

Home Retrofit Education Programs for  
Low-Income Communities

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Senior Capstone

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### Abstract

Energy efficient homes are key for a sustainable future in any city. However, the lack of knowledge about the subject restricts many households to do their part in the movement. This research focuses on programs available to low-income households, to perform home weatherization retrofits and to learn about the subject as well. Implementing and focusing on the learning portion of home weatherization and energy efficiency to homeowners increases social equity and reduces energy usage in a home over time. Three programs are analyzed to extract the benefits and drawbacks of each. Each program's goal varies but are all aimed to help low-income communities. Homeownership education, hands-on home weatherization, and home construction are the focuses of each program. The final recommendation for each program is to increase advertisement and focus their outreach on specific sections of the city of Tucson which can benefit the most from their services.

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## Introduction

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The word sustainability is used across many fields of study and many people see it as a buzzword, but its broad use defines the word's connection among disciplines. The United States Environmental Protection Agency defines sustainability with a simple principle of “everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment,” and to pursue sustainability “is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations” (Learn About Sustainability, n.d.). Being able to support present and future generations is ultimately defined as the conservation of resources through different means and maintaining a positive lifestyle. The three pillars of sustainability, economic, social and environmental, support the idea of sustainability through different means. Social sustainability is the hardest to measure but one of the most important since it includes a community's sense of commitment with each other.

Social inequity is an issue that cities all over the world face. How does social injustice and inequity relate to sustainability? A balanced interconnection of social, economic and environmental factors in every community slowly and ultimately create a sustainable city. The environmental aspect not only refers to the natural resources around us but to human's interaction to social and economic systems and they all need to be unified to increase the community's welfare. All three aspects are locked with each other, however, the social aspect is one of the weakest and hardest system to define because it is not always a tangible resource such as water or money.

Social inequity among community groups is a clear representation of a lack of social sustainability in cities. Low-income communities want to become more involved in the city and increase their contribution to better themselves and others, however, the lack of resources and education pulls people back and impedes them from moving forward in society. Prosperity has different meaning for everyone. For some, moving forward is defined as building new roads and investing on the physical growth of the city. However, for others prosperity can be seen through the simple ability to save and put money away at the end of the month while still paying all of their bills. A prosperous and healthy society contributes to a sustainable society. Rob Bijl, author of *Never Waste a Good Crisis: Towards Social Sustainable Development*, states, “The difficult thing about the social aspect of sustainability is that it is layered (it pertains to both an individual and a collective level) and it is reflexive (there is a continuous exchange between what we observe, how we interpret this, and how we behave)” (Bijl, 2011). The important word mentioned in the previous quote is “we,” followed by an action. The inequality gap among social groups can be reduced with social action to benefit oneself and it will ultimately benefit the community as a whole.

A very low-income communities can help society and themselves is to reduce the amount of energy their home uses, ultimately making their homes more sustainable. Many people are intimidated by the combination of the words ‘sustainability’ and ‘home.’ For many people, it automatically means adding expensive features such as solar panels to their roofs and/or living a lifestyle less than comfortable to what they are used to. That is not always the case. Reducing a house’s energy consumption does not always have to be expensive or inconvenient for the homeowner, and it can become an educational process for the whole family. Many people are not educated on what techniques can improve their home’s energy efficiency and their overall

lifestyle. Many people may be interested and willing in improving their homes to reduce energy bills, but do not always have the monetary resources readily available to do so or the knowledge to take action.

Federal, state and local grants are available to help people improve their homes, however, the word does not always reach the people that need it the most: low income communities, people with language barriers or people with disabilities. Receiving grants or being able to pay for home repairs is not the only key in home sustainability. Being educated in what treatments can lead to the highest conservation of energy is probably the most important part, especially when a limited amount of money is available. Education is one of the most important components of social equity and balancing the three pillars of sustainability. The aim of this study is to research various energy efficiency education programs, and home retrofit programs throughout Arizona to further understand the contributing factors of each program to society. Understanding and collecting successful aspects of each program will allow for a deeper understanding on how existing and new programs can reach more people and create a larger impact throughout the community.

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## Literature

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### Energy Consumption

The average American household's energy consumption is about 911 kWh and pays about 114 dollars a month (Wirfs-Brock, 2014). However, most old homes are not average and

spend more money due to energy loss throughout their homes. Fifty-four percent of the total energy used in a home is used by the heating and cooling system. According to U.S. Energy Information Administration, Arizona's air conditioning energy consumption of 25 percent is more than four times the national average of 6 percent (Arizona State Profile and Energy Estimates, 2015). Energy loss is experienced throughout the home as heat loss through the walls, floor, roof/attic, and windows and doors. Recognizing specific areas where homes lose energy is the first step to fixing the problem. Home audit, also known as a home energy assessment allows people to fully understand energy use throughout their homes and identifies problem areas such as where air leaks out and ultimately money as well. Professional assessments are available in most cities. Do-it-yourself assessment tutorials are also available online for the community.

Professional audits are not always doable for low-income households as they can be an unnecessary expense on top of monthly bills. Therefore, alternatives to professional audits do exist to identify energy loss throughout a home. The Energy.gov website offers step-by-step instructions on how to assess a home. Energy audits start with locating air leaks along baseboards, walls or ceilings. The sealing of air leaks can offer energy savings ranging from 5% to 30% per year. Energy loss through walls and ceilings is due to a lack of insulation and it is part of the energy audit process. Older homes may have less insulation due to different construction codes at the time. Checking whether pipes, ductwork or chimneys are sealed correctly is also part of the assessment. The inspection of heating and cooling equipment such as checking filters, and the overall system is one of the most important steps since such systems use up to 54 percent of the total home energy (Energy Saver, n.d.). Although online step-by-step instructions are a great tool for homeowners, they are not always clear or available. People without experience will most likely not evaluate a home as efficiently as a professional will.

