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# Local Response to Climate Change: A Case Study Approach

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**Abstract**

The scientific consensus on the causes and consequences of climate change is clear and experts continue to strongly recommend immediate mitigation and adaptation responses (IPCC, 2014). Responses to climate change are occurring at the international, national, and subnational level, but adaptation to climate change is also highly local. Local communities across the world are organizing groups and institutions to determine their best responses for local mitigation and adaptation actions. This study analyzed the formal local community organization, the Kalamazoo Climate Change Coalition (KCCC), and its structured activities in order to evaluate how Kalamazoo has responded to climate change. Methodology for this study included a literature review for context, historical documentation of the KCCC to provide a timeline of events and operations, interviews with leadership, and an electronic survey to general of members from the KCCC. One of the most important findings from the analysis was that engaging climate champions and local government officials leveraged progressive climate policy. Involving and educating stakeholders from multiple sectors was another important finding that came from the research. The information gleaned about the organization and primarily from the interviews also served as the basis for several recommendations to provide future direction and enhance citizens, governments and scholars understanding of the capacity of local communities to respond to climate change.

## Introduction

President Barack Obama said it well at the last UN Climate Summit of 2014, "The alarm bells keep ringing, our citizens keep marching. We cannot pretend we don't hear them. We must answer their call." Climate change is a global trend that threatens everyday life with unpredictable weather patterns, rising sea levels, loss of biodiversity, human health impacts and overall ecosystem degradation. Scientists have provided extensive research on the importance of preventative measures but there are still citizens and politicians that proudly proclaim themselves as "climate deniers."

Advances in climate science are providing clearer understandings of the inherent variability and vulnerability of the Earth in the face of anthropogenic climate change. The implication of climate change on the Earth depends on the human response through technology, policy, economic structure and lifestyle change (Moss, Edmunds, Hibbard & Maning 2010). There are currently no best practices on how to respond to climate change, but the science is clear and people are responding to climate change in many different ways. Studying what communities are doing to respond to climate change is significant because it can give other communities ideas for action. The lack of best practice analysis does not give communities a pass for inaction but creates an opportunity to create meaningful action. The last United Nations Intergovernmental Panel on Climate Change report (UN IPCC) scientists warned that the Earth is locked on an "irreversible" course of climatic disruption from the buildup of greenhouse gases

(GHGs) in the atmosphere, and the impacts will only worsen unless nations agree to dramatic cuts in pollution.

The international community is working to create global climate policy, but lacks enforcement tools. National governments may find importance in mitigation and adaptation to climate change but do not know each and every community and its resources across the varying time zones. Individual states may understand the importance of responding to climate change but lack the proper resources. This leaves responding to climate change up to local communities and cooperative federalism.

The goal of this study was to evaluate the local response to climate change using the grassroots organization the Kalamazoo Climate Change Coalition (KCCC) as a case study. To understand the overall context, this thesis first examined the responses at these various scales of governmental action through the lens of current literature. After describing the survey methods, I provided a historical background and description of the KCCC. I then evaluated the interviews and surveys of KCCC members and leaders. The thesis closes with discussion of results of the research along with recommendations to the future.

## Scales of Climate Change Response

### *International*

International cooperation on climate change is essential because both the causes and effects are shared amongst all nations across the world and is considered

to be the "ultimate global issue" (Rowlands, 1995, Bonds, 2010). However, nations pollute at varying levels, causing unequal sources with the developed countries by far the largest contributors to the problem. While many studies have concluded that climate change is disproportionately affecting the rural poor in the developing world (IPCC, 2007). Thus, mitigation of global climate change requires all countries to be engaged in the conversation through comprehensive emission reducing approaches.

During the 1960s and 1970s many environmental events caused disastrous results worldwide, which spurred organizations and governments to come together for the United Nations Conference on Environment and Development (UNCED), which included climate change. In 1992, the UNCED established the United Nations Framework Convention on Climate Change (UNFCCC), which has 196 parties that have been meeting annually since 1995. The UNFCCC understood the importance of common but differentiated responsibilities to deal with the problem of collective action globally. The purpose of conferences of the parties (COP) was to understand what the current knowledge was on climate change and the impacts and effects it would have on human society.

Following the momentum of the First World Climate Conference, the 1988 Toronto Conference established the Intergovernmental Panel on Climate Change (IPCC). The IPCC provides the international community with scientific assessments based on the current science of climate change, which emphasizes the "triple bottom line" of environmental, social and economic data. The IPCC receives data from

scientists around the world that contribute to the data pool on a voluntary basis, the IPCC does not complete research or monitor climate related data.

In 1997 the United Nations Framework Convention on Climate Change (UNFCC, the Kyoto Protocol recognized that the currently developed countries are responsible for the high levels of emissions, therefore it places more stringent restrictions on developed countries. For example, the developing world has 80% of the world's population, but only consumes 30% of the world's energy resources (Subbarao & Llyod, 2011). Combatting climate change by curbing emissions has public and private benefits, particularly in developing countries. Thus, the developed countries are expected to do two things under Kyoto: reduce emissions and finance carbon reduction projects in developing countries. However, many developed countries are either not part of Kyoto or not fully implementing their commitments under Kyoto. Most scholars explain this through the collective action or commons problem where general benefits may not cause a country to act on climate change and can cause "free riders" that neglect home-state action (Finus & Rubblke, 2013). For example, the United States never signed and other governments were very reluctant to sign onto the international Kyoto Protocol and the Copenhagen Agreement of 2008 because of the restrictive emission policies they would have to implement. Additionally, scholars point to the lack of trust necessary to engage in comprehensive agreements (Olson, 1965).

Developing countries have no obligation to reduce emissions under the Protocol. The Kyoto Protocol language promoted developed countries to finance the

implementation of projects under "The Clean Development Mechanism (CDM)" to achieve sustainable development in developing countries. However, studies on local developing communities show that equity and sustainable development were unlikely when using the CDM to mitigate climate change. Many problems arose because multiple objectives often led to the trade-off between greenhouse gas (GHG) reduction and sustainable development, which increased fragmentation (Olsen, 2007;He, Huang & Tarp, 2014). A study that looked at five hundred case studies on local and rural CDM projects demonstrated the failure of the sustainable development goal (Subbarao & Llyod, 2011;He, Huang & Tarp, 2014). CDM in its current state and design has typically failed to deliver the promised benefits. Successful projects were found to have had good community involvement and these projects were typically managed by cooperative ventures rather than corporation (Subbarao & Llyod, 2011).

In the international realm, fragmentation is highly problematic for government solutions to climate change. There are two main issues with the fragmentation with international law solutions: first, is the potential for contradiction in interpretations and the second is that the role of the state is diminished. Fragmentation can cause overlapping of institutions which can lead to powerful states maintaining their power and causing conflict. Fragmentation in the context of climate change policy may increase efficiency but can also cause serious concerns of fairness and equality for less powerful states in the international realm. The argument for fragmentation of climate change governance is that the limits on

carbon emissions set by the UNFCC have not reduced global emissions nearly enough and diversifying will help to add more instruments for reaching goals set (Palmujoki, 2013).

International climate action could be more effective if it was enforced and regulated. International policies are "soft law" meaning countries are not required to follow through or sign international agreements. Top down approaches often do not result in a significant correlation between climate action and actual significant emission reduction. The global commons often has many "free-riders" that pollute and emit with no regard to neighboring countries. Many initiatives have come from the international community but ultimately fail to respond to climate change.

***National: Examples of China and the U.S.***

Even though climate change is a global problem, many countries have come up with different environmental policies because it suits their national interest. Countries that are enacting climate policies see a stabilized climate in their best interest, therefore reducing abatement costs and avoiding impacts of climate change (Rowlands, 1995). Climate change action at the national level can be very slow, hard to implement and it often leads to litigation. Research from the Center for Climate Strategies (CCS) suggests that U.S. national efforts to decrease emissions have failed. Due to the failure of the national government, the CCS works with states to implement one of 450 climate policies. The CCS has worked with over twenty states and over 1,000 stakeholders to develop State Climate Action Plans. An example of this is Arizona that saved $5.5 billion dollars though using a CCS plan, even though

these plans can save states billions of dollars, these small cost-effective measures struggle to gain support (Martin, 2015).

The Current Obama administration in the United States is taking steps towards adaptation and mitigation to climate change. President Obama stated that the US needs to build a 21st century clean energy infrastructure by modernizing our grid, increasing renewable energy on public lands and reducing carbon pollution to move towards a clean energy economy. The Environmental Protection Agency (EPA) continues to announce energy standards for coal burning power plants; they recently updated standards in 2013 to be more stringent. In June of 2014, the EPA released the Clean Power Plan which was the first-ever carbon pollution set of standards for existing power plants that will protect human health and put our nation on the path toward a 30% reduction in emissions from the power sector by 2030. Also, this plan will have climate and health benefits worth an estimated $55 billion to $93 billion per year and will cut pollution by over 25% by 2030.

When Obama entered office, there was no renewable energy on public lands. Solar generation has increased by ten times and electricity production from wind power has increased three times. Utilizing renewable resources reduces the amount of carbon emissions that come from burning coal and natural gas. Not to mention that the implementation of renewable energy networks can boost the economy by increasing jobs in the United States. Obama has had successes with increasing the strength of the fuel economy, increasing clean energy, decreasing carbon pollution and pushing for states to adopt renewable energy standards. The Federal

government has also expanded spending on energy efficiency upgrades from $2 billion dollars to $4 billion dollars. As of 2013, President Obama also signed a Presidential Memorandum directing that the federal government buy at least 20% of its electricity from renewable sources by the year 2020.

