lowered utility bills. For this model variable, our team used the most recent past 12 months' electricity consumption data from Alliant Energy's website for estimating Average Energy Use and Cost. First, our team used a systematic random sampling method to select our samples for owner-occupied units (1,120 total samples) and apartment buildings (200 total samples) that would result in a 95% level of confidence. For a significant number of apartment buildings, no data was available at all; in these cases, we accessed the next available item in the random sample.

We then ran regression analysis to estimate the KWH/sq. ft. electrical consumption for both types of housing units. This analysis determined that square footage and dwelling value were the major predictors of household-level energy usage in Dubuque. Specifically, square footage and dwelling value increases are associated with an increase in average monthly energy consumption. However, the prediction strength of this regression was fairly weak, so we employed a decision tree model to estimate household electrical consumption as related to dwelling square footages and dwelling values. As a result of the decision tree outputs, all parcels in the city were assigned a value for average monthly energy consumption based upon their total square footage and housing value. Finally, this average monthly figure was normalized by square feet for each parcel, and the mean was calculated for all parcel values.

For usage in the Priority Model, this variable was then divided into two classes, above average and below average consumption. Overall, this helps to focus attention on the areas of Dubuque where larger quantities of electricity per square foot are being consumed as compared to the city average. It is these areas where GHHI energy-efficiency interventions will have the greatest impact. (Map 9.)

Map 9: Household Electricity Consumption per Square Foot of Living Space



Health

Household Radon Levels by Zip Code Testing above 4.0 pCi/L (source: Iowa Department of Public Health Radon Program)

- Zip code 52003 - 42% of homes testing above 4.0; ranking = 100
- Zip code 52001 - 38% of homes testing above 4.0; ranking = 90
- Zip code 52002 - 32% of homes testing above 4.0; ranking = 80
 - Model Weight = 6.5%

Radon is a naturally occurring cancer causing radioactive gas that according to the U.S. Environmental Protection Agency (EPA) causes an estimated 21,000 lung cancer deaths per year. That is more annual deaths than those caused by drunk driving, falls, drowning or home fires. The gas typically enters home through cracks or holes in the foundation. It is not a phenomenon limited to old homes as it can also infiltrate new homes, sealed or drafty homes, and homes with or without a basement. Any home testing above 4.0 pCi/L is considered to be above the EPA recommended safe level, and its occupants or owners should strongly consider mitigation. Although our radon data is not very specific due to its aggregation at a zip code level and limited to only one data collection year (2010), our team overall felt that radon is important enough to warrant inclusion as a model variable. Although the Iowa Department of Public Health has radon data dating from 1990–2010, until 2010 the data mixes pre- and post-mitigation measurements. Only the 2010 data set focuses on pre-mitigation readings.

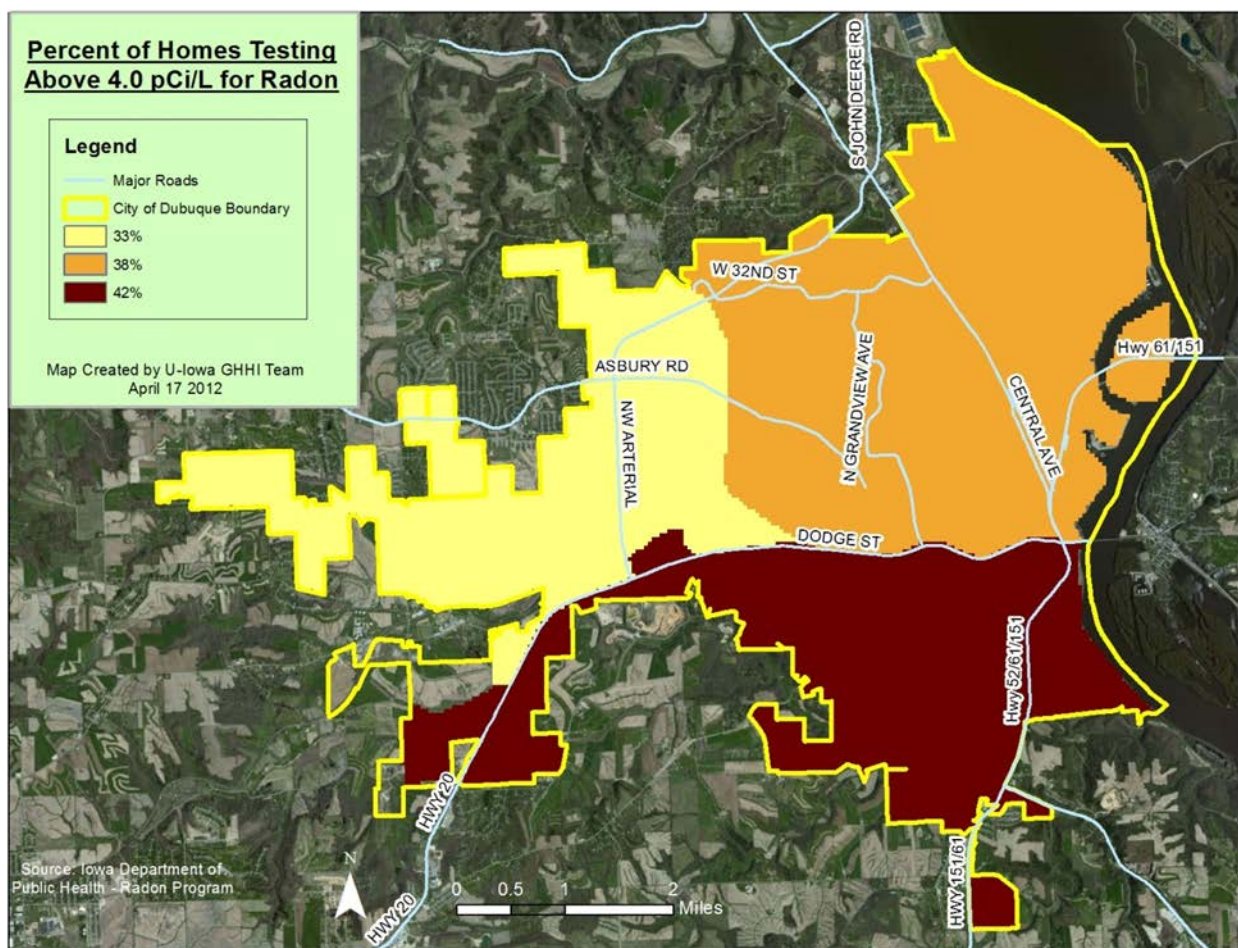
Since any home testing above the 4.0 pCi/L threshold is significantly impacted by this dangerous gas, the team wanted to add at least some weight to each of the three zip codes, with more weight placed upon zip codes with a higher percentage of homes testing above EPA recommended level. The zip code with the highest number of homes testing above 4.0 pCi/L is considered the priority region for GHHI radon mitigation. This does not suggest that the other zip codes do not have radon mitigation needs, but due to limited resources, GHHI should focus efforts in the areas already testing the highest. (Map 10.)

Health Data Limitations

Our team had a difficult time obtaining health-related datasets, which we felt would be a critical component of trying to prioritize GHHI resources. For this effort, we contacted the Dubuque Community School District, Iowa Department of Human Services, and the University of Iowa College of Public Health. Our team tried to find comprehensive and detailed health-related datasets, such as student absenteeism rates due to sickness, children's blood lead levels and asthma rates. However,

there are some fundamental limitations with public health data. Many datasets are not at the appropriate geographic boundaries for our model and are poorly recorded. Also, we do not want to display health data at the parcel level due to privacy issues. Instituting a city-wide health monitoring survey system would be ideal. We initially recommended that Dubuque pursue this option. However, further research indicates such a system would be extremely expensive in addition to the challenges of maintaining privacy. Thus, to do cost-benefit or return on investment analysis for health improvements due to GHHI, the city more realistically could enter into specialized agreements with the Dubuque County Health Department and/or the U.S. Census Bureau to obtain micro-level health data. Health is the least accounted for measure in our current model, due to data availability issues. However, once the necessary health data is gathered at the proper level of analysis, it should be included in this model with a relatively high weighting.

Map 10: Household Radon Levels by Zip Code Testing above 4.0 pCi/L



Analysis of Priority Model Output

The final model output (Map 11, below) is a color-coded raster map delineating 20,833 cells by the four priority need categories. The color scale moves from light to dark as priority increases.

Housing units within the darkest cells should be considered of the upmost importance for GHHI, as these areas scored the highest in the model output. In other words, those cells are the areas of the city that contained multiple indicators of need. Clusters of those darkest cells indicate large geographic areas in need of GHHI assistance and are the regions where GHHI should focus its outreach and resources. On the final output maps we have also identified major arterial roads and underlaid an aerial map of Dubuque to better orient the user(s).

Map 11: GHHI Priority Model for Dubuque

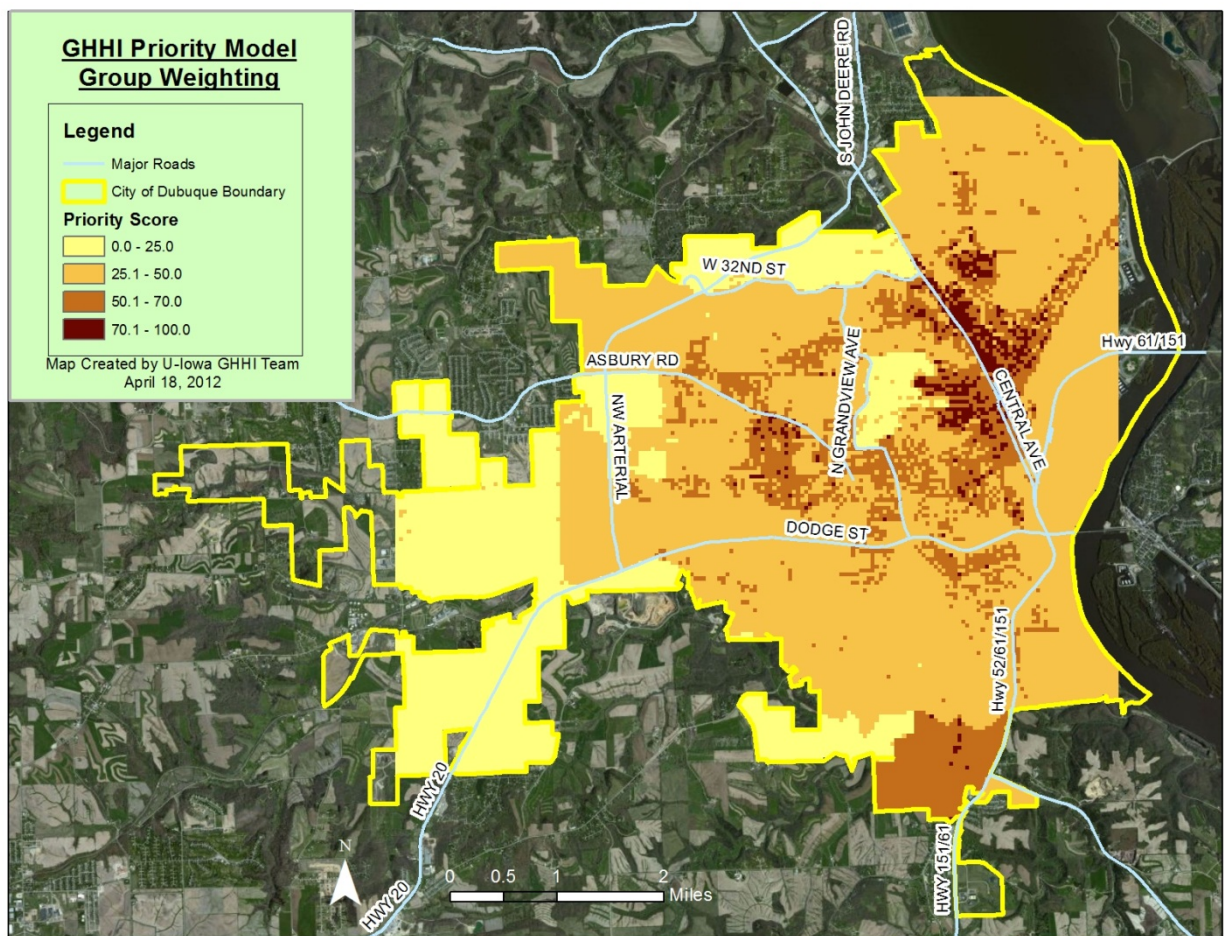


Table 3: Priority Model Results

| Category | Scores | UI Team | | Dubuque | |
|---------------|--------------|------------|------------|------------|------------|
| | | Cell Count | % of Cells | Cell Count | % of Cells |
| Very Low | 0-25 | 4951 | 23.8% | 3966 | 19.0% |
| Low | 26-50 | 12378 | 59.4% | 12836 | 61.6% |
| Moderate | 51-75 | 2981 | 14.3% | 3397 | 16.3% |
| High Priority | 75-100 | 523 | 2.5% | 634 | 3.0% |
| | Total | 20833 | 100.0% | 20833 | 100.0% |

As shown in the UI team version (middle columns) in [Table 3](#) (above), 83.2% of the city of Dubuque falls into the very low (23.8%) or low categories (59.4%), while 16.8% was classified as either moderate (14.3%) or high priority need (2.5%). The Dubuque version (right columns) differed slightly in that 80.6% fell into the very low (19.0%) or low (61.6%) category. while 19.3% was classified as moderate (16.3%) to high (3.0%) priority.

Some of our original expectations were realized in the output of each version as significant portions of the Washington, Point, and North End neighborhoods seem to display a great need for GHHI interventions. It is important to note, however, that specific portions of these neighborhoods show greater need than others. The model output did not simply point to an entire neighborhood as being in need but rather more precisely pinpointed small sub-sects of neighborhoods that appear more in need than others. Also, areas of the city that were not part of our original expectations appeared as high priority clusters. Sections of western and extreme southern Dubuque show a moderate to high priority need. Specifically, the orange (moderate priority) area in far southern Dubuque is impacted by the following model variables: housing cost-burdened homes, poverty rate, median household income, and children age 10 and younger. The fact that several block group-level variables are receiving relatively high rankings in this area explains why a moderate priority appears over a rather large piece of land. Ultimately, the high priority output range of 2.5 to 3% appears a reasonable and manageable number for which to focus outreach efforts and GHHI resources.

