Energy Burden in the City of Cincinnati:

A guidebook to implementing community-based programs to address energy burden

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Greater Cincinnati Energy Alliance

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1. Introduction

The City of Cincinnati has received numerous accolades for its commitment to sustainability over the past several years. Despite all the accolades, it continues to face a variety of cultural, economic, and environmental challenges with regards to advancing its sustainability efforts amongst its low-income populations. Finding innovative ways to reach this segment of the population and connect it with sustainability focused programs is critical to achieving the city's long-range sustainability goals.

The City of Cincinnati demonstrated its commitment to advancing these efforts in the *2018 Green Cincinnati Plan*, a comprehensive set of recommendations designed to address issues related to sustainability, equity, and resilience. The first goal listed in the Built Environment section of the plan is to "decrease household energy burden by 10%."[1] To achieve this, the plan recommends working with community stakeholders to develop educational and financing programs that encourage the owners of multi-family properties to make energy efficient upgrades.

This document is intended to serve as a guide to assist the city and its partners with providing services to achieve the 10% reduction in household energy burden outlined in the *Green Cincinnati Plan*. It outlines strategies and resources that can be used to address energy burden in low-income and underserved neighborhoods by providing energy efficiency information to renters and homeowners.

Energy Burden

Energy burden is defined as the percentage of a household's annual gross income that goes toward payment of annual utility costs (electric, natural gas, or other heating fuel). This measure illustrates how the impact of high energy prices and inefficient housing are disproportionately felt by different population groups or households in different parts of the community. Energy costs that may be affordable to a middle-class household, may not be affordable to a low-income household. In fact, low-income households spend three times more of their income on energy bills than higher income households.[2]

$$\text{Energy Burden} = \frac{\text{Total Annual Energy Utility Spend}}{\text{Total Gross Household Income}}$$

Households that face high energy burdens experience many negative long-term economic and health related burdens. Research has found that there are three separate but interrelated consequences of energy burden: (a) illness and stress, (b) financial challenges, and (c) housing instability.[3]

Health risks associated with energy burden often occur when households live in dwellings that are either too hot in the summer or too cold in the winter. While residents may consciously make the decision to keep the temperature at an uncomfortable level in order to keep their utility costs down, it can exacerbate conditions such as asthma and heart disease.

[1] City of Cincinnati, 2018
[2] Drehobl and Ross, 2016
[3] Hernandez and Bird, 2010

The financial challenges associated with energy burden can force households to forgo necessities such as purchasing food and addressing health issues in order to pay utility bills. A 2012 study found that paying utility bills was the most common reason why individuals took out a high interest payday loan.[4]

Housing instability resulting from energy burden occurs when households are forced to move due to high utility costs, utility debt, or utility shut-off. This can negatively impact employment opportunities for adults and education outcomes for children. Studies have shown that children who are forced to move due to housing instability are often absent from school, demonstrate slower grade progression, and are more likely to drop out of school.[5]

Utility Disconnects and Energy Burden

According to the U.S. Energy Information Administration, 31% of Americans struggle to pay household energy bills or maintain adequate temperatures in their home. In addition, 14% of Americans reported that they receive utility disconnection notices on a regular basis.[6]

In the City of Cincinnati, there were an average of 3,500 disconnections per month from June 2018 through May 2019. This equates to 2.5% of total households. According to Duke Energy, the average disconnect amount, or the utility debt, was $331.97 for electricity customers and $350.16 for gas customers.

Causes of Energy Burden

In order to address energy burden, it is important to understand the many issues that help to contribute to its occurrence.

Poverty

Households living below the poverty line face constant pressures to make ends meet. When a household is living from paycheck to paycheck, an unexpected high utility bill from an extreme weather event can start a cycle of late payments and disconnection notices.

Aging housing stock

Most low-income households live in older homes and apartment buildings that are extremely inefficient. A study conducted by the Joint Center for Housing Studies of Harvard University found that homes in the Midwest built prior to 1970 use 20 percent more energy per square foot than homes built since 1990.[7] Leaks in the building envelope combined with inefficient heating and cooling equipment can lead to high utility costs. In addition, health and safety issues in older homes often prevent residents from qualifying for weatherization programs designed to reduce energy usage.

Split incentive between renters and owners

A split incentive occurs when one party is responsible for the cost of the energy efficiency improvement, but another party receives the savings from the improvement. The split incentive issue can take two different forms. The first form occurs when the tenant pays the utility costs. In this scenario the landlord may not be willing to make improvements because the benefits will go to the tenants. The second form occurs when the landlord pays the utility costs. In this instance the tenant may not be willing to utilize energy efficient behaviors, such as adjusting the thermostat

[4] Levy and Sledge, 2012
[5] Galvez and Luna, 2014.
[6] U.S. Energy Information Administration, 2015.
[7] Joint Center for Housing Studies of Harvard University, 2007

when they are away, since they do not pay the cost of the utilities. The split incentive issue is a major barrier that must be overcome in order to effectively address energy burden issues.

Lack of access to information

In many cases low-income households lack access to communication channels that can inform them about programs designed to address energy related issues. This lack of information prevents households from taking advantage of programs specifically designed to assist them with reducing energy costs. In cases where utilities notify low-income households about programs designed to assist them, the utility's message is often viewed with a level of distrust since the household's previous interactions with them are often limited to payment and service disconnect notices.[8]

High up-front costs of energy efficient improvements

For low-income households that own their homes, the cost of making energy efficiency improvements can often be cost prohibitive. It can take several thousand dollars to upgrade a heating or cooling system or to make insulation and air sealing improvements. Even though these improvements will result in lower utility bills in the future, the initial cost to invest in the improvements is too high. The costs associated with making general improvements to a home in order to qualify for weatherization programs are often prohibitive as well.

Strategies to address Energy Burden

A 2018 report from the Environmental Defense Fund found that there are ways to help overcome many of the causes of energy burden in low-income households. Increasing investment in energy efficiency services for low-income households would help create healthier and more resilient communities, saving energy, and lowering bills for customers who need it most.[9] While there are a number of solutions that should be pursued at the state level, this section focuses on solutions that can be implemented at the local level.

Leverage community-based organizations to implement energy related programs

Low-income households nationwide may not trust government agencies, utilities, or energy efficiency contractors. It is important to work with community-based organizations that are viewed as trusted sources of information and who advocate for residents. These organizations can be utilized to host or sponsor programs designed to educate community members about energy efficiency related topics.

Conduct outreach and education programs to increase energy literacy

Low-income homeowners and tenants can be better positioned to act if they understand how to save energy in their dwelling. Programs that promote greater energy literacy and teach energy saving strategies that households can implement on their own, can help to decrease energy burden.[10]

Deploy resources to address health and structural issues

Up to 15% of low-income households nationwide may be unable to participate in weatherization programs due to health and safety issues in the home, such as mold or leaky roofs, that prevent programs from installing energy saving improvements.[11] The city and its partners should work to identify funds to address health and structural issues so that more homes can qualify for weatherization programs.