The National Environmental Policy Act (NEPA) set broad policies that required agencies to consider the likely environmental effects of their activities. NEPA requires all federal agencies to prepare an environmental impact statement (EIS) for legislation and other major federal actions significantly affecting the quality of the human environment. Congress created the Council on Environmental Quality (CEQ) to coordinate agencies compliance with NEPA. Climate change is a fundamental environmental problem that is directly tied to the emission of GHGs; therefore NEPA statute will include GHGs in the future. Studies done by the United States Global Change Research Program (USGCR) show that the effects of increasing GHGs are significantly impacting water availability, increasing ocean acidity, causing sea-level rise, decreasing ecosystems, energy production, affecting agriculture, decreasing food security, and impacting human health The EPA said that changes in our climate caused by increased GHG emissions are adversely impacting and endangering our health and welfare.

The Clean Air Act sets regulations for mobile and stationary sources to protect public health and welfare by regulating hazardous criteria pollutants in the United States. The six criteria pollutants are carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide, ozone and lead. The Federal government regulates

the criteria pollutants under the National Ambient Air Quality Standards (NAAQS). In the context of climate change, the Clean Air Act regulates carbon pollution and GHGs, because they pose a serious threat to health and public welfare. Also, the EPA is working with the National Highway Safety Administration to impose standards on new motor vehicles.

As the current greatest GHG emitter and developing country, China is an example of strong national action. In the past, responding to climate change has not been a priority for local governments in China. Climate change is treated as an international issue that needs to be dealt with by the central government. In China, local governments mitigating climate change is not seen as a priority because cutting GHGs can cause an economic decline (Pan, 2003). No local governments in China expressed interest in making climate change a priority before 2007. China is a unitary government; local governments decide to take action when requirements and regulations come from the central government. Since mid-late 2007, there has been a shift in local governments with the creation of the National Leading Group on Climate Change (NLGCC) that was created by the central government. There are twenty-seven agencies; representing almost all agencies of the central government. The NLGCC was created to coordinate efforts across the country and is responsible for organization and coordination of climate change issues to mitigate fragmentation. The NLGCC is developing a voluntary plan that increases renewable energy and decreases total energy consumption by 20%. Many provinces in China have quickly adopted legislation on energy conservation, where failure to meet

standards comes with penalties (Qi, Ma, Zhang & Li, 2008). When addressing climate change, unilateral, moderate approaches work. Unilateral policy reduces "free riders" along with reducing the incentive to consume more based on energy cost decreases (Bosetti & Cian, 2013).

As knowledge on climate change expands, administrations of national governments increasingly allocate resources towards climate change and reducing emissions. Millions of dollars are allocated towards clean energy and climate change adaptation each year. National solutions can be very slow, hard to implement and leads to litigation. Climate change affects States differently, so passing national legislation may not lead to success for all varying states. Also, overall failure to decrease emissions is a major problem of top down national policy.

***U.S States***

Many diverse actions are being taken at the state level in the United States, such as the setting of statewide GHG levels and specific sector targets. The case for state intervention for climate change can be made if states know which resources and industries causing pollution can be easily addressed and gain political constituent support. Regulations and climate legislation can involve engaged stakeholders from around the state. Policy makers are advised to plan for adaptation, implement adaptation, and finally review the results. While planning and strategizing for climate adaptation, states must realize that they may be dealing with imperfect knowledge. Climate modeling is used at all levels of government and can help states determine steps, but still have a degree of uncertainty. States that

react in the short term can result in poor adaptation because climate change is a long-term problem with high levels of uncertainty. Uncertainty may range from turnover with government officials and priorities, technological advances and future climate projections (Ulph, A. & Ulph, D, 2013;Springer, Kosogianis & McCorriston 2013).

In recent years, New York has been leader in climate change adaptation. The New York City Panel on Climate Change (NPCC) has been a dedicated group of scientists as well as legal professionals and risk management experts that were brought together by Mayor Bloomberg in 2008. This group recognizes that climate change will affect everyday life for residents of New York City as environmental conditions shift. The NPCC frames climate change adaptation as an extension of risk management planning because it involves multiple layers of uncertainty. Historically, risk management has been used as a mechanism for planning in the face of uncertainties, especially in fields such as financial planning. More recently, risk management has begun to appear as a way to encourage planning for adaptations to climate change. The NPCC came up with the idea of "Flexible Adaptation Pathways" for climate adaptation that can change and evolve as technology and risk does, it also allows for alterations and flexibility in responses.

The Western Governors' Association (WGA) represents the Governors of 19 Western states and 3 U.S. flag islands. The association is comprised of Governors for bipartisan policy development, information exchange and collective action on issues. The WGA was established in 1984 and provides strong multi-state

leadership. The WGA has a task force that deals specifically with clean and diversified energy and more specifically wind power, known as the Wind Task Force (WTF). Through extensive research, this group found that during 2005 approximately 2,500 megawatts of wind generating capacity was installed in the United States. According to the American Wind Energy Association, current U.S. wind capacity stands at 9,149 megawatts.

***Michigan***

People living in the Great Lakes region are already feeling the effects of a changing climate. Shifts in seasonal temperatures and precipitation patterns could have dramatic impacts on the economy, ecology, and quality of life. The Great Lakes are a major source for agriculture, recreation, and tourism, both long and short term goals are increasingly being set in regards to climate change and the effect that it will have on these various industries. A 2013 survey taken in the Great Lakes Region showed that an overwhelming majority of respondents (90%) indicated that a changing climate had already affected the Great Lakes region, with 39% indicating it had affected the region "a lot" and half suggesting that climate change had affected the region "a little." Only 1.3% suggested that climate change had affected the region "not at all." The acknowledgement and consensus on the affects that climate change is having on our ecosystems allows for preemptive approaches from engaged stakeholders and grassroots organizations (Petersen, Hall, Kahl & Doran, 2013).

Michigan passed its Renewable Portfolio Standard (RPS) in 2008. The RPS requires electric utilities to generate at least 10% of their energy from renewable sources, or to negotiate the equivalent using tradable renewable energy certificates, by 2015. All but three of Michigan's 72 utilities are on track to meet the target. Michigan increased its capacity from 2.4 megawatts of wind power in 2007 to 287 MW in 2011 and this increase is enough to power more than 120,000 homes. Being surrounded by the Great Lakes, Michigan has enough wind energy to power more than 9 million homes. The solar power industry is increasing rapidly and was growing at the rate of 16% annually between the years of 2003 and 2010. The solar market employs over 6,000 workers each year. Solar and wind companies in Michigan employ 10,000 workers each year and is estimated to support 21,000 manufacturing jobs alone in state by the year 2020. All of these initiatives in renewable energy at the state level help to decrease the amount of GHG emissions that are emitted into the atmosphere each year. Transitioning Michigan's economy towards renewable energies can help to boost the amount of clean energy employees and propel our state towards being more climate neutral.

Many local governments in Michigan have adopted PACE (Property Assessed Clean Energy) legislation in their communities, which makes easier to finance green energy projects. Property Assessed Clean Energy (PACE) programs are effective ways to finance energy efficiency, renewable energy, and water conservation upgrades to buildings. PACE can pay for new heating and cooling systems, lighting improvements, solar panels, water pumps, insulation, and more for almost any

property including homes, commercial, industrial, non-profit, and agricultural. PACE creates local, clean energy jobs, helps the environment and saves money for property owners. Currently thirty-one states, plus the District of Colombia have adopted PACE legislation at the local level, including cities in New York and Michigan, among many around the United States. PACE works by passing legislation at the local government level and is completely voluntary. It allows for businesses to choose to apply for financing in either the residential or commercial sectors. PACE financing can cover up to 100% of a project that stays with the property as it is passed on and sold to new owners.

The Michigan Climate Coalition (MCC) has formed topic-specific subgroups that organize climate change activities, research and initiatives by sector. These working groups are led by key contacts from that sector, address different aspects of climate. The working groups are: Agriculture, Coastal and the Great Lakes, Education, Forests, Energy, Transportation, Health, Inland Waters, Wildlife and Terrestrial Ecosystems. The MCC seeks to decrease fragmentation through information, communication and action in order to assist Michigan in responding to climate change. This organization strives to foster communication and networking, fill in the knowledge gaps and translate scientific information to engage more citizens. The Michigan State University Climate Change Leadership Fellows and community leaders founded the MCC. Michigan State University (MSU) built the MCC based on the Wisconsin Initiative on Climate Impacts.

The University of Michigan collaborated with Michigan State University and the National Oceanic and Atmospheric Administration (NOAA) to start the Great Lakes Integrated Science and Assessments Program (GLISA). This organization is comprised of climatologists, social scientists, and outreach specialists. They are interested in understanding the potential impacts of climate change, how climate information can be most useful, and how decisions regarding climate change adaptation are made. GLISA builds capacity to manage risks from climate change and variability in the Great Lakes region.

***Grassroots/Cities***

Sierra Club Representative Eric Antebi recently stated, "The federal government has been a total no-show with global warming, but by having all these cities take the lead, it's really creating a lot of momentum" (DeGrane, 2006). Local response to climate change has been gaining traction since the mid-1990s. The UN conferences gave top-down approaches to local climate actions that attempted to institutionalize local actions. Top-down approaches often fail due to lack of information, local expertise, financial resources and support politically and will often cause unforeseen consequences.

Local governments and organizations know the resources in their communities and better understand what is at stake (Bond, 2010). Creating effective adaptive policies requires that local government officials strategically plan financial allocation due to acknowledgement of policy in the context of climate change. Many successful programs stem from “grassroots” or “homegrown” plans of action from

citizens that know the resources and local politics. Over seven hundred local governments have engaged in climate change policy (Betsill & Rabe, 2009).