The assessments described above are common ways to inspect a home in order to reduce the amount of energy used. As mentioned earlier, many times older homes use more energy and low-income families tend to live in older homes. The average Arizona household uses about 1,012 kWh per month, 101 kWh more than the average U.S. home (Wirfs-Brock, 2014). To put into real-world perspective, the average energy use is enough energy to “launch a Volkswagen Beetle into orbit next to the International Space Station” (Energy Saver, n.d.). The extreme heat in the desert contributes to the extra use of energy in Arizona. However, low-income families usually experience higher than usual energy bills, usually because they live in older homes, compared to families with higher income. According to ACCCE (American Coalition for Clean Coal Electricity) 2014 report *Energy Cost Impacts on American Families, 2001-2014* states, “The 60 million households earning less than \$50,000, representing 49% of U.S. households, will devote an estimated 20% of their after-tax incomes to energy, compared with an average of 8% for households with annual incomes above \$50,000.” For families with incomes less than \$30,000 their energy cost increased from 16% to 26% of their after-tax income (Trisko, 2014). Overall, low-income households are highly affected by expensive energy bills and need the most help. Grants and programs are available for low-income families to help improve their homes to ultimately lower their energy cost.

## Grants and Programs

Energy costs have always played an important role in the United States. The U.S. is currently ranked second place behind China in coal consumption and the rising prices of energy have been seen since the 1970’s. The Low Income Energy Assistance Program (LIHEAP) was created as a result of the dramatic energy price increase in the 1970’s and it is under the U.S.

Department of Health & Human Services. LIHEAP “helps keep families safe and healthy through initiatives that assist families with energy costs” (Office of Community Services, n.d.). The program offers assistance for home energy bills, energy crises, weatherization and energy-related minor home repairs.

When LIHEAP was first established it received support from a broad spectrum of politicians. Lorie Higgins and Loren Lutzenhiser, authors of *Ceremonial Equity: Low-Income Energy Assistance and the Failure of Socio-Environmental Policy*, agreed that “even conservative interests recognized that unavoidable distributional impacts would accompany rising energy prices and that their impacts should be mitigated.” However, LIHEAP quickly lost its support as it became known to be part of a “welfare” program. The program lost funds and fewer than 20 percent of the eligible households at the time received assistance. However, one of the most important aspects to highlight is that about half of all eligible households were unaware of the program’s existence (Higgins & Lutzenhiser, 1995). The lack of knowledge about the program and other similar programs is still an issue now-a-days.

National programs such as Habitat for Humanity have become an important characteristic for our communities’ success. Habitat for Humanity’s online homepage states, “We build because we believe that everyone, everywhere, should have a healthy, affordable place to call home. More than building homes, we build communities, we build hope and we build the opportunity for families to help themselves” (Habitat for Humanity, n.d.). Assistance programs are seen throughout the country with different characteristics and approaches, however, they all share the same goal, to improve low-income families’ lifestyle. Grants, weatherization programs, home repair programs, and related services offered to the public help families in the moment,

however, they should all include a homeownership education campaign to enhance the overall experience.

Local assistance programs are available for low-income communities to improve their home. The Housing and Community Development Department of the City of Tucson offers several programs to the Tucson community. The programs offered are for low-income households to repair their homes, and about 200 families in the community's most needy neighborhoods are helped annually (Low Income Home Repair Assistance, n.d.). Most of the grants given out are very strict in the way they are spent. For example, the Tucson Annual Residential Rehabilitation (TARR) Program allowed the money to be spent on: leaking roof repairs and/or replacement, electrical, sewer line, gas leak, replacement of furnace or cooling system, water heater replacement, structural, water leak, security, and any other emergency life threatening conditions. The criteria described above may only be replaced if the existing structure is no longer serviceable or they put a member of the household in danger (Tucson Annual Residential Rehabilitation (TARR) Program, n.d.). However, the program is currently unavailable due to lack of funding. The program would be a great opportunity for low-income households, therefore, interest and awareness on the program needs to increase to bring funding back.

Loan programs are also available for families in the Tucson community. An example of a local loan program is the Home Deferred Loan Program which receives its funds from the Federal HOME Program. It is an interest-free loan program that allows people to fix all existing deficiencies in the electrical system, plumbing system, heating and cooling system and roof structural system. Any cosmetic purposes are not allowed. The amount of funding available varies per applicant, it can be 2/3 or 1/2 of the total eligible rehabilitation costs, or \$15,000,

which ever amount is less (Low Income Home Repair Assistance, n.d.). Having programs like the ones described above allows people to fix existing issues within their homes and repair them to improve and lower their energy consumption.

Tucson Electric Power Company (TEP) also offers a variety of energy efficiency programs to the community; Residential Rebate Programs, Low-Income Weatherization Program, and PowerShift Program (Arizona Utility Energy Efficiency Programs, n.d.). The Low-Income Weatherization Assistance Program works with community partners to provide energy efficiency upgrades to reduce monthly electric bills. TEP partners with Tucson Urban League and Pima County to “help low-income residents reduce their energy expenses through the installation of improved insulation, upgraded cooler motors and other such ‘weatherization’ improvements to their homes” (Customer Care, Weatherization Assistance , n.d.). The upgrades are free for qualifying families. TEP also sponsors energy conservation workshops with Tucson Urban League and Pima County to teach low-income customers day-to-day energy efficiency techniques and how to gain control over their energy bills. The weatherization program includes: caulking and weather-stripping, insulation upgrade, sunscreens, water heater insulation and exposed pipe wrap, paint roof and exposed ducts white, replace or service evaporative coolers, install low-flow shower heads, and plant vegetation on south/west exposures (Customer Care, Weatherization Assistance , n.d.). TEP.com is a great resource for quick energy saving information. Under ‘Tools and Resources,’ Home Energy Tips are located and available for anyone browsing for energy saving techniques. The website is organized by three categories: Quick Guide to Efficiency, Cooling and Heating, and Appliance Efficiency.

