

# **Capstone Project**

## **A CAPSTONE PROJECT REPORT IN THE**

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## Abstract

**Background:** Every year more than a quarter-million people die due to the effects of climate change. Sixty-two percent of Americans say that climate change is affecting their local communities. However, only 1 in 10 Americans consider themselves to be “very well informed” about climate change, and seventy-five percent say they would like to know more. The Climate Council of Greater Kansas City (CCGKC) is an umbrella organization that was formed in response to the magnitude of global warming and in recognition of the need for collective action on a community-wide level to address the climate crisis. **Objective:** The purpose of this project is to identify and evaluate ways of community engagement that can strengthen public knowledge about the contributors to climate change, expand the important work happening in Kansas City, and address the climate-related issues we face today. **Methods:** Interviews with local environmental organizations were conducted and published online for public awareness. Blog posts with information about greenhouse gas emission drivers, trends, and mitigation were sent out in a weekly newsletter. CCGKC Twitter was used as a tool to direct the community to relevant information and highlight the opportunity to participate in the annual Earth Festival hosted by CCGKC. **Results:** Partner organizations, social media platforms, and interviews played a meaningful role in community engagement strategies. These efforts empowered citizens to learn about climate change topics and to potentially build a coalition of support on a range of integrated environmental policies and programs. **Conclusion:** Community involvement in the dimensions of climate change is a way for residents to understand its negative impacts and take full advantage of potential opportunities to set sustainable development goals in the area in which they live. Community involvement can influence the way social, economic, and environmental policies and actions are designed and appraised.

## Introduction

The increase of greenhouse gases leads to global warming and results in climate change. Global warming is a gradual increase in temperature of the earth's atmosphere due to an abundance of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and other pollutants. At a global level, climate change leads to disastrous weather events including hurricanes, heatwaves, wildfires, droughts and it costs society their health. The National Centers for Environmental Information (NCEI) addresses climate events from a historical perspective. Since the year 1980, the United States has had 258 weather and climate disasters and the cumulative cost exceeds \$1.75 trillion. The most expensive year for weather and climate-related disasters in the United States was in 2017 at around \$306 billion (Smith, 2020). Just as the number of billion-dollar disasters is increasing, the health burden of polluting energy sources is now high as well. Climate change can be a driver of disease migration and cause many health effects from toxic air pollutants within vulnerable communities affecting children, the elderly, and those diagnosed with asthma or cardiovascular disease (Health Impacts, 2019). Strategies for mitigating climate change can prevent morbidity and mortality rates in the human population, while also protecting the environment and future generations.

## Background

### Community

The health risks that climate change distributes affect populations globally, regionally, and at a community level. Communities throughout the United States are experiencing extreme weather conditions, unhealthy air quality, and are prone to chronic and infectious diseases as temperatures alter (EPA, 2017). Since the outside environment is unavoidable, these changes to the climate mean that all communities are at equal risk for poor health outcomes. Cities play a

major role in climate change due to its enormous carbon footprint (Hoornweg, 2011). More than four billion people live in urban areas and over two-thirds of global energy is consumed by cities and accounts for over seventy percent of the world's CO<sub>2</sub> emissions (Ritchie, 2018). Urban areas have drastically expanded on a global scale and its trend will persist for the upcoming decades. Cities are prone to the impacts of climate change along with its hazards, which inevitably affects public health. The specific community that I focused on in this project is Kansas City, Missouri.

### Kansas City, Missouri

Weather conditions in Kansas City, Missouri will change as greenhouse gas emissions increase (ClimateLOOK, 2016). An analysis of Kansas City's weather conditions indicates the frequency of heatwaves will increase, summer nights will become hotter, and increases in precipitation are substantial with an intensification of rainfall in both spring and fall (ClimateLOOK, 2016). The anticipated changes in temperature and precipitation are expected to degrade Kansas City air quality, increase demand for cooling, and induce stress on water supply systems as well as flood and wastewater control efforts (ClimateLOOK, 2016). Ultimately, this poses a greater annual risk for more severe storms, financial damage, and climate-related morbidity and mortality.