Coordination with Quick App Process

Overall, this model serves as a long-range planning tool for Dubuque's GHHI program by highlighting locations of future participants whom the City should engage. The purpose of this model was to provide a tangible and expandable tool to target program resources. Currently, Dubuque is identifying and recruiting new participants via referrals from the individual housing programs involved in GHHI (much the same way as housing assistance worked prior to the GHHI

approach). However, these housing units are then evaluated using the city's Quick App form to prioritize units based upon their need for multiple housing programs, income qualifications and overall need for immediate GHHI assistance. Staff use the Quick App to vet prospective participants over the phone and rank their needs. (See [Appendix B](#) for a sample copy of the form.) The Quick App process is a valuable tool helping to identify those units that can most benefit from a holistic approach to home repair. However, the Quick App process is based on incoming referrals to the program. We strongly believe the Priority Model can work in conjunction with the Quick App to serve as a proactive means of reaching out and identifying future property owners and households that are in need, but have not yet heard of the benefits of the GHHI program. The use of our model alongside the Quick App form will result in a highly efficient application of GHHI's limited resources. Instead of relying on individual housing programs to generate a list of potential units for GHHI, our model can identify future units with greater accuracy and with a higher probability that they are in need of a GHHI style approach to housing assistance. The Quick App then functions on the backend of this process, much the same way it does now, to obtain detailed, household-specific information, and prioritize the programs waiting list.

Model Results Compared to Historic Districts and Floodplains

We have included additional map layouts showing our model output in relation to both historic districts ([Map 12](#)) and floodplains ([Map 13](#)) within Dubuque. Homes within each of these areas raise issues related to increased costs and efficient use of GHHI program resources. We were unable to receive accurate information on which parcels within the city's historic districts are considered "contributing" to the districts. It is these contributing historic properties that will face higher costs due to the quality of materials required, the potentially labor intensive rehabilitation methods, and time lags associated with Historic Preservation Commission Review standards. The issue for Dubuque to contend with, however, as exemplified in [Table 4](#) below, is that 10% of the moderate to high priority cells identified by the model also lie within a historic district.

For floodplains, the issue is not increased upfront costs of repair, but the potential for futile actions and wasting resources. Homes in floodplains stand a greater chance of damage from flood events; thus, GHHI efforts and funds are likely to have a more lasting impact in non-floodplain areas. At issue here is that according to our analysis of model output against the 100-year floodplain, 23% of the moderate to high priority cells lie within Dubuque's floodplain.

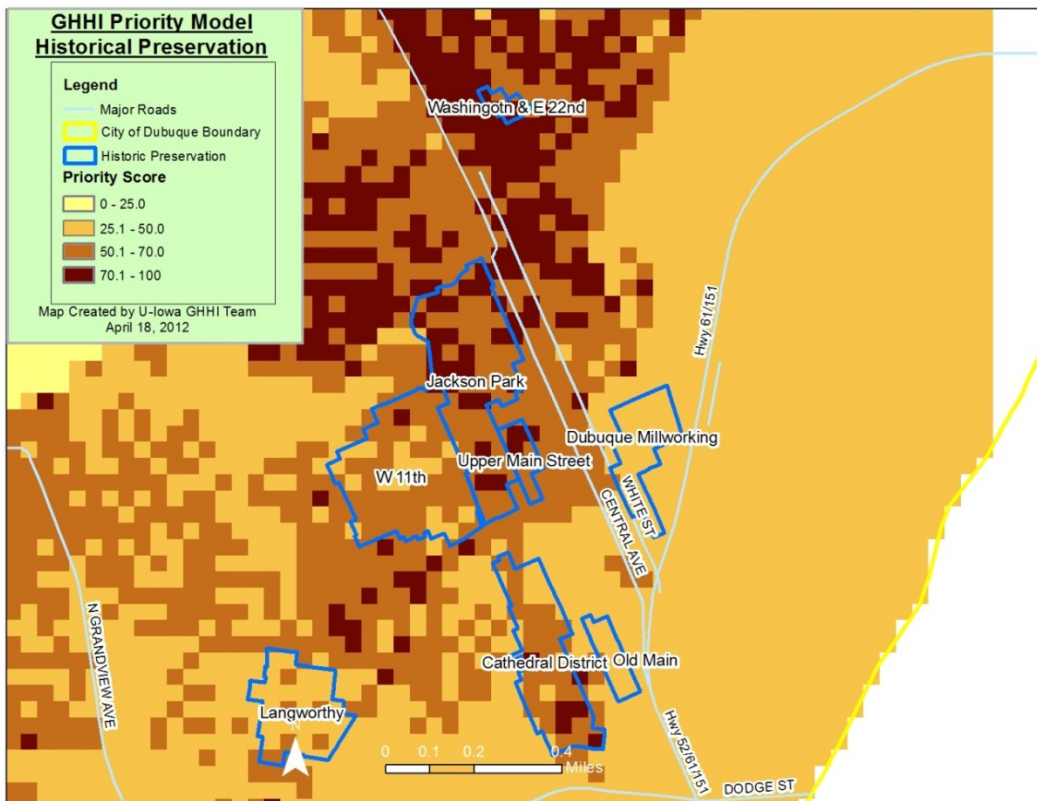
The team decided not to eliminate homes from the Priority Model based solely on their presence in either a historic district or floodplain. Rather we chose to highlight the policy issues involved in

GHHI resource allocation in these areas. It is ultimately up to the city of Dubuque to decide how to handle these properties that appear to have a high need for GHHI assistance but reside in more complicated locations. However, our recommendation is that Dubuque address non-floodplain high priority areas first. Regarding historic districts, the City will need to consider the fact that conforming homes in these areas may be more costly both financially and in staff time to rehabilitate while meeting historic preservation guidelines. Ideally, historical preservation funding can be additionally leveraged to ensure historic homes are included in GHHI but not at the expense of eliminating qualifying non-conforming homes in any given high priority area.

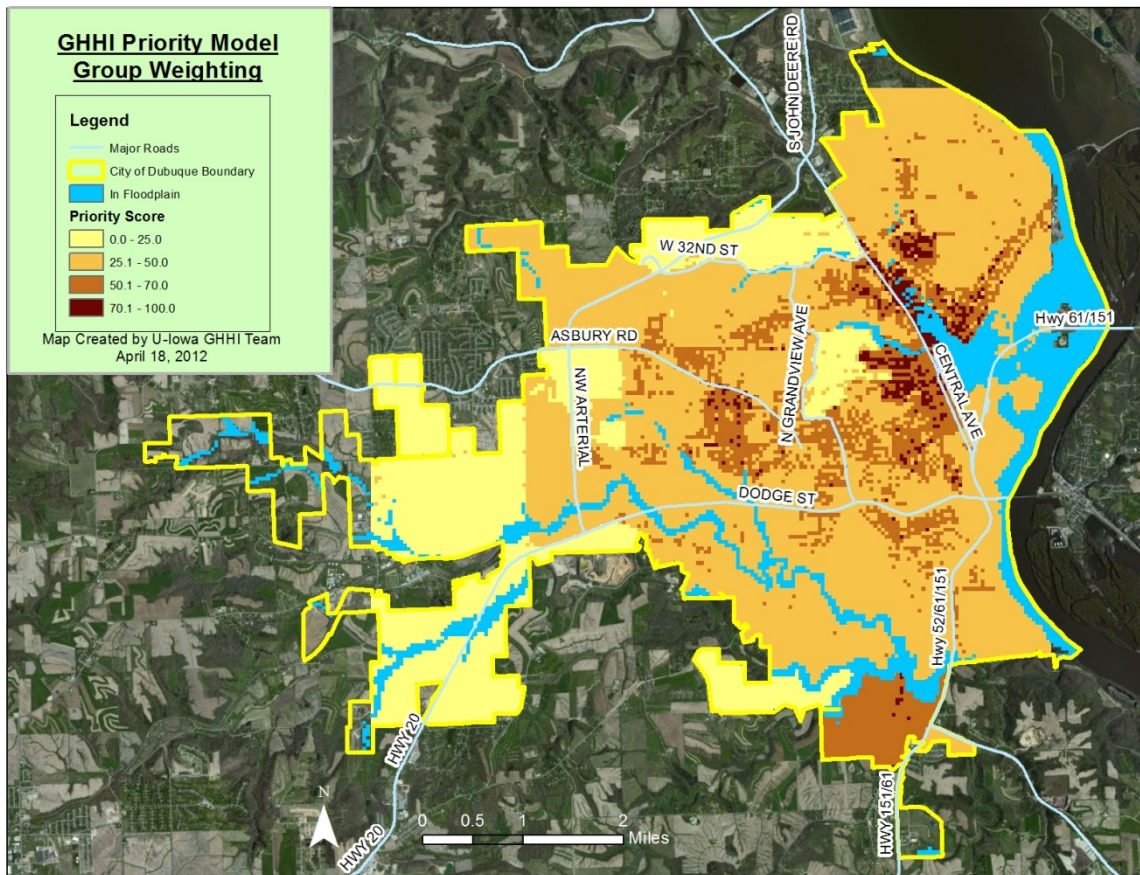
Table 4: Priority Model Output: Floodplain and Historic District Analysis

| | % of Category Cells within Dubuque 100 Year Floodplain | % of Category Cells within Historic Districts |
|----------|--|---|
| Category | % | % |
| Very Low | 9% | 0% |
| Low | 12% | 1% |
| Moderate | 7% | 4% |
| High | 16% | 6% |

Map 12: GHHI Priority Model and Historic Preservation



Map 13: Priority Model and Floodplains



Finally, we hope this model becomes part of an iterative process of identifying program participants for the City of Dubuque. GHHI in Dubuque has an uncertain future due to the unpredictable nature of funding. However, limited funding and the use of valuable staff time are reasons to strictly define and carry out program implementation in the most cost-effective ways. Even if and when additional funding sources are leveraged, assistance based on prioritization will still be useful.

The model we have presented makes great strides towards more precise identification of need as defined by GHHI but could benefit from further refinement, especially in the area of health. But its use in conjunction with the City's Quick App form will create a powerful and efficient prioritization campaign, and pave the way for this program to succeed in the long run. Shortcomings of our model data include significant amounts of block group census data, which lead to broad geographical

targeting, and a general lack of health data. The only health variable included in the current model is radon data at the zip code level for 2010. Increasing the collection of micro-level data through data agreements with the Census Bureau and the Dubuque County Health Department, for example, will greatly improve the effectiveness of this model. We hope that this becomes a tool that Dubuque refines so that overtime its true potential can be realized as appropriate data becomes available.

Recommendations

1. Initiate a block-by-block outreach effort based on the High Priority cell clusters identified in the model output.
2. Continue to advocate for enhanced data collection efforts, specifically health related data, to better refine the Priority Model.
3. Incorporate the model into grant funding requests to give Dubuque a competitive advantage in leveraging additional program funding. The model proves the city has done a detailed analysis of program need and pinpointed specific areas.
4. Use the Priority Model in conjunction with the Quick App form to increase administrative efficiency by more quickly identifying those units with a high probability of need for GHHI assistance.
5. Address non-floodplain, and potentially, non-historic district households first.

A SUSTAINABLE PROGRAM

This section explores four critical elements of a sustainable GHHI program over the long term. Each section describes the methodology used to explore the topic and provides findings and recommendations:

- Renters and Landlords
- Innovative Funding
- Interdepartmental Collaboration
- Participant Engagement and Outreach

Renters and Landlords

One important facet of expanding and improving Green and Healthy Homes services in Dubuque is to further recruit landlords into the GHHI program. Many low-income households live in rental housing rather than owning their own homes. Renters often have little power to improve the energy efficiency and healthiness of their living conditions without landlord support and investment. Thus, in order to provide the maximum amount of benefit to poor families, rental housing should make up a significant portion of the households served by GHHI.

While landlords with low-income tenants are eligible for GHHI participation, we are concerned that landlords are not as likely as homeowners to participate in the program. By March 2012, only nine landlords, representing approximately 25 rental units, were participating in GHHI (40% of total units in the program pipeline). Landlords may not be interested in making any more investments in their units than are absolutely necessary or some may simply be unconvinced about the benefits of the program. Additionally, renters may not be fully informed about the benefits of renting an energy-efficient unit with improved indoor air quality. As a result, demand for such green and healthy rental units may be artificially low.

In order to include renters and landlords in the Dubuque program, we must consider the split incentive pertaining to a landlord's investment into their rental properties. The split-incentive refers to who enjoys the benefits of a property investment. For example, if a landlord invests in their property to make the unit more energy efficient, but the renter pays the utility bills, the renter reaps most or all of the benefits of the increased building efficiency. The renter may stay longer in the unit and reduce turnover for the landlord, but the original investor (in this case, the landlord) receives little or no return.

GHHI can help landlords make health and efficiency updates for reduced cost if their tenants meet the program income guidelines. However, landlords may still have to cover some costs out of pocket. Additionally, some landlords may need GHHI assistance if their tenants do not meet the income requirements for the program yet still are considered low-income. In these cases, landlords may need more financial support and/or incentive to make green and healthy retrofits.

Increasing the number of affordable, green and healthy rental units in Dubuque is a particularly important goal for fighting both climate change and poverty. GHHI hopes that helping low-income families improve their living quarters can have beneficial impacts on family outcomes. Because many low-income households are unable to afford the privilege of home ownership and because renters traditionally have limited control over the health and energy efficiency of their homes, GHHI and the City of Dubuque should take an active interest in focusing resources on creating green and healthy rental units.

One of our central research goals was to formulate policy ideas for increasing participation in green and healthy rental unit retrofits. We recommend that Dubuque (1) make green and healthy updates to the local housing code, (2) implement a performance-based rental system that regulates energy-efficiency and healthy homes standards in rental units, (3) support marketing opportunities for landlords and renter education techniques to advertise the benefits of green and healthy rental units, and (4) enact a point-of-sale energy efficiency ordinance for owner-occupied housing.

Methodology

Our research methods for this topic area included expert interviews, literature reviews and case studies. We reviewed the Dubuque Housing Standards code and made a considerable effort to include the perspective of Dubuque landlords; however, the Dubuque Landlords Association was not interested in speaking with our research team at this time. We also asked other GHHI sites two basic rental-related questions as part of our spring questionnaire ([Appendix C](#)). Due to a low response rate, that input was minimally useful. (An extensive survey of rental-related processes and issues in all GHHI sites was beyond the scope of this project.)

This section of the report includes four main topics: case studies of successful housing retrofit programs in other cities; discussion of necessary updates to municipal codes and ordinances in

Dubuque; discussion of key policy issues for consideration related to new housing regulations; and recommendations for increasing participation in green and healthy rental retrofits.

Case Studies

Our cases studies represent three municipal programs and one state program that address issues of energy efficiency and/or rental property improvements. Two cases are located in the Midwest, one in the Southwest and one in the West. This section examines cities both similarly sized to Dubuque and larger. The following cases were selected for study because they represent innovative and successful practices for improving existing housing stock through regulations.