The process of improving a home comes full circle when the education is provided by online resources and get put into action with programs or grants. Education and monetary help

need to come hand-and-hand to encourage low-income homeowners to make the best choices for their home. Information found online is a great source for many people, however, not everyone is inclined or able to search home repair tips online. People that need the knowledge about energy saving techniques do not always know how to use a computer or search in depth for help. Therefore, the information needs to become part of people's daily conversations and be part of community events, thus everyone can have the same opportunity in benefiting from the programs provided.

## Social Equity

Social justice is part of the sustainability pillar, however, sometimes it is the hardest to measure success on. Long term social progress and equity is not measured by GDP as many believe. Bijl, author of *Never Waste a Good Crisis: Towards Social Sustainable Development*, states, "...economic resources are not the only important elements in people's lives; in order to 'capture' well-being accurately, other things need to be measured as well: individuals' expectations and degree of satisfaction; the way in which they spend their time; their paid and unpaid activities; their health and educational status; their relationships with other people; their political activity; and their participation in public life." (Bijl, 2011) Social equity is a large part of sustainability and education is an important aspect of it.

Increase in education allows for prosperity in communities and better adaptation to society. As mentioned above, relationships with other people and involvement in community brings people to "feel responsible for solving social problems and implementing proposed measures" (Bijl, 2011). Ultimately, the inclusion of communities in social movements brings people together and education about the subject/movement allows for a better understanding and following of the subject. Sustainability and home retrofit education in a wide community-level is

essential for the success of social equity. Bringing equal opportunities to communities that do not always think subjects such as sustainability, reduction of consumed energy and home retrofit can be part of their lifestyle due to their income ultimately contribute to an increase in social equity.

Different programs around the country help low-income families reduce the use of energy in their households. Weatherization programs have become an essential part of the community, however, comprehensive homeownership education campaigns need to become a part of all weatherization programs in the country. As mentioned earlier, social equity is tied to almost every aspect of one's life and health and education are not the exception as they can go hand-and-hand with each other. Home retrofit techniques such as the reduction of air infiltration is a common way to reduce energy consumption, which ultimately benefits the residents' health. "Reductions in air infiltration should decrease penetration of outdoor pollutants, which is of particular importance in traditionally leakier low-income households in neighborhoods with high outdoor air pollution" (Chan W, 2005). Brent Stephens, author of *Home Energy-Efficiency Retrofits*, focuses on the incorporation of homeowner education in weatherization programs as education material alone usually fails to alter people's actions. He states, "Greater energy savings from home retrofits could be achieved by complementing homeowner education campaigns with regular feedback on energy use and economically motivational programs" (Stephens, 2011). Active learning is key when behavior changes are needed in a community. Home walkthroughs with trained specialist to identify energy-inefficient behaviors throughout a home are also recommended to experience the best results and promote "green and healthy housing."

Tucson and every city is responsible for increasing and implementing social equity among its community. According to a report on the city of Tucson done by Sustainable Design

Assessment Team Report (SDAT) in 2007, Tucson is at a crossroads, and awareness about sustainability topics are on the rise. The SDAT program is an assistance program that focuses on sustainability principles that provides communities with specific design solutions after broad assessments are made to the city (Tucson SDAT, 2007). One of the recommendations done by SDAT to the city of Tucson is to develop a sustainable user's guide. Guidebooks are needed to focus on specific needs for groups such as homeowners, developers, or planners. Another education strategy would be focused on creating a center for workshops opened to the community. "The center would be a showcase building exemplifying sustainable design ideas, offering exhibits and workshops, and serving as a central clearinghouse for information dissemination and networking" (Tucson SDAT, 2007). Raising awareness of what is available to the public that ranges from services, funds and assistance increases involvement within the community and ultimately can reduce social inequity gaps.

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## Methodology

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The project will be conducted through a constructive research methodology. Constructivist research draws conclusions from extensive background research on the topic, and it allows for the formulation of a new theory based on related cases (Creswell, 2007). The research tool used for the case study will be grounded theory. "Grounded theory studies are studies in which data is collected and analyzed and then a theory is developed that is grounded in the data" (Creswell, 2007). Theories on home retrofit programs, homeownership education programs and their outreach to the community, and the community's engagement in sustainable

practices will allow for interpretation in what is needed to improve education among society. Home retrofit education programs need to be tailored to the specific needs and resources of the people participating in such programs. Another aspect that will impact the research and make it a realistic approach will be to incorporate the barriers that exist in low-income communities and how such barriers can impact people's opportunity of home retrofit.

Three local Tucson programs were chosen to investigate their effectiveness and community outreach. Community outreach is divided into different sectors; website information, advertisement and availability of information to the public. Chicanos Por La Causa, Primavera Foundation and Tucson Urban League hold different types of low-income assistance programs. Chicanos Por La Causa is a multiple-state organization that originated in Arizona. Chicanos Por La Causa manage the Self Help Housing Program which is part of the base-case of this research. Primavera Foundation's Homeownership Department holds education classes for its members. The final program that is part of the research is Tucson Urban League's Weatherization Program. All three of these programs have similar missions, to help the low-income community, however they carry out their mission in different ways. Each program will be defined in detail below. Overall, conclusions and recommendations will be drawn as to how programs can be improved and to what extent education can benefit homeowners taking into consideration the theories described above.