In a study done by Yale University, researchers asked participants about types of local harms from climate change and categorized them into six different groups; alarmed, concerned, cautious, disengaged, doubtful and dismissive. Across all six categories, three-quarters of Americans said they would like their communities to build more bike paths and bike lanes, and to increase the availability of public transportation. Sixty percent of participants that identified as dismissive stated they supported these policies to increase more sustainable transportation. Many of the cautious and disengaged participants also stated that they would be in favor of changing legislation to support new homes to be more energy efficient. This study also showed that more than half of the participants supported protecting all of the resources that applied to their community (Leiserowitz, Maibach, Feinberg, Roser-Renouf & Howe, 2012).

Many organizations are working to make their communities more resilient and resistant to climate change by bringing awareness to local government officials and paving the way for further action. Future policies are shaped by education and awareness that is being taught to mobilize community members. Building strong relationships within the local government allows for opportunities to work with officials on creating strong climate policies. Lastly, historical knowledge of the ecological landscape is crucial to future policies surrounding adaptation because the

specific nature of future climate change impacts continues to be uncertain and differ from place to place(Agawal, 2010;Bond, 2010).

Obstacles in optimizing preventative adaptation actions come from many different sources. The first obstacles are states that are unwilling to collaborate with local governments on adapting to climate change. Realizing that the state might not always be willing to partner with local governments in response to climate change allows organizers to utilize resources in the community. Another obstacle on the local level is the lack of a climate champion that has authority and weight in the local government. Climate champions in the government help to push policy forward and influence by education of fellow legislators (Bonds, 2010). Finding a champion in the local government is challenging and can become an obstacle because this person may have to choose climate protection over other problems affecting the community (Betsill & Rabe, 2009). Not having educated stakeholder involvement can lead to a lack of initiative and funding surrounding climate actions in the community. Perceptions surrounding climate change are shifting and becoming more urgent in the political sphere.

The International Association of Governments that made commitments to sustainability founded the International Council for Local Environmental Initiatives (ICLEI) in 1990. ICLEI currently has close to 1,000 members with more than 250 in the United States, which strive to advance climate change solutions through cumulative local action. This organization provides policy and technical assistance to local government members. In 1993, ICLEI enacted a campaign called Cities for

Climate Change Protection (CCP). This campaign then led to the formation of the largest CCP network called the US Mayors Climate Protection Agreement. Researchers in Australia criticize the CCP for being ineffective because it immobilizes the citizen and social mobilization has been found to be a key way to respond to climate change. The methods of the CCP also resulted in little noticeable GHG reductions (Slocum, 2004;Bond, 2010).

Over 800 local governments participate in the CCP and are integrating sustainability and climate change mitigation and adaptation into daily decisions and policy. In 2005, ICLEI launched the Climate Resilient Communities Program with funding from the National Oceanic and Atmospheric Administration (NOAA) to help local governments throughout the United States improve their resiliency to climate change. The CRCP helps local governments develop tools to protect their communities from the impacts and costs associated with climate change. Organizations and networks such as these attempts to integrate climate change into sustainability initiatives at the local level (Betsill & Rabe, 2009).

Research shows that where national governments won't lead, cities will (Betsill & Rabe, 2009). Cities that have taken the lead in responding to climate change are helping to increase both intercity and interstate interactions (Betsill & Rabe, 2009). Many cities have some type of sustainability legislation allowing for community leaders to integrate climate protection into existing legislation at local levels (Betsill & Rabe, 2009). Responding to climate change takes an interdisciplinary approach; no single discipline can solve the issue and create

successful sustainable cities (Leiserowitz, 2012). Educating stakeholders on adaptation is important. Engaging more non-tradition stakeholders and greater community engagement aids in effective climate change action. When stakeholders are educated and care they are more willing to take action (Bond, 2010;Hansen, Hoffman, Moser & Ekstrom 2011).

International and national climate plans, such as the CDM from the Kyoto Protocol failed to involve the local community and ultimately are not successful (Olsen, 2007;He, Huang & Tarp, 2014). Local action is effective when the community is engaged through education to increase the public level of awareness and facilitate action on climate change (Bond, 2010). Involving community members and volunteers from different sectors is extremely important (Miranda & Larcombe, 2012). Networking through multiple sectors is also extremely important and can 'bridge ties' to other organizations to increase social capital (Newman & Dale, 2005). The different sectors need to range from civil organizations, NGOs, private sector, academic and other stakeholders will ensure the level of commitment climate change as an urgent challenge within the community (Laukkonen, Blanco, Lenhart, Kliner & Njenga, 2009).

In order to have effective climate change action, both adaptation and mitigation efforts must be prioritized across a wide range of stakeholders, community members and sectors (Laukkonen, Blanco, Lenhart, Kliner & Njenga, 2009). To truly make effective change a mechanism must be established to effectively coordinate efforts and set priorities within a human development

approach towards climate change (Laukkonen, Blanco, Lenhart, Kliner & Njenga, 2009). Even though climate change is a global issue, it has promising local solutions, which is why I chose to research Kalamazoo's response.

## Methodology

While the literature on the international, national, and local responses to climate change provided the overall context and served as a comparison, this research was designed as a case study that investigated the Kalamazoo Climate Change Coalition (KCCC). Given the increase and importance of the decentralized local response, the assessment of local actions tackling climate change is crucial. The purpose of this study was to evaluate the organization, structure, approaches and actions of the KCCC to gain a better understanding of how Kalamazoo is responding to climate change and to recommend future practices to share with community organizers to strengthen current programs.

Participants were surveyed and interviewed to better understand and evaluate the KCCC. In recruiting participants, the goal was to best represent the wide spectrum of participants in the KCCC, which was comprised of different types of sector participants at two different levels: 1) leaders of working groups and the KCCC (10 interviews) and 2) general members (100 email surveys). The evaluation of the KCCC was comprised from two data sources 1) primary documents from the organization on the creation, evolution, actions, and aspirations of the KCCC, and 2) information solicited from participants by interviews with a small group of leaders and an electronic survey to the general membership. The following two sections describe the two data sources and methods in greater detail.

### *Historical Background*

To better understand the history of the KCCC, I utilized primary sources from and about the organization. The Kalamazoo Nature Center (KNC) website has pages dedicated to the specific programs that it runs. The KCCC has a webpage on KNC's website (naturecenter.org). This webpage gives details about each of the working groups and overview of the KCCC. The KCCC utilized social media and Facebook page with information including the mission statement and goals.

The Energy Efficiency Brochure was a product of the Western Michigan University graphic design department and River Run Printing Press Company. Southwest Michigan Spark magazine is a free monthly publication that is found in over 470 locations that published an article about the KCCC. The KCCC rain barrel project was also featured in *A View from the Curb;* a bi-annual publication by the city of Kalamazoo that contains important information about trash and recycling. The KNC's Conservation Stewardship Department, which the KCCC resides under, publishes a monthly newsletter that was available to all members and staff.

To adequately gather data and understand the historical background, I gathered and read the information from the various publications and online sources. I summarized the trends and looked for parallels with the historical sources and the literature review. Reading and analyzing the historical evolution of the KCCC was a relatively short process because the organization has limited materials available about the history of the group. The limited amount of sources was a good indicator about the lack of visibility that the KCCC has. By looking at the historical sources and having personal experience and knowledge of the organization, I was able to piece

together the historical evolution and narrative of the organization and apply this information to the case study.

***Membership Survey***

The general membership of the KCCC working groups were made up of approximately 100 community members and sustainable business leaders. The working groups meet approximately once on a monthly basis and the KCCC Steering Committee meet quarterly. At quarterly meetings, the working groups shared what they had been working on and were able to collaborate on their various projects. All of the working groups were taking actions to move Kalamazoo towards a greener future with increased sustainability by addressing the effects of climate change

For the membership, initial contact with all of the members was made via email and included the consent form and a link to the survey. Only currently listed general members were contacted to take the survey. : The survey contained eight questions and took approximately 15- 45 minutes depending on how in-depth the participant went with the questions. The data was recorded in digital format through a survey collection site. Additionally, at subsequent KCCC general meetings participants were invited to complete the survey in person

To perform the survey data analysis I rated the participant responses on the Likert type scale with the electronic survey questions, and quantified , mean, median and range of responses. . The open-ended electronic survey questions were used to gather a synopsis of ideas that are recorded. After reviewing the data obtained from the interviews and research contrasts and comparisons were made

by looking for patterns, along with the development of metaphors. The information was put into a more concise and categorized format. I utilized systematic procedures to produce an inductive inquiry, working within the analytic framework from literature review.

***Leadership Interviews***

Interviewing the working group leaders helped gain a better understanding of the structure and background of the working groups. The working groups each had a member that leads the activities of the group. This working group leader may have been actively engaged as part of their profession outside of the coalition, or an engaged community member. The various working group leaders helped to plan and facilitate meetings, send group updates, and stay actively engaged in communication and outreach for the group. I developed a series of twelve questions, to get a deeper understanding into the working group structure. The questions were meant to purposefully avoid structural and communications answers, and to focus on how Kalamazoo was responding to climate change via the KCCC.

The KCCC is structured into seven working groups which each address different sectors of climate-related concern on the local scale: 1) Energy Efficiency Group, 2) Sustainable Food, 3) Green Infrastructure, 4) PACE, 5) Sustainable Green/Blueways, 6) Communities, and 7) Storm Water Action Group. The interviews covered multiple sectors including five nonprofit, two university, one government and two citizens.