Austin, Texas: Energy Conservation Audit and Disclosure Ordinance (ECAD)

In late 2008, the City of Austin, Texas, approved an ordinance requiring all local properties older than 10 years, including single-family, multi-family and commercial, to participate in an energy audit before the next sale of the property. Audit results then must be shared with potential or actual buyers. The purpose of the ordinance is to “disclose building energy performance and facilitate energy improvements in existing homes and commercial buildings.”² The local electric utility, Austin Energy, administers the program. Some property owners are exempted from this ordinance, including low-income households who qualify for free weatherization, manufactured housing and properties that have recently undergone certain energy-efficiency improvements.³

While the program aims to *encourage* energy-efficiency retrofits, it does not require most property owners to actually implement any energy-efficiency measures. Multi-family buildings with high energy use per square foot are an exception (detailed below). Thus, the ordinance is primarily a tool for educating property owners about their energy usage and how to reduce their usage.

The City of Austin encourages and incentivizes energy-efficiency building retrofits by “continuing energy efficiency outreach and education, identifying low-cost opportunities, and providing financial and technical resources” to property owners.⁴ Austin Energy provides rebates and low-interest loans to property owners making voluntary energy-efficiency retrofits. The average rebate covers up to 60% of the cost of improvements made to a single-family home and 80% of the cost of

² American Council for an Energy-Efficient Economy, “Case Study-Austin Energy Conservation Audit and Disclosure (ECAD) Ordinance,” September 2011, 1.

³ Ibid, 2.

⁴ Ibid, 1.

improvements to a multi-family building.⁵

The utility company estimates that property owners pay \$200 to \$300 to have a certified energy auditor assess a single family home of 1,800 square feet or less with a single air-conditioning system but that price varies with the size of the building.⁶ Residential audits include an assessment of attic insulation, the duct system, the number of windows receiving direct sunlight, air conditioning equipment, and potential conservation opportunities such as old appliances and inefficient toilets. The ordinance requires that multi-family building audit results be posted in the building and disseminated to tenants. Additionally, multi-family buildings that are found to be using energy per square foot in excess of 150% of the average multi-family building per square foot are required to reduce their energy use by 20% within 18 months of the date of the audit.⁷

The City of Austin estimates that about 3,000 homes per year will undergo energy audits as a result of the ECAD ordinance.⁸ The potential savings of the ECAD program have been calculated by Austin Energy and the City of Austin to total savings of \$723, 650, 7,788,000 kWh, and 4.897 tons of carbon dioxide per year.⁹ Overall, the ECAD program helped the City of Austin meet its Climate Protection Plan goals. ECAD participation has steadily increased since 2009, especially as rebate incentives have increased in dollar value over time.¹⁰

Insights for Dubuque:

- Establish a strong partnership with local utility providers to expand energy-efficiency efforts for residential units. A utility partner could help shoulder some of the costs of energy-efficiency improvements.
- Use a point-of-sale ordinance to establish an effective, albeit slow-moving, program for increasing residential energy-efficiency in owner-occupied housing.
- Target the highest per-square-foot energy users for mandated remediation while also providing resources for easing the financial burden of such improvements as a way to focus first on the “low-hanging fruit” of residential energy efficiency.

⁵ Ibid, 3.

⁶ Ibid, 3.

⁷ Ibid, 2.

⁸ Ibid, 4.

⁹ Ibid, 1.

¹⁰ Ibid, 4.

Brooklyn Center, Minnesota: Performance Based Rental System

In early 2010, the City of Brooklyn Center, Minnesota, implemented a Performance Based Rental System (PBRs) in order to address the city's declining rental stock and rising crime rates at some rental properties. City officials were noticing that complaints lodged against rental properties for property maintenance and safety violations were on the rise and that "rentals didn't look as good as the rest of the neighborhood," according to Housing and Community Standards Supervisor Jesse Anderson.¹¹ The Performance Based Rental System was crafted to not be overly aggressive on good landlords, while focusing staff resources on the worst-needs rental cases. The City crafted the PBRs after informing and working with the Multifamily Rental Association, and the final ordinance was passed with very little opposition. As Supervisor Anderson noted, there was little opposition from local landlords who might be penalized by the ordinance "mostly because they weren't paying enough attention."¹²

As part of the PBRs, the City rates rental licenses on a four-tier scale with Type I being the best and Type IV the worst. Staff members assign each licensed property to one of the four license types based on (1) the number of qualifying police service calls and public nuisance law violations at the rental property and (2) the overall condition of the property and number of inspections code violations (increased violations increase the license category type). [Table 5](#) shows the requirements associated with each rental license tier.

¹¹ Jesse Anderson (Housing and Community Standards Supervisor Brooklyn Center, Minn.), personal communication (L. Graffunder), February 10, 2012.

¹² Ibid.

Table 5: Brooklyn Center Performance Based Rental Program License Categories

| Requirement | Type I | Type II | Type III | Type IV |
|--|--------------------------|----------------------|-----------------|---|
| Association for Responsible Management Meetings | Recommended | Recommended | Attend 25% | Attend 50% |
| Crime Free Housing Program | Phase I (recommended) | Phase I | Phase I and II | Phase I, II and III |
| Inspections | Once every three years | Once every two years | Once every year | Once every 6 months |
| Action Plan for Improvements | - | - | Required | - |
| Mitigation Plan | - | - | - | Required -- Must be completed prior to Council license approval |
| Monthly Updates to City staff | - | - | - | Required |

Source: "License Categories/Types," City of Brooklyn Center, Minn., accessed February 5, 2012, <http://www.ci.brooklyn-center.mn.us/index.aspx?NID=237>.

The City's Building and Community Standards Department enforces the program and has faced some heavy staff burden as a result of the numerous Type IV licenses that have been issued. These licenses require a six-month inspection cycle, which can be cumbersome when inspecting large apartment complexes. The performance standards require that difficult landlords meet extra requirements in a short period of time. As a result, it has been challenging (but not unsuccessful) for the City to get landlords to comply and improve their properties.

While the program offers more penalties than direct incentives to landlords, those landlords who earn Type I and Type II licenses enjoy longer inspection cycles, which saves them money over time. Landlords with troubled properties must undergo more frequent inspections (a significant cost), attend meetings of the Association for Responsible Management and participate in multiple phases of the Crime Free Housing program. Supervisor Jesse Anderson deems the Performance Based Rental Program "very successful" in improving the quality of rental housing in Brooklyn Center and in helping difficult landlords to become better property managers and better neighbors in the

city.¹³ Dubuque could craft a performance-based rental system similar to Brooklyn Center that focuses regulatory attention on green and healthy housing standards.

Insights for Dubuque:

- Structure mandatory housing improvement regulations on a tiered system related to rental quality and energy efficiency
- Couple such a program with incentives like longer inspection cycles to benefit responsible landlords while targeting enforcement efforts onto absentee or otherwise difficult landlords

Boulder, Colorado: SmartRegs

Boulder, Colorado, passed the SmartRegs rental energy efficiency ordinance in fall 2010 in order to reduce greenhouse gas emissions from rental units, which comprise one-half of the city's housing stock.¹⁴ The new ordinance included updates to the city Housing Building Code and Rental Licensing Code and a minimum standard of energy efficiency for all rental housing that must be met by year 2019.¹⁵ Updates to the Housing Building Code included the adoption/replacement of the existing code with the latest International Property Maintenance Code (IPMC), which emphasizes energy efficiency in buildings. The SmartRegs ordinance was passed after a six-month public deliberation process that included "focus groups ... held to receive feedback and help understand the impact the different proposed requirements would have to local property owners, managers, and providers of affordable housing."¹⁶

Under SmartRegs, landlords are required to demonstrate that each of their rental units has a Home Energy Rating System (HERS) rating of 120 or below or that they have earned 100 points on the City's Prescriptive Pathways checklist. (Trained inspectors use HERS, which is federally recognized, to evaluate residential energy-based systems such as insulation, window efficiency and heating, cooling and ventilation operations.) Populus Sustainable Design Consultants for the City of Boulder developed the Prescriptive Pathways checklist as an equivalent and less costly alternative to the

¹³ Jesse Anderson (Housing and Community Standards Supervisor Brooklyn Center, Minn.), interview by Linnea Graffunder, February 10, 2012.

¹⁴ City of Boulder, Colorado, "SmartRegs Fact Sheet," accessed March 26, 2012, http://www.bouldercolorado.gov/files/PDS/rentalhousing/Energy_Efficiency_Project/SR_factsheet.pdf.

¹⁵ City of Boulder, Colorado, "SmartRegs," accessed March 28, 2012, http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=13982&Itemid=5257.

¹⁶ Megan Cuzzolino (Residential Sustainability Specialist, Boulder, Colo.), personal communication (E. Eiseman), March 19, 2012.

HERS testing process.¹⁷ SmartRegs inspectors use the checklist to inventory various energy-efficient aspects of a rental unit such as insulation R-values, window fenestration, water conservation measures and presence of photovoltaics.¹⁸

Although there was initial concern in Boulder that landlords would bear too heavy of a cost burden under the SmartRegs, the City worked with local partners to allay property owners' concerns. Boulder Residential Sustainability Specialist Megan Cuzzolino explained that the City "worked with a local stakeholder who is well-known in the community to help spread the word about the feasibility of the ordinances and the availability of rebates and assistance through our service, EnergySmart."¹⁹ The already existing local EnergySmart program partnered with local energy efficiency consultant EnergySmart to provide rebates and technical inspection assistance for the Prescriptive Pathways option, and to provide property owners the services of an Energy Adviser to guide the owner through the SmartRegs process.²⁰ Cuzzolino stressed that the financial "assistance available through EnergySmart has been absolutely integral to the success of the policy thus far." Rebates available for SmartRegs activities have been adjusted since implementation. The original rebate levels of \$100 to \$200 were not sufficient to motivate many property owners to start upgrades, so the rebates were increased to \$300 to \$500, which have created an increase in participants.²¹

In addition to providing financial support to landlords through program affiliates, the City also worked with their consultant Economic & Planning Systems (EPS) to identify any new burden the SmartRegs might place on landlords over time. EPS conducted an economic analysis that demonstrated the Net Present Value (NPV) of a hypothetical apartment building under SmartRegs and without SmartRegs to demonstrate the cost of property improvements borne by landlords over a period of ten years. Under SmartRegs, the impact on the NPV of the building was only 1.3% lower than without SmartRegs.²² However, going one step further, EPS calculated that because landlords

¹⁷ David Neiger et al, "City of Boulder SmartRegs Case Study Final Report," accessed March 29, 2012, http://www.bouldercolorado.gov/files/PDS/rentalhousing/Energy_Efficiency_Project/SmartRegs_Final_Report_to_City_of_Boulder_March_26.pdf, 4.

¹⁸ City of Boulder CO, "SmartRegs Prescriptive Pathways Checklist," accessed March 29, 2012, http://www.bouldercolorado.gov/files/LEAD/Smart_Regs/Prescriptive_List_10.24.11.pdf.

¹⁹ Cuzzolino, personal communication (E. Eiseman), March 19, 2012.

²⁰ Energy Smart, "SmartEnergy SmartRegs," accessed March 28, 2012, <http://energysmartyes.com/home/smartregs>.

²¹ Cuzzolino personal communication (E. Eiseman.) March 19, 2012.

²² Economic and Planning Systems, Inc., "SmartRegs Economic Analysis," (Memo, Denver, CO, 2010), accessed March 28, 2012,

could charge a small rent premium for their newly improved units, the NPV of a building under SmartRegs was actually 1% higher than without SmartRegs.²³ In summary, although SmartRegs does cause landlords to make relatively small investments in their property, they can recoup those costs and more over time.

Cuzzolino said that, after a year of implementation, the “general sense is that support has increased since the policy has been implemented. Property owners are finding that the requirements are not as difficult to meet as they had originally anticipated.”²⁴ However, although landlords have until 2019 to make all the necessary SmartRegs upgrades, funding for rebate incentives is set to expire in 2013, which may negatively affect the progress of efficiency upgrades. In addition, tenants who are unfamiliar with the SmartRegs ordinance have been resistant to cooperation because often rental units must be accessed multiple times. Cuzzolino said “this can come off as intrusive to tenants.”²⁵ In order to overcome this resistance, the City is now working to educate renters about the benefits they can expect from the SmartRegs ordinance, such as lower utility bills and increased comfort in their homes.

Insights for Dubuque:

- Mandates for property improvements work best with both financial and technical support for landlords to achieve compliance.
- Upgrades are feasible and do not necessarily overburden rental property owners—in fact, the value of the property may increase and rent premiums can potentially be charged for the increased value as a result of the upgrades.

http://www.bouldercolorado.gov/files/PDS/rentalhousing/Energy_Efficiency_Project/SmartRegs_Economic_Analysis.pdf, 8.

²³ Ibid.

²⁴ Cuzzolino, personal communication (E. Eiseman), March 19, 2012.

²⁵ Ibid.

State of Wisconsin: Rental Weatherization Program (RWP) and Property Assessed Clean Energy Bonds (PACE)

Since 1985, the state of Wisconsin has required that all rental properties meet a minimum standard of energy efficiency at the point of sale. Residential properties must be inspected and found to meet the RWP standards before ownership of the property is transferred and when the intended use is to rent the property. The RWP weatherization standards include specific stipulations for efficient windows, patio doors, weather-stripping, window caulking, moisture control in attics and crawl spaces, and home insulation.²⁶ Several types of property are excluded from the RWP requirements, including one- and two-family residences built after 1978, multi-family buildings of three units or more built after 1976, condo buildings of three units or more, and rental units that are not rented over the winter months.²⁷ Essentially, the properties affected by the RWP are those built before 1976 or larger multi-unit buildings.

The State of Wisconsin notes that RWP benefits include a reduction in the overall demand for heating fuel, which helps stabilize heating fuel prices for all and helps reduce the state's large dependence on imported heating fuel.²⁸ Additionally, the RWP shifts "the burden of energy-inefficient rental units...from tenants, who are necessarily limited in any corrective action, to landlords by requiring them to upgrade their buildings."²⁹ The State of Wisconsin also argues that the cost of energy-efficiency upgrades can be recovered in the form of utility savings and the increased value of the building after upgrades.³⁰

In addition to mandating that rental units meet energy-efficiency standards, the State of Wisconsin recently moved to allow municipalities to issue loans to residential property owners for energy efficiency improvements. A provision of the 2009 Wisconsin Act 11, the state now "allows municipalities to issue PACE (Property Assessed Clean Energy) bonds which allow building owners to pay for energy efficiency improvements over time through an increase in their annual property taxes."³¹ This type of municipal bond helps make energy-efficiency upgrades more financially feasible to property owners who may otherwise be unable to pay for the upfront costs of larger

²⁶ "Important Information for Buyers and Sellers of Residential Rental Properties," Rental Weatherization Program, accessed March 2, 2012, <http://dsps.wi.gov/sb/docs/SB-RentalWeatherizationBrochure7366.pdf>.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

³¹ "Q&A," State of Wisconsin Legislative Reference Bureau, accessed March 2, 2012, <http://legis.wisconsin.gov/lrb/research/qanda.htm>.

energy-efficiency projects. Cities such as Madison, Milwaukee, River Falls and Racine have already launched PACE programs for local residents.³²

Insights for Dubuque:

- Implementing a local point-of-sale requirement for health and energy-efficiency upgrades in rental units may be a politically palatable way to slowly improve rental energy efficiency
- Adopt a PACE bond program. Precedent for this type of program in Dubuque has been set in some ways by the City’s Homeowner’s Rehabilitation Loan Program—a program which would also serve as a logical foundation for building a program that assists landlords in making comprehensive health and energy efficiency upgrades to their units regardless of the income of their tenants.