[8] Cluett, Amann and Ou, 2016
[9] Environmental Defense Fund, 2018
[10] Hernandez and Bird, 2010
[11] Environmental Defense Fund, 2018

2. Energy Burden in the City of Cincinnati

According to the 2017 American Community Survey, Cincinnati's poverty rate is 27.7 percent, the third highest among the nation's 81 largest cities.[12] When money is tight, low-income households are forced to make difficult decisions between purchasing necessities, such as food and medicine, and paying utility bills.

In its 2016 report, *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*, the American Council for an Energy-Efficient Economy (ACEEE) identified the Cincinnati metropolitan region as having the ninth worst energy affordability of 48 major metro regions in the country.[13]

The ACEEE report utilized data from the U.S. Census Bureau's 2011 and 2013 *American Housing Survey* to measure energy burdens in metro areas. The survey utilized a random sample of individual households which were each asked to complete a questionnaire covering a variety of topics. The median energy burden was calculated using the data reported by each household in the metro area. Households were then broken down further into subgroups based on a variety of characteristics.

Table 1: Summary of Cincinnati Metro data from 2016 ACEEE report

	Sample Size	Median Energy Burden	Highest Energy Burden Quartile
All Households	2,401	4.34%	
Low-income	1,141	8.45%	15.49%
Low-income multifamily	246	6.19%	12.95%
African American	271	6.86%	15.64%
Latino	66	3.87%	7.26%
Renters	683	5.96%	12.12%

The data compiled by ACEEE provides a useful overview of energy burden in the Cincinnati metro region. However, it also includes households located outside the City of Cincinnati. Examining data at the neighborhood level can provide a better picture of the impacts of energy burden in the city.

Neighborhood Energy Burden Analysis

Residential utility data from 2017 was obtained from Duke Energy and used to determine average annual utility cost per household at the census block group level. The utility data provided included the total

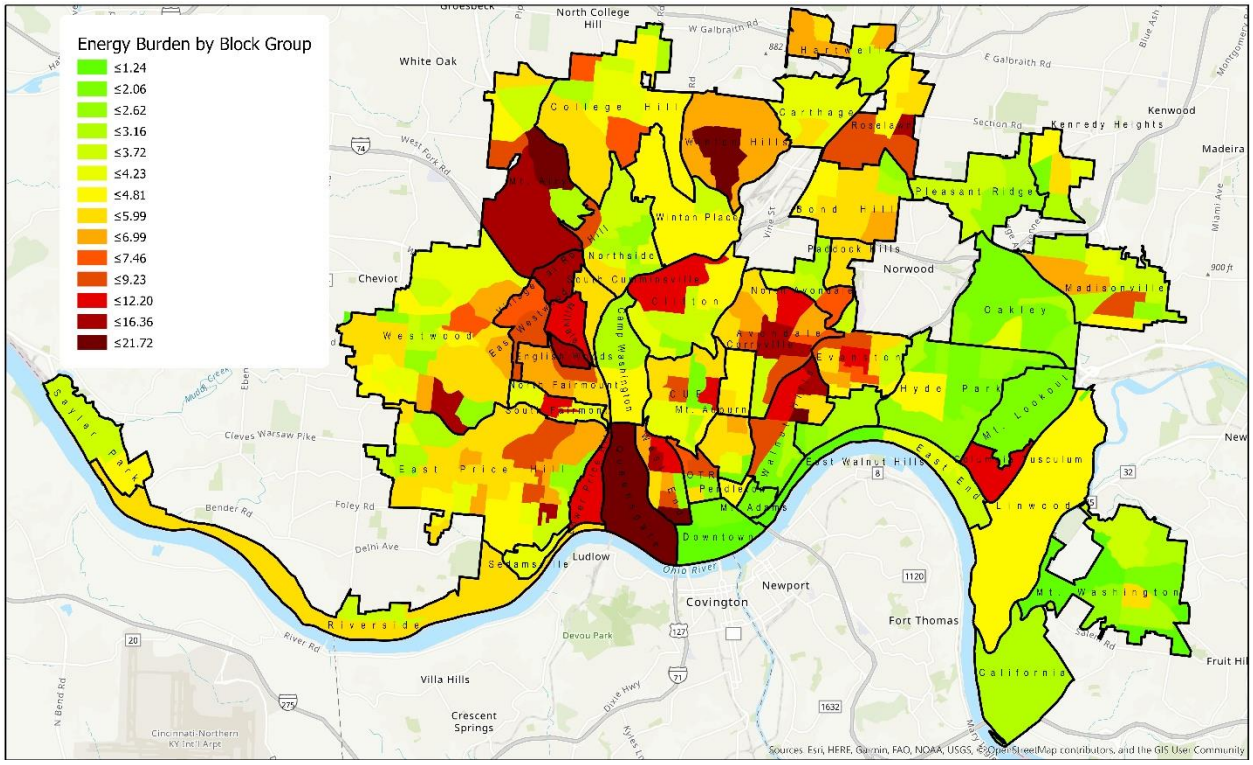
[12] Curnutte and Londberg, 2018
[13] Drehobl and Ross, 2016

number of residential accounts in each census block group as well as the total amount spent on residential utilities. In order to determine the average annual household utility cost, the total amount spent on utilities was divided by the number of accounts. The average annual household utility cost per census block group includes all applicable fees and riders as well as generation and distribution costs.

The U.S. Census Bureau's *American Communities Survey* was used to obtain median household income data at the census block group level.[14] Energy burden was calculated at the census block group level by dividing the average annual utility cost per household by the median household income. A neighborhood energy burden figure was then calculated by finding the weighted average energy burden across the census block groups in each neighborhood. This was done to remove the impact of different size census block groups on calculations at the neighborhood level.

The median energy burden across all census block groups in the City of Cincinnati is 4.47%, slightly higher than the 4.34% value calculated by ACEEE. Low-income census block groups are those that have a median household income equal to or less than 80% of the median household income for all census block groups in the city. There are 94 census block groups that fall into the low-income category based on this definition. The median energy burden in these census block groups is 7.41%, which is less than the value of 8.45% calculated by ACEEE.

Figure 1: City of Cincinnati Energy Burden by Census Block Group



The weighted median energy burden across all neighborhoods in the City of Cincinnati is 4.75%, higher than the 4.34% value calculated by ACEEE. In low-income neighborhoods, the weighted median energy burden is 9.16%, higher than the 8.45% value calculated by ACEEE.