For the interviews, the initial contact with the leaders was made via email, in which the leaders were requested to participate in an in-person interview and included the consent form and the questions. Only working group leaders and leaders of the KCCC from the KNC were interviewed. Collection of data took place during the semi-structured face-to-face interviews that were recorded through audiotaping. Interviews took place at KNC, Kalamazoo Valley Community College and The Kalamazoo Waste Water Treatment Plant depending on the participant's availability. The interview process took approximately one hour. None of the participants declined being audio taped, therefore I utilized an Olympus Digital Voice Recorder Model DS-5000. See appendix B for a full list of leadership questions. The initial consent from the potential participant was a response to an email request for participation, which included the consent form. The subject scanned the signed consent form and emailed, faxed, or mailed it back. See appendix D for a table of the leadership.

***Compilation***

After completing the leadership interviews and membership survey data was compiled using analysis techniques such as organizing the audio recordings. Then after reviewing the data obtained from the interviews and research, contrasts and comparisons were made by looking for patterns, along with the development of metaphors. Next, the information was organized into a more concise and categorized format. Lastly, I utilized systematic procedures for inductive inquiry by working within the analytic framework from literature.

**Historical Context of the KCCC**

The Kalamazoo Nature Center (KNC) started as a small conservation effort to save a picnic spot and is now over 1,000 acres of natural space. KNC was rated the top nature center in the United States in 1970. The mission is to help people explore,

reconnect and understand nature. They have a multitude of programs that are focused on conservation of the environment.

Two KNC naturalists, Ashley Wick and Sarah Reding, realized that there was a lack of attention and focus at the KNC on one of the largest issues facing our generation, climate change. At the same time, there were many organizations in the city of Kalamazoo working on adaptation and mitigation projects in Kalamazoo; however there were significant gaps and high fragmentation in the organizations that were working in the community. Creating the KCCC was seen as a way to bridge gaps and engage climate leaders under one umbrella in order to focus existing efforts and energy. KNC received funding from Freshwater Future (FWF) which is dedicated to supporting the needs of community-based groups and actions working to protect and restore the Great Lakes. With the help of FWF climate funding, the KCCC was able to hire organizers, host meetings, locate and engage organizations. The funding has also helped the KCCC to grow its membership around 100 members with specific focus areas

The KCCC thus comprised community citizens, organizations, and institutions committed to addressing climate change on a local scale through the coordination of projects that adapt and mitigate the effects of climate change, by disseminating resources, and empowering community members to take action. The KCCC has had a number of successes throughout the community throughout its short history and utilized strategic incremental actions to accomplish tangible goals through designated working groups within the KCCC.

Education of Kalamazoo residents by dissemination of important climate related materials moved the KCCC forward by spreading knowledge and fostering change. The working groups were comprised of members from Western Michigan University, Kalamazoo College, Consumers Energy, the City of Kalamazoo, and The Army National Guard along with many more prominent organizations in the community. Engaging a wide range of organizations reached further into the community and made the group more visible and successful through collaboration and positive partnerships. The KCCC was founded on the idea that existing groups could come together to take incremental strategic actions in the community to address climate change. Promoting climate successes in the community and gaining support propelled the coalition forward.

### *Energy Efficiency Working Group*

The Energy Efficiency working group consisted of employees and members of, Fort Custer Military Base, Consumers Energy, Kalamazoo Valley Community College and Four Winds Energy. The mission of this group was to increase education and raise awareness about energy efficiency at the homeowner level. The Energy Efficiency group partnered with Western Michigan University graphic design students to produce a brochure about energy efficiency. The brochures are planned to be printed using recycled paper and ink, creating another opportunity for education in distribution on sustainability. The brochure was meant to serve a larger purpose in showing how individual homeowners can help in becoming more

resilient to the effects of climate change. As of this writing, members planned to distribute copies of the brochure to marginalized communities, and neighborhood associations across Kalamazoo.

The group saw energy efficiency as important both at the individual homeowner level and at larger scale businesses. The KCCC addressed businesses and nonprofits through PACE and homeowners through the Energy Efficiency working group. Reducing resource consumption through energy efficiency was not limited by sector or size of the home or business. Members of the Energy Efficiency group also advocated for the passage of Property Assessed Clean Energy (PACE) legislation. See appendix E for the energy efficiency brochure.

***Property Assessed Clean Energy (PACE) Working Group***

This working group brought Property Assessed Clean Energy (PACE) legislation to the County of Kalamazoo. PACE is a voluntary financial inventive for businesses for financing for energy efficiency projects. The group was directly involved in the political process and worked with commissioners.. Leadership brought Andy Levin, the founder of Levin Energy Partners LLC who spoke about the importance of PACE to the Rotary Club in Kalamazoo.

The working group persuaded local businesses to sign letters of support for PACE. The leaders of this group successfully found a business that was willing to not only sign a letter of support, but was willing to put time and resources into a plan for when PACE was passed. The working group members worked with the local

government and passed legislation that was mutually beneficial to many parties in the community. The County Commissioners unanimously voted to pass the legislation, thus creating a PACE district in the county of Kalamazoo.

### *Sustainable Food Working Group*

The Sustainable Food Working group consisted of local activists, writers, concerned citizens, the Kalamazoo Chapter of the Wildones, Trybal Revival Permaculture Team, The Peoples Food Co-Op, the Office for Sustainability and the Aryuveda Institute. They successfully partnered and hosted an ERAC/E workshop on the importance of eliminating racism. At the time of this writing, the group was working toward creating a Food Forest in a marginalized community using permaculture techniques to decrease the need for watering and intensive agricultural. To further understand food forests, they toured two local food forests and in doing so made connection in the permaculture community.

The Sustainable Food group came up against difficulty trying to pinpoint a project because many of the projects they came up with were already present in the community. They did not want to duplicate successful projects in the community and all of the members had very specific reasons for joining the group that did not always align with the whole group.

### *Storm Water Action Group (SWAG) Working Group*

The Storm Water Action Group (SWAG) consisted of many organizations such as Western Michigan University, the Kalamazoo County Drain Commissioner, The Kalamazoo River Watershed Council, The Kalamazoo River Clean-Up Coalition, Students for a Sustainable Earth and the Michigan Department of Environmental Quality. This group successfully acquired a grant through Fresh Water Futures and sold rain barrels at a reduced rate to the Greater Kalamazoo area in the summer of 2014. They sold over 300 rain barrels, which increased education and raised awareness in the community while promoted the sale and during the rain barrel pick up event. At the time of this writing, The SWAG group was currently working on another rain barrel sale this upcoming year.

Kalamazoo College students partnered with SWAG while working on their final projects for a senior capstone course. The students prepared GIS maps about abundance and distribution of both rain barrels and wealth in the community. The maps will help to successfully advertise based on ecological necessity and socioeconomic factors.

***Green Infrastructure Working Group***

The Green Infrastructure (GI) working group consisted of the Kalamazoo Chapter of the Wildones, the Kalamazoo County Drain Commissioner, The Michigan Department of Environmental Quality, United Methodist Church, the Kalamazoo River Watershed Council and the Kalamazoo Nature Center. Many members of the GI group attended a GI conference and left with many great ideas. This group partnered with the Sustainable Food Working Group, to help with the permaculture,

native pollinators and GI installations that were integral to the future Food Forest landscape. This group partnered with the United Methodist Church and installed a native plants rain garden and also with the Kalamazoo Nature Center on their rain garden project. They have focused on increasing signage of natural lawns with native plantings around the city that was similar to the Monarch Weigh Station signage and the Wayne County Grow Zone signs.

Rain gardens take advantage of rainfall and storm water runoff with their design and plant selection. They are designed to withstand extreme moisture and concentrations of nutrients such as nitrogen and phosphorous. After installation, storm water has more time to infiltrate and less opportunity to flood and erode landscapes. At the time of this writing, the Green Infrastructure working group was duplicating the "1,000 Rain Garden Project" to push for installation of rain gardens in areas of ecological concern.

***Sustainable Green/Blueways Working Group***

The Sustainable Green/Blueways working group partnered with the Kalamazoo Nature Center, the Kalamazoo County Landbank, the Michigan Department of Environmental Quality and the Kalamazoo County Drain Commissioner. The goal was to connect the Kalamazoo Valley River Trail (KVRT) along Portage Creek to increase and connect the green spaces. Increasing the trail capacity was also a health initiative to get more Kalamazoo citizens out on the trail and utilizing non-motorized transportation. The group contracted Tower Pinkster

architecture firm to draw up a map of what the project would look like and was moving forward with plans by coordination and organization along the creek.

### *Transit Working Group*

At the time of writing, the Transit Working group was a new venture of the KCCC. The Transit Group is made up of Kalamazoo Metro Transit, the City of Kalamazoo, and The Western Michigan University Office for Sustainability, Friends of Transit and Western Michigan University. They were working on promoting "National Dump the Pump" day through increased education on public and non-motorized transit through social media. For "National Dump the Pump Day" Metro Transit planned to distribute passes to ride public transportation for free. The main goals that the group had set included increasing education and reducing the amount of cars on the road.

**Survey Data Analysis**

In the last section I detailed the historical chronology and background of the KCCC and the working groups. In the following sections I present the results of my primary data sources of the interviews with working group leaders and the membership survey. The leadership interview data summarizes the 10 in-person interviews conducted with the leadership and the survey data summarizes the electronic survey sent to 100 members. After reviewing the data obtained from the interviews and research, contrasts and comparisons were made by looking for patterns, along with the development of metaphors. The information was organized into a more concise and categorized format. Lastly, I utilized systematic procedures for inductive inquiry by working within the analytic framework from literature to draw themes and parallels. Leadership interview and membership survey questions are available in the appendices B and C.

