Green Cincinnnati Plan
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Climate Change in Cincinnati—Why We Need the Green Cincinnati Plan

Green Cincinnati
BUILDING A SUSTAINABLE AND EQUITABLE CITY

city of CINCINNATI

Climate Change in Cincinnati—Why we need the Green Cincinnati Plan

A global crisis with real local impacts

Why is Climate Change Happening?

Exploiting fossil fuels for industrialization has spurred prosperity and economic growth over the last 150 years. However, the bill for that growth is now coming due. Increasing concentrations of greenhouse gases in the atmosphere from the burning of fossil fuels are causing changes in our climate. As human population and consumer behaviors grow and require more resources, we must reckon with the consequences of burning fossil fuels to power our lives.

A growing collection of recent scientific reports has found that global climate emissions need to decline by 45% from 2010 levels by 2030 and reach net zero around 2050 to limit global warming to 1.5°C.[1] The local impacts of climate change in Cincinnati—rising heat, increased storms, pests, worsening impacts on health and agriculture, climate migration, increased costs to municipal government—require the City to act to mitigate Cincinnati's impact on global warming.

Children get relief from summer heat in the water fountains at Washington Park. Photo courtesy of City of Cincinnati.

Addressing carbon emissions will take a global effort. With 70% of emissions coming from urban areas, Cincinnati recognizes that cities play a unique role. Focused efforts to decarbonize locally will improve the quality of life, economic well-being, and long-term sustainability of our City and region.

Local Impacts of the Climate Crisis

Although climate change is a global issue, its impacts vary by region. While some parts of the globe and the United States will experience the effects of melting ice caps, rising sea levels, forest fires, and hurricanes, Cincinnati will not. Instead, rising temperatures and an increased frequency and severity of storms will cause major impacts which the City and its residents will have to face together.

Rising Temperatures and Severe Storms

The earth is getting hotter and so is Cincinnati. Historically, Cincinnati experiences about 30 days a year with a heat index over 90°F. By mid-century, it will be 79 days.[2] By 2080, the average daily temperature is projected to be more than 10°F hotter.[3]

> “Rising temperatures and an increased frequency and severity of storms will cause major impacts

While many parts of the world are experiencing drought, Cincinnati is actually experiencing more storms. Annual precipitation in the Midwest has increased 5-10% since 1950.[4] Not only will the Cincinnati region see more storms, the storms will be more severe.

As Cincinnati’s climate changes, there will be impacts to our ecosystem, infrastructure, and the health and well-being of residents.

Health Implications

An increase in the number of dangerously hot days will lead to an increase in heat-related illnesses, including heat rash and cramps, and potentially fatal illnesses like asthma and heat stroke. Similarly, extreme temperatures put additional pressures on hospitals, emergency rooms, and medical services.

Illnesses carried by ticks, mosquitos, and other vectors are also expected to increase as the warming weather allows these carriers to move into new geographic regions, expanding their range. Infection rates for Lyme disease (spread by ticks) could rise, and other viruses, like West Nile, could appear in the local mosquito population.[5]

Climate change will also impact air quality. In Cincinnati, major sources of poor air quality include ozone and small particulate matter (PM 2.5). Hot sunny days with stagnant air accelerate ground-level ozone production, which can increase the amount of particulate matter present. Exposure to

these pollutants can cause or exacerbate health conditions like respiratory and cardiovascular diseases, aggravated asthma, and other chronic illnesses, leading, in some instances, to premature death.[6]

Increasing storms and flooding can also lead to adverse health effects, especially in areas where sewer and water infrastructure is inadequate. Flooding from storms can cause sewer back-ups into homes and businesses, and water intrusion into buildings, resulting in increased exposure to pathogens and illness.[7] Flooded homes can cause sleeplessness, anxiety, depression, and post-traumatic stress disorder.[8]

Severe storms caused flooding of the Ohio River onto the Public Landing downtown.

Impact to Infrastructure

Heavy storms caused by climate change can also impact infrastructure. In 2019, large rain events caused hillside instability along Columbia Parkway, requiring a $17.6 million 2-year stabilization project to repair the damage and prevent future landslides.[9]

Large rain events also affect the quality of water in the region. Like many older cities, Cincinnati has a combined storm-sewer system that was not designed to manage the volume of water generated during the kinds of extreme storms we are experiencing now.

When the volume of water exceeds the capacity of the storm-sewer system, the water is evacuated into combined storm sewer overflows (CSOs), resulting in stormwater and raw sewage entering the region's water ways. According to estimates, approximately 7.1 billion gallons of combined sewage overflow in a typical year are released into area waterways.[10] While improvements to the region's sewer system have controlled and removed over 150 CSOs, the number of CSO occurrences per year has remained constant over the past decade due to increased storm events.

Intense storms caused landslides onto Columbia Parkway in 2016, requiring over $17 million to clean-up and repair. Photo courtesy of City Staff.

Agricultural Disruptions

As increased heat causes local waterways to evaporate, this decrease in water supply will negatively impact agricultural productivity.

Crop loss is one of the chronic threats to agriculture from climate change in the Greater Cincinnati Area. Rising temperatures are expected to extend the frost-free season 20 days by mid-century.[11] While this might increase crop yield, hotter summers and periods of drought are expected to lead to a 5-25% decline in corn and soybean crop yields by mid-century.[12]

Moreover, an increase in average winter temperatures will affect the freeze-thaw cycle of the soil. This disruption can lead to challenges like flooding, increased insect and weed populations, and loss of native species that require colder temperatures to germinate.[13] Furthermore, the increase of pests and weeds from rising temperatures and the extended growing season can reduce yields, requiring the use of more adaptive farming techniques.[14]

The region is also expected to become more humid. This increase in high air moisture allows for many agricultural pests and pathogens to flourish, competing with crops and decreasing grain storage. These changes can all result in major economic output losses for farmers and require quick action to adapt farming techniques.