Renter Education

One of the most important ways to spur landlord participation in green and healthy retrofits is to help increase market demand for green and healthy rental units. Landlords will respond to demands of the local rental market. If green and healthy upgrades are considered desirable or even normative by renters, then landlords will have strong incentive to update their rental offerings.

While the ideal rational housing consumer factors the costs of safety and utility services into the price of their rent, most real consumers do not have all the necessary information to make such a rational decision or they may act irrationally in response to other factors, such as the style of the home or the availability of other more desirable amenities. In order to value the benefits of a green and healthy rental unit, the consumer must understand the cost savings associated with building energy efficiency and the health benefits of the reduced risk of exposure to radon, mold, VOCs, lead and pests.

When consumers understand the tangible benefits of a green and healthy rental unit, they are likely to switch their demand towards these units. A public education campaign undertaken by the GHHI partners and the City of Dubuque Housing Department would go a long way in increasing renters’ level of education about their living arrangements. This type of campaign could include a brochure of “top tips” for choosing a rental home in Dubuque, public service advertisements on local cable and radio channels, or announcements and programs at the Dubuque public library. Another way to educate renters and bolster demand would be to include a mandated energy usage disclosure

³² “Wisconsin Local Option Energy-Efficiency Improvement Loans,” Database of State Incentive for Renewables and Efficiency, accessed March 30, 2012, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WI71F&re=1&ee=1.

program between landlords and prospective tenants in which landlords must demonstrate the annual utility costs of the unit.

In addition to creating more demand for green and healthy rental units, a tenant education campaign may also help landlords recoup some of their retrofit investment. If renters are educated about the benefits and savings of a green and healthy unit, they may also be willing to pay a reasonable premium for these rental units. Over time, this rent premium could help to cover the cost of the upgrades. Boulder, Colorado, conducted an economic analysis of the potential impact their SmartRegs ordinance might have on landlords' bottom lines, and they found that even a monthly rent premium as small as \$18 was more than enough to cover the cost of a \$1,200 improvement project over a period of 10 years.³³

As long as the rent premium is not more costly than the savings demonstrated by the energy-efficiency improvements, informed tenants will likely be willing to pay more for a green and healthy unit. As noted in the Boulder study, tenants' willingness to pay a rent premium for a green and healthy rental unit is more likely "if average utility savings are published in the lease or provided in other forms of legal documentation."³⁴ This possibility of slightly increased rent in exchange for lower utility expenditures may be a crucial selling point for landlords considering making green and healthy property retrofits.

Housing and Sustainability Concepts

Dubuque is truly a sustainability leader for communities of its size. Among other achievements, in 2009, the City developed and adopted a sustainable building code for new construction. Additionally in 2009, the City adopted a new sustainable development code. Combining a sustainable (new construction) building code with sustainable development regulations has been a progressive step in achieving positive sustainability outcomes for housing and overall development--outcomes that are in-line with the City's 11 sustainability principles. However, in order to continue as a leader in sustainable practices, the City needs to apply sustainability concepts to existing homes, as well.

³³ "SmartRegs Economic Analysis" (Memo, Economic and Planning Systems, Inc., Denver, Colo., 2010), accessed March 29, 2012, http://www.bouldercolorado.gov/files/PDS/rentalhousing/Energy_Efficiency_Project/SmartRegs_Economic_Analysis.pdf, 11.

³⁴ Ibid, 9.

Existing homes stand to gain the most in terms of sustainable practices with relatively low investments. Renters experience unhealthy, unsafe and inefficient living environments compared to the greater community, while simultaneously not possessing the right to change that environment. For these reasons, the city should phase out their existing housing standards in exchange for the International Code Council (ICC) International Property Maintenance Code. This is one of many codes released by the ICC, which is the international leading authority and publisher of codes. The code is updated every three years, so the city could either adopt the 2009 version or wait for the new 2012 version. Allowing five to 10 years for this code change to phase-in gives landlords ample time to adjust to the new regulations. In conjunction with the property maintenance code, the City should adopt a residential energy-efficiency code that is used for both rental licensing inspections and for owner-occupied homes at point of sale.

Housing Code Update

Dubuque's Housing Standards is a minimum housing code with language and requirements that very generally and minimally address the health, safety and welfare of the existing housing stock. The Housing Standards (city code chapter 6-6-10) apply to all existing housing within the city, although rental units are more often subject to the code than owner-occupied housing due to rental license inspections scheduled every two years. Owner-occupied units are inspected less frequently because they do not require yearly occupancy licenses; however, such units are still expected to meet the minimum housing standards and are typically inspected by a private inspector upon sale or transfer of the property. Thus overall, rental property landlords stand to bear the brunt of any regulatory code change.

As noted above, we recommend that the City of Dubuque adopt the 2009 or 2012 International Property Maintenance Code (IPMC). The IPMC is similar to Dubuque's current code in many ways, but addresses additional health and safety conditions in the home and uses more specific language. Several homes that have undergone a GHHI intervention in Dubuque have had poor on-site grading or driveways in disrepair, which in turn caused water to infiltrate back into the home around the foundation, causing mold. Dubuque's current housing code does not address on-site grading and water drainage issues, while the IPMC does in detail. Other IPMC provisions define indoor air quality in detail and define structural integrity more specifically than the current code. Overall, the IPMC would modernize the city's code and apply the most up-to-date health, safety and welfare understandings to existing renter-occupied and owner-occupied properties alike.

Energy Efficiency Code Adoption

Replacing Dubuque's current minimum Housing Standards code with the International Property Maintenance Code is a positive first step in improving the health and safety of the City's rental stock. However, the IPMC does not adequately address building energy efficiency. To fully realize all benefits associated with a GHHI-style housing program, energy efficiency must be accounted for within Dubuque's regulatory approach for existing housing. Many building codes already exist which incentivize and/or require energy-efficiency measures as part of new construction. However, a much smaller number of examples exist which apply such standards to existing housing. Our case study of Boulder Colorado, provides an example of a successful regulatory approach to requiring energy-efficiency standards for existing housing.

Boulder's SmartRegs provide two alternatives for existing homes to come into compliance. The performance-based requirement can be thought of as measuring the outcome, that is, the actual achieved high energy efficiency of a unit. The prescriptive-based requirement can be thought of as a measure of the processes or individual factors that, when met, should equate to an energy efficient unit. Boulder's prescriptive-pathway checklist can be found in [Appendix D](#). Implementing a regulation with two options for meeting compliance requirements offers property owners the ability to choose the most suitable method for themselves.

The City of Dubuque should consider adopting an energy efficiency or weatherization code to accompany the IPMC. This interaction would serve much the same function as does the interplay between the City's adopted building codes, the IBC and IECC. The IPMC ensures safe and healthy housing, while a weatherization code provides assurances of increased energy efficiency and resource conservation. Adopting one of these housing standards codes without the other would ignore the mission of GHHI and fail to make a potentially larger beneficial impact on Dubuque's housing.

If a weatherization code is adopted without the IPMC, health problems may be exacerbated. One of the original purposes for combining local housing programs into a single approach under GHHI was to guard against individual retrofits that damage the overall housing environmental quality. Specifically, weatherization sealing actions that are conducted without healthy home considerations run the risk of exacerbating existing indoor air quality issues such as mold and radon.

The recommendations for landlord/rental units can be divided into those that relate to expanding the GHHI program to rental units, and those that aim to incorporate the long-term goals of GHHI into the City's regulatory framework (most notably the code update recommendations). The reality is that this program's longevity is volatile, mainly due to funding uncertainties. Even if Dubuque's GHHI program continues to grow, only a small fraction of the City's housing stock will undergo program intervention. While GHHI is a beneficial and important program for Dubuque, it currently can only make incremental improvements in the city-wide housing stock due to its voluntary nature and limited funding streams. Dubuque's goal should be to learn from the program's well-researched and understood objectives and then adopt long-term regulations which ensure that the most modern understandings of health, safety and welfare are applied to the City's entire housing stock.

Economic Feasibility of GHHI-Type Regulations in Dubuque

In order to evaluate the economic feasibility of reaching compliance with new green and healthy housing standards for landlords, our team conducted a Net Present Value (NPV) analysis of the cost of retrofits under several different scenarios. We modeled our scenarios on the previously mentioned economic analysis of the SmartRegs program in Boulder.

Our analysis assumed a hypothetical 10-unit rental property with a monthly rent of \$775 per unit that was to be sold after ten years. For our NPV analysis we made the following assumptions: a vacancy rate of 5%, an inflation rate of 2.5%, a capitalization rate of 8.5 %, a discount rate of 10%, and an operating expense ratio of 40% (which includes items such as maintenance, insurance and taxes). We assumed the total cost of retrofitting one rental unit up to new Green and Healthy Homes type standards, herein referred to as SmartCodes, at \$12,000. This cost was based on the average per unit expenditure of the 23 GHHI rental unit projects to date. The types of rental units in the GHHI program range from a one-bedroom rental all the way up to a single family home. Finally, we calculated the NPV over a 10-year time frame to allow landlords a reasonable amount of time to come into compliance with the new SmartCodes and to allow time for possible rental premiums and energy efficiency savings to set in.

Net Present Value Scenarios

We ran five NPV scenarios for comparison:

- 1) Baseline property valuation representing no change in minimum code and no upgrades
- 2) SmartCodes rental retrofit with no assumed rent premium resulting from the project
- 3) SmartCodes rental retrofit with a rent premium included
- 4) SmartCodes rental retrofit funded in majority by GHHI with no rent premium resulting from the project
- 5) SmartCodes rental retrofit funded in majority by GHHI with a rent premium included

In scenarios 2 and 3, landlords assume the full cost of the project and, as such, were reasonably allowed to stagger the project start and expenditures to years 4 and 8. In scenario 3, a rent premium was added and assumed to occur one year following completion of each project phase. In scenarios 4 and 5, the cost of retrofit and project start was assumed to occur entirely in year one due to the timeline of the GHHI program. In scenario 5, a rent premium was also assumed to occur one year following project completion in order to allow time for retrofit benefits to appear.

Results of the NPV analysis

On a present value basis, participation in GHHI is certainly in the interest of the rental property owners. In scenario 1, the baseline 10-unit rental property valuation with no changes to minimum code or upgrades to property was \$643,241. In the second scenario, the city was assumed to have enacted SmartCode regulations in line with GHHI standards, but the landlord is required to entirely fund the \$120,000, or \$12,000 per unit, in upgrades to the property. If the landlord funds and make the upgrades in two increments over 10 years, the present value of their property drops by 11% ([Table 6](#), Scenario 2 below). The owner would have to assume a 15%, or \$116, rent premium increase up to \$890 per unit by year 10 for their property valuation to break even as shown in scenario 3 in [Table 6](#) below.

If the property owner is required to meet the new SmartCode regulations, but has the project funded through GHHI, the present value decreases by just 1% ([Table 6](#), Scenario 4). In other words, the property valuation is nearly the same even without having to assume a drastic increase in rent premium. If the landlord does see an increased rent premium even half that of scenario 3, they can see an immediate 8.5% increase to the present value of their property. (The rent premium increase can be achieved passively through energy-efficiency savings.) If the owner, with GHHI funding, sees even a 5% rent premium in scenario 5, then the present value of the property is 6% or \$36,864

higher (Table 6, scenario 5). We can separately provide the City of Dubuque with a detailed Excel worksheet on the Present Value Analysis.

Table 6: Present Value Analysis for Rental Properties

| Scenario 1: Baseline | No Upgrades | SmartCodes / No Premium | Value Impact | % Change |
|--|------------------|----------------------------|------------------|-------------|
| Present Value of Property | \$643,241 | - | - | - |
| Scenario 2: SmartCode Upgrade with No Rent Premium | No Upgrades | SmartCodes / No Premium | Value Impact | % Change |
| Present Value of Property | \$643,241 | \$569,457 | -\$73,784 | -11% |
| Scenario 3: SmartCode Upgrades with 15% Rent Premium | No Upgrades | SmartCodes With Premium | Value Impact | % Change |
| Present Value of Property | \$643,241 | \$644,755 | \$1,515 | 0% |
| Scenario 4: GHHI with No Rent Premium | No Upgrades | GHHI / No Premium | Value Impact | % Change |
| Present Value of Property | \$643,241 | \$639,422 | -\$3,818 | -1% |
| Scenario 5: GHHI with 5% Rent Premium | No Upgrades | GHHI With Premium | Value Impact | % Change |
| Present Value of Property | \$643,241 | \$680,104 | \$36,864 | 6% |

What these scenarios highlight is that a property can be upgraded to SmartCode or GHHI standards much sooner as opposed to being spaced over 10 years. This means the owner and tenants receive the benefits of increased energy efficiency, health and safety in year one rather than waiting years for improvement. The City will in effect be improving the housing conditions and quality of life for a portion of its population without delaying benefits or impacting affordability through increased rents. Even if the rent premiums increase, the smaller increment can still be sufficient to incentivize property owner participation and cooperation. This present value analysis also highlights the need

for significant and lasting funding sources to make these projects feasible, without which, affordability will be have to be sacrificed.

Key Issues for Policy Consideration

Key issues to consider when weighing any possible policy changes for increasing green and healthy rental units in Dubuque include market factors, local organizational capacity and social equity issues. The following questions are likely to arise amongst property owners, elected leaders and the general public regarding any policy push for green and healthy rental units. These questions should be satisfactorily addressed before any policy implementation is undertaken.

Will housing affordability be reduced by extensive improvements to rental units?

Often housing that is affordable to very low-income households is affordable because it cannot be rented for a higher price due to the condition of the unit. In theory, nicer rental units command higher prices. This is commonly referred to as the filtering theory of affordable housing—the idea that all housing may eventually become “affordable” as the property ages and declines. With this in mind, decision makers must be sure that action to improve rental properties does not result in the gentrification of a formerly affordable neighborhood and the subsequent displacement of low-income households. Housing affordability must be preserved at the same time that rental units are made healthier and more energy efficient.

Will landlords be able to afford bringing their units up to new green and healthy standards?

Also connected to concerns about housing affordability is the concern that landlords need to be able to cover their costs in some way. Boulder, Colorado, demonstrated through careful economic analysis that even small rent premiums combined with technical assistance and financial incentives made upgrades to rental units both possible and profitable. Likewise, our team also attempted to demonstrate the economic feasibility of green and healthy upgrades for landlords, as discussed earlier in this report. Any policy that impacts rental units must not place undue burdens onto landlords, otherwise the local supply of affordable rental units may be reduced.