### *Leadership Interview Data*

One of the working group leaders said, "I was once told that the Earth is not ours, but that we are borrowing the Earth from our grandchildren seven generations into the future… I've lived by this ever since." Most of the working group leaders were engaged in local climate action as part of their careers and were individually doing impressive things in the community to mitigate and adapt to climate change both directly and indirectly. The leaders of the working groups understood the urgency and were responding with action. Three common themes emerged from the interviewing process: 1.) Visibility, both the severe lack of externally and an impressive amount internally, 2.) Need for infrastructure and maximizing capacity, and 3.) Role of government involvement.

The first major theme that arose from all of the interviews was visibility. All of the working group leaders felt the KCCC had a severe lack in community visibility. The KCCC was built on the idea of educating the community through raising awareness. Many of the participants interviewed commented that visibility was impressive within the leadership and organization. The KCCC met quarterly for "Steering Committee Meetings" where each working group updated the group as a whole on their projects and put out a call to action or collaboration. The organization utilized social media and email reminders and updates through Google Groups, which allowed members to be aware of events, news and successes that were happening between the different working groups and the community. Working group leaders commented that there needed to be a strong effort to get the KCCC

into the media, although comments were also made about the lack of resources. Participants indicated that using all of limited grant funds on advertising successes and events would not be a wise use of the limited money. Suggestions for increased visibility included utilization of larger news sources such as MLive, monthly newsletters, and using social media in a higher capacity to maximize visibility within the community.

The second main theme was to continue to build the infrastructure of the organization to maximize capacity and efficiency. Many of the working group leaders suggested building the infrastructure by recruiting more volunteers and interested community members .They also suggested trying to involve different organizations and find representation from unrepresented sectors. Interview data suggested a next steps should be to increase staffing of the KCCC, whether this staff person was through the Kalamazoo Nature Center, the city of Kalamazoo, or a state or federal organization. One of the working group leaders stated, “We need a type of climate czar to deal with everything climate change in the city of Kalamazoo.” Along with the addition of a hired staff person, adding more climate interns could continue building a strong network.

The third main theme that arose from the interviews was to maximize government involvement. The KCCC had the presence of multiple County and City Commissioners as well as the Drain Commissioner. The KCCC involvement with the passing of PACE legislation was crucial and involved direct conversations with Kalamazoo government officials.

***Membership Survey Data***

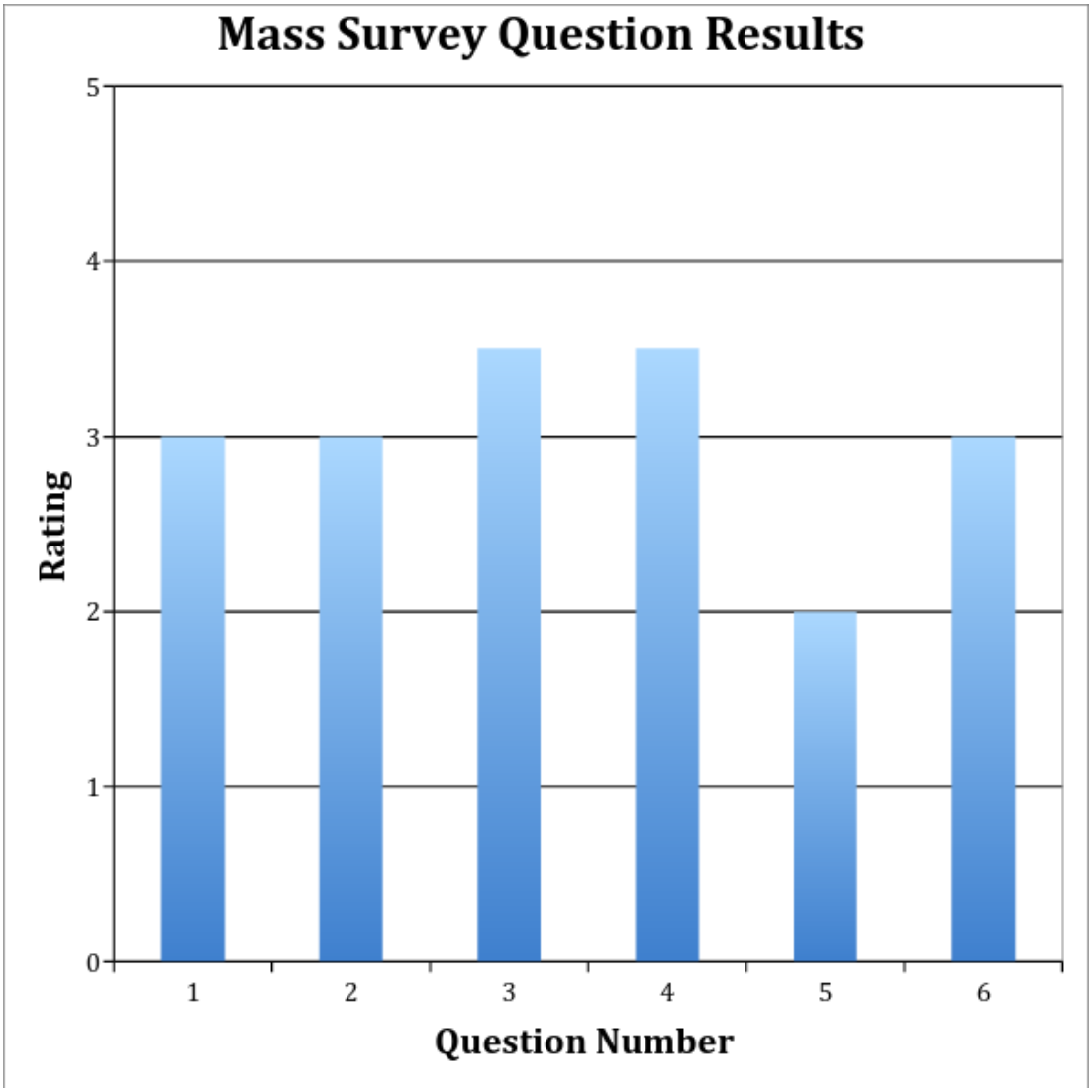
The survey was taken by 40 of the total 100 KCCC members, thus 40% of the membership participated in the survey through both the online platform (SurveyMonkey) and paper copies. The highest group identification was participants that identified with no group and those that identified in the Sustainable Food working group. See appendix C for the membership survey questions.

The survey questions asked the KCCC members about their level of involvement both in the Coalition and in their careers, the effectiveness, retention of new members and visibility. The survey also asked participants to provide cities that they had heard of that have strong climate action taking place. Most of the questions received "average" results. One of the open-ended questions asked participants about the major focus area that the KCCC needs to work on. The survey also asked participant's to list cities that they had heard of that they thought have strong climate action taking place. The top three cities reported were Ann Arbor, Grand Rapids and Portland. The major focus areas that were identified in the survey results were: transportation, marginalized communities, formulating a climate action plan and political engagement.

***Figure One: Mean Results by Survey Question***

I asked participants six questions about involvement, effectiveness retention and visibility(see Figure 1). The participants in the KCCC are either highly satisfied or extremely dissatisfied. This result of average showed leaders areas for

improvement within the KCCC. The lowest rated question was regarding visibility. Visibility was a common theme throughout the. Moving forward, leaders of the KCCC will take into account the survey results and actively try to integrate the suggestions and results. The survey results were analyzed in SPSS and the Chi square test was utilized to ascertain whether there were any differences between the participant responses from the different working group.




**Premise of Question:** 1.) Level of Involvement 2.) Career Involvement 3.) Effectiveness 4.) Retention of New Members 5.) Visibility [Community]

**Likert Scale 1=Low, 3= Average, 5=High.**

**Recommendations**

After analyzing the common themes that emerged, recommendations can be extrapolated for the future of the KCCC:

- Dedicate a budget to advertising in large media outlets
- Condition all support of working group events on including a statement that recognizes the KCCC
- Seek and maintain high visibility partners
- Seek immediate grant or other funding to hire a full-time climate czar
- Actively recruit city and other local elected officials to serve on the working groups
- Actively work towards writing and institutionalizing a overarching climate action plan for the city of Kalamazoo
- Work to form networks across the state and within the local community to decrease the issue of fragmentation

The first recommendation is to increase visibility in the local community through promoting successes and advertising. Through increased visibility, connections in the local government and outreach into more sectors will be potentially come easier. By reaching out to large corporations and institutions such as hospitals, promotional efforts would potentially be increased exponentially. Conditioning working groups to promote the mission of the KCCC during events will increase visibility and promote the organization in the community. Actively working

to promote the KCCC in marginalized communities is an important recommendation to be more inclusive and diversified.

Local, grassroots organizations can create lasting change from engaging citizens to think differently about the community they live in. By growing resources and reaching further into different sectors the KCCC will continue to grow and gain momentum through successes, large and small. Increasing the infrastructure can happen by hiring a staff person that is dedicated to the climate action, whether it is through the Kalamazoo Nature Center or through another engaged organization. Increasing the infrastructure may mean hiring more interns to propel projects forward and growing the volunteer base strategically in order to gain leverage in the community. Increasing the infrastructure capacity would allow for increased opportunities for grant writing. Hiring staff that is knowledgeable about climate change could work directly with government officials to write a Climate Action Plan for the city of Kalamazoo. For the KCCC to have access to more resources would help to propel the Coalition forward. More resources would help to increase marketing and advertising.

Advertising and publicity is very important when trying to increase visibility in the community. All of the working group leaders and many of the responses through the mass survey commented on the lack of visibility within the community. There is a common thought that more needs to be done to engage the media such as contacting Mlive and publishing articles in various news sources. Engaging the media will not only help to increase visibility but will also help to raise awareness

and increase education. Educating the citizens of Kalamazoo is one of the main goals and reasons for trying to raise awareness on climate change.