## Cases

### Chicanos Por La Causa

Chicanos Por La Causa (CPLC) was founded in 1969 by a group of community and student activists of Mexican background to address problems of the barrios of South Central

Phoenix. CPLC's initial goal was to create job opportunities and combat community deterioration, however, they quickly expanded their services to assist a higher diverse community. CPLC has expanded its services to "provide bilingual and bicultural social services in Arizona, New Mexico, and Nevada impacting more than two hundred thousand people of low-income yearly" (Chicanos Por La Causa, n.d.). The services are divided into education, health and human services, housing, and economic development.

Chicanos Por La Causa has established different approaches to housing assistance. The website is organized through various tabs and one of them is the 'Programs' section which includes all of the work they do for the community. The 'Housing' section of the website is listed under 'Programs' and it provides a brief introduction into the department and what they do. "CPLC's housing programs include a full-service commercial real estate management and development organization that provides facilities management. The agency offers counseling services to clients on mortgage default, pre-purchase, post-purchase, and first time home buyer education, financial literacy, foreclosure prevention and fair housing. In addition, CPLC develops and builds affordable single-family housing units for low-income families in economically distressed neighborhoods" (Chicanos Por La Causa, n.d.). The programs described above are all great resources for people in need. The 'Housing' page of the organization's website provides a brief description of the programs and includes contact information for each program.

The most relevant program to this research that Chicanos Por La Causa provides to the community is The Self Help Housing Program. The Self Help Program touches deeply on the economic and social aspect of sustainability as it allows low-income families to own a home. The Self Help Housing Program was established in 1993 and it is part of the Nogales sector of

the organization. The program targets low-income families who are unable to purchase a home through conventional methods, and allows families to volunteer in a “mutual self-help project” to construct each other’s homes under qualified supervision. Groups of four to nine families are set up to help build each other’s homes with help from contractors. The families rotate jobs such as wall framing, installing trusses, sheetrock, installing doors, windows and flooring, insulation, and painting. The families build about 65 percent of all non-licensed required construction around the sites. The homes are built from the ground up following Energy Star 3 Standards. The Energy Star checklist includes high-performance fenestration, quality-installed insulation, air leak barriers, reduction of thermal bridging, mechanical ventilation design, heating and cooling system design, air flow tests, and electrical measurements (Energy Star, 2015). All of the houses built received an Energy Star certification at the end of the construction process. The savings during construction allows families that would not be able to normally afford a home to own a home.

The Self Help Housing Program has been successful due to its location. Thirty-five percent of people are in poverty in Nogales Arizona (U.S. Census Bureau, n.d.). The project is aimed at the lowest income bracket, which is abundant in Nogales. The program does not do official workshops prior to the construction of the homes, all of the training is done on-site.

Chicanos Por La Causa is a multi-state organization, however, the Self Help Assistance Program is only available in Santa Cruz County, Arizona which the website fails to inform its visitors. Advertisement for the program is limited to the website information and a word of mouth campaign. The organization’s website provides a brief description of the program and a phone number with an address for more information, however, it lacks clarification of where the program is located and what the requirements for people interested in participating are. The

organization largely depends on its members to spread the word about the organization's mission and how it can benefit low-income communities.

### Primavera Foundation

Primavera Foundation is an organization in Southern Arizona that “provides pathways out of poverty through safe, affordable housing, workforce development and neighborhood revitalization” (Primavera, n.d.). Primavera has made a large impact in Southern Arizona through its partnerships with participants, community, and other organizations. Primavera's four main areas of support are survival, stability, security, and sustainability. The Homeownership Department is conducted under the security section of the organization. The organization's website describes the security division as providing “a variety of financial education and asset-building services, including incentive-based savings plans as it partners with individuals and families seeking long term financial empowerment” (Primavera, n.d.).

The Homeownership Department conducts post home purchase education classes which vary in topics about gardening, home repair, investments, energy efficiency, and low water use. The classes are held quarterly in English and Spanish. The advertisement for these classes is not highly funded, therefore, the involvement of current members is very important. The Primavera Foundation website has a lot of information and it can be overwhelming for new visitors looking for specific information. The website is organized with different tabs to keep the visitor engaged and curious about the organization. The ‘Homeownership’ section of the Primavera Foundation is brief but informative with direct action sentences of what they provide to the community and what is expected from the members. The website provides a qualification application that people can preview and fill out prior to attending the classes.

Advertisement for the program and classes is not highly funded, therefore their website and email contact with their members is crucial. Members of the Homeownership Program receive an invitation via e-mail to the education classes that can help them improve their post-home purchase experience. The classes are done in collaboration with Habitat for Humanity, therefore, Habitat for Humanity's new homeowners are also invited to attend the class and learn about different aspects of homeownership. The classes are open to the public; contact information and documentation needed to participate in the classes is provided on the website.

The Home Repairs, Safety and Energy Efficiency class is led by different professionals in the subject. The Utility Efficiency section is led by a Tucson Electric Power employee and consists of topics such as: How to make your home more efficient, Home energizer workshop, and ending with an energy efficient gift bag. Teaching the community how to make their home energy efficient allows homeowners to implement the knowledge gained in their own lifestyle and around their homes. The next section of the class is about Home Repairs and it includes topics such as: Weatherization in the Desert, To-do lists that all Homeowners should have, and Important Repairs. The last section of the class teaches the homeowners the process of hiring someone to do the repairs that can become too large of a task for them to accomplish. The class is simplified to important topics that every homeowner needs to be aware of and able to do themselves in their home. However, the class speakers are also realistic and give people the resources needed to contact a professional for help. The variety of topics is an important aspect of the class and brings diversity to the simple topic of homeownership. The second portion of the class includes subjects about Financial Health and Community Involvement.

### Tucson Urban League

The Tucson Urban League is an empowerment center that helps people in need through different programs and connects them to the right services to increase their economic and social outcomes. Tucson Urban League's mission is to "advance economic and social prosperity for African Americans and other underserved Tucson area residents by creating access to opportunity through advocacy, community partnerships, and programs and services" (Tucson Urban League, Inc., n.d.). Tucson Urban League offers multiple services such as affordable housing assistance, employment and training, utility bill assistance and weatherization assistance. All of the programs listed above fit into and contribute to the sustainable development triangle described earlier (social, economic and environmental).