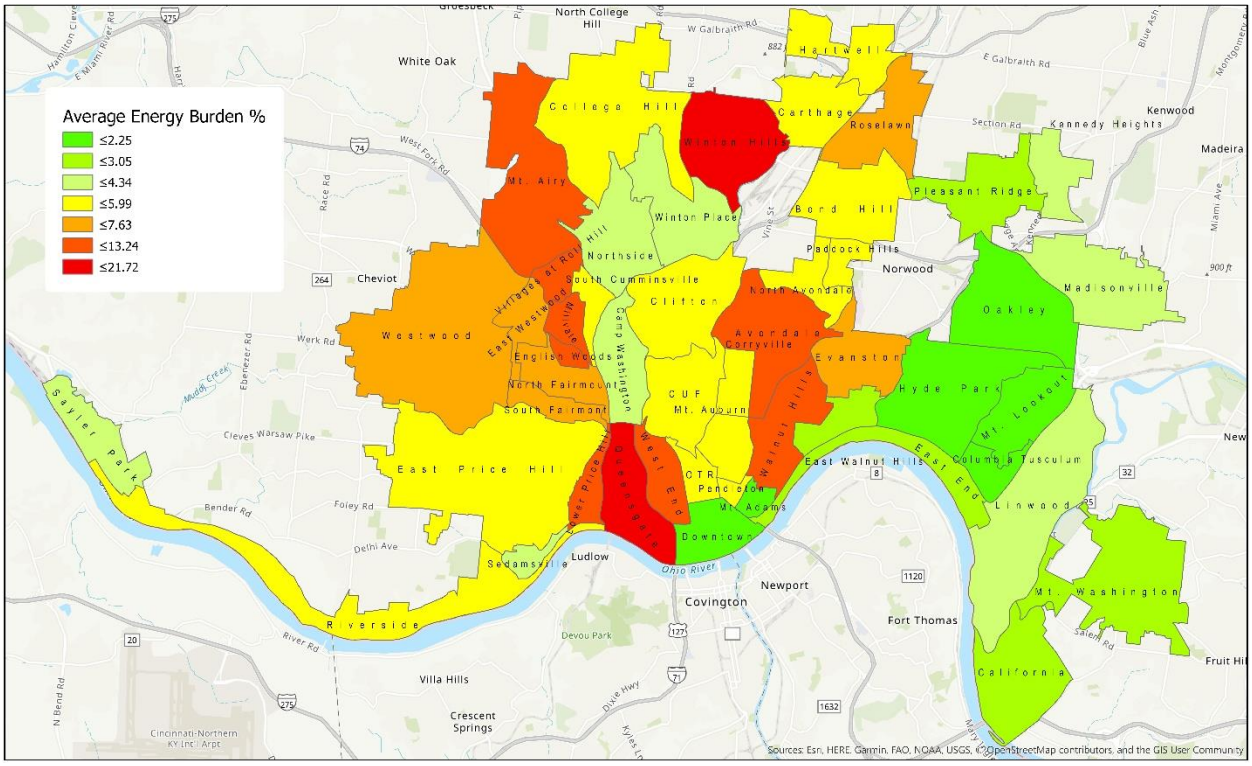
[14] Census Bureau, 2017

Table 2: Comparison of Energy Burden Results

	ACEEE Study	Census Block Group Level	Neighborhood Level
All Households	4.34%	4.47%	4.75%
Low-income	8.45%	7.41%	9.16%

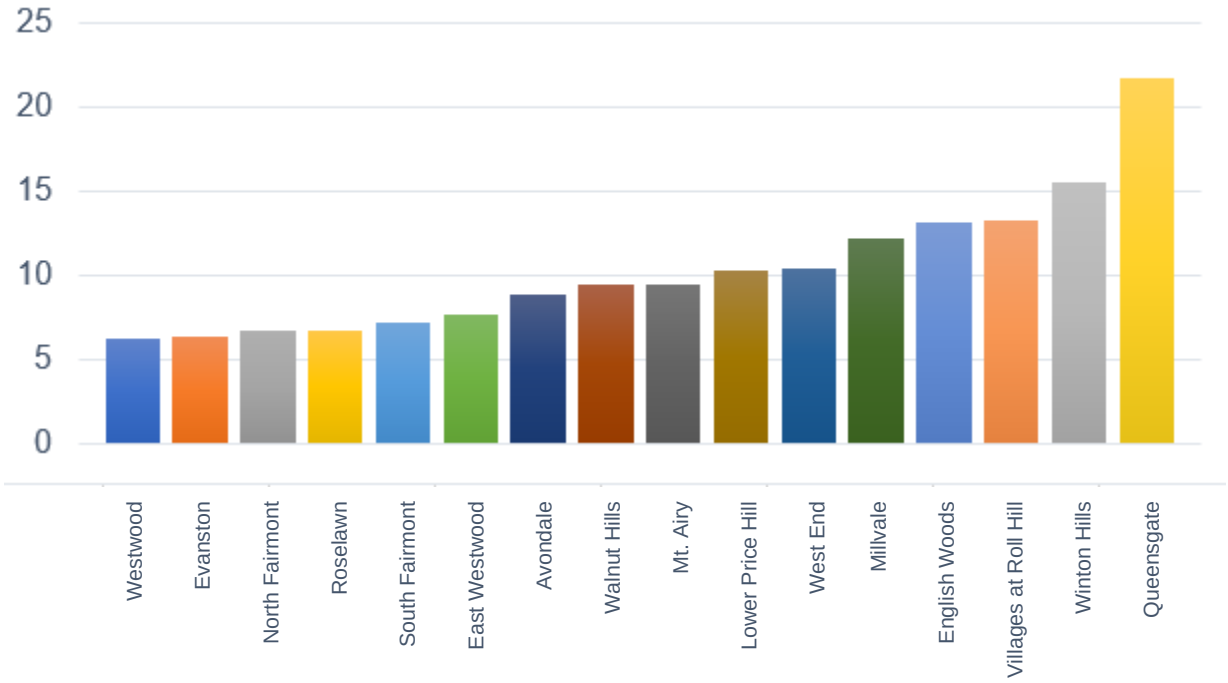
The neighborhood with the highest energy burden in the city is Queensgate with a rate of 21.72%. This value may be artificially high due to the low population and large margin of error for the median household income data in that neighborhood. The neighborhood with the lowest energy burden is Downtown with a rate of 1.47%. Appendix A provides an overview of the energy burden values for all neighborhoods in the city.

Figure 2: City of Cincinnati Energy Burden by Neighborhood



There are 16 neighborhoods in the City of Cincinnati with weighted energy burden levels greater than six percent, which is considered the threshold for energy poverty.