At the time of this research, the city of Kalamazoo is currently working through severe financial troubles and is struggling to balance the budget. Potential climate champions in the local government may be preoccupied with securing the budget and dealing with short-term issues before responding to climate change. The County Commission proved it has environmentally aware commissioners that take into consideration "homegrown" advocacy groups when it passed PACE legislation. The KCCC was able to find a climate champion in the commission and pass PACE unanimously.

Members and leaders of the KCCC help to guide the direction of action. Based on member surveys, the direction of the KCCC will be placing emphasis on transportation, inclusivity of minorities and marginalized communities, creating a climate action plan, increasing walkability, storm water, political action, visibility and energy efficiency. Many of these future action items relate back to specific working groups such as the transportation working group, SWAG and the energy efficiency working group. A large number of participants that took the survey do not identify with a specific working group; working to place these members into groups of interest should be a high priority of KCCC leadership. The KCCC is working in the community and helping to increase education and awareness of climate change but has yet to become highly visible. Kalamazoo needs progressive policies to

institutionalize energy efficiency and renewable energy standards. Kalamazoo currently does not have a climate action plan for the city or the county.

## Discussion

Cooperative federalism is an important part of responding to climate change. Local officials in the state of Michigan follow the standards that are set by the

National government. For example, the Green Infrastructure and Storm Water Action working groups are collaborating on applying for a § 319 grant through the Clean Water Act (Clean Water Act, 1972) Local groups utilizing federal funding is a prime example of cooperative federalism to accomplish projects help the community become more climate resilient. The working group is applying for financial resources to improve the whole watershed. The Kalamazoo River watershed spans across many counties, the grant is engaging multiple local organizations and government officials. Collaboration between organizations in different counties helps to spread awareness on climate issues and place importance on proactive measures.

The current literature on responding to climate change warns that top down approaches from international and national levels of government fail to realize that climate change affects locations differently. As a local grassroots organization, the KCCC leveraged community specific problems to empower individuals and insight action. For example, Kalamazoo was still affected by a large oil spill from 2010. Educating individuals that lived through the oil spill to care about the importance of removing fossil fuels from the river can strategically lead to a conversation about the negative affects of fossil fuels in the context of climate change. Historical knowledge of the ecological landscape is crucial to future policies surrounding adaptation because the specific nature of future climate change impacts continues to be uncertain and differ from place to place. (Agawal, 2010;Bond, 2010)

Since the survey, the KCCC is adding a transit working group that is dealing with transit related issues in Kalamazoo. The study done by Yale University cited in literature review states that increasing sustainable transit in the community is appealing to those that remain dismissive of climate change action. The current literature also relays the importance of working with local government officials to pass progressive climate policy and find climate champions to push through climate policies. The KCCC is working with local government officials with passing PACE.

The constant issue of fragmentation on climate change issues significantly affects successful climate action with all scales of government. The KCCC is striving to decrease fragmentation by bringing key players and concerned citizens together. An example of how fragmentation is still a large issue is with the Sustainable Food Working Group. This group is trying to stay engaged in food issues facing the community but often stumble upon similar but slightly varying groups that are also working on similar projects. The KCCC allows for both citizens and sustainable business leaders to collaborate on existing projects and create further climate successes in the community.

Highly fragmented actions across organizations in a local community can also lead to the tragedy of the commons being continually perpetuated. When multiple organizations in the community are working on climate related issues, organizers may assume that another community organization or different level of government actor will take action and neglect the issue. Kalamazoo currently has no overarching climate action plan that enforces GHG emission reduction from polluters at the time

of this study. With no overarching plan polluters become “free-riders” and easily disregard the local commons. Large polluting “free-riders” benefit economically and community residents suffer.

Successful projects of the clean development mechanism (CDM) under the Kyoto Protocol are found to have had good community involvement and were typically managed by cooperative ventures rather than corporations. (Subbarao & Llyod, 2011) The KCCC prides itself of collaboration with organizations to utilize diverse expertise of community members and sustainable business leaders. Partnering with multiple diverse sectors including private corporations is an important strategy to engage a multitude of stakeholders. Based on the evaluation of data and the current research on local climate responses across the United States and internationally, it is apparent although Kalamazoo has progressive actors and it could be focusing more energy and attention to the issue of climate change. Climate change reaches into every sector and is affecting the majority of Kalamazoo residents.

## Conclusion

The fact that Kalamazoo has many local organizations that are taking on climate change is an impressive quality of the city (Blanford, Kriegler & Tavoni, 2014). Although, the limitations of this study were primarily centered with the fragmentation of groups and policies at different governmental levels. Many actors are working to make their communities more resilient and resistant to climate change but lack the necessary tools and funding to increase wide scale visibility. The response to climate change at any level comes with a multitude of challenges and an unclear pathway for success. As a student researcher, time was a major limitation that prevented researching specific cities both around and outside of Michigan. Many Michigan cities have impressive climate action plans or projects taking place that would be interesting to research extensively to come full circle with the research and fully understand what the city of Kalamazoo could be doing to be more competitive with extremely progressive cities that are under the same state policy restrictions.

Another major limitation to this study is that I was only able to evaluate actions taken by the KCCC, not the effectiveness of the actions in the context of measurable GHG reduction or community resilience. This study did not evaluate if the county of Kalamazoo is more resilient to climate change because of the work the KCCC was doing in the community. Future researchers should work in tandem with the next carbon audit to analyze base line data from the first carbon audit to evaluate measurable changes in GHG emissions for the city of Kalamazoo. Another

limitation is the lack of research on how Kalamazoo compares to cities across the state of Michigan before and after the creation of the KCCC. Evaluating this statewide data would allow researchers to understand the actual effectiveness of the Kalamazoo compared to other cities.

The goal of this research was to analyze Kalamazoo's response to climate change. Kalamazoo could be doing more to address climate change. Even though there were many organizations tackling "low-hanging fruit" projects, at the time of this research Kalamazoo still did not have an overarching climate action plan. Also, at the time of this research, the city of Kalamazoo was faced with severe economic trouble which lead to a lack of strong and plentiful "climate champions" in the city and county commission. The city of Kalamazoo completed a municipal carbon audit, which showed support for future climate action. The KCCC aimed to decrease fragmentation, engage in cooperative federalism. I believe that at the time of this research in the context of the literature review, Kalamazoo was responding relatively well to climate change.

Based on the conclusions of this study, I gained a greater understanding of the response to climate change at different levels of government, with an emphasis on local climate action was gleaned, providing resources for the Kalamazoo Climate Change Coalition which will be continuing its work in the community and may offer strategic planning opportunities for members and leaders. There are many positive aspects to the KCCC; ultimately it brings together actors in the community that are all working on climate related action. Bringing together these community actors

helps to pool resources and provides opportunities for collaboration to increase efficiency. Participants collaborate and decrease the problem of duplicating projects meaning they can more efficiently work together to implement stronger ideas and outcomes. The feedback from the survey shows that there are improvements that can be made to better align with the participant's ideal organization. The KCCC is lacking in setting long term goals and keeping current members engaged. Feed back from the research gives organizers opportunities to strengthen the organization and further increase effectiveness of the organization within the community.

After analyzing the current literature on different levels of government and the types of action taking place at each, I have come to a realistic conclusion. Being a community organizer for local climate action, I had a very unrealistic view that local grassroots actions are the solution to climate change. Local climate change has many benefits but to adequately address climate change, the world needs strong cooperative action from all levels of government. International policy needs more "teeth" to enforce massive global GHG reductions at all levels of government. Local action may help the community, but not all communities have strong, progressive leaders and community organizers working to make their communities more climate resilient. The current governmental structures and international relations paired with high rates of consumption leave a bleak outlook for what the future will look like due to the effects of climate change. At any level of government, there needs to be overarching actions and policies to reduce GHGs, along with cultural

shifts away from consumptive attitudes from the individual and the world as a whole.

**Works Cited**

Arawal, Arun. "Local Institutions and Adaption to Climate Change- in Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World." *SOCIAL DIMENSIONS OF CLIMATE CHANGE EQUITY AND VULNERABILITY IN A WARMING WORLD* (n.d.): n. pag. Web.

Asselt, Harro Van. *The Fragmentation of Global Climate Governance: Consequences and Management of Regime Interactions*. N.p.: Edward Elgar, 2014. Print.

Baker, Ingrid, Ann Peterson, Greg Brown, and Clive McAlpine. "Local Government Response to the Impacts of Climate Change: An Evaluation of Local Climate Adaptation Plans." *Landscape and Urban Planning* 107.2 (2012): 127-36. 2010. Web.

Blanford, Geoffry, Elmar Kriegler, and Massimo Tavoni. "Harmonization vs. Fragmentation: Overview of Climate Policy Scenarios in EMF27." *Climactic Change* 123.3-4 (n.d.): 383-96. Web.

Bond, Meghan. "Localizing Climate Change: Stepping up Local Climate Action." *Management of Environmental Quality* 21.2 (n.d.): 214-25. Emerald Group Publishing, Limited, 2010. Web.

"Climate Change; Findings from K. Krellenberg and Co-Authors Broaden Understanding of Climate Change (Supporting Local Adaptation: The Contribution of Socio-environmental Fragmentation to Urban Vulnerability)." (n.d.): 55. Web.

DeGrane, Susan. "Local Governments Fight Climate Change." *The American City and Country* 121.10 (2006): 8-10. Web.

Environment Canada, and U.S. Environmental Protection Agency. *Great Lakes Water Quality Agreement*. Rep. N.p.: n.p., 2012. Print.

Finus, Michael, Christos Kotsogiannis, and Steve Mccorriston. "The International Dimension of Climate Change Policy." *Environmental and Resource Economics* 56.2 (2013): 151-60. Web.

*Informing an Effective Response to Climate Change*. Washington, D.C.: National Academies, 2010. Print.