Will the policy increase the time and cost burdens (e.g., for increased monitoring) on city and nonprofit staff members? Will new staff need to be hired?

In order to effectively expand GHHI and to enact any policy that requires more regulation, monitoring or certification of properties, there has to be enough organizational capacity in place to handle the work load. While this may seem like commonsense, it is crucial that a realistic and thorough inventory of staff capacity for implementation activities be made before committing to any policy. Additionally and specific to GHHI, multi-family properties offer significantly more

opportunity for program efficiency and speed because GHHI can often retrofit multi-family properties more quickly and meet program production goals sooner than can be achieved with single-family housing.

Why are rental units being targeted for improvement? Shouldn't everyone do their part, not just landlords?

Dubuque as a community has professed a commitment to 11 sustainability principles related to resource use, the vitality of the community and the strength of the local economy. By implementing policies that improve the health and safety of living environments, while also reducing the costs and ecological consequences of energy usage, Dubuque reinforces its commitment to sustainability. In addition, the city has already set a precedent by establishing green building practices for new construction and development. Finally, due to the nature of rental license renewal and the established requirements for granting renewal, the city has a unique leveraging opportunity for making home retrofits happen in rental units that does not exist in the same way for existing owner-occupied housing.

Recommendations

In light of the above case studies and policy considerations, we recommend that Dubuque implement a multi-faceted approach to improving the local rental stock including both regulatory and market-based policies.

1. ***Combine incentives and regulation.*** A green and healthy inspired performance based rental system that combines incentives and regulatory penalties to mandate that rental units meet energy efficiency and Healthy Homes program standards could make a big difference in the lives of Dubuque's low-income renters both financially and health-wise. This program should offer speedier licensing and permitting and longer inspection cycles for rental properties meeting green and healthy standards and focus attention on poor quality rentals with increased inspection frequency and mandated action plans for implementing improvements.
2. ***Provide marketing assistance to landlords.*** As a supplement to this performance-based program, the City should offer marketing assistance for landlords who make green and healthy upgrades to their rental units. This assistance could take the form of a dedicated page on the city website highlighting green and healthy properties for rent or the City could issue certification stickers or signs for rental units to advertise that the unit has met GHHI

(or similar) standards. A periodic news release could announce which properties meet the current standards.

3. ***Increase renter awareness.*** The City should actively raise consumer awareness about the benefits of living in an energy efficient and healthy home. A renter education campaign could be included in Sustainability Indicators events and media outreach. The City also can consider requiring landlords to include utility consumption and cost information in rental lease agreements to educate prospective tenants about the energy efficiency of the property.
4. ***Update the housing code and adopt a new energy-efficiency code.*** To support the transition of all Dubuque housing towards greater energy efficiency and healthy homes standards, the City should update the Housing Code to include strong standards for energy efficiency and health and safety issues. This can be accomplished by adopting the International Property Maintenance Code in conjunction with an energy efficiency code for increased sustainability in existing homes.

Innovative Funding

Continued funding is essential to an ongoing and expanded GHHI program in Dubuque. Securing funding for any city-based program, especially a new one, is often complex and challenging. A complete investigation of funding issues and options was beyond the scope of our project due to our focus on the Priority Model. Indeed, funding issues merit a semester or year-long study on their own. In addition, the Community Foundation of Greater Dubuque and the City are better positioned to lead funding exploration, given their established relationships with local financial entities.

Currently, the Dubuque GHHI program relies on several federal grant sources such as lead abatement grants and Healthy Homes. Grant availability and the size of awards, especially at the federal level, can vary from year to year. Given this, we focused primarily on how public grants could be leveraged with private funds (lenders) to support loan-based products. We examined stand-alone loan products and health-related partnerships. We also considered financing that would benefit landlords, as incorporating rentals was another focus of our spring-term research. Given our overview approach, we do not recommend detailed actions but suggest resources and options that the Foundation and the City might find useful.

Methodology

To find relevant financing ideas, our research focused on expert reports or interviews:

- We reviewed a report published by Delta Redevelopment Institute (DRI) on best practices and case studies from different locales. DRI has a proven track record of quality research and work in lead- and energy-efficiency related funding. Although based primarily on lead poisoning prevention efforts, the DRI report is useful for GHHI because the recommendations “can be applied to a broader range of healthy or green home improvements, generally costing less than \$10,000 per unit.”³⁵ In addition, Chicago-based DRI currently partners with the Chicago GHHI effort.
- The Department of Energy (DOE) Building Better Neighborhoods Program (BBNP) published online information in November 2011 that describes energy-efficiency financing best practices and cases. No municipality in Iowa appears to be participating in BBNP, however, we researched the guidebook on Dubuque’s behalf. We explored “Michigan Saves,”

³⁵ “Creative Funding Strategies for Remediation of Lead and Other Health Hazards: A Guide for Increasing Private-Sector Financing,” Delta Redevelopment Institute, 2010, accessed November 12, 2012 at http://www.delta-institute.org/sites/default/files/1-DeltaREDI_CreativeFundingStrategiesForRemediationOfLead.pdf, 2.

a statewide program that includes features that could benefit Dubuque, and interviewed an expert with Michigan Saves.

- We followed up on two recommendations from GHHI National to consider insurer-related sources of funding and reviewed two reports on the topic. Given our project scope we could only touch on insurer-related funding.
- We contacted other GHHI sites about ongoing funding. The four responding sites said they were still working to identify future funding sources for their programs.
- We investigated the Energy Efficiency and Conservation Block Grant (EECBG) Program; it currently is not offering funds, but is a resource Dubuque's GHHI program should watch for future funding opportunities.
- Last, we researched two State bills aimed at incentivizing energy efficient housing at the community level.

Overview

Our funding research results echo several findings from our other research on rental and landlord issues. We provide our overall findings below, despite some duplication, for the benefit of those who may be reading only this section.

1. **Pairing private funds with public grants or other monies is key.** A local funding match is sometimes a grant application requirement. From first semester research, we found weatherization services were historically targeted to the poorest households and utilized grants, while rehabilitation services included moderate income households, utilized loans to ensure household buy-in and focused on wealth preservation in neighborhoods.
2. **Developing supply and demand for loan products is important.** Financing can focus on making loans to the homeowner, landlord, or even contractors with the City. A non-profit organization or financial institution can provide the capital or act as a liaison for funding distribution. However, it can be time-consuming to set up loan programs, and it can also add time to the participant approval process.
3. **Use incentive options whenever possible and avoid linking funding program qualifications to the need for a landlord to be cited for a violation.**
4. **Fine-based funding may be an option but is likely complicated.** One GHHI site received state funding from the fines of a local polluter. While this is a unique source of funding, the ideal program would utilize funds achieved in a positive, proactive way, rather than through punitive-based measures.

5. The Iowa Legislature has recently considered two bills aimed at incentivizing energy efficient housing at the community level. While the bills have not been passed into law, there is clear interest at the state level to provide incentives for energy-efficient homes. Legislation can be an important practical and visible way to highlight the importance of localized energy-efficient practices. This is especially important since the legislation is sponsored by Dubuque's own representative, Charles Isenhart.

Findings

The Delta Redevelopment Institute and the Department of Energy provide excellent information on supply and demand issues for home-rehab financing. We provide below overviews of each resource and then focus on "best practices" that can be drawn from them.

Delta Redevelopment Institute, "Creative Funding Strategies for Remediation of Lead and Other Health Hazards: A Guide for Increasing Private-Sector Financing," 2010.

The main goal of DRI efforts is to pair public grant funds with private funding. Lenders and government/non-government organizations (NGOs) need to work together to increase both supply and demand for non-traditional loans. The report also provides cases studies on five private Leveraged Loan Programs. All use government grants, tax credits or TIF to pay part (usually 50%) of costs and to leverage private investments. Three of the programs do not require a building owner to be cited for a violation in order to qualify. In addition, large loan pools can minimize risk for lenders.

Federal Department of Energy Building Better Neighborhoods Program

In 2010, the Department of Energy published online a guide meant to aid governments setting up state efficiency programs.³⁶ The guide also helps recipients (municipalities) of Energy Efficiency and Conservation Block Grants and American Recovery and Reinvestment Act funds. The guide's insights are not limited to just those funds, as the Clean Energy Finance Guide for Residential and Commercial Building Improvements comprehensively lays out tools and strategies that can be used to create an effective and sustainable energy efficiency lending program at a variety of scales. We recommend that Dubuque further consult this resource as an initial step to creating their own funding mechanism, and have included a summary of resource components in [Appendix E](#).

³⁶ "Clean Energy Finance Guide for Residential and Commercial Building Improvements 3rd Edition," U.S. Department of Energy, accessed February 7, 2012, http://www1.eere.energy.gov/wip/solutioncenter/pdfs/ch01_clean_energy_lending.pdf.

Funding Best Practices

Energy-efficiency and rehab programs should encourage local lenders to establish or expand nontraditional loan programs. A major challenge is limited demand since the programs are targeted to low-income areas where landlords or owners have the least ability to cover the cost of improvements. Based on the two resources we reviewed, the following subsections focus on what different stakeholders can do to expand funding. Lenders and contractors can increase business by following key steps. Likewise, governments, nonprofits and citizens can increase their options through private-based financing.

For Lenders

- Include health and energy audits as part of a loan's due diligence. This can be used to ensure extensive enough improvements are being recommended and then performed with loan funds.
- Focus on low-income areas that could qualify for Community Reinvestment Act credit or other government subsidies. Lending to certain populations could be a good way help a bank meet its CRA requirements.
- Work with nonprofit partners and government entities to utilize public subsidies, grants, pooled loan funds or loan guarantees. This will help reduce risk and expand a program's eligible participant base.
- Consider underwriting pros and cons for various types of loan programs. Loans to contractors or nonprofits intermediaries and loans made directly to landlords or homeowners offer different advantages when compared to one another.
- Handle single-family and multi-family loan products differently, as needed. Increasing the number and variety of participants allows lenders to decrease risk.
- Engage local contractors as a marketing strategy. Contractors should be motivated to participate by the increased amount of business they can create for themselves.

For Government or Non-Governmental Organizations

- Help reduce risk to lenders by providing credit enhancement to applicants through public subsidies, pooled loan funds or loan guarantees. Encouraging lending to those that may not otherwise qualify should be a primary goal of a GHHI-related efficiency lending program.
- Change codes to prevent or remediate dangerous situations before households members are hurt by lead, falls or other hazards. Proactive, rather than reactive, measures will help

households avoid incurring medical expenses that further decrease their ability to maintain their homes.

- Collaborate with community financial institutions, contractors and other community organizations to advertise the program and increase participation. Creating and fostering a local network has been found to be a very successful way to establish an initiative and increase participation.
- Reform grant programs to remove barriers and make it easier for homeowners and landlords (as discussed below) to participate.

To Engage Landlords

- Provide access to grants that are not based on tenant incomes. Currently, landlords must verify the income of all tenants in order to receive lead rehabilitation financing. Instead, use landlord certification of affordable rents. These ideas are supported by our separate focus on [landlords and renters](#).
- Reform grant requirements to allow a certified, non-city contractor to assess healthy home and energy needs, not city inspectors, who must issue citations for units not meeting code. Minimizing punitive measures may help encourage landlord participation in an efficiency program they may otherwise avoid.
- Include all types of units in lead remediation financing programs. Some types are currently excluded (studios), which means the extent of GHHI effectiveness is somewhat restricted.
- Establish flexible financing terms (especially interest rates) while keeping subsidized financing programs as affordable as possible to the greatest number of homeowners or landlords. Engaging a large number and variety of participants is key to program success on the part of lenders, as their risk is minimized.

Michigan Saves

As noted earlier, the best practices above came in part from the federal Department of Energy's Building Better Neighborhoods Program website, which highlighted Michigan Saves as an effective program. The Michigan Saves program exemplifies a statewide program that Dubuque's GHHI could scale down to make their program sustainable in the long-term. By using a relatively small amount of money, about \$6 million, the State of Michigan was able to set up and secure a lending program that is geared towards making residential efficiency upgrades.

The main component of Michigan Saves is a loan loss reserve fund that has thus far used \$3 million to leverage \$60 million in lending capacity throughout the State of Michigan. This fund secures loan capital that is provided by nine individual lenders located throughout the state.³⁷ These lenders supply their own capital and service the loans. As a result of this control, they set most of the loan terms. Participants wishing to take advantage of the loan loss reserve fund must follow minimal guidelines. These guidelines include debt-to-income ratio requirements, maximum interest rates, and credit score requirements tied to recoverable amounts of loans the reserve fund may affect.³⁸ Michigan Saves has made about 600 loans since September 2010, with default rates well under 1%.³⁹

As noted, Dubuque needs a smaller-scale program than used in Michigan, but many of the features could be adapted for the city's purposes. A loan loss reserve fund, or some similar credit enhancement, set up at the city-level would not need to be near as large as the one used in Michigan's program. The fund could possibly be established by grants or come from state funding for efficiency purposes. Like Michigan Saves, local lenders (credit unions, local banks, etc.) could make good partners that supply their own capital and servicing. This would be crucial as the program likely would not be large enough to draw interest from national or larger regional banks.

In Michigan, local certified contractors have successfully marketed the Michigan Saves program, and contractors in Dubuque could act similarly.⁴⁰ This is an advantageous partnership for all parties. Contractors gain more business, and the efficiency program gains exposure, leading to more lending activity. There are many options for credit enhancement that could make efficiency lending attractive to institutions in Dubuque, several of which are outlined in a summary of an energy-efficiency lending guide put out by the Department of Energy ([Appendix E](#)). It will be up to Dubuque's GHFI leaders to examine available options and customize a program that can work in conjunction with GHFI Dubuque.

³⁷ "Michigan Saves Partners: Lenders," Michigan Saves, accessed March 17, 2012, <http://www.michigansaves.org/Customers/HomeEnergyLoanProgram/ParticipatingLenders.aspx>

³⁸ "Michigan Saves Program Description," Better Buildings Neighborhood Program Guide, accessed March 17, 2012, http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/pdfs/michigan_saves_program_description.pdf

³⁹ Laura James, Public Sector Consultants, Inc., personal communication (Z. Panoff), March 3, 2012.

⁴⁰ Laura James, Public Sector Consultants, Inc., personal communication (Z. Panoff), March 3, 2012.

Insurer-based Options

Health-based insurance payouts to individuals for their home improvements may be unlikely, but payments to efficiency- and health-related programs like GHHI may be possible if the need for such measures can be established. In addition, insurer-related funding that helps make homes safer, even if not directly incorporated in the GHHI funding stream, can free up other program funds to further the GHHI program. Preventing asthma- and fall-related health problems are two key areas of concern. We reviewed a report published in 2010 by the Lowell Center for Sustainable Production, “Asthma: A Business Case of Employers and Health Care Purchases,” and the Rand Corporation’s “Falls Prevention Intervention in the Medicare Population.”⁴¹ (Please see [Appendix F](#) for a quick overviews of these reports.)