Figure 3: **City of Cincinnati neighborhoods with weighted energy burden above 6%**



3. Local Resources to Address Energy Burden

A wide variety of programs are available to low-income households to help reduce high energy burden. Unfortunately, many low-income households are either not aware of the programs or do not know how to access them. The City of Cincinnati should work with local partners to educate residents about these programs and help sponsor events to facilitate the registration process.

Home Energy Assistance Program (HEAP)

Provides eligible households assistance with their home energy bills. This one-time benefit is applied directly to the customer's utility bill or bulk fuel bill. The Winter Crisis Program (HEAP Winter Crisis Program) helps income eligible households maintain their utility service if they are threatened with disconnection, have been disconnected, or have less than a 25 percent supply of bulk fuel in their tank. The program runs from November 1 until March 31. The Summer Crisis Program (HEAP Summer Crisis Program) provides bill payment assistance for persons 60 years of age and older or those with a certified medical condition. The program runs from July 1 until August 31.

Eligibility: Households must have a household income at or below 175 percent of the federal poverty guidelines to participate in the program and must report total gross household income for the past 30 days (12 months preferred) for all household members. Both homeowners and renters are eligible for assistance.

Local program implementer: Community Action Agency – Cincinnati | Hamilton County

Home Weatherization Program (HWAP)

Provides eligible individuals with assistance to improve the energy efficiency of their homes and reduce their energy costs. HWAP provides a home inspection to identify energy saving improvements and the installation of cost-effective improvements.

Eligibility: Households must have an income at or below 200 percent of the federal poverty guidelines. Priority is given to households with residents older than age of 60, those with disabilities, those with children in the home, and households with a high energy usage and/or burden. All families who have received assistance any time during the last 12 months under Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), or Home Energy Assistance (HEAP) (does not include Emergency HEAP) are automatically income eligible for weatherization services.

Local program implementer: People Working Cooperatively

Duke Energy Weatherization Program

Helps eligible households save energy and reduce expenses through the installation of energy saving improvements and by providing education on energy saving behaviors the household can adopt. The program is available to single-family and multi-family units.

Eligibility: Households must have a household income of less than 175 percent of the federal poverty guidelines. Both homeowners and renters are eligible for assistance.

Local program implementer: People Working Cooperatively

Duke Energy Furnace Replacement

Provides eligible households with a replacement for inefficient or inoperable heating systems.

Eligibility: Households must have a household income of less than 175 percent of the federal poverty guidelines and use more than 1 therm of natural gas per square foot of living space.

Local program implementer: People Working Cooperatively

Duke Energy Refrigerator Replacement

Provides eligible households with a replacement for inefficient refrigerators as determined by a two-hour metering test.

Eligibility: Households must have a household income of less than 200 percent of the federal poverty guidelines. The program is available to single-family and multi-family residences. Participants must show verification of refrigeration ownership.

Local program implementer: People Working Cooperatively

Electric Partnership Plan (EPP)

Assists eligible households in reducing their electricity usage. EPP provides in-home audits and installs appropriate electric energy efficiency measures to reduce electric usage. Customers also receive information on how they can reduce their electric use and improve their home's efficiency.

Eligibility: Households are eligible for EPP if they are on or eligible for the Percentage of Income Payment Plan Plus (PIPP), have 12 months of electric usage at their current address, and have an annual electric baseload usage of at least 5,000 kWh.

Local program implementer: People Working Cooperatively

Percentage of Income Payment Program Plus (PIPP Plus)

Helps households manage their energy bills by establishing consistent monthly payments based on a percentage of household income. Homes heated with gas have a monthly payment of 6% of their household income for their natural gas bill and 6% of their household income for their electric bill. Homes heated with electric have a monthly payment of 10% of their household income. The balance of a household's utility bill is subsidized by the state of Ohio. There is a minimum monthly payment of $10.00. Paying 24 on-time and in-full payments eliminates any outstanding balance with the utility company that a household may have.

Eligibility: Households must have a household income at or below 150 percent of the federal poverty guidelines and have utility service from an electric or natural gas company regulated by the Public Utility Commission of Ohio. Households applying for PIPP must report total gross household income for the past 30 days (12 months preferred) for all members. Both homeowners and renters are eligible for assistance.

Local program provider: Community Action Agency – Cincinnati | Hamilton County

Table 3: **Summary of local resources**

Program	Weatherization Assistance	Utility Bill Assistance	Income Qualification	Renters Eligible	Program Provider
Home Energy Assistance Program		✓	Less than 175%	✓	Community Action Agency
Home Weatherization Program	✓		Less than 200%		People Working Cooperatively
Duke Energy Weatherization Program	✓		Less than 175%	✓	People Working Cooperatively
Duke Energy Furnace Replacement	✓		Less than 175%		People Working Cooperatively
Duke Energy Refrigerator Replacement	✓		Less than 200%	✓	People Working Cooperatively
Electric Partnership Plan	✓		Less than 150%		People Working Cooperatively
Percentage of Income Payment Program Plus		✓	Less than 150%	✓	Community Action Agency

4. Benchmarking Successful Programs

In order to design a program that will successfully address energy burden in the City of Cincinnati, it is important to understand the types of programs other organizations, both locally and nationally, are currently offering. While there are a wide variety of programs offered throughout the country by state governments and utilities, this document elected to benchmark programs that are focused on addressing energy related issues in low-income communities. By learning what characteristics make these programs successful, the City of Cincinnati can develop its own strategy to address energy burden.

Empower Chattanooga

Empower Chattanooga is a program of green|spaces, a nonprofit working to advance the sustainability of living, working, and building in Chattanooga. The program offers a new approach to coordinating the delivery of a range of services based on grassroots feedback, real-time geospatial analysis, and the ongoing coordination of public and private resources.[15] Its efforts are focused on three neighborhoods in the city where electricity usage is 43% more per square foot than the average home in Chattanooga.

Prior to entering the three target neighborhoods, Empower conducted focus groups in order to **understand each neighborhoods' characteristics** and unique qualities as well as their diverse cultures and perspectives in order to stimulate effective change. The focus groups also revealed the challenges associated with using traditional communication to educate residents about the program. It recommended **peer-to-peer communication** and **leveraging relationships** with trusted organizations in the community.

Empower Chattanooga uses a community organizing strategy to help residents and organizations in the three target neighborhoods learn about low cost and no cost ways to reduce their utility bill. A mainstay of the program are **monthly energy efficiency workshops** that teach homeowners and renters that easy changes can add up to big savings on their utility bill. The venues and times are varied as to **make participation convenient** and free meals are provided. Special community events are also scheduled, such as free movie nights, where energy efficiency topics are discussed.

Key takeaway:	Each neighborhood is unique. A cookie cutter approach to program implementation does not work.

Green Impact Zone

The Green Impact Zone was an initiative in Kansas City, Missouri to transform 150 square blocks of the city's urban core through sustainable reinvestment. Founded in 2009 and initial funded through the American Recovery and Reinvestment Act, the Green Impact Zone produced infrastructure improvements, energy efficiency improvements, employment and training programs, as well as other benefits for the five neighborhoods that comprised it.