The findings include:

- Temperature is projected to substantially increase in an annual average of 4°F by mid-century (2021-2060)
- Heatwaves are projected to increase by 5°F by mid-century
- Precipitation is projected to increase in an annual average of 1.5" by mid-century

## Community Needs

In 2015, The Weather Channel ranked Kansas City, Missouri 5th out of 25 cities to be most impacted by climate change in the United States. The news article states that the decrease in snow precipitation and ice melting sooner in the spring and arriving later in the fall are all indicators of average annual temperatures rising (The Weather Channel, 2015). Kansas City needs to define its pathways to mitigate its GHG emissions by reducing the demand for energy, supporting more sustainable lifestyles, and producing eco-friendly energy supplies. However, it is difficult for a city to create and implement an integrated sustainable urban system without outside assistance and support of the activism of individuals, organizations, businesses, and legislators. There is a definite need for community engagement. It enables citizens to better understand climate issues at a local level and builds their capacity to participate in deliberative adaptation strategies by gaining skills and knowledge (EPA, n.d.). The overarching principle of fostering a safer and cleaner environment is by individuals recognizing that citizens are a community's most valuable resource. Kansas City constructing its pathways to mitigate its GHG emissions is going to take residents rethinking the way they live, work, and travel.

## Current Policies

On August 17, 2017, Mayor James and the City Council adopted Resolution 170586. The purpose of Resolution 170586 is to improve Kansas City's environmental goals and build upon Kansas City's commitment to its Climate Protection Plan that was adopted in July 2008 (American Council for an Energy-Efficient Economy, 2019). Resolution 170586 was adopted to abide by and commit to the Paris Climate Agreement targets (American Council for an Energy-Efficient Economy, 2019). The Resolution is an effort for buildings to produce efficient energy, see an increase in wind and solar power, and see a rise in electric vehicles. The Resolution also

challenges all universities, public and private schools, hotels, and hospitals in the city to steer away from the reliance of coal-fired generating plants.

### Climate Council of Greater Kansas City

The Climate Council of Greater Kansas City (CCGKC) is an umbrella organization that was formed in response to the magnitude of global warming. The CCGKC recognized a need for collective action on a community-wide level to address the climate crisis. The CCGKC is involved in delivering messages regarding environmental and sustainable development to the general public. The goal of CCGKC's is to support, partner, and expand other organizations working to better the Kansas City metro area. CCGKC is hosting an annual Earth Festival allowing the community to engage in a week-long series of over 30 climate-related events. The 2020 Earth Festival is from April 18<sup>th</sup> to April 26<sup>th</sup>. The purpose of this event is to inspire community action and support local organizations advocating for change at a regional level.

### Partner Organizations

In addition to state, regional, and national organizations, Kansas City cannot succeed in the green transformation towards a livable, healthier, and more sustainable environment without the collaboration and partnership with community organizations throughout the metro area. The CCGKC has over twenty partnerships with some of the leading environmental organizations in Kansas City. Collaborating with many different organizations helps recognize the diversity of a community, increase credibility, and strengthens health assessment efforts. Numerous partner organizations will be tabling at the Earth Festival.

### Citizens Climate Lobby

The Citizen's Climate Lobby (CCL) is an organization where Kansas City residents can educate themselves on a nonpartisan approach to climate change solutions. Anyone can become



a volunteer and advocate for the policy action, *Energy Innovation, and Carbon Fee and Dividend Act HR763* that will reduce America's carbon emissions.

### The Resilient Activist

The Resilient Activist is another partner organization that focuses on relieving the trauma of a climate activist. Throughout the life of a climate activist, there is sometimes an inevitable feeling of guilt, distress, and forms of anxiety or depression. The media coverage of the environmental crisis can be overwhelming and can cause a decline in our mental health and wellness. However, the Resilient Activist provides an opportunity to heal oneself, feel a sense of empowerment, and create internal and external coping strategies. The Resilient Activist is a community-building resource that guides personal resilience in the Kansas City area.