This research will focus on the Weatherization Assistance Program. The Tucson Urban League website is well-organized that allows visitors to find the programs and mission of the organization easily. The Weatherization Assistance Program is located in the drop-down tab named 'What We Do.' The titles of the tabs allows new visitors to easily identify what the organization is about and how to move through the website which is important for any organization offering assistance to the public.

The Tucson Urban League Weatherization Program provides assistance to "low-income households to reduce their utility bills by making their homes more energy efficient." The website lists the services provided by the program as: air sealing to reduce infiltration; testing, tuning and maintaining heating and cooling systems; duct insulation; replacing smoke detectors; testing hot water heaters, stoves, and refrigerators for energy efficiency, and safety; shading sun exposed windows, primarily for houses using central air-conditioning; installing energy efficient light bulbs; and homeowner energy education (Tucson Urban League, Inc., n.d.). All of the

services listed above are great techniques to reduce energy use in a house. Application forms are available on the website in English and Spanish.

Applicants are required to provide to the Tucson Urban League income verification for each household member as the program is geared to low-income households only. Current bank statement, mortgage statement, electric, gas and water utility bills are also needed for the application process. If the applicant meets the requirements of a specific income level, the service of weatherization is provided for free. Cynthia Dominguez, Administrative Assistant, described the program as “successful” due to its popularity and current waiting list.

Advertisement for the program has multiple approaches. Tucson Urban League’s website is their main form of advertisement and communication with the public. Southwest Gas and Tucson Electric Power include flyers with information about the program in every household’s bill. Representatives of Tucson Urban League attend community events and do outreach in different sections of town while passing out flyers with information about multiple programs. Their last outreach method is word of mouth. Success stories from members of the community can be a very powerful tool for any organization, and having members spread the word about the Weatherization Assistance Program is a great opportunity for the organization and the community.

Funding comes from different sources for this program. City of Tucson, Arizona Community Action, Pima County, Southwest Gas, State of Arizona, and Tucson Electric Power provide funding for the Weatherization Assistance Program.

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## Discussion

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Homeowner education has multiple approaches. Different organizations manage education programs according to their mission and the community's needs. The organizations and programs described above each have a unique approach and all have positive impacts on their communities. A similarity that all of the described programs share is their commitment to help the community through safe housing. Chicanos Por La Causa, Primavera Foundation and Tucson Urban League are committed in helping the Arizona community have an affordable home and in educating the homeowners to maximize their homeownership experience. Each program will be analyzed and compared according to the information provided above.

Chicanos Por La Causa provides many services to the public, and the Self Help Housing Program relates the most to this research. The program is a great opportunity for the homeowner to implement energy efficient techniques because they are building the house from the ground up. The houses are built to follow Energy Star 3 requirements, therefore, energy efficiency supervision is part of the process. Energy saving techniques that are harder to implement on houses that are already built such as correct orientation or quality of insulation are part of the construction process. Including an energy education section to this program as a prerequisite to the construction of their home would be the optimal addition to the Self Help Housing Program.

A down-side to the Self Help Housing Program is that it is only part of the Nogales office and only helps people in the Santa Cruz County. The incorporation of the program to every office and location where Chicanos Por La Causa is present would be a positive change for the organization since the program is aimed to help very low-income people. The program relies on

word-of-mouth campaign and their website as their advertisement, however, that is a narrow community outreach as people that need the program do not always have access to a computer. An increase in community outreach would positively impact the program.

The Primavera Foundation's Homeownership Department focuses on the education their new homeowners have in order to avoid any major issues with their new home. The post-purchase education classes vary in topics from gardening, home repair, investments, water use, and energy efficiency. The broad spectrum of the topics give the new homeowner a general knowledge of how to own a home successfully. The variety of topics within the home repairs and energy efficiency sections of the class is a good start for people with little knowledge about the subject and sets a strong foundation for the homeowners. The Home Energizer Workshop led by a TEP employee allows a hands-on process for the class attendees. There is another section which is called Weatherization in the Desert. Low-income communities need the tools to become informed on how to lower their energy consumption and how to make their home more energy efficient overall. The Weatherization in the Desert section of the class allows people to take notes on what to improve around their own home in the years to come.

Primavera Foundation's classes are better advertised compared to the word of mouth campaign that The Self Help Housing Program primarily relies on. The post-purchase education classes are advertised through email to existing members of the homeownership program and new homeowners as well as information on their website. Being able to reach different neighborhoods with low-income families is important because many times people are willing to learn but do not have the resources to find such classes on their own. The internet has become the main form of outreach for many organizations such as Primavera Foundation, however, as mentioned earlier, sometimes low-income households do not have access to a computer. Public

libraries have internet access for anyone, although the length of the program might cause people to lose interest. Therefore, the post home purchase classes should include a third form of advertisement that does not include the internet.

The Tucson Urban League is the final case study that focuses specifically on home retrofit rather than homeowner education workshops like Primavera Foundation. The Weatherization Assistance Program provides assistance to low-income families to make their homes safer and more energy efficient. The program focuses on air sealing to reduce infiltration; testing, tuning and maintaining heating and cooling systems; duct insulation; replacing smoke detectors; testing hot water heaters, stoves, and refrigerators for energy efficiency, and safety; shading sun exposed windows, primarily for houses using central air-conditioning; installing energy efficient light bulbs; and homeowner energy education. The organization sends crews to the homes to identify and analyze the specific needs. The extensive services and work that the Weatherization Assistance Program offers to the community is a great example of what the local government should provide to the community.