One of the key components to the success of the Green Impact Zone was its **strong outreach and engagement program**. It made a clear distinction between its outreach activities, which delivered one-way communication, and its engagement activities, which focused on two-way dialogue and relationship building. It used a wide variety of tactics within each of these components to inform, educate, and encourage residents to take action. The Green Impact Zone worked to **tap local knowledge** in order to

[15] Empower Chattanooga, 2014.

gain an understanding of each neighborhood and its dynamics. Without this understanding, outreach and engagement efforts may have created new areas of conflict instead of addressing the intended issue. The Green Impact Zone recognized early on that **human capital is the greatest resource** for any organization or initiative. By having boots on the ground, it was able to educate residents and build trust through door-to-door engagement and one-on-one engagements.

Key takeaway:	Staff and community champions advocating for the program through person-to-person interaction builds support and increases the likelihood of success.

Light Up Avondale

Light Up Avondale is an initiative of the Cincinnati Zoo & Botanical Garden focused on the Avondale neighborhood of the City of Cincinnati. The goal of the program is to connect the neighborhood to conservation and energy efficiency by facilitating the installation of LED lighting in homes, community organizations, churches, and spots where lighting could improve safety and security. The LED lighting upgrades will result in lower energy bills every month which will put money back into homeowners' and renters' pockets and cut expenses for community organizations so they can invest in their core missions.

Even though the Zoo has been active member of the Avondale community for many years, it knew that it had to **have a plan in place** before it started to roll out the program. It leveraged its **understanding of the neighborhood and how it communicates** to get residents involved. One component of this involved having a presence at places that play an important role in the community. By being active in the community, Zoo staff was able to **build relationships**. While this is time consuming, it is an important key to success because people who know and trust you are more likely to participate in your program. Finally, finding residents to participate in the program who can then serve as **community champions** is critical. Many residents needed to hear from people who had a good experience with the program before they would participate themselves.

Key takeaway:	Relationship building is time consuming but critical for success.

Working in Neighborhoods

Working in Neighborhoods (WIN) is a local nonprofit working primarily in the South Cumminsville neighborhood of the City of Cincinnati. Since its founding in 1978, WIN has worked to revitalize communities by renovating and building homes, provided financial literacy training, and worked to build communities. One of its most recent initiatives is the creation of a net zero urban village in South Cumminsville. Through the project, 25 homes will receive energy efficiency upgrades and 25 highly efficient homes will be built. The premise for the project is that reducing monthly energy costs will improve the quality of life for residents by improving comfort and decreasing monthly expenses.

Over the years, WIN has built or renovated over 166 homes in the South Cumminsville and College Hill neighborhoods. Despite its long record of working in those communities, the organization still faces pushback from residents on occasion. A key component of WIN's success is **community engagement**. It works closely with neighborhood community councils and canvases door-to-door to educate residents. In College Hill, they worked with a group of residents to determine where in the community the organization should focus its work. In South Cumminsville, it took the completion of four to five projects and the support of a **strong community champion** to get other residents on board with the program.

Key takeaway:	Organizations should not go into neighborhoods where they have not been invited.

5. Neighborhood Energy Burden Pilot Program

One of the causes of energy burden mentioned earlier in this document is the lack of access to information about energy related programs that is prevalent in low-income communities. This lack of information prevents households from taking advantage of programs specifically designed to assist them with reducing energy costs.

In order to ensure that low-income communities have access to information about programs that can help address energy burden, a neighborhood specific pilot program was conducted. The design of the pilot program was influenced by the lessons learned from the benchmarking study as well as from research on the topic of energy burden. The pilot program utilized two strategies to reach low-income communities:

Leverage community-based organizations

Develop partnerships with community-based organizations that are viewed as trusted sources of information and who advocate for residents. These organizations can be utilized to host or sponsor programs designed to educate community members about energy efficiency related topics.

Conduct outreach and education programs to increase energy literacy

Low-income homeowners and tenants can be better positioned to act if they understand how to save energy in their dwelling.

These components led to the implementation of a pilot program that featured a workshop sponsored by a community-based organization during which residents received information and resources to help them reduce their energy burden.

Neighborhood Selection

A key component of the pilot program was to identify and select a community-based organization operating in a low-income neighborhood with which to partner. A list of potential neighborhoods was developed based on median household income. Neighborhoods where community organizations were already working on energy related issues, such as South Cumminsville, were removed from the list. This was done to ensure that that the pilot program was conducted in a neighborhood that was not already familiar with energy efficiency programs.

The benchmarking and research conducted for this project made clear the importance of having the community-based organization sponsor a program in the neighborhood rather than an outside organization offering the program without local support. As a result, a list of potential community-based partners was developed for each of the remaining neighborhoods. Interviews were conducted with potential community-based partners in five neighborhoods to provide them with information about the program and to gauge their interest in participating.

The community-based organizations were asked to provide the following assistance with implementation of the pilot program:

- Secure a space for the event
- Identify network of community champions to promote the event
- Promote the event through their own communication channels

Two finalists were selected based on the interviews. Presentations were made to the boards of each organization to provide additional information and provide them with an opportunity to ask questions. The

Mt. Airy Town Council voted to participate in the program and was selected as the community-based partner for the pilot.

Energy Burden in Mt. Airy

Seven census block groups make up the Mt. Airy neighborhood. Their energy burden ranges from a low of 2.83% to a high of 20.58%. The weighted average energy burden for the neighborhood is 9.51% which is above the 6% energy poverty threshold. Two of the neighborhood's census block groups are among the top ten census block groups with the highest energy burden in the city.

Pilot Program Design

The goal of the energy workshop was to provide neighborhood residents with information and resources that they could use to lower their energy burden. The table below outlines the key components of the pilot program and how those components were implemented.