### Compost Collective Kansas City

Compost Collective KC is a curbside composting organization. The organization offers 5-gallon compost buckets with compostable liners and a lid at residents' curb to fill with food scraps, plants and flowers, and other compostable waste. The organization will retrieve the bucket on a designated pick-up day for nutrient-dense compost collection. Afterward, the bucket is cleaned, replaced with a new liner, and set back on the residents' curb for the process to begin again. Composting is a method used to reduce methane emissions from organic waste sent to landfills (EPA, 2019). The benefits of keeping compostable food out of landfills are that it reduces the byproduct of methane from landfills, eliminates the need for chemical fertilizers, and is a way to allow the growth of more crops (Weinstein, 2017). Composting programs and organizations within the city is a simple way for residents to divert waste from landfills.

## The Sunrise Movement

The Sunrise Movement focuses on an equitable approach to the climate issue. This group stresses the social determinants of health including factors like socioeconomic status, education, and physical environments that are impacted the most by climate change. As the organization strives to build communities together across the nation by the millions, the goal is to transform political power. The Sunrise Movement efforts are targeted towards politicians and elected leaders who stand up for the health of the nation and oppose the use of fossil fuels.

## Stakeholders

It is vital to identify all groups that have an interest or that will be affected by community changes. Because climate impacts are long-term and cumulative, it requires vigilant planning that the short-term, election-driven political system might not be able to accommodate (USAID, 2013). However, the business and various nongovernmental organization sectors can. A diverse group of stakeholders helps focus on key issues and helps express the need for additional climate change support (EPA, n.d.). Adaptation decision-making is more proactive when stakeholders are involved.

### Potential Stakeholders:

• Natural resource programs	• Businesses
• Public works	• Utility companies
• Environmental organizations	• Schools and universities
• Regional planning organizations	• Youth groups
• Health care providers	• Public safety

## Outcome

The outcome is to have a significant increase in community engagement and build community awareness. The engagement processes will inform, include active participation, and have a level of consultation with individuals and stakeholder groups. The community will optimistically develop knowledge of contributors to greenhouse gas emissions, environmental hazards affecting their health, and an understanding of sustainable development concerning the environment. The Kansas City community can create their vision of a sustainable future and develop action plans for making the community a better place to live.

## Purpose

### Public Health Action

The purpose of this research project is to identify and evaluate the levels and types of community engagement strategies that strengthen public knowledge about the contributions to climate change. Climate change adaptation requires extensive public support from all sectors and it takes understanding the importance of community-based engagement. I will participate in community capacity building to strengthen community awareness about the urgency of climate change. I will be working with the CCGKC and use various community engagement techniques and methods that involve the Kansas City community and stakeholders. Interviews with CCGKC partner organizations will be conducted and published to the CCGKC YouTube page for public awareness. Blog posts with information about greenhouse gas emission drivers, trends, and mitigation will be sent out in a weekly newsletter using the CCGKC website. The CCGKC Twitter platform will be used as a tool to direct the community to relevant information and highlight the opportunity to participate in the annual Earth Festival. Through the use of these

engagement techniques, I will see how effective each strategy is at a community level leading to CCGKC's annual Earth Festival.

### Literature Search

Many recent studies have focused on the problems linked to climate change and its negative effects. An investigation on the livestock in Bangladesh and its contributions to greenhouse gas emissions (GHGE) shines a light on the agricultural sector which is a major driver of climate change (Das, et al., 2020). Previous GHGE livestock data from the years 2005 to 2018 was calculated to estimate the rise of emissions from the year 2020 to 2050. The study may be used as a helpful guide for agricultural professionals to begin environmental mitigation measures. An emission assessment model was used to break down the beef-production process (Chen, et., 2020). Feed production, transportation, and energy consumption are the drivers that influence GHGE as well as the feedlot, manure handling systems, cattle diet, feed additives, and climate. The layout of each GHGE influencer is crucial in understanding where the high percentages of GHGE come from.

Research has also focused on a transition from meat-based protein to plant-based and its benefits regarding the health of the environment and oneself. Addressing the gaps in diet-climate literature resulted in a reduction in GHGE when replacing beef, pork, and poultry intake with plant-based protein in an individual-level diet study (Willits-Smith, et al., 2020). The findings tied in both aspects of diet healthfulness and changes in GHGE.