According to the coordinator of the Weatherization Assistance Program, there is currently a waiting list for the services, therefore, their advertisement can be considered a success. TEP and Southwest Gas utility bills include flyers advertising the program which is a great form of advertisement because it reaches most homeowners. The website includes extensive information about the program and an application in Spanish and English for people to fill out at home, instead of having to call or wait to go into the office. Tucson Urban League is the only program analyzed which included application forms on the website and in different languages. Many cultures and different types of households can take advantage of the program when it is presented in their language. Their final form of community outreach is by having representatives

attend different events around town and talking to the community about what Tucson Urban League has to offer.

All three case studies have strengths and weaknesses, but considering the best aspects and learning from the faults from each program allows for a better understanding in what the community needs. More programs like the ones stated above need to be readily available for everyone. Community outreach is one of the most important factors for assistance programs to be successful and help the highest amount of people and the ones in most need. Tucson Urban League has the best community outreach from all three cases presented above. Using their website, flyers and community events to reach people is the best way to create connections with the community. Also, having the application process readily available for people online is important because it allows people to sign up quickly instead of having to wait to call for more information. Making the process easy and accessible for people is the best way to get people involved.

The programs offer different benefits for its members, and the focus of this research is to make home retrofit education more available to the community. Therefore, all three case studies relate to the ultimate goal of this research. All three programs are good on their own, however, people would benefit the most by combining Primavera Foundation's education workshops with the Self Help Housing Program. Being educated and informed in what a low energy usage home needs before building it delivers the best outcome for anyone. However, building a home from the ground up is not the most realistic approach to having an energy efficient home. Therefore, taking advantage of programs like the Weatherization Assistance is crucial for low-income homeowners. TEP also offers an extensive weatherization program. Pairing the education courses with local and federal grants or loans would also create successful home retrofits.

The ultimate outcome would be to combine government monetary assistance that is given out for home retrofit along with education classes about the topic. Classes such as the one Primavera Foundation offers is a great example of an education class that teaches the community about energy efficiency and weatherization processes. The strong impact comes from offering low-income households with high utility bills the opportunity to have a grant or a loan along with the education on how to lower their energy consumption with their lifestyle choices and home repairs. However, as mentioned earlier, the grant program offered in Tucson for home repairs is currently not available due to lack of funding. More interest needs to be expressed for the loan and grant programs to pressure the government to return the funding. Therefore, an alternative to offering a grant or a loan and home retrofit classes at the same time is to increase awareness for current programs around Tucson. The Tucson Urban League Weatherization program has the most effective community outreach through their informative website, partnership with TEP and Southwest Gas, and in-person contact with the community at various events. Having multiple methods of reaching the community is the best technique for the success of an assistance program.

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## Limitations & Recommendations

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The lack of internet access in low-income households is a major limitation for aid programs targeting that specific community. According to the 2015 survey conducted by Pew Research Center, roughly 15 percent of U.S. adults do not use the internet. The number is alarming, especially when programs that are designed to help people's living condition are only

advertised online. The survey distinguishes people through several filters such as ethnicity, age, income level, and education level. People earning less than \$30K a year have the highest percentage of people without internet access at 25%. Hispanic and blacks also have the highest rate at 18 and 20 percent, respectively. A third of the people surveyed said that they “did not go online because they had no interest in doing so or did not think the internet was relevant to their lives” (Anderson, 2015). People’s lack of computer skills, time and money affect the homeowner education outcome. The highest number of people without internet access are low income households, and programs designed to make low-income household’s lives better are usually advertised online.

Low income households are part of every community and Tucson is not the exception. According to the 2014 United States Census Bureau website, the country’s average ‘persons in poverty percent’ is 14.8, Tucson almost doubles the country’s average at 25.1 percent. (U.S. Census Bureau, n.d.). The poverty line for a household of four is \$23,850 (Federal Poverty Level Guidelines, n.d.). A recommendation for programs that target low-income households is to focus the majority of their advertisement in areas with high poverty rates. Therefore, since funding for advertisement is limited for all programs mentioned earlier, targeting specific areas would make the best use of the program’s money.

Poverty levels, owner occupied housing units, and renter occupied housing units are the major themes explored on the Tucson map and specific problematic areas were highlighted. Figure 1 (below) shows the highlighted areas in relation to its surrounding neighborhoods according to poverty rates. Two focus areas are noted with high poverty percentage rates and different homeownership characteristics. The first area is located between South 4<sup>th</sup> Ave and the railroad (East and West boundaries), and East 26<sup>th</sup> St and East 33<sup>rd</sup> St (North and South

boundaries). There are 266 households with more than 75% of the population being Hispanic. The majority of the households are family-based homes. The median household income is \$38,462 and 63.2% of the residents are below poverty level (Tucson, Arizona Neighborhood Map - Income, House Prices, Occupations, Boundaries, n.d.). The rate of owner occupied housing units for the same focus area is 32.9%. Therefore, 32.9% of the households in the highlighted area are owned by the current resident of the home. Most of the homes are renter occupied housing units at 67.1 percent (Tucson, Arizona Neighborhood Map - Income, House Prices, Occupations, Boundaries, n.d.). Making major changes to a rented home is not a realistic approach to the issue, however, learning about energy efficiency techniques is valuable knowledge for possible future home purchases. Also, if the Self Help Housing Program were to expand, advertising and raising awareness in focus areas with high renter rates and high poverty rates would yield the best outcome.

The second focus area that is recommended for higher advertisement is located West of South Park Ave and between East 36<sup>th</sup> St. and East Irvington. There are 103 households with the majority of them being family-based homes. The median household income is \$35,260 and the percentage of residents living below the poverty level is 42.3 percent. The vast majority of residents are Hispanic. The renter vs. owner occupied households are opposite of the previous focus area. Renter occupied housing units make up 33.9 percent of the households and the rest (66.1%) are owner occupied. Programs such as the Weatherization Program or the Homeowner Education classes need to focus their advertisement for areas such as the ones described above. Therefore, each type of program need to find specific focus areas that meet the needs and requirements of their projected audience.