Table 4: Pilot Program Components and Design

Key Programmatic Component	Pilot Program Design
Partner Identify a community- based organization to partner with for the event.	The Mt. Airy Town Council was selected as the community-based partner for the event.
Location Secure a meeting location that is familiar to community members and where they feel welcomed and comfortable.	The workshop for the pilot program was held at the Mt. Airy School, a public school at the heart of the community. It is also the location where the Mt. Airy Town Council holds its monthly meetings.
Outreach Advertise the event throughout the community using a variety of methods.	The community was informed about the event using the following outreach methods: • Posting the event on the Mt. Airy Town Council website • Including the event in the Mt. Airy Town Council newsletter • Posting the event on the Mt. Airy Town Council and Mt. Airy CURE Facebook pages • Sharing the information with the community through Nextdoor • Promoting the event at other community events • Using Facebook advertising targeted to the community

Workshop format Coordinate with the partner to identify a workshop format that will work in the community.	Mt. Airy Town Council provided feedback on the workshop format based on their previous experience in the community. They recommended a series of stations that attendees would rotate through during the event. They also felt it was important to provide some food for attendees. As a result, a sampling of small desserts was provided at each station for attendees to have while they were listening.
Data collection Collect basic contact information and have attendees complete a short survey.	Attendees were asked to provide their contact information and to complete survey questions about their energy usage. This provided basic data on the attendees and their energy literacy. The contact information allowed the organizers to follow-up with the attendees 30 days after the event to see if they implemented any of the concepts that they learned.
Take home materials Provide attendees with materials and resources so they can implement what they learned.	Attendees received handouts at each session that they could use as a resource after the event. Each household that completed and turned-in a survey was given a basic weatherization kit. The kit contained: • Spray foam • LED bulbs (2) • Door sweep • Weather strip • Foam outlet gaskets

Once the pilot was designed, the next step involved identifying the session topics for the workshop. In order to provide attendees with the best information, agencies throughout the region responsible for implementing energy programs were asked to participate. Based on their programs and experience, four main topics were decided upon for the workshop.

Reading a utility bill

Residents are constantly bombarded with phone calls and salespeople at their door asking to switch electric or natural gas providers. In some cases, the plans being sold have a low introductory rate followed by escalation clauses that can result in the resident paying two to three times normal utility rates. This session provided attendees with an understanding of how to read their utility bill, how to determine their rate, and where to find resources to assist them with obtaining a fair rate.

Energy saving behavioral changes

Most individuals know they should turn-off the lights when they leave a room or that they should change the thermostat when they leave the house. However, they do not always understand the impact that these actions have financially. This session provided attendees with information on

simple behavioral changes they can take in their daily lives and the impacts that those actions can provide.

Simple DIY energy saving improvements

Whether they are a homeowner or a renter, there are simple low-cost improvements that a resident can make to decrease their energy usage. The improvements can result in cost savings and improved comfort. This session empowered attendees by providing them with instructions and advice about low-cost improvements they could complete themselves.

Information on energy programs

In many cases low-income households lack access to communication channels that can inform them about the variety of programs designed to address energy related issues. This session provided attendees with information about programs available in the community that could assist them with addressing high energy bills or installing energy saving improvements.

Pilot Program Results

The Mt. Airy Energy Efficiency workshop was help on Wednesday, August 28, 2019 at 7:30 pm. The workshop was held at the conclusion of a regularly scheduled Mt. Airy Town Council meeting. Fourteen community members attended the event. Due to the small number of attendees, the stations were eliminated and the entire group listened to the presentations together.

The following partners assisted with the workshop sessions:

- Reading a utility bill – Greater Cincinnati Energy Alliance
- Energy saving behavioral changes – Working in Neighborhoods
- Simple DIY energy saving improvements – People Working Cooperatively
- Information on energy programs – People Working Cooperatively

The sessions were well received and attendees appeared to be engaged. They asked pointed follow-up questions and appeared to be savvy about energy efficiency issues.

Attendees were asked to complete a survey at the completion of the workshop in order to gather information about their energy usage and obtain feedback on the usefulness of the event. Thirteen attendees completed the survey.

The results of the survey indicated that all but one of those in attendance were homeowners. All but one attendee found the workshop useful and indicated that they learned something that will help them reduce their energy usage at home. Attendees were asked if their home is comfortable in the winter as a way to determine if their home is air sealed and insulated properly. Nine of the respondents (69%) indicated that their home is comfortable. Nine respondents (69%) indicated that they feel like they are spending too much on utilities. The complete results of the survey can be found in Appendix D.

Lessons Learned

There are two main improvements that should be made to the program design outlined above. These changes will ensure that future workshops achieve their intended goal of providing low-income households with the information and resources they need to reduce their energy burden.

Community Outreach

The organizers successfully partnered with the Mt. Airy Town Council (MATC) to bring the event to the community. While the MATC is well known in the community, it is an all-volunteer organization that does

not have boots on the ground. In the end, this limited the amount of person-to-person outreach that occurred prior to the event.

It is critical to connect with community groups or individuals that can spread the word about the event and encourage people to attend. Important groups to contact include churches, other community-based organizations, and resident or homeowner associations. In some communities it may make sense to partner with the community council and have them make the introductions while in others it may be better to partner directly with a community-based organization that has a full-time staff operating in the community.

Target Population

While demographic information was not collected during the workshop, based on the conversations during the different sessions it appeared that most if not all the attendees were middle class rather than the intended target audience of low to moderate income households. This is an indication that the outreach efforts used for the workshop did not effectively reach the intended populations.

Partnerships with community-based organizations that have a full-time staff will ensure the outreach efforts reach the targeted population. By having staff members who are constantly in contact with the target population promote the event, it will validate the legitimacy of the workshop and help spread the word throughout the community.

6. Conclusion

Low-income households in the City of Cincinnati spend a disproportionate share of their income on energy related expenses. Over a quarter of the city's census block groups have an energy burden higher than six percent, the threshold for energy poverty. These populations usually live in older less efficient housing and are difficult to reach with information about energy efficiency.

The city should explore different ways to address energy issues impacting low-income households. Programs that assist with the installation of energy saving improvements or home repairs that will allow low-income households to qualify for weatherization programs are sorely needed. However, programs of this nature would require a significant budgetary investment in order to address energy burden throughout the city.

As an alternative, the city should work with partners throughout the community to educate low-income residents about steps they can take to reduce their energy burden. These community-based outreach and education programs should contain the following key elements in order to maximize results:

Identify Target Populations
The analysis of neighborhood energy burden contained in this report provides the city with a list of communities where it should target its efforts. Outreach and education programs should focus on reaching both homeowners and renters.

Develop Effective Partnerships
It is important to partner with an organization that is respected and trusted in the community. Partners should have staff that actively interacts with community members or be able to connect with other groups that are able to do so.

Provide Useful Information
Outreach and education efforts should focus on providing low-income residents with information that will help them save energy in their dwellings. Programs that promote greater energy literacy and teach energy saving strategies that households can implement on their own, can help to decrease energy burden.

While community-based outreach and education programs will not eliminate energy burden, they can result in real energy savings that provide tangible benefits to low-income households. The programs can be implemented by the city with a relatively low financial investment and can help it work toward the goal outlined in the *Green Cincinnati Plan* of achieving a 10% reduction in household energy burden.