State Legislation

Representative Charles Isenhardt (representing the Dubuque area) recently wrote two bills to support energy-efficiency upgrades and funding: House File 436 and House File 2452.

[2011 House File 436](#) proposed to expand the Iowa Department of Economic Development (DOED) Energy City Designation Program for more sustainable and energy-efficient practices. Most salient for funding for the GHHI program is DOED technical assistance for grants. The grants were meant to “attract private sector investment in energy improvement projects” (Section 3.3). The bill also proposed the creation of energy improvement plan financings by localities (Section 4). Without the financial assistance of this type of legislation, increased activities and flexibility to partner with utility companies cannot occur.

[2012 House File 2452](#) (current session) would allow property tax exemptions for property owners whose structures meet certain energy efficiency and environmental quality standards. Cities would be allowed to set these standards. There is clear interest at the state level for incentivizing property owners to have greener homes and buildings. By lowering costs for homeowners, the feasibility for renovating homes increases. The bill effectively blends sustainability and property tax reduction goals. It thus serves to reconcile political differences surrounding the issue of “green initiatives” and associated costs for implementing these practices. The legislative session has not yet closed. As a result, we cannot provide a final outlook on this bill.

⁴¹ “Asthma: A Business Case of Employers and Health Care Purchases,” Lowell Center for Sustainable Production, February 2010, accessed March 17, 2012, http://asthmaregionalcouncil.org/uploads/documents/hria_asthma_report.pdf

The bill would allow homes already in GHHI, and those that will enter the program, to be in a better position to receive property tax reductions.

Recommendations

1. Explore with *local banks and credit unions* whether they can develop appropriate loan products. Recognize that adding a loan option increases the time needed for the applicant approval process and project timeline.
2. Encourage lenders to establish *loan terms that are inclusionary for landlords/renters*, and limit building citations as a requirement for loan qualification. This echoes information we found in our research on increasing landlord participation in GHHI activities.
3. *Create and foster a network* of local financial institutions, contractors and other organizations in an attempt to market the program, service loans, and perform the work using familiar partners.
4. Consider options for establishing a *credit enhancement fund* that can be used to encourage lending to potential participants that may not otherwise be qualified for energy efficiency loans.
5. Continue to work with Representative Isenhardt, as appropriate, on *relevant legislation* and ensure Dubuque serves as an example of successful green and healthy home updates.

Interdepartmental Cooperation Building

One of the hallmarks of the Green and Healthy Homes Initiative is the program's collaborative approach to integrating local weatherization, healthy homes, lead abatement and home rehabilitation services to provide integrated home repair for individual households. As with all collaboration projects between already established entities, institutional or interpersonal barriers may prevent collaboration efforts from reaching their full potential.

Methodology

To assess whether interdepartmental cooperation in Dubuque might need to be improved as GHHI expands, our team sent a brief questionnaire ([Appendix G](#)) to 12 key program leaders. The response rate was six out of 12. We summarize below the major findings garnered from the six respondents, and based on these insights, include recommendations for program improvement.

Summary of Responses

There are three major process-related issues that could be addressed in order to improve both staff and client experiences:

1. ***GHHI needs access to a less restrictive option for "gap funding" for home retrofit work.*** Initially, the City expected its Homeowners Rehabilitation (Rehab) program to provide low-interest loan funding for certain retrofit projects that might exceed program spending limits or did not qualify for funding under Healthy Homes or weatherization programs. However, the underwriting criteria of the Rehab program are such that many low-income households with poor credit histories might not qualify for a loan. As a result, the Rehab program has only been minimally involved in GHHI homes so far, and property owners have fewer options for financing some of their GHHI work.
2. ***GHHI lacks a strong project management framework.*** Several respondents noted that problems with project management, as well as efficiency and communication between partners, have created frustration for staff and property owners alike. GHHI participants have called with concern about the speed of progress on their homes only to find that a project partner has forgotten or overlooked completing key steps or jobs. These omissions increase the displacement time for the household and slow down the entire GHHI process. When projects are not kept on schedule, other households waiting for their turn in GHHI become anxious, partly because they are newly informed that their house may be unsafe or may be making them or their families sick.
3. ***GHHI data collection systems are not streamlined or user-friendly.*** Currently, in order to comply with various program reporting requirements, GHHI staff members enter program

data separately into the Efforts to Outcomes (for national GHHI data tracking), Elite (for local program coordination) and Stellar (for local health data) tracking systems as well as various spreadsheets. This process is both cumbersome for staff to use and introduces the strong possibility of error or inconsistency across data systems.

Recommendations

1. ***Strengthen project management.*** Staff should consider appointing a strong project manager to coordinate GHHI activities at each individual home, so that the work is finished as quickly and efficiently as possible. A project manager would help ensure that households receive the best service and attention, while also increasing coordination and communication between Healthy Homes, Weatherization, Rehab and Lead Abatement staff.
2. ***Identify a new long-term funding option for GHHI use.*** This option should be accessible to households with few assets and/or poor credit history. In order for GHHI to be truly successful in assisting low-income households, gap financing options must be available for these households. Reversing the historical exclusion of poor households from access to financing options may help bring them out of poverty rather than compounding the problems of poverty. This recommendation relates to other recommendations we developed through our direct research on funding.
3. ***Streamline data collection systems.*** GHHI staff has already been working on improving the data collection system and this work should be continued until a satisfactory option is found. In addition, there is hope that the Emphasys program being implemented by the City will provide a solution for combining data collection across programs and systems.

We recognize that adopting process changes can be time-consuming. However, the time spent initially streamlining processes result in both time- and cost-savings. For example, staff will need to spend less time down the road fixing problems and contractors may not need to be called back to a home for a follow-up fix. And, of course, program participants will have an improved experience.

Participant Engagement and Outreach

We researched public outreach methods so that Dubuque can make its GHHI program more proactive. Dubuque was selected for GHHI because it is a city that “gets things done.” Proactive outreach can fit into that model and help ensure that residents who would most benefit from assistance indeed will. A proactive plan also can help a municipal program make the best use of staff and funding resources. More broadly, outreach helps cities and residents build trust and create avenues of communication while achieving goals. This relationship building can then have a spillover effect to other programs and processes.

For the purposes of this report, we define “outreach” as efforts to recruit participants, engage them over time, and generally inform the public of GHHI opportunities and achievements. Dubuque does not currently have a proactive outreach plan for the program (details below). However, we recommend that the City begin developing and adopting a proactive outreach plan over time, otherwise the City risks relying on an ever-growing waiting list for participation. A waiting list suggests there will always be demand by participants and is an incremental method of addressing need in Dubuque. That is, the City is not fully focused on the long-term issue of need and may not be directing limited resources of time and money to the homes that need the most help. Likewise, tracking residents’ progress after their participation in GHHI and maintaining outreach will give the City insight on gaps and hidden opportunities to make the program stronger. We provide ideas for effective outreach below.

We also include ideas to increase outreach and communication with landlords. At least one of the neighborhoods identified by our model (Washington Neighborhood) has more rental units than owner-occupied units. Thus, Dubuque must appropriately engage landlords as it expands the GHHI program.

Methodology

We gathered and analyzed outreach-related information on Dubuque’s specific program, other GHHI sites’ programs, and community-based and conflict resolution research. Our research included:

- Email interviews with Lindsey Harms, Sharon Gaul and Kim Glaser
- Email interview with the City’s media relations coordinator (Randy Gehl)

- Questionnaire emailed to all other GHHI sites (15) after coordination with GHHI National, with follow-up contact, as needed (see [Appendix C](#) for the specific questions and list of respondents)
- Skype interviews with Elizabeth Walsh, doctoral student at University of Texas – Austin, who is studying community engagement and “one-touch” home retrofits
- Review of best practices from freight transportation planning and conflict resolution for applicability to landlord outreach

Current GHHI-Related Outreach Efforts in Dubuque

The program does not have a defined outreach effort to recruit participants.⁴² No single person is assigned to oversee outreach activities. Dubuque’s GHHI website, which is very basic, appears at the Community Foundation of Greater Dubuque website but is not easily found at the City website.⁴³ The existing site provides contact information and briefly describes the program, but nothing actionable for a potential participant. (This site can be developed further, as suggested in the recommendations below.) Collectively, the Dubuque staff members have decided to work through an existing housing needs waiting list before actively recruiting new participants (84 names were on the waiting list as of mid-March 2012). Thus, the City is not promoting its website or publicizing the program. However, scaling up the GHHI program will require an effective outreach campaign. The outreach can focus on areas highlighted by the prioritization model. Additionally, outreach activities provide good publicity for GHHI, which can help garner public and financial support for the program as it expands.

The program also is not formally tracking how people hear about the GHHI opportunities. Based on routine interactions, for example, through the “Quick App” intake process, staff reports that most people hear about GHHI through “word of mouth” from family, friends, and occasionally, contractors.⁴⁴ However, the initial point of contact is not actually being recorded on any forms. It may help the program down the road to track this information to identify strengths and weaknesses in connecting with different potential participants.

In addition, we consider the importance of engagement once homes have been upgraded. The Home Advocate role may help keep participants engaged in the program, such as to help ensure home

⁴² Lindsey Harms, personal communication (B. Soglin), March 2, 2012.

⁴³ Community Foundation of Greater Dubuque, GHHI website:
<http://dbqfoundation.org/OurInitiatives/GreenHealthyHomesInitiative.aspx>

⁴⁴ Lindsey Harms, personal communication (B. Soglin), March 2, 2012.

maintenance. However, there is apparently no formal program in Dubuque to follow up with participants at defined points, such as one-year after program completion. Such follow-up would help ensure that residents are keeping their homes healthy and green. The renovation investments must not wither away after GHHI fixes are made. Follow-up measures will also allow staff to gather information (to the extent permitted by appropriate privacy considerations) on post-intervention outcomes such factors as health, school and work attendance, and wealth retention. Moreover, GHHI National requires cities to provide a follow-up program after homes are renovated.

Existing Outreach Options for Dubuque

The City and the Community Foundation of Greater Dubuque each have active and effective media relations and communications office. Also, many City staff members have led outreach efforts for their specific program area, such as lead abatement. Randy Gehl, the City's media coordinator, says that traditional media (120 news releases annually) and City cable channel announcements are still useful in this age of increased social media. The use of Twitter and Facebook for other City matters helps reach younger residents. Overall, however, it is a "challenging time" to be communicating with the public, as Gehl noted, due to the multiple outreach modes to which different audiences respond.⁴⁵ City residents also can sign up to receive alerts on specific topics. All households receive the *Dubuque Advertiser*, in which the City and the Foundation can share information. Each spring, the city holds an annual exposition to feature city programs and departments. An estimated 1,800 people attend the event. The City and Foundation also have partnered with the Sustainable City Network (SCN) on public educational events for other topics. Based in Dubuque, SCN helps many municipalities learn about and promote sustainability products, services and best practices.

Ideas and Highlights from Other Sites and Experts

The other GHHI sites that responded to the outreach section of our questionnaire included three of 15 sites: Chicago, New Haven, and San Antonio (Baltimore answered only funding-related questions, which are discussed elsewhere). Programs vary widely in outreach efforts, in part because some are more focused on rentals than others. National GHHI reports that as of December 31, 2011, Chicago GHHI had completed 264 homes; New Haven had completed 262 units (mostly rentals); and San Antonio had completed three units with 59 in the pipeline.

Word-of-mouth is useful for raising awareness, and in many cities, GHHI outreach comes from existing programs, such as lead abatement (San Antonio and New Haven). However, word-of-mouth

⁴⁵ Randy Gehl, personal communication (E. Eiseman), March 13, 2012.

alone is not a sufficient mechanism. Challenges at other sites include how, and if, websites and other forms of communication are used and tracking how participants get into the program. (As noted earlier, such tracking information can help determine gaps and opportunities.)

Use of New and Traditional Media: Most GHHI programs do not have a well-developed website, whether standalone or part of another website. Understandably, it takes time to create and maintain a quality site. San Antonio, for example, uses its lead program website, and even that is not current.⁴⁶ New Haven uses its lead program website for GHHI-related activity. However, it does not use Facebook or Twitter. Some households will have no or little access to a computer, so placing a priority on website development may not be necessary. In addition, the Chicago program noted that many people have trouble using websites even if they have access. In particular, they struggle to download files such as a PDF-format brochure. It is beyond the scope of our report to examine which populations have website access challenges. However, a basic website presence can get the word out to those with access and also help keep existing and potential partnerships informed. At the same time, no program should rely only on a website for outreach.

Chicago is focused on building its website.⁴⁷ Led by CNT Energy, Chicago, along with its partner organizations, will centralize online information on green and healthy home programs, not just GHHI. Chicago formally began GHHI activities in summer 2010, with funding for the GHHI project coordinator coming from local foundations.⁴⁸ Major sources of funding for unit interventions come from HUD-funded lead grant, DOE-funded weatherization, and state-funded energy and window replacement program.⁴⁹ Chicago provides two helpful one-page outlines of how the GHHI process works for landlords and how it works for individuals/families. We recommend these as models for Dubuque (visit www.cntenergy.org/buildings/ghhi).

New Haven produces two radio public service announcements that are aired on local radio stations. One is read by the mayor and the other by a well-known minority alderman. This helps reach their target audiences. (New Haven is approximately evenly comprised of blacks, Hispanics and whites.)

⁴⁶ <http://www.sanantonio.gov/planning/housing/leadbasedpaint.aspx>

⁴⁷ <http://www.cntenergy.org/buildings/ghhi>

⁴⁸ Michael McKnight, personal communication (B. Soglin), April 18, 2012.

⁴⁹ Ibid.

Public Events and Fairs: San Antonio hosts an informational booth at a newly instituted annual city-wide “green” fair. New Haven hosts an annual June event that is focused on lead awareness and abatement issues, but also ties in to their local GHHI. The event is held at an enclosed carousel to attract many families with young children. Program staff members pass out flyers and share a goodie bag that includes items marked “lead-free is best for me.”

Meetings: Several sites said the old-fashioned method of meeting face-to-face at other organizations’ meetings in their communities is very helpful. They attend neighborhood group and nonprofit organization meetings, as well as property owner meetings, to introduce the program. New Haven says it is important to get to know the local religious leaders and connect with their congregants. Chicago has 76 defined community, or neighborhood, areas, so CNT Energy will place a priority on working with neighborhood-based organizations. Clearly, cities have not given up on traditional methods of outreach. In-person interaction is often an essential way to build trust.

Citizen-Involvement and Community Partnerships: San Antonio uses “promotoras,” an effort which involves having local outreach workers visit schools and Head Start Locations. The workers also make house-to-house visits to inform residents about San Antonio’s GHHI. These outreach workers are hired through the city’s sub grantee, the Family Service Association, which is a faith-based organization. While the outreach workers must be trained, their involvement can help build trust as they themselves learn to value green and healthy homes.