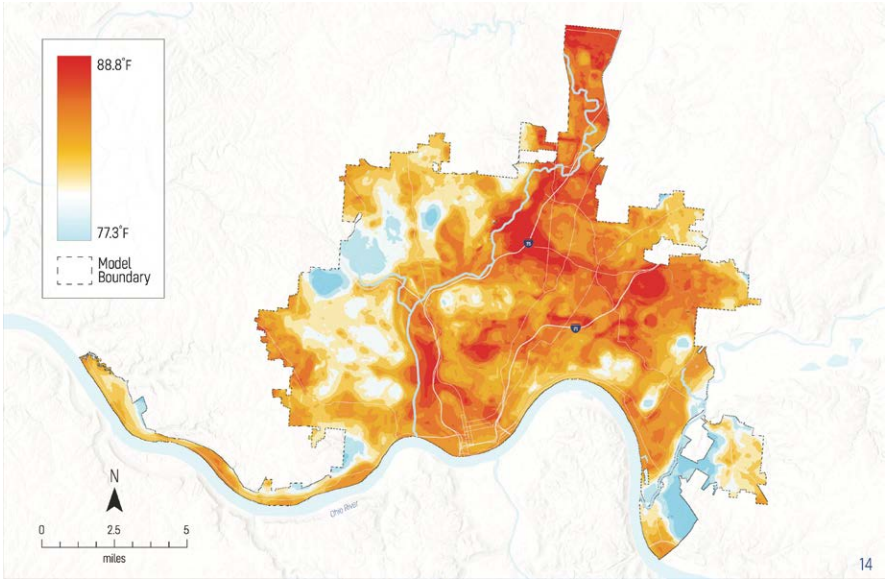
Climate Migration

Extreme heat, more frequent large flood events, forest fires, hurricanes, and other natural disasters are displacing people from their communities.

> Due to rising temperatures, Cincinnati must develop and prepare the infrastructure and economy to be resilient to climate change.

One example of this is the extreme floods that impacted 13 counties in eastern Kentucky in July 2022. The flooding destroyed homes and infrastructure, required over $154.6 million for recovery, and displaced people from their homes for months.[15]

Cities in the Midwest are expected to experience climate migration from communities impacted by sea level rise and other natural disasters.[16] As a large city within this region, Cincinnati must develop and prepare the infrastructure and economy to be resilient to climate change—as well as prepare to receive those who might relocate to the City out of necessity. Preparing for in-migration requires improving infrastructure to serve a larger, more diverse population, increasing housing availability—especially affordable housing and multi-family housing—and providing transportation improvements for a growing city.



2020 Heat Watch Report predicts Cincinnati neighborhoods could experience up to a 10 degree difference in evening temperatures. This is one example of how climate change will affect the city and residents unequally.

Climate Change is an Equity Issue and a Risk-Multiplier

Not all residents and neighborhoods of Cincinnati will be equally impacted by climate change. In this way, the climate crisis is first and foremost an equity issue.

A 2020 study documented the Urban Heat Island Effect in Cincinnati and found that areas with lower levels of tree canopy and higher levels of impervious surfaces—such as parking lots and roads—have higher surface temperatures, sometimes up to 12°F higher.[17] This means that not all of the city's 52 neighborhoods will experience the impact of rising temperatures equally.

The 2020 Heat Watch Cincinnati study identified the neighborhoods in Cincinnati with the greatest urban heat island exposure. These include predominately low-income communities of color that were historically red-lined and where residents have been systematically denied access to financial services.[18] These neighborhoods will feel the effects of rising temperatures more dramatically, and these effects will be compounded for residents in housing where air conditioning is not available.

Not only will the impacts of climate change not be equally distributed throughout Cincinnati, but the adverse health effects of climate change will also not be distributed equally. Vulnerable populations will be more likely to face worsening health conditions. This includes older adults, children, and those living in risk-prone areas which are disproportionately affected by heat, flooding, and poor air quality. These populations are often communities of color and low-income.[19]

Similarly, with storms, these issues do not impact residents equally. The effects of storms more severely impact residents in neighborhoods on hillsides and in valleys.

The climate crisis acts as a risk-multiplier, making existing problems worse. When considering poverty (including energy poverty), homelessness, and public health issues, some members of our community are at higher risk from the impacts of climate change. The nature of these risks and the way they present in our communities is a growing field of research, shaping the way cities design climate solutions to protect the most vulnerable populations.[20]

The Cost of Inaction

Given how rising temperatures and increased storms will impact the City, it is important to allocate the appropriate resources to address these impacts. In 2022, the Ohio Environmental Council, Power A Clean Future Ohio, and Scioto Analysis published the report "The Bill is Coming Due: Calculating the Financial Cost of Climate Change to Ohio's Local Governments." This report documents how Ohio cities could spend an additional $1.8 to $5.9 billion per year by 2050 to manage the effects of climate change.[21]

The report reviewed 10 climate impacts on municipal spending: air conditioning installation, electrical costs, cool roofing, cooling centers, road repair, drinking water treatment, storm recovery, power lines, stormwater management, and elevating roads. These costs will not only burden the municipalities, but also their residents and taxpayers. Cincinnati must act now to prepare the infrastructure for climate change.

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> **THE BILL IS COMING DUE**