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8. Appendices

Appendix A: Neighborhood Energy Burden Values

Neighborhood	Weighted Median Household Income*	Annual Energy Cost	Weighted Energy Burden**
Queensgate	$13,580	$2,949	21.72%
Winton Hills	$14,039	$1,728	15.55%
Villages at Roll Hill	$7,044	$933	13.24%
English Woods	$9,591	$1,264	13.18%
Millvale	$11,416	$1,389	12.17%
West End	$18,667	$1,523	10.46%
Lower Price Hill	$13,295	$1,363	10.25%
Mt. Airy	$31,650	$2,073	9.51%
Walnut Hills	$25,622	$1,392	9.43%
Avondale	$19,710	$1,522	8.89%
East Westwood	$21,248	$1,636	7.63%
South Fairmont	$26,701	$1,481	7.2%
Roselawn	$26,713	$1,490	6.77%
North Fairmount	$25,095	$1,656	6.72%
Evanston	$30,405	$1,684	6.34%
Westwood	$34,143	$1,759	6.27%
East Price Hill	$30,237	$1,520	5.96%
South Cumminsville	$27,396	$1,615	5.9%
Paddock Hills	$29,375	$1,653	5.63%
OTR	$39,750	$1,314	5.12%
Hartwell	$38,449	$1,826	5.11%
Riverside	$31,397	$1,550	4.93%
Corryville	$23,108	$1,097	4.82%
Bond Hill	$36,141	$1,750	4.8%
CUF	$26,626	$1,183	4.77%
Carthage	$33,386	$1,571	4.75%
West Price Hill	$36,906	$1,606	4.72%
Mt. Auburn	$41,127	$1,527	4.63%
College Hill	$43,296	$1,853	4.61%
Clifton	$41,316	$1,653	4.57%
North Avondale	$49,394	$2,069	4.51%
Pendleton	$31,544	$1,406	4.46%
Linwood	$38,646	$1,676	4.34%
Madisonville	$41,076	$1,543	4.29%
Sedamsville	$34,722	$1,462	4.21%
Kennedy Heights	$46,948	$1,729	4.07%
Sayler Park	$45,076	$1,765	4.05%
Spring Grove Village	$44,073	$1,685	3.9%
Northside	$45,531	$1,548	3.69%

Camp Washington	$37,896	$1,315	3.66%
Mt. Washington	$59,201	$1,624	3.05%
Pleasant Ridge	$53,461	$1,569	2.97%
California	$92,167	$2,632	2.86%
East End	$84,467	$1,663	2.69%
East Walnut Hills	$62,181	$1,636	2.49%
Hyde Park	$84,980	$1,774	2.25%
Oakley	$64,555	$1,370	2.23%
Columbia Tusculum	$93,264	$1,829	1.96%
Mt. Lookout	$116,959	$2,032	1.72%
Mt. Adams	$83,233	$1,368	1.64%
Downtown	$86,289	$1,158	1.39%

* Median Household Income data is a 5-year estimate for the 2013-2017 period in 2017 inflation adjusted dollars obtained from the United States Census Bureau's *American Communities Survey.* It was calculated by weighting the median household income for each census block group in the neighborhood to compensate for population differences.

**Weighted Energy Burden for each neighborhood was calculated by weighting energy burden for each census block group in the neighborhood to compensate for population differences.

Appendix B: Energy Burden in 80% Median Household Income Census Block Groups*

Neighborhood	Census Block Group	Median Household Income**	Annual Energy Cost	Energy Burden
Queensgate	390610263001	$13,580	$2,949	21.72%
Mt. Airy	390610085012	$17,142	$3,528	20.58%
Winton Hills	390610080001	$8,644	$1,666	19.27%
West End	390610265001	$9,363	$1,729	18.47%
Walnut Hills	390610037002	$8,769	$1,612	18.38%
Avondale	390610270001	$9,315	$1,524	16.36%
Avondale	390610270004	$10,759	$1,679	15.60%
East Price Hill	390610096004	$13,563	$2,057	15.17%
Mt. Airy	390610085011	$9,000	$1,364	15.16%
Walnut Hills	390610036001	$8,611	$1,241	14.41%
West End	390610269002	$10,577	$1,489	14.08%
Roselawn	390610271004	$11,294	$1,510	13.37%
Villages at Roll Hill	390610085021	$7,044	$933	13.24%
English Woods	390610086014	$9,591	$1,264	13.18%
Avondale	390610068002	$12,247	$1,584	12.93%
West End	390610269004	$13,571	$1,727	12.73%
Walnut Hills	390610267002	$11,789	$1,438	12.20%
Millvale	390610077001	$11,416	$1,389	12.17%
West End	390610269003	$13,667	$1,587	11.61%
South Fairmont	390610272003	$13,389	$1,539	11.49%
Walnut Hills	390610036002	$11,622	$1,264	10.87%
CUF	390610030002	$21,750	$2,297	10.56%
Avondale	390610068003	$15,559	$1,608	10.34%
Lower Price Hill	390610263002	$13,295	$1,363	10.25%
Evanston	390610038002	$17,500	$1,774	10.14%
Clifton	390610071001	$20,063	$2,028	10.11%
West End	390610264002	$17,819	$1,645	9.23%
Evanston	390610038001	$17,829	$1,632	9.16%
Roselawn	390610271003	$15,805	$1,434	9.07%
East Price Hill	390610093003	$13,750	$1,194	8.68%
Walnut Hills	390610267001	$16,667	$1,425	8.55%
Avondale	390610270003	$18,438	$1,554	8.43%
OTR	390610017001	$15,052	$1,259	8.36%
Roselawn	390610271002	$13,709	$1,132	8.26%
OTR	390610016001	$17,109	$1,370	8.23%
CUF	390610029001	$12,577	$1,027	8.17%
Mt. Airy	390610208114	$23,514	$1,872	7.96%
Avondale	390610069002	$22,325	$1,747	7.82%
East Price Hill	390610092002	$19,722	$1,537	7.79%
East Westwood	390610088001	$20,121	$1,568	7.79%
East Price Hill	390610095001	$17,917	$1,393	7.78%
North Fairmount	390610086012	$21,250	$1,648	7.75%
Madisonville	390610056004	$21,739	$1,682	7.74%