Community-based Social Marketing: In our consultation with Elizabeth Walsh, doctoral student at University of Texas at Austin, she noted that brochures, websites and other informational materials in of themselves usually do not effect behavioral changes. According to Walsh, studies from Pacific Power and Electric show that when people make verbal or public commitments to participate in an effort, they are more successful. Some cities with non-GHHI programs, as well as Baltimore’s GHHI, hold neighborhood or school-based challenges to promote energy-efficiency. (The Baltimore Neighborhood Energy Challenge is partnering with Baltimore’s GHHI.)⁵⁰ Such a challenge may not be appropriate for Dubuque’s GHHI program, which is household-based, rather than neighborhood-based. However, the idea of an individual making a public commitment (willingly, of course) could benefit both the individual, by inspiring him or her to maintain the rehabbed home, and help inspire others. Such commitments can be as simple as signing a pledge,

⁵⁰ Michael McKnight, personal communication (B. Soglin), April 18, 2012.

when work on the house begins, to uphold the improvements over time. This public engagement should respect people's need and desire for privacy. Thus, these community-based activities should be voluntary and not a requirement for program participation. Neighborhood groups could support individual pledge-making.

Basic Tracking: San Antonio is tracking initial contact through the promotoras who log the responses at homes they have visited. New Haven does not track how people hear about their programs, while Chicago tracks referrals only through one program. We were somewhat surprised to see most programs are not comprehensively tracking how people initially connect with their respective GHHI programs. However, we had information from only three of the 15 sites.

The above insights from other GHHI sites can be helpful. Of course, we kept in mind that Dubuque differs from these other sites in terms of size, overall percent of housing that is rental versus owner-occupied, population characteristics such as ethnicity and other factors that make Dubuque unique. All of these elements may impact how and why a particular approach may work in one locale, but not in another. Nevertheless, we can appropriately incorporate ideas into our recommendations at the end of this section.

Convening the Landlords

The GHHI program should foster a deeper relationship with the Dubuque Area Landlords Association and other local landlords since there are some different issues to consider when involving rental units instead of owner-occupied homes. Code requirements and violation issues aside, the final decision for making changes to a rental home currently lies with the landlord. Ensuring that the landlords in Dubuque fully understand the costs and benefits of GHHI for their properties begins with outreach and communication.

One well-known practice to engage the private sector in collaboration comes from the field of freight transportation planning. For the public sector to engage the private freight shippers and movers, principles such as trust-building, information-sharing and regularly scheduled meetings allows the public and private sectors to work together more efficiently. Most important, the public sector has to convince the private sector that the partnership is of equal value to both sides.⁵¹

⁵¹ Rhodes, Katsikides, Schmidt, and DeRuchie, *Talking Freight Seminar Series*, "Engaging the Private Sector in Freight Planning," from the U.S. Department of Transportation, Federal Highway Administration, July 20, 2011, accessed April 8, 2012. http://www.fhwa.dot.gov/planning/freight_planning/talking_freight/11talking.cfm

Currently, the Dubuque Area Landlords Association is not convinced that working with the GHHI program or any program related to green and healthy rental retrofits is of value to their members.⁵²

We encourage the City to reach out and engage the landlords, especially through the Landlords Association, so they participate in and promote the GHHI program. Discussing with them how the program works and the costs and benefits associated with renovating homes in this fashion are important steps in information sharing. Having landlords understand that participating in the program has a value to them, as well as helping the city, is integral. Reaching out to this population will make it easier to renovate rental units as the program scales up. (More information about this topic appears in the [Renters and Landlords](#) section of this report.)

Findings from conflict resolution materials also suggest that collaboration and convening sustainable, long-lasting partnerships is an important method for mitigating conflicts and for effective planning. Information gathering and sharing are important steps that outreach efforts enable, as well as building long-lasting partners. The collaborative process takes many forms, but any high-quality collaborative product must be fair and balanced to both parties (i.e., the City and the Landlords Association). Open communication and having both parties understand that they share interests through the GHHI program are also integral.⁵³

Recommendations

We understand why Dubuque wishes to work through the GHHI waiting list before actively recruiting other participants. However, we recommend the City incrementally add outreach efforts. Otherwise, there is a potential risk to always have and rely on a waiting list. The City can consider a range of methods to engage others, from passive to very proactive (word-of-mouth to door-to-door engagement). However, the former may not reach all, and the latter can be time-intensive. Our recommendations include, but are not limited to, ideas that are low-cost and less time-intensive.

1. Track First Point-of-Contact

Such information may point to ways to track the program in the future. Along these lines, the preexisting service areas, for example, lead and weatherization, should review and determine how past participants gained entry to the programs. They also should track how people hear about the program. Collectively, this information can help identify gaps and opportunities for outreach. In

⁵² Jerry Maro, president, Dubuque Area Landlords Association, personal communication (L. Graffunder), March 2, 2012.

⁵³ Richard Margerum, *Beyond Consensus*, MIT Press: Cambridge Mass., 2011.

particular, Dubuque might follow the lead of New Haven and others and focus on its lead abatement program to leverage engagement.

2. Create New Partnerships and Deepen Existing Ones

- Identify a few individuals who have completed the GHHI process and are willing to serve as “ambassadors” to share their stories. This may not only help recruit appropriate participants but also keep past participants interested in maintaining their homes or taking other measures to promote health and energy efficiency in their households and communities.
- The City already interacts with churches, faith-based organizations and community programs. As Randy Gehl noted in our discussion with him, this should continue with a GHHI focus. Evidence from other GHHI sites indicates that these partnerships can greatly benefit GHHI.
- Continue fostering good relationships with neighborhood associations and groups. This is especially needed in the vulnerable neighborhoods indicated by the Priority Model.
- As appropriate, partner with the Sustainable City Network.
- Utilize local pediatricians, to inform their patients’ families about the program if they test positive for lead.
- Convene with landlords to facilitate informed growth in the program and sustain relationships as GHHI moves forward.

3. Use Public Commitments and Internet-based Story Telling

- Have participants share their testimonials online
- Consider using a type of public commitment, such as signing a pledge when work on the house begins to uphold the improvements over time.

4. Leverage Media

- Do not rely entirely on websites, but do have a web presence. For lower-cost website development and maintenance, consider engaging a student who is studying website design. However, ensure the website is keep up-to-date.
 - Images of home improvements could inspire participants and a downloadable brochure would be helpful.
 - The website would be more effective with a dedicated “Learn more” link or button for potential participants to click on. This would be one way to allow residents to volunteer for participating in the program. (Staff would obviously need to review

inquiries to determine qualification for the program, including adherence to the Priority Model, if adopted.)

- GHHI should also increase their online presence by directing links from the City's own website (and eventually through the Dubuque Area Landlords Association's webpage and utility companies) to the GHHI website.
- Post any videos and other social-marketing devices on the website.
- Consider developing a text messaging program and/or Twitter presence to deliver timely home-upkeep reminders to past participants. For example, alerts could highlight that it is time to change furnace filters or check to ensure gutters are not clogged. The Home Advocate might be able to take on this role.
- When the city is ready for more proactive engagement, Public Service Announcements can be recorded by Mayor Roy Buol and/or other prominent Dubuque citizens who are recognized by neighborhoods that fall into GHHI priority areas.
- Create a video featuring two families (renters and homeowners) as they go through the GHHI process. Edit into a short and long version to show, respectively, on YouTube, the cable channel, and the GHHI website.
- To keep down costs, use the *Dubuque Advertiser* and texting, both of which the city communications staff uses effectively to date.

While we acknowledge that the City currently utilizes a waitlist and accepts participants either on a volunteer basis or from other programs, this is an incremental method for addressing the need to make greener and healthier homes. We have provided several outreach methods that can generate several positive outcomes as the GHHI program grows in participants and strength. A more directed outreach effort can improved information-gathering, marketing, participant engagement, and partnering with landlords. The City can choose among the above-mentioned recommendations when it seems appropriate, given time and funding constraints.

APPENDICES

Appendix A: Complementary Work by UI Field Problems Poverty Team

Both our team and the UI Field Problems Poverty team have concerned our research with questions about housing affordability and quality of life in Dubuque. Our GHHI team included a high priority for low- and moderate-income populations in our Priority Model and the Poverty team also looked at housing issues for low- and moderate-income people in their Affordable Housing Suitability Model. Our respective map outputs have proved to be complementary for a broad focus on affordable housing efforts in Dubuque.

The Affordable Housing Suitability Model designed by the Poverty team highlights areas of Dubuque with the highest suitability for new affordable housing. Affordable housing is defined in our work and the Poverty team's work as "housing in which the occupant is paying no more than 30% of their gross income for gross housing costs, including any utility costs." The variables included in this Affordable Housing Suitability Model are: Distance to Existing Assisted Rental Housing, Elementary School Mobility Rate, Median Housing Income, Elementary School Poverty Rate, Elementary School English Language Learner (ELL) Rate, Crime Density, and Distance to Transit Line. The output shows that the central area of Dubuque is less suitable for new affordable housing developments than peripheral regions. The Poverty team's work indicates that the areas to the south of Downtown, the areas to the west of the Kennedy Mall and areas to the north of Clarke University's campus are most suitable for affordable housing. As the Poverty team states, "siting affordable housing in locations where poverty is already concentrated will exacerbate the disproportionate mix of income at that region" so the Poverty team has advocated for a more scattered-site approach to new affordable housing.

In comparison, our priority map shows that there is a high demand for GHHI work in the central city areas, where affordable housing and poverty is currently concentrated. Working to improve the housing conditions for the occupants who live in the central city areas will decrease their housing burden and improve their living environment. The application of the recommendations promoted by these two projects will enable Dubuque to decrease residents' housing burdens and improve the living environment for low- and moderate-income residents, encourage the equitable mix of income among residents, and promote social vibrancy for the community.

Appendix B: City of Dubuque "Quick App" Intake Form

| | | | |
|---|--|--------------------------------|--|
| | Return to: Housing Department | Phone: 563.589.1724 | 350 W 6th St, Suite 312 Dubuque, IA 52001 |
| GHHI QUICK APP | PHONE: <input type="text"/> | DATE: <input type="text"/> | |
| NAME: _____ | CITY: Dubuque | STATE: IA | |
| ADDRESS: _____ | ZIP: <input type="text"/> | | Email: _____ |
| WHY DID YOU CALL TODAY? WHAT IS YOUR INTENT? | | | |
| What is your total approximate gross income (per year) including all benefits received? | <input type="text"/> | | |
| Does anyone in your household receive SSI or F.I.P. Benefits? Y/N | <input type="text"/> | | |
| Has Operation New view performed weatherization services for your property since 1994? Y/N | <input type="text"/> | | |
| What is your household size? | (enter number) <input type="text"/> | | |
| <u>FAMILY HOUSEHOLD INFORMATION (Yes=5)</u> | | | |
| Do you have children under the age of 6? | Comments <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | |
| Do you have children under the age of 18? | | | |
| Are you over 62 years of age? | | | |
| Does anyone in the household have a disability? | | | |
| Do you have any pets? | | | |
| <u>FAMILY HEALTH INFORMATION (Yes=5)</u> | | | |
| Does any member of your family have asthma, allergies or upper respiratory illness | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | |
| Has any member of your family been hospitalized with asthma in the last year? | | | |
| Has any member of your family visited the Emergency room due to asthma in the last year? | | | |
| Has any member of your family seen a physician due to asthma in the last year? | | | |
| Has any member of your family been hospitalized for burns or accidental injury in the home? | | | |
| <u>PROPERTY INFORMATION</u> | | | |
| Do you live in a pre-1978 house? Yes=5 | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | |
| Do you have peeling paint? Yes=5 | | | |
| Are your shingles deteriorated? Yes=5 | | | |
| Do you have any electrical hazards? Yes=5 | | | |
| Has your furnace been replaced in the last 15 years? No=5 | | | |
| Has your water heater been replaced in the last 10 years? No=5 | | | |
| Age/Type of air conditioning? New in last 5 years? No=5 | | | |
| Is your house excessively cold or hot? Yes=5 | | | |
| <u>AIR QUALITY</u> | | | |
| Has house been checked for Radon in the past year? If so, has it been mitigated? No=5 | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | |
| Does anyone in your household smoke? Or visit that smokes? Yes=5 | | | |
| Have you had moisture in your basement in the past year? Yes=5 | | | |
| Have you had mold in the past year? Yes=5 | | | |
| Have you had pest infiltration or rodents? (cockroaches, bats, mice, bed bugs, etc) Yes=5 | | | |
| Do you have exhaust fans in your bathroom or kitchens (and do they work)? No=5 | | | |
| Have you used pesticides in the past year? Yes=5 | | | |
| <u>GENERAL SAFETY (NO=5)</u> | | | |
| Has your furnace been serviced or checked in the past year? | <input type="text"/> <input type="text"/> <input type="text"/> | | |
| Does your house have smoke alarms? | | | |
| Does your house have Carbon Monoxide detectors? | | | |
| Comments: _____ | Total (140 pts) | <input type="text" value="0"/> | |

Appendix C: Spring Questionnaire for Other GHHI Sites and List of Respondents

The following invitation note and questionnaire were emailed beginning February 28, 2012 to contacts at all 15 GHHI sites other than Dubuque. Respondents included:

- Baltimore: Michael Shaw (funding and rental questions only) (email interview)
- Chicago: ChaNell Marshall, CNT Energy (email and telephone interview)
- New Haven: Paul Kowalski, Environmental Health Program (telephone interview)
- San Antonio: Cynthia Saldivar, Department of Planning and Community Development (e-mail interview)

Invitation and Questionnaire

I contacted you last fall about [your city's] GHHI program. Thanks again for your input on those questions, and I have a few follow-up questions that focus on outreach, as well as rental units. If you could take a few minutes to answer these questions by Thursday, March 8, I would greatly appreciate it. You can email your responses, or if you prefer, we can talk by phone at your convenience. (If I need to contact someone else with [your city's] GHHI, please let me know who that is.)

1. What methods are you using or plan to use for engaging the potential beneficiaries of GHHI?
2. What methods are you using or plan to use to generally inform the public of GHHI?
3. If you are tracking how applicants/participants are hearing about your program, what are their overall responses?
4. If you have a public GHHI website, please paste the URL here:
5. What methods are you using or plan to use for engaging potential partners/funders?
6. How many rental units have participated in your program? (Completed and/or in progress)
7. If you are including landlords in your program, what funding streams support their participation?

Appendix D: Boulder, Colo., SmartRegs Prescriptive Pathway Checklist

SmartRegs Prescriptive Pathway Checklist

Need 100 Total Points + Mandatory Water Conservation Measures

This form is to be used by City of Boulder Class G licensed inspectors.