The focus areas described above are a couple of the many below poverty level areas located in Tucson. However, it is important to note that homeownership education and home repair programs need to focus their attention and advertisement in areas like the ones described above. An important advertisement strategy is placing flyers in TEP and Southwest Gas bills. Funding extensive advertisement is not usually permissible for organizations such as Chicanos Por La Causa, Primavera Foundation or Tucson Urban League, therefore, they can pay for flyers to be sent to specific neighborhoods within the focused areas.

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## Conclusion

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As the city of Tucson strives to move towards a more sustainable city, the consumption of energy by every household needs to become a priority. Home retrofits such as switching to compact fluorescent lights, increasing insulation, checking for air leaks, and programming the thermostat correctly to reduce the amount of energy used in homes. Some techniques can be carried out by the homeowner, without professional assistance, however, people are not well educated on the subject to always do so. Being able to make profitable alterations to a home is a great skill any homeowner can and should have. Homeownership education programs need to be a larger contributing aspect of the community for Tucson to keep moving forward.

This research found three programs that show the different types of low-income assistance programs available to the community. Chicanos Por La Causa manages the Self Help Housing Program which allows people to build their own home and help others build their homes as well. The organization provides professional assistance and guidance throughout the

process. The Self Help Housing Program is a great opportunity for people to construct their homes with as many energy-saving techniques as possible, however, the energy conservation education is not provided prior to the process. The program would be greatly benefited by the addition of an energy conservation class that is required for everyone in the program. The concept of the class is great, to help people in the lowest income brackets build and own a home, however, it is only offered in Nogales Arizona. The Self Help Housing Program needs to expand to other cities and increase their advertisement as well.

The Primavera Foundation's Homeownership education classes are of great help to the community. The classes focus on finance, energy efficiency, gardening, and home repairs. Low-income households can greatly benefit by attending the classes which are offered in Spanish and English. However, the advertisement for this program is not much and many people who might need the knowledge do not find out about the class. Funding for advertisement is limited, therefore, local government needs to step in and help get the word out there. Funding from local governments should go to programs such as the Homeownership Department that manage education classes.

The Tucson Urban League Weatherization Program provides assistance to low-income households by making their homes more energy efficient through different techniques. The program is well advertised as TEP and South West Gas bills have flyers with information about the program. Tucson Urban League sends representatives to community events to talk to people about their needs and lets them know about various programs the organization has. The partnership with TEP is probably the most important aspect of the Weatherization Program as it is part of TEP's website.

As the primary researcher, there were some limitations throughout the process. There is not a large amount of research about the specific benefits of homeowner education, specifically their education on energy efficiency. Many of the techniques or workshops found were online videos, however, not everyone has access to a computer. Many low-income households do not have internet access or know how to use a computer. Therefore, going to places with public computers such as a library becomes less realistic. Not knowing how to use a computer or not having internet access seem like extreme limitations for people in the 21<sup>st</sup> century, however that is a realistic approach when analyzing low-income households in Tucson. As an educated student, with computer and internet access, it was difficult to find the programs described above. Therefore, it can be much more difficult for people with little to no computer skills.

Advertisement for such programs cannot take place only through a word-of-mouth campaigns or their website. Flyers, in-person contact, radio or local television announcements need to be part of their advertisement strategies and the local government needs to help fund such resources.

All of the programs described above are part of the community education system in Arizona. Each program is tailored to help the community in different ways either through homeownership education, at home energy efficiency assistance, or building a home from scratch. Allowing the homeowner to be an active part of the process through education and hands-on work are the most important factors of the home retrofit process.

Figures

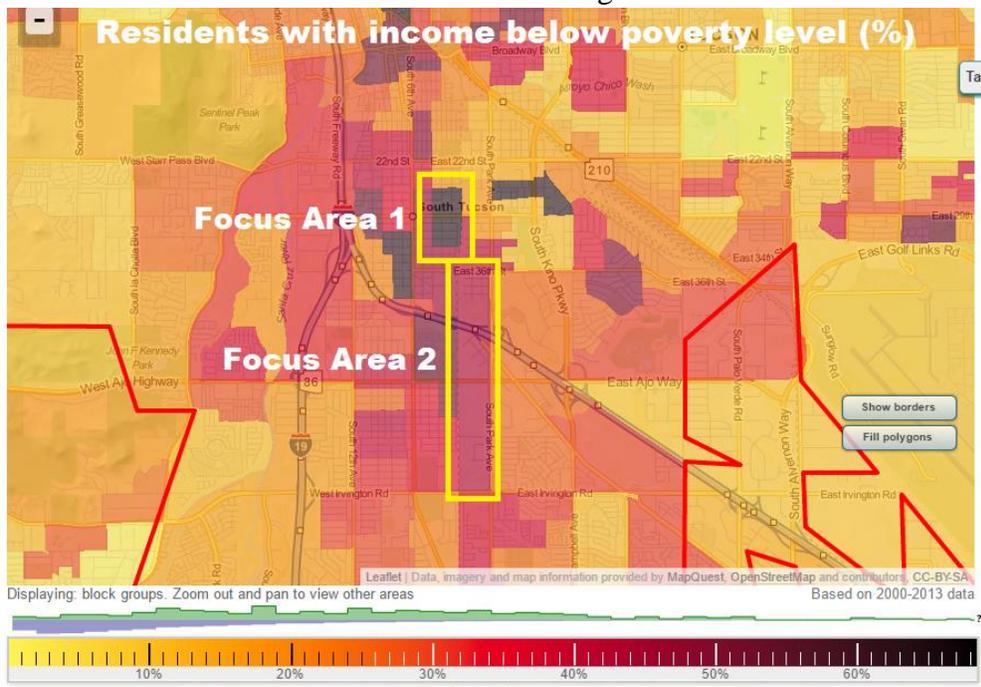


Figure 1. Residents with income below poverty level (%)  
 Tucson map shows areas with high (dark purple) poverty rates. Focus area 1 has a rate of 63.2% of residents with income below the poverty level. Focus area 2 has a rate of 42.3% of residents with income below the poverty level.