Laukkonen, Julia, Paola Kim Blanco, Jennifer Lenhart, Marco Keiner, Branko Cavric, and Cecilia Kinuthia-Njenga. "Combining Climate Change Adaptation and Mitigation

Measures at the Local Level." *Habitat International* 33.3 (2009): 287-92. Web.

Leiserowitz, Anthony, Connie Renouf, Peter Howe, Edward Maibach, and Geoff Feinberg. "Global Warming's Six Americas in September 2012." (2012): n. pag. Web.
Lutsey, Nicholas, and Daniel Sperling. "America's Bottom-up Climate Change Mitigation Policy." *Energy Policy* 36.2 (2008): 673-85. Web.

Martin, Phillip. "States of Change: State Level Climate Policy." *Kennedy School Review* 9 (2009): n. pag. Print.

Miranda, Gabriela, and Grahm Larcombe. "OECD Local Economic and Employment Development (LEED) Working Papers." Organisation for Economic Cooperation and Development (OECD), 05 May 2013. Web.

Olsen, Karen Holm. "The Clean Development Mechanism's Contribution to Sustainable Development: A Review of the Literature." *Climatic Change* 84.1 (2007): 59-73. Web.

Palmujoki, E. "Fragmentation and Diversification of Climate Change Governance in International Society." *International Relations* 27.2 (2013): 180-201. Web.

Petersen, Brian, Kimberly Hall, Katherine Kahl, and Patrick Doran. "In Their Own Words: Perceptions of Climate Change Adaptation from the Great Lakes Region's Resource Management Community." (2013): n. pag. Web.

Prutsch, Andrea, Torsten Grothmann, and Sabine McCallum. *Climate Change Adaptation Manual : Lessons Learned from European and Other Industrialized Countries*. N.p.: Routledge, 2014. Print.

Qi, Ye, Li Ma, Huanbo Zhang, and Huimin Li. "Translating a Global Issue Into Local Priority: China's Local Government Response to Climate Change." *The Journal of Environment & Development* 17.4 (2008): 379-400. Web.

Rabe, Barry, and Michele Betsill. *Toward Sustainable Communities: Transition and Transformations in Environmental Policy*. N.p.: n.p., 2009. Print.

Reeves, Andrew, Mark Lemon, and Diana Cook. "Jump-starting Transition? Catalysing Grassroots Action on Climate Change." (n.d.): n. pag. Institute of Science and Sustainable Development, 8 May 2013. Web.

Rowlands, Ian H. "Explaining National Climate Change Policies." *Global Environmental Change* 5.3 (1995): 235-49. Web.

Subbarao, Srikanth, and Bob Lloyd. "Can the Clean Development Mechanism (CDM) Deliver?" *Energy Policy* 39.3 (2011): 1600-611. Web.

Wilson, Elizabeth. "Adapting to Climate Change at the Local Level: The Spatial Planning Response." *Local Environment* 11.6 (2006): 609-25. Web.

# Appendices

## *APPENDIX A. HSIRB Exemption/Approval Letter*

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: January 14, 2015

To: Denise Keele, Principal Investigator
Nora Gimpel, Student Investigator for honor's thesis

From: Amy Naugle, Ph.D., Chair

Re: Approval not needed for HSIRB Project Number 15-01-15

This letter will serve as confirmation that your project titled "Local Communities Response to Climate Change: A Best Practice Analysis" has been reviewed by the Human Subjects Institutional Review Board (HSIRB). Based on that review, the HSIRB has determined that approval is not required for you to conduct this project because you are analyzing community adaptation to meteorological conditions (adaptation to climate change) and not collecting personal identifiable (private) information about an individual.

Thank you for your concerns about protecting the rights and welfare of human subjects.

A copy of your protocol and a copy of this letter will be maintained in the HSIRB files.

1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
CAMPUS SITE: 251 W. Walwood Hall

## *APPENDIX B. Leadership Interview Questions*

1. How long have you been working with the KCCC and which working group are you associated with?
2. What is the goal of the KCCC in your understanding? Is it adequate?

3. What is the structure of the KCCC in your understanding? Is it adequate?

4. Is the KCCC Effective?
a) What is the most important thing that the KCCC is doing or should be doing to maximize our efforts and increase our success?

b) What do you think the KCCC could be doing better?

5. Are the right people or enough people involved?

6.. How visible is the KCCC within its own membership, and the larger community?

7. Are you doing work outside of the coalition to adapt to climate change in the local community either directly or indirectly?
If yes: What work or projects are you working on outside of the KCCC and are they part of your professional career?

8. What cities have you heard of that have strong local actions? What differences do you see between these communities and ours?

9 How do you envision the future of local climate action taking place and what will the future of the KCCC look like?

10. What do you see as roadblocks to further success?

***APPENDIX C. Membership Survey Questions***

1.) Which working group are you affiliated with? (Circle One)

Energy Efficiency

Sustainable Food Systems

Sustainable Green/Blueways

PACE

Green Infrastructure

Transportation

Storm Water Action

No Specific Working Group

More than One Group

2.) Rate your level of involvement with the KCCC. (1=low, 5=high)

1 2 3 4 5

3.) Rate your level of career/professional involvement with other local climate action groups, businesses or municipalities. (1=low involvement, 5=highly involved)

4.) Rate the effectiveness of the KCCC. (1=low, 5=high)

1 2 3 4 5

5.) Rate the adequacy of the KCCC in terms of recruiting members. (1=low recruitment, 5=high)

1 2 3 4 5

6.) Rate the adequacy of the KCCC in terms of retaining members. (1=low retention, 5=high)

1 2 3 4 5

7.) Rate the visibility of the KCCC within the larger community? (1=low visibility, 5=highly visible)

1 2 3 4 5

8.) Rate the efficacy of KCCC in comparison to other local communities (1=low, 5=high)

1 2 3 4 5

9.) What community have you seen or heard of that has very strong local climate action?

_____

10.) What do you think is the most important thing that the KCCC has focused on or accomplished? (In general or for a specific working group)

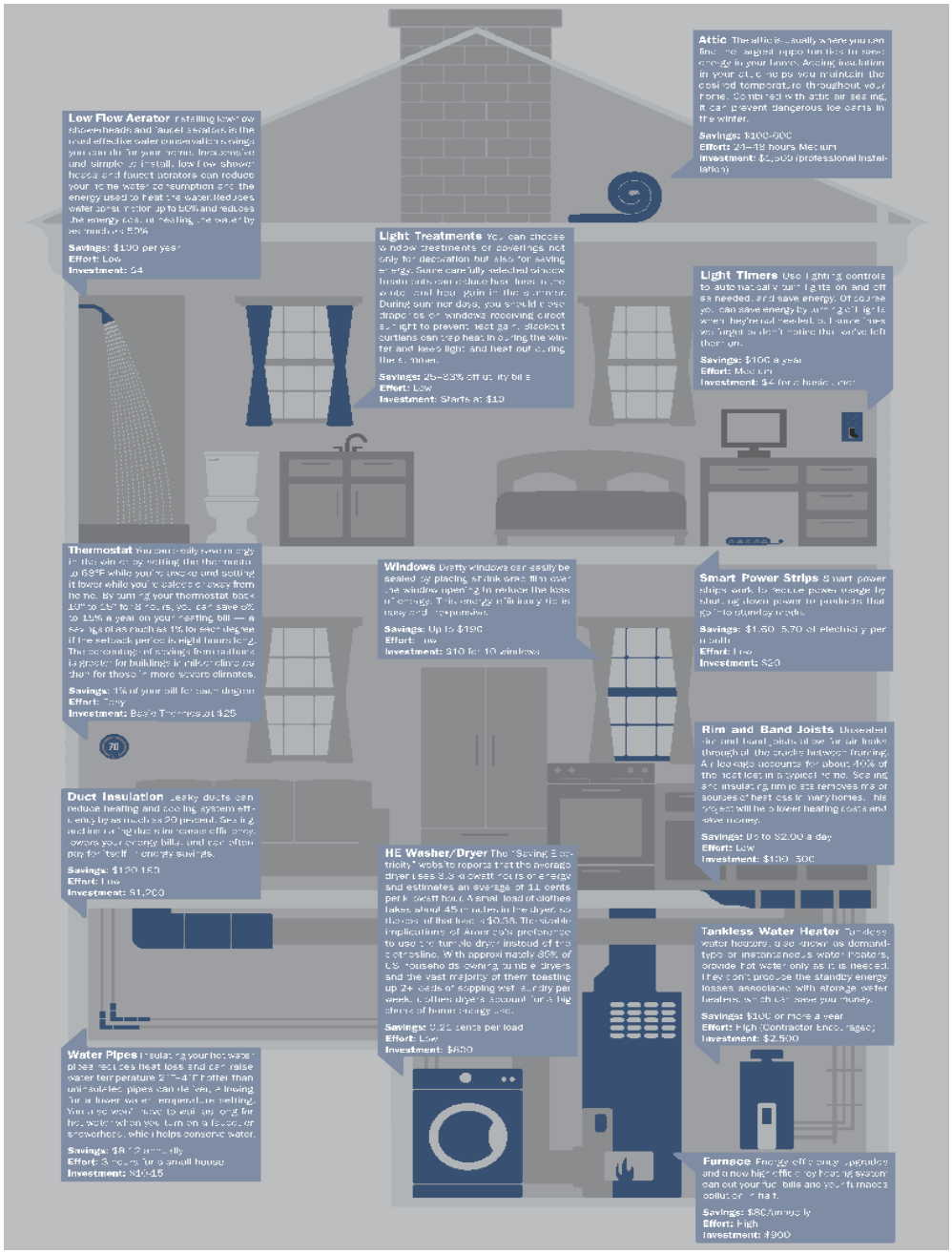
11.) What would you like to see the KCCC focus on to help Kalamazoo be more resilient and resistant to climate change? (In general or for a specific working