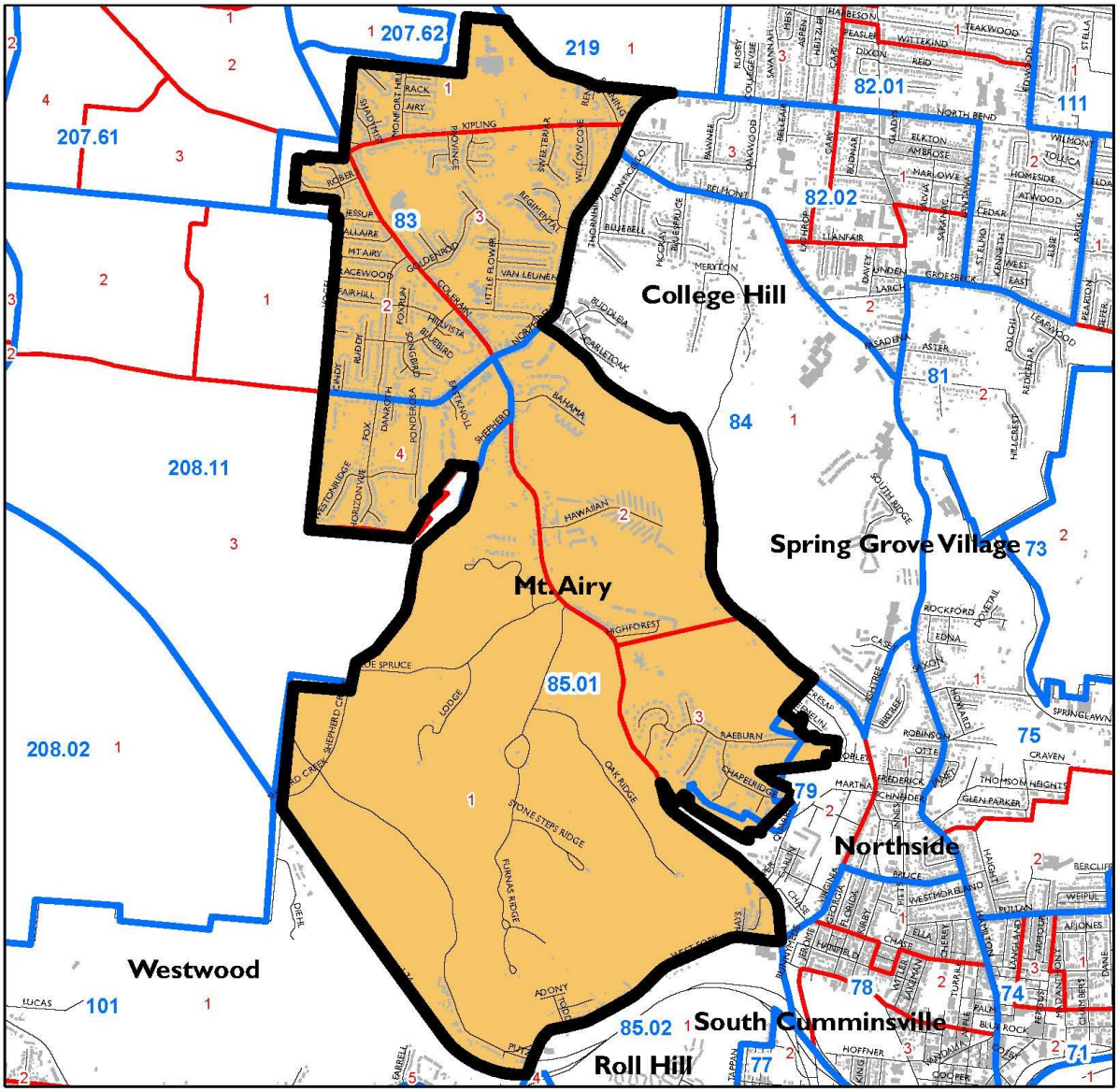
Northside	390610079002	$20,655	$1,579	7.64%
College Hill	390610081002	$22,431	$1,674	7.46%
College Hill	390610082013	$22,399	$1,667	7.44%
Avondale	390610066002	$21,682	$1,611	7.43%
Evanston	390610039002	$22,050	$1,629	7.39%
East Westwood	390610100024	$23,136	$1,705	7.37%
Westwood	390610100022	$21,955	$1,608	7.32%
OTR	390610016002	$16,641	$1,203	7.23%
Evanston	390610039001	$22,566	$1,611	7.14%
Madisonville	390610055003	$22,614	$1,579	6.98%
Westwood	390610088002	$25,405	$1,753	6.90%
Avondale	390610066001	$22,473	$1,545	6.88%
East Price Hill	390610093004	$23,350	$1,596	6.84%
Evanston	390610039003	$23,750	$1,612	6.79%
West Price Hill	390610097002	$21,910	$1,476	6.74%
West End	390610264001	$22,798	$1,533	6.72%
Winton Hills	390610080002	$26,957	$1,790	6.64%
West End	390610269001	$24,427	$1,614	6.61%
Westwood	390610100041	$24,400	$1,598	6.55%
East Price Hill	390610093002	$20,820	$1,352	6.49%
Mt. Auburn	390610022003	$23,169	$1,500	6.47%
Hartwell	390610060001	$24,188	$1,555	6.43%
West Price Hill	390610097005	$23,571	$1,508	6.40%
Westwood	390610100025	$25,079	$1,595	6.36%
Avondale	390610069001	$22,188	$1,407	6.34%
North Fairmount	390610086013	$26,739	$1,680	6.28%
East Price Hill	390610092001	$26,400	$1,620	6.14%
Westwood	390610102013	$26,397	$1,575	5.97%
East Price Hill	390610094001	$24,871	$1,481	5.95%
West Price Hill	390610098001	$23,803	$1,409	5.92%
Riverside	390610103002	$26,222	$1,539	5.87%
Northside	390610078003	$27,022	$1,584	5.86%
West End	390610002001	$18,883	$1,099	5.82%
Corryville	390610033002	$18,958	$1,090	5.75%
Avondale	390610068001	$27,167	$1,553	5.72%
CUF	390610029003	$21,016	$1,172	5.58%
West Price Hill	390610099022	$26,366	$1,464	5.55%
CUF	390610030001	$23,814	$1,314	5.52%
Mt. Washington	390610046022	$27,269	$1,504	5.52%
East Price Hill	390610092003	$24,688	$1,355	5.49%
Mt. Airy	390610083001	$26,066	$1,421	5.45%
Westwood	390610100023	$25,556	$1,355	5.30%
Walnut Hills	390610037001	$25,823	$1,366	5.29%
Roselawn	390610110002	$25,590	$1,326	5.18%
Avondale	390610069003	$27,039	$1,350	4.99%
CUF	390610029002	$27,218	$1,358	4.99%
CUF	390610025001	$21,164	$1,017	4.81%
Corryville	390610033001	$22,336	$1,039	4.65%

Corryville	390610032001	$25,863	$1,162	4.49%
CUF	390610026001	$27,045	$1,068	3.95%
CUF	390610030003	$21,750	$389	1.79%

*The 80% median household income value for census block groups in the City of Cincinnati is $28,269. This is based on a 5-year estimate at the census block level for the 2013-2017 period in 2017 inflation adjusted dollars obtained from the United States Census Bureau's *American Communities Survey.*

**Median household income data was not available for some census block groups. In those cases, median household income data at the census tract data was used.

Appendix C: Mt. Airy Census Block Groups



Appendix D: Energy Efficiency Workshop Survey Results