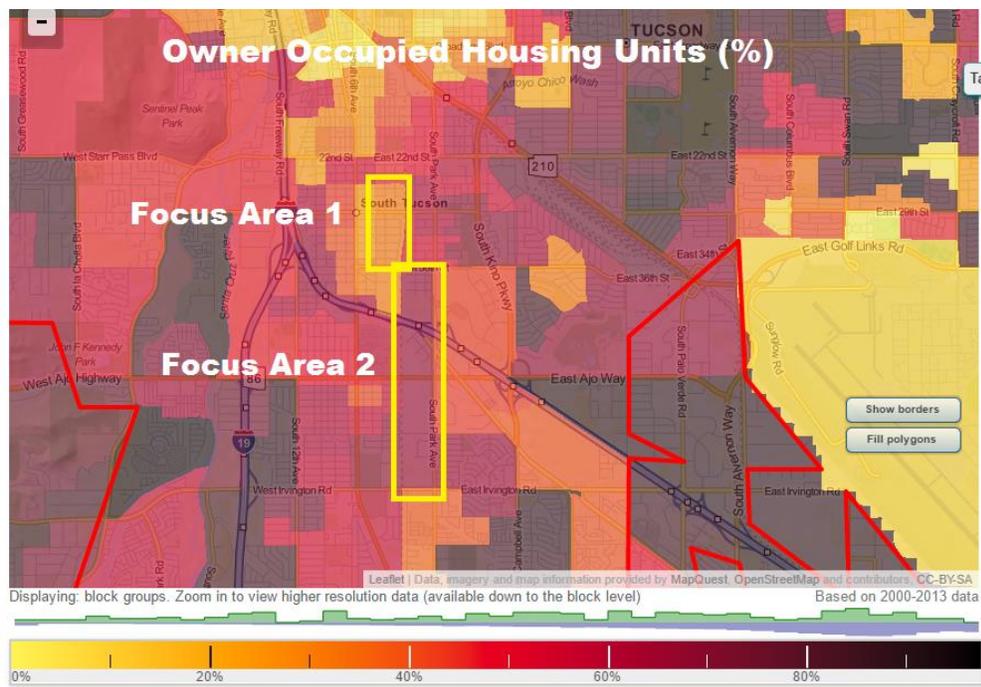


Figure 2. Owner occupied housing units (%)  
 Figure shows areas with high (dark purple) owner occupied housing units in Tucson. 32.9 percent of residents in focus area 1 own the home they live in. 66.1 percent of residents in focus area 2 own the home they live in.

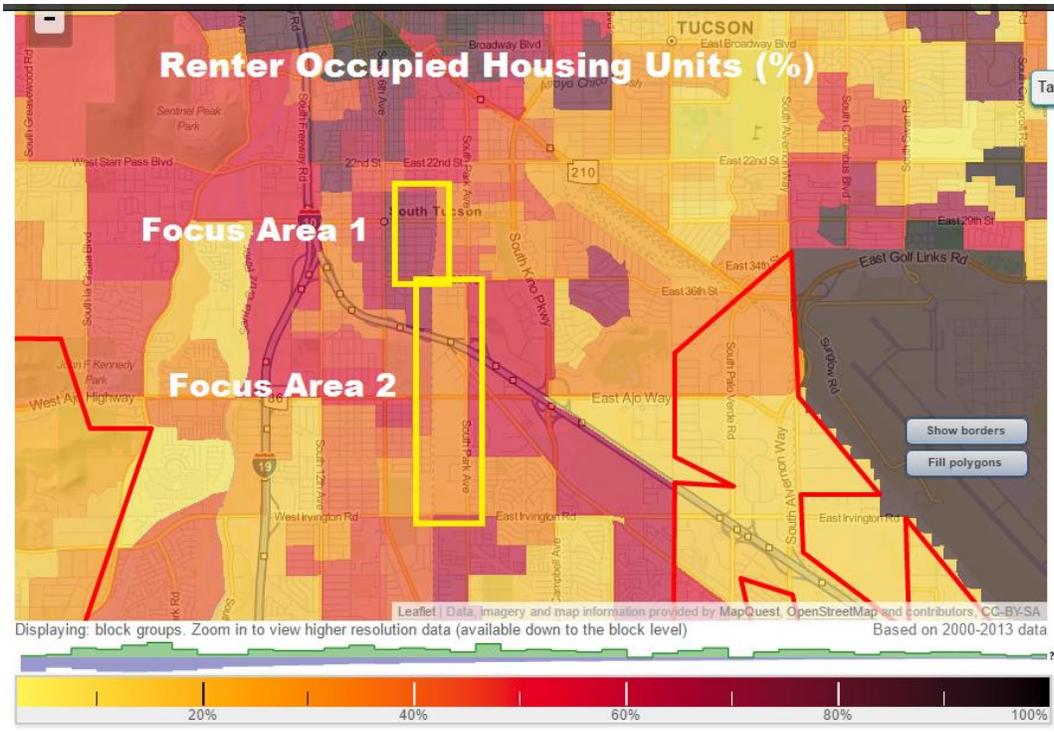


Figure 3. Renter occupied housing units (%)

The map shows the rate of residents that rent the home/apartment they live in. In focus area 1, 67.1% of its residents rent the place they live in. In focus area 2, 33.9% of its residents rent the place they live in.

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