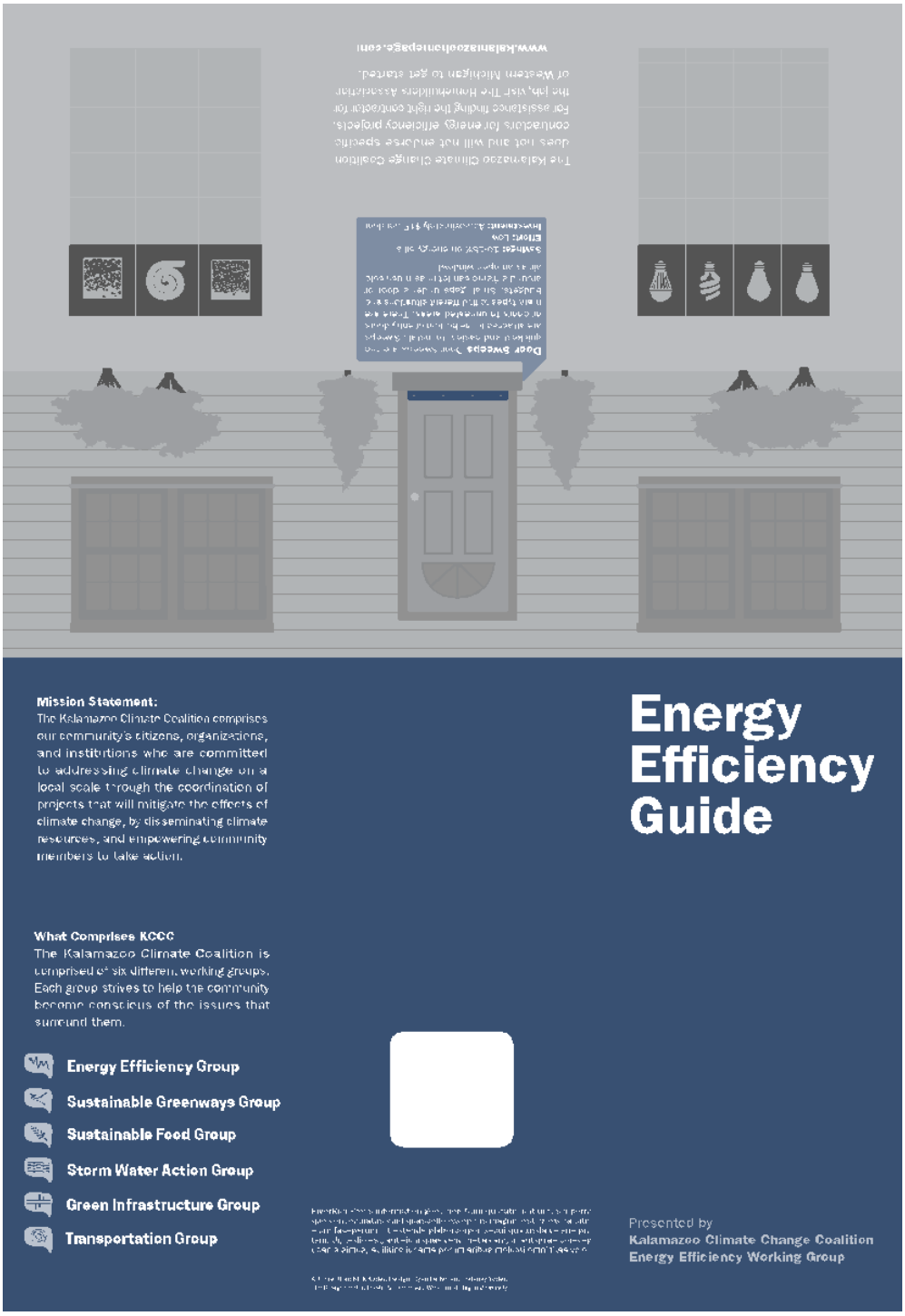
***APPENDIX D. Working Group Leaders Table***

| Name | Working Group | Organization | Position | Contact [Email] |
|---|---|---|---|---|
| Jacquelyn McSchulkis | Sustainable Food | X | Community Member | jvmt@yahoo.com |
| Bill Rose | Sustainable Green/Blueways | Kalamazoo Nature Center | CEO | brose@naturecenter.org |
| Sarah | Sustainable | Kalamazoo Nature | VP | sreding@naturecen |

| | | | | |
|---|---|---|---|---|
| Reding | Green/Blueways | Center | Conservation | ter.org |
| Kelly Clarke | Sustainable Green/Blueways | Kalamazoo County Land bank | Director | brose@naturecenter.org |
| Dan Maley | Energy Efficiency | Kalamazoo Valley Community College | Facilities Management Director | dmaley@kvcc.edu |
| Michele Richards | Energy Efficiency | FortCuster Military Base | Environmental Resource Manager | michele.m.richards2.nfg@mail.mil |
| Ashley Wick | PACE | Kalamazoo Nature Center | Biological Research Director | awick@naturecenter.org |
| Jamie McCarthy | StormWater Action | Kalamazoo River Watershed Council | | krwc@kalamazooriver.org |
| Dave Wendling | Green Infrastructure | X | Community Member | Dave.wendling47@gmail.com |
| Brian Petersen | Communities | Western Michigan University | Professor | Brian.petersen@wmich.edu |

## *Appendix E. Energy Efficiency Guide*






***Appendix F. Spark Magazine***

SPARK 10 JUNE 2014

# Addressing Climate Change Locally

## The Kalamazoo Climate Change Coalition



The Kalamazoo Climate Change Coalition (KCCC) is a group of citizens and organizations that are committed to addressing climate change on a local scale. The coalition is comprised of working groups that coordinate projects that will mitigate the effects of climate change by disseminating climate resources and empowering community members to take action. The KCCC was created in 2013 by founders Ashley Anne Wick and Sarah Reding of the Kalamazoo Nature Center.

Currently, the coalition consists of six working groups. Storm Water Action Group (S.W.A.G) recently secured a grant to sell rain barrels at a reduced cost to Kalamazoo residents. On May 17th, the group held a "Roll Out the Barrels" pick-up event at the WMU community gardens with a rain barrel demonstration. The Sustainable Greenways Working Group is brainstorming ways to connect different entities that are working to green the Portage Creek area with a leader in Kelly Clarke (Kalamazoo Land Bank). The KalamazEE (Energy Efficiency) Working Group is collaborating with local graphic design students to create materials that compile all of the energy efficiency programs currently in our community. The group realized that there were many programs and incentives that many community members did not know about.



The Communities Working Group is working on a community's needs assessment in order to better understand how to work with communities in response to climate change. This group is headed by Dr. Brian Petersen (WMU Environmental Studies faculty members). Our Food Systems group is looking at aspects of farming and food building in the community. Members of this group recently helped organize and attended a food justice workshop at the People's Food Co-Op. Lastly, we have a temporary subgroup that is working on PACE (Property Assessed Clean Energy).

This is a new and innovative way for commercial property owners to pay for energy efficiency upgrades, on-site renewable energy projects, and water conservation measures. PACE financing has many features that can uniquely solves barriers to the adoption of energy efficiency measures. The KCCC is pooling community efforts to get PACE funding in Kalamazoo County. PACE would be a boon for business owners that wish to increase their energy efficiency and reduce costs.

As the coalition grows in strength, Kalamazoo residents can look forward to a brighter, more sustainable, future due to the work done by the KCCC and community.

**Visit naturecenter.org/ConservationStewardship/ClimateChange for more information.**

*Lisa Panich, Kalamazoo Nature Center, lpanich@naturecenter.org (269) 381-1574 ext. 38, www.naturecenter.org*

***Appendix G. A View from the Curb Article***

Spring/Summer 2014

# A VIEW FROM THE CURB

THE CITY OF KALAMAZOO'S GUIDE TO WASTE & RECYCLING

Photo by Ron Porritt, courtesy of Discover Kalamazoo

## Inside This Issue



THE CITY OF Kalamazoo

## Help "Roll Out the Barrels"

Rain barrels, that is! The City of Kalamazoo is sponsoring a *RAIN BARREL SALE* this spring. Do something good for the environment and save money on your water bill this summer by buying and installing a rain barrel.

**Did you know lawn and garden watering can make up nearly 40% of total household water use during the summer?** Using rainwater collected in a rain barrel can save you money on your water bill. Here are some other advantages:

- Rainwater is a naturally soft water and devoid of minerals and other chemicals, which is better for plants and gardens
- Reduces pollution by capturing and reusing water that would otherwise runoff roofs and pick up pollutants such as oils, fertilizers and soil particles that are harmful to our lakes and streams
- Allows you to manage where and when rainwater is released, therefore preventing flooding during heavy rainfall and allowing watering with stored water during dry weather

A limited number of barrels are available at a discounted price of $45 each in four color choices. They are 55-gallon reused, food-grade, plastic barrels that come with all the necessary parts. Visit www.kalamazoocity.org or www.upcycle-products.com to order yours today! A mail-in order form is available online. All barrels must be pre-ordered and paid for in advance of pickup. Hurry, sale ends May 10!

**All orders can be picked up on Saturday, May 17 from 10 a.m. to 2 p.m. at WMU's Stadium Drive Community Gardens** *(located on the NE corner of Howard and Stadium Drive behind the WMU Stadium Drive Apartments and across from Kalamazoo Christian High School). Call 978-4606 or visit www.kalamazooriver.org for more information.*

Receipt required at time of pick-up.