In the last two decades, the textile industry has made a serious threat to the environment and has stirred up conflict. The abundance of textile waste ending up in landfills is primarily due to the concept of fast fashion (Shirvanimoghaddam, et al., 2020). This leads to the global annual consumption of material causing concern in the environment, society's health, social and

economic security. However, a circular economy would slow down this trend. A circular economy is a system aimed at minimizing waste and keeping products textiles for longer use. The emphasis on the “reuse, repair, refurbish” aspect contrasts with the traditional linear economy which has a high disposal rate (Shirvanimoghaddam, et al., 2020). Keeping resources such as textiles in a loop for as much time as possible is an innovative approach towards a circular textile economy.

Changing the foundation of the economy starts at a community level. The involvement in communities allows for partnership, team building, and the support of similar values. A community-based intervention involved a random sample of households for a survey on the knowledge, attitudes, and practices of recycling and handling waste (Hammed, et al., 2018). The results held a positive reaction and 100% of the participants were willing to contribute and adopt waste management practices. This study is important because it shows how effective community involvement is and how simple a change of behavior is when climate change mitigation is brought to individuals’ attention. This type of public involvement should be implemented in different communities to spread climate awareness.

Community facilities focusing on the conservation of energy sources are another essential part of community development. A climate-smart healthcare system is a positive method towards a healthy climate and economy. Low-carbon healthcare can allow health facilities to save money by reducing energy, and improve the quality of care in numerous settings by supporting community health all while being climate-smart (Wanegård, et al., 2019). This strategy creates a strong and sustainable health system.

## Methods

### Twitter

During this project, I had the privilege of running the CCGKC Twitter page where I tweeted about special events, partner organizations, interviews, the 2020 Earth Day festival, and climate-related content. I tracked the Twitter Analytics to access reports on impressions and engagements on individual tweets.

### Blogs

To help promote activities, provide information, and encourage dialogue, I wrote seven articles reporting on CCGKC partner organizations, greenhouse gas emissions, fast fashion, sustainable food, and climate-related events held in the Kansas City area. The articles were posted as blogs on the CCGKC website and sent out through The Climate Digest. The Climate Digest are weekly newsletters of environmental news and events that subscribing members receive.

### Interviews

I interviewed five partner organizations. Each interview has a brief discussion of each organization's team leaders, their contributions to the health of the environment, an introduction of the organization itself, and its impact on the Kansas City community, as well as what the organization anticipates in the upcoming years. The content from the interviews is intended to be posted on the CCGKC YouTube page as a way for individuals to connect and support local groups. Through the use of YouTube analytics, the data can encompass the level of engagement and reactions from the audience.

## Earth Festival

An annual Earth Day Festival was hosted by the CCGKC. The event provided a way to share information and raise awareness about the magnitude of climate change and its contributors. This community engagement technique was designed in collaboration with local organizations and stakeholders that understand the impact climate change has on an urban area. To measure the effectiveness of the event, I used an attendee list for all meetings in Zoom to track the interaction of visitors. This tool allowed me to obtain the total festival headcount as well as the average attendance for each event.

## Results

### Twitter

Certain tweets did not attract the audience as well as others. Timing, graphics, hashtags, and content of the tweet all play a factor. Below is a comparison of two different reactions from two tweets based on content.

#### **Example Tweet 1**

- Informative tweet
- No picture included in tweet
- No hashtag included in tweet
- Tweeted at 1:00 pm

Tweet activity after 9 hours:	91impressions	18 engagements
Tweet impressions after 18 hours:	107 impressions	22 engagements

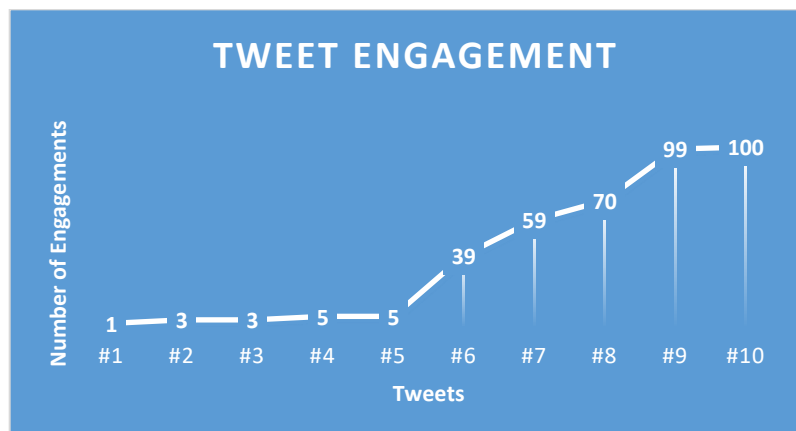
**Example Tweet 2**

- Educational tweet
- Picture + Graph included in tweet
- 2 hashtags
- Tweeted at 9:00 pm