Instructions:

1. Circle the applicable point selection in each category
2. Fill in the Base and Final Points in each category
3. Total the points in the table below
4. Provide a Class G inspector license number and signature
5. Submit the form with the preceding SmartRegs Energy Efficiency Application pages

Unit Address and Number: _____

Enter total points in the space below

| | |
|---------------------------------|--|
| Total Base Points | |
| Total Final Points | |
| Total Water Conservation Points | |

| | |
|--|--|
| | |
|--|--|

Class G inspector - PRINT NAME

License #

| |
|--|
| |
|--|

Class G Inspector Signature

Mandatory Water Conservation

Must earn two points regardless of whether Performance or Prescriptive SmartRegs Pathway is chosen. Points earned in this category do not count towards Prescriptive 100 point requirement.

| Water Conservation Measure | Points |
|---------------------------------------|--------|
| Low flow showerhead* | 1 |
| Low flow lavatory faucets* | 1 |
| Self-closing faucet valves** | 1 |
| High-efficiency or dual-flush toilet* | 2 |
| ENERGY STAR washing machine | 2 |
| ENERGY STAR dishwasher | 2 |

*Points awarded based on average of all fixtures in unit

**Points awarded if all faucets are equipped with self-closing valves.
Please refer to the SmartRegs Guidebook for further clarification.

| WALLS | | Base: | | Final: | |
|---------------------------|-----|-------|-----|--------|--|
| R-VALUE | 25% | 50% | 75% | 100% | |
| No Insulation | 0 | 0 | 0 | 0 | |
| >R-3 Continuous | 3 | 6 | 9 | 12 | |
| R-5 Continuous | 4 | 8 | 12 | 15 | |
| R-13 | 5 | 10 | 15 | 20 | |
| Uninsulated Basement Wall | 5 | 10 | 15 | 20 | |
| >R-19 | 5 | 11 | 16 | 21 | |
| Insulated Basement Wall | 6 | 13 | 19 | 26 | |
| Shared Wall | 6 | 13 | 19 | 26 | |

| WINDOWS/FENESTRATION | | Base: | | Final: | |
|-------------------------------------|-----|-------|-----|--------|--|
| U-FACTOR | 25% | 50% | 75% | 100% | |
| Single Metal (1.2 U-Factor) | 0 | 0 | 0 | 0 | |
| Single Non-Metal* (.95 U-Factor) | 0 | 1 | 1 | 2 | |
| Double Metal (.80 U-Factor) | 1 | 2 | 3 | 4 | |
| Double Non-Metal* (.55 U-Factor) | 2 | 3 | 5 | 6 | |
| 0.35 U-Factor* | 3 | 7 | 10 | 13 | |
| 0.30 U-Factor | 3 | 7 | 10 | 14 | |
| <0.25 U-Factor | 4 | 7 | 11 | 14 | |

| INFILTRATION | | Base: | | Final: | |
|--|--|-----------------|--|--------|--------|
| ACH _n | | | | | POINTS |
| ≤1.20 ACH _n | | | | | 2 |
| 0.75 ACH _n | | | | | 4 |
| 0.50 ACH _n | | | | | 6 |
| ≤0.35 ACH _n (ventilate per ASHRAE 62.2) | | | | | 7 |
| TEST STATS: | | | | | |
| ACH _n : _____ | | Volume: _____ | | | |
| CFM50: _____ | | n-Factor: _____ | | | |

| CEILINGS | | Base: | | Final: | |
|-----------------|-----|-------|-----|--------|--|
| R-VALUE | 25% | 50% | 75% | 100% | |
| No Insulation | 0 | 0 | 0 | 0 | |
| R-19 | 6 | 12 | 18 | 24 | |
| R-30 | 6 | 13 | 19 | 26 | |
| >R-38 | 7 | 13 | 20 | 26 | |
| Shared Ceilings | 7 | 14 | 20 | 27 | |

| FLOORS / FOUNDATIONS | | Base: | | Final: | |
|---|-----|-------|-----|--------|--|
| SLAB ON GRADE | | | | | |
| TYPE | 25% | 50% | 75% | 100% | |
| Slab Edge: R-0 | 2 | 3 | 5 | 6 | |
| Slab Edge: >R-5 | 2 | 4 | 5 | 7 | |
| Slab Edge: >R-10 | 2 | 4 | 6 | 8 | |
| Slab Edge: >R-10 AND Under Slab: >R-10 | 3 | 6 | 8 | 11 | |
| BELOW GRADE SLAB (Basement Slab) | | | | | |
| Basement Slab | 2 | 4 | 6 | 8 | |
| FOUNDATION WALLS (Crawlspace) | | | | | |
| R-0 | 0 | 0 | 0 | 0 | |
| R-2 | 2 | 3 | 5 | 6 | |
| R-11 | 2 | 4 | 6 | 8 | |
| >R-19 | 2 | 5 | 7 | 9 | |
| FRAMED FLOORS (Only Available if No Ducts or HVAC Equipment are Located in Unconditioned Space Below Floor) | | | | | |
| Framed Floor: R-0 | 0 | 0 | 0 | 0 | |
| Framed Floor: R-13 | 3 | 5 | 8 | 11 | |
| Framed Floor: R-25 | 3 | 6 | 9 | 12 | |
| Framed Floor: >R-38 | 4 | 7 | 11 | 14 | |
| Shared Floor | 4 | 8 | 11 | 15 | |

| DUCT LEAKAGE | | Base: | | Final: | |
|-----------------|--|-------|--|--------|--------|
| CFM per 100 SF | | | | | POINTS |
| 80 cfm @ 25 Pa | | | | | 0 |
| 60 cfm @ 25 Pa | | | | | 4 |
| 40 cfm @ 25 Pa | | | | | 9 |
| 20 cfm @ 25 Pa | | | | | 14 |
| <10 cfm @ 25 Pa | | | | | 17 |
| No Ducts | | | | | 17 |

| DISTRIBUTION SYSTEM | | Base: | | Final: | |
|---|-----|-------|-----|--------|--|
| LOCATION / INSULATION | 25% | 50% | 75% | 100% | |
| Uninsulated Pipes/Ducts (In Unconditioned Space) | 0 | 0 | 0 | 0 | |
| Pipes/Ducts Insulated (R-4) (In Unconditioned Space) | 1 | 3 | 4 | 6 | |
| Pipes / Ducts Within Conditioned Space | 2 | 3 | 5 | 7 | |

*Historically designated properties and properties older than 50 years with wooden window frames that rehabilitate and install storm panels will receive credit at the 0.35 U-Value level.

Total this page: _____

2

| HEATING | | Base: _____ | Final: _____ |
|------------------------|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| Electric, Oil, or ASHP | 0 | | |
| Gas 65% AFUE | 0 | | |
| Gas 80% AFUE | 13 | | |
| Gas 90% AFUE | 17 | | |
| Gas 96% AFUE | 19 | | |
| GSHP (COP 3.3) | 29 | | |
| GSHP (COP 4.1) | 38 | | |
| GSHP (COP 4.8) | 43 | | |

| COOLING | | Base: _____ | Final: _____ |
|-----------------------------|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| 10 SEER or worse | 0 | | |
| 13 SEER | 4 | | |
| 15 SEER | 6 | | |
| Direct Evaporative Cooler | 6 | | |
| No Cooling | 6 | | |
| 17 SEER | 7 | | |
| 19 SEER | 8 | | |
| Indirect Evaporative Cooler | 8 | | |
| GSHP (\geq EER 13.6) | 4 | | |

| LIGHTING | | Base: _____ | Final: _____ |
|--|--------|-------------|--------------|
| HIGH-EFFICACY LIGHTING (solar tubes/light tunnels counted as light fixtures) | POINTS | | |
| 0% | 0 | | |
| 25% | 2 | | |
| 50% | 4 | | |
| 75% | 6 | | |
| 100% | 7 | | |

| HOT WATER | | Base: _____ | Final: _____ |
|---------------------------------------|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| Electric, Oil or Heat Pump | 0 | | |
| Gas 0.56 EF | 0 | | |
| Gas 0.60 EF | 1 | | |
| Gas 0.64 EF | 2 | | |
| Gas >0.82 EF | 6 | | |
| Gas Boiler Side Arm (65% AFUE Boiler) | 0 | | |
| Gas Boiler Side Arm (80% AFUE Boiler) | 3 | | |
| Gas Boiler Side Arm (95% AFUE Boiler) | 5 | | |

| WHOLE HOUSE FANS | | Base: _____ | Final: _____ |
|------------------|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| Whole House Fan | 2 | | |

| REFRIGERATION | | Base: _____ | Final: _____ |
|---------------------|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| 750 kWh/year | 0 | | |
| 650 kWh/year | 2 | | |
| 450 kWh/year | 3 | | |
| ≤ 350 kWh/year | 4 | | |

| SOLAR THERMAL | | Base: _____ | Final: _____ |
|---|--------|-------------|--------------|
| SPECIFICATION | POINTS | | |
| Points per 20 sq ft of collector surface area | 8 | | |

| PHOTOVOLTAICS* | | Base: _____ | Final: _____ |
|--------------------|--------|-------------|--------------|
| ARRAY RATED OUTPUT | POINTS | | |
| Points per kW** | 44 | | |

| OCCUPANT | | Base: _____ | Final: _____ |
|--|--------|-------------|--------------|
| MEASURE | POINTS | | |
| Sub-Metering: Real Time Energy Monitoring Device | 1 | | |
| Programmable Thermostat | 1 | | |
| Provide Operation / Training Manual | 1 | | |
| Tenant Attends Energy Conservation Class | 1 | | |

| OTHER | | Base: _____ | Final: _____ |
|---|---|-------------|--------------|
| MEASURE | POINTS | | |
| Heat Pump Desuperheater | 1 | | |
| Electronically Commutated Motor ("ECM") | 3 | | |
| Passive Solar Design | Discretionary – approved by City of Boulder | | |
| Innovative Practice | Discretionary – approved by City of Boulder | | |
| Technically Impractical: Carbon Offsets | Must be Approved by City of Boulder (8 points per metric ton of CO ₂ offset) | | |

*Qualifying installations include power purchase agreements, solar leases, or verified subscription in Community Solar Garden.

**Units must earn 70 prescriptive pathway points in other categories to be eligible to earn PV points.

Total this page: _____

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Appendix E: U.S. Department of Energy's Clean Energy Finance Guide for Residential and Commercial Building Improvements

The chapters in the guide are as follows (most relevant sections in **bold**):

Chapter 1: Major Components and Options

Chapter 2: Possible Bonding Options for Energy Efficiency and Renewable Energy Financing Programs

Chapter 3: Risk Assessment

Chapter 4: Federal Tax Issues Related to Energy Efficiency and Renewable Energy Projects

Chapter 5: Basic Concepts for Clean Energy Unsecured Lending and Loan Loss Reserve Funds

Chapter 6: Partners and Stakeholders: Roles and Potential Impact

Chapter 7: Path to Self-Sustainability

Chapter 8: Clean Energy Lending From the Financial Institution Perspective

Chapter 9: Implementation Process Flow

Chapter 10: Resource Requirements

Chapter 11: Clean Energy Finance for the Large Commercial Sector: Structures and Strategies

Chapter 12: Commercial Property-Assessed Clean Energy (PACE) Financing

Chapter 13: Small Business Financing Options for Clean Energy Projects

Chapter 14: Contracts, Agreements, and Other Resources

Chapter 15: Summary of Additional Resources on Financing

Source:

"Clean Energy Finance Guide for Residential and Commercial Building Improvements 3rd Edition."

U.S. Department of Energy. Accessed February 7, 2012.

http://www1.eere.energy.gov/wip/solutioncenter/pdfs/ch01_clean_energy_lending.pdf.

Appendix F: Insurer-Related Funding Issues

Findings on asthma from the Lowell Center for Sustainable Production – “Asthma: A Business Case of Employers and Health Care Purchases.”

Asthma in children and adults costs households directly (medication needs, etc.) and employers indirectly due to lost time or reduced productivity. Some estimates state that health care expenditures for workers with asthma are up to 2.5 times more than those that do not have the disease.⁵⁴ The reports notes that based on year 2007 data, about one-fifth of a household’s direct costs associated with the chronic illness may be preventable.⁵⁵

Because the physical home and work environments can impact asthma, the report recommends that when a business chooses or creates a health care packages it should consider funding to improve asthma-related physical conditions at both homes and workplaces. Providing education and increased access to home improvement options helps to prevent asthma attacks and costly emergency room visits or other measures that accompany them. According to the report, these types of proactive methods prove to be much less costly to employers and insurance providers, creating a return on investment of approximately \$1.50. Returns may be even higher if the absolute value of losses due to reduced productivity could be found.

Medicare / falls-related funding issues

The federal government contracted the Rand Corporation to investigate using Medicare funds to help reduce falls at home and other household injuries by seniors. The report, based on analysis that synthesized the findings of 57 articles, was published as “Falls Prevention Intervention in the Medicare Population” in 2003. As background, the authors noted one of every three persons over the age of 65 falls each year, with many of these falls occurring in the home. Hip injuries commonly result from falls and may cost Medicare as much as \$240 million in surgical treatment by 2040.⁵⁶ Thus, Medicare is motivated from a financial, as well as public health and ethical concern, to reduce the number of falls. Interventions, as new Medicare benefit, could reduce the risk of falls by 12% and the number of falls by 19%.⁵⁷ The report said the evidence is not “conclusive” but does suggest that a fall-intervention program could be “highly cost-effective.”⁵⁸ In addition, health problems due to falls can add to health-care costs and reduce a person’s ability to maintain their home or pay rental bills. Dubuque’s GHHI could not directly capture these Medicare-related savings. However, if Medicare did release funds for certain home safety improvements, it would potentially free up other city funds that otherwise would be used for safety-related rehabilitation to reduce accidents and directly help residents with their own budgets.

⁵⁴ “Asthma: A Business Case of Employers and Health Care Purchases.” Lowell Center for Sustainable Production, February 2010, accessed March 17, 2012,

http://asthmaregionalcouncil.org/uploads/documents/hria_asthma_report.pdf.

⁵⁵ Ibid.

⁵⁶ Paul G. Shekelle, Margaret Maglione, John T. Chang, Walter Mojica, Sally C. Morton, Marika Suttorp, Elizabeth Roth, Shannon Rhodes, Shin-Yi Wu and Sydne Newberry, “Falls Prevention Interventions in the Medicare Population,” Santa Monica, Calif.: RAND Corporation, 2003, accessed April 7, 2012,

<http://www.rand.org/pubs/reprints/RP1230>, iv.

⁵⁷ Ibid, 21.

⁵⁸ Ibid, 21.

Appendix G: Interdepartmental Cooperation Building Questionnaire

The following questions were sent by email to twelve GHHI partners on and around March 7, 2012.

- 1) What processes or issues in your area have been solved or improved since the adoption of GHHI? How?
- 2) What two things work best about the GHHI process and why?
- 3) What two things would you like to change about the GHHI process in order to make your job work better? Why?

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