Tweet activity after 1 hour:	390 impressions	43 engagements
Tweet activity after 10 hours:	745 impressions	69 engagements & 1 direct message

With this data, I was able to see a clear trend as to which tweets had higher activity and twitter user involvement. I found that twitter users were far more engaged in tweets that included graphics with straight forward, educational points about climate-related content that pertain to their lives. The audience also tends to be drawn to tweets that include relative hashtags and links to websites with additional information on the topic.

Below is another example to help illustrate the level of activity between tweets that differ in content. Numbers 1-5 are tweets that lacked graphics, hashtags, and/or links, which resulted in low numbers of engagement. In opposition, numbers 6-10 are tweets that had the highest numbers of engagement and included the missing content from 1-5.





## Earth Festival

The week-long Earth Festival had a total of 30 events with guest speakers and environmental organizations from across the Missouri and Kansas side. Each event had an average of 27 viewers with a total of 806 people.

<b>DATES</b>	<b>GUEST SPEAKERS</b>	<b>TOPICS</b>	<b>NUMBER OF PARTICIPANTS</b>
4/16/2020	GKC Interfaith Council	Faiths' Call for Climate Action	72
4/18/2020	Climate Council	Climate Speakers Forum	43
4/18/2020	The Resilient Activist	Ecological Angst: Building Resilience	25
4/18/2020	Hope Faith	Climate Change & Social Equity	16
4/18/2020	KC Can Compost	From Waste to Justice	20
4/18/2020	Temple Buddhist Center	Conscious Activism	15
4/18/2020	Climate Action KC	Climate Action Plan & Playbook	18
4/18/2020	Missouri Organic Recycling	The Alchemy of Compost	33
4/19/2020	CinemaKC & TBC	Heart & Soil	55
4/19/2020	The Resilient Activist	Good Grief Support Circle Demonstration	16
4/19/20	Citizens Climate Lobby	The Case for Carbon Fee & Dividend	15
4/19/2020	Climate Council	COVID- 19: Climate Change & Pandemics	15
4/19/2020	Mad Hatter Compost Tea	Soil Plants Water & Climate	22
4/19/2020	Temple Buddhist Center	Chanting to Heal the Planet	35
4/20/2020	Climate Council	Sustainable Living	20
4/21/2020	David Hakan	Climate Concert	8
4/21/2020	Climate Council	Sustainable Energy	12
4/22/2020	Temple Buddhist Center	Meditation for the Planet	44

4/22/2020	Unity Temple & Temple Green Team	Building a Home Forest	45
4/22/2020	American Public Square & TBC	The Fight for our Future	137
4/22/2020	Climate Council	Sustainable Food	27
4/23/2020	Stan Slaughter and Friends	Rockin' Environmental Music	23
4/23/2020	Climate Council	Sustainable Mobility	12
4/24/2020	Climate Council	Sustainable Fashion	15
4/26/2020	Climate Council	Sustainable Living	10
4/26/2020	Climate Council	Sustainable Energy	8
4/26/2020	Climate Council	Sustainable Food	10
4/26/2020	Climate Council	Sustainable Mobility	6
4/26/2020	Climate Council	Sustainable Fashion	8
4/26/2020	Climate Council	Climate Festival Party	21

## Discussion

Each community-based strategy carried messages through interviews, social media platforms, websites, and special events. Engagement techniques are designed to share information, elicit views and opinions, and aim to involve communities (EPA, n.d.). The effectiveness of each community engagement technique increases with a collaboration of partner organizations that understand the issues of climate change (EPA, n.d.). Social media platforms allow the general public the opportunity to engage with issues of climate change, share opinions and connect with community resources.

Twitter analytics identifies the strengths and weaknesses of the presented content, compares the data to previous periods, and measures what is working well in terms of educational marketing, and what is not. Web analytic tools do not predict users' needs but are proficient at revealing users' behavior (Barba, Cassidy, Leon, & Williams, 2013). Twitter analytics provides an in-depth view of the performance of a tweet through impressions,

engagements, profile clicks, and hashtag clicks. This engagement technique illustrates the value of content when posting tweets, as well as the importance of what the audience is attracted to. These findings are also important to understand as it pertains to Twitter age demographics. It was found that 40% of adults in the United States who use Twitter are between the age of 18-29 years old, 26% of United States Twitter users are 30-49 years old, and 17% are 50-64 years old (Clement, 2019). Because Twitter's audience is heavily represented by a younger audience, I found that visuals, hashtags, and time play an important factor in terms of engagement and interactions. This was useful to figure out the components of twitter that can be useful to reach and educate a larger audience, and invoke more involvement from the younger demographic.

Blogs are a highly viable vehicle for broadcasting information on climate-related topics within the Kansas City community. The purpose of the blog posts is to attract, engage, and educate community members on the different climate-related resources Kansas City has to offer, as well as climate-related topics. This web-based engagement method is a valuable tool that can be used to engage communities and stakeholders.

Interviews are an informal and trusted setting that provides the opportunity for organizations to virtually meet community members (EPA, n.d.). The one-on-one approach can provide a more detailed understanding of each organization's leaders' thoughts and behavior on climate change (EPA, n.d.). Individuals gain knowledge about climate issues and gather information about local environmental organizations' mission and vision. YouTube is a valuable online platform for interviews that can be viewed by the public. It is also a powerful tool for any individual, business, or organization to reach a large number of people. YouTube analytics allows one to quantify the effects of making changes to the engagement strategy as well as identify the strengths and weaknesses of the videos.

The purpose of the Earth Festival is to bring together all sectors of Kansas City and increase the visibility and approachability of the climate crisis, as well as build community relationships. In terms of community capacity building, events naturally inspire people to participate in conservation and climate mitigation actions (Lessman, 2019). This is a great way to build relationships and collaborate with people interested in the well-being of Kansas City. The Earth Festival invited the community to see the work CCGKC symbolizes.

### Limitations

In terms of addressing climate change at a local level, determining adaptation needs, and identifying the gaps in adaptation relies on scientific knowledge about the enormity of climate change. Therefore, the lack of scientific research and evidence at a local level poses a limitation to adaptation. Furthermore, the absence of political support is a critical barrier.

In response to the threat of the COVID-19 pandemic, the Earth Festival transitioned from an in-person community event to a webinar on Zoom's software, which created a limitation in data and community involvement.

Web-based community engagement methods and social media have limited face-to-face interaction and require time dedicated to posting. Due to the amount of time these platforms require, there could potentially be a limitation in community engagement if there is a lack of consistency. This limitation applies to the use of interviews as they also require a significant amount of time and effort. In addition, data collection of interviews was incomplete due to delays caused by COVID-19.

### Strengths

The community engagement techniques demonstrated in this paper can be applied to various sectors within an urban area. Each method can be used by anyone with an interest in

community engagement. All levels of government, council members, businesses, and organizations tasked with developing a comprehensive engagement strategy can use this approach to build sustainable relationships with the community (EPA, n.d.). A majority of these accomplishments could not have been possible without the support and collaboration of existing partnerships and stakeholders.

## Conclusion

The act of addressing climate change should emphasize the physical, chemical, and biological risk factors that the environment poses on the human population, as well as the integration of environmental health at a community level. Like most social issues, individuals do not think about outside stressors irrelevant to their own lives. A lot of the time, individuals do not know something is a problem until something big is made of it or is regularly shown on news broadcasts or forms of social media. One of the most debated topics over the years is climate change as well as the development of policies and strategies to combat the issue (Mavrodieva, et al., 2019). Implementing climate change mitigation at a city level is practical when there is community involvement. Developing community engagement strategies to combat the social dimensions of climate change is a way for residents to understand its negative impacts and take full advantage of potential opportunities to set sustainable development goals in their area. Community involvement can influence the way social, economic, and environmental policies and actions are designed and appraised.

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