

CITY OF CLEVELAND

MUNICIPAL ACTION PLAN 2025



CITY OF CLEVELAND
Mayor Justin M. Bibb

MAYOR'S OFFICE OF
SUSTAINABILITY





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SUSTAINABILITY**

Table of Contents

Land Acknowledgment	4
Acronyms	5
Glossary	6
Letter from Mayor Justin Bibb	8
Executive Summary	11
Chapter 1: Introduction	19
Chapter 2: Current Conditions	23
Business As Usual (BAU) Scenario	23
Greenhouse Gas Inventory	25
Assessing Climate Risks & Vulnerabilities	30
Chapter 3: Roadmap to Net Zero Emissions	45
Evaluating Climate Actions	46
Impact and Benefits of the MAP	50
Built Environment	57
Clean Energy	65
Clean Transportation	73
Resilience and Empowerment	84
Resource Management	92
Water and Green Space	103
Chapter 4: Implementing and Using the MAP	113
Chapter 5: Conclusion	121
Endnotes	124
Acknowledgments	129

Figures and Tables

Figures

Figure 1: BAU Forecast Results for GHG Emissions through 2050	24
Figure 2: City of Cleveland Operations GHG Emissions by Source (2010–2022)	27
Figure 3: City of Cleveland Operations GHG Emissions by Scope (2022)	28
Figure 4: City of Cleveland Operations GHG Emissions by Department (2022)	29
Figure 5: GHG Emissions Impact by Focus Area (2030)	50
Figure 6: GHG Emissions Impact by Focus Area (2050)	51
Figure 7: Projected GHG Savings from Cleveland MAP Actions through 2050	52
Figure 8: Total Energy Use by Building Size (2022)	57
Figure 9: City Operations Energy Use by Department (2022)	66
Figure 10: Transportation Sector GHGs by Mode (2022)	73
Figure 11: Transportation Fuel Use by City Department (2022)	74
Figure 12: Circular Economy Butterfly Diagram	93
Figure 13: Justice40 Census Tracts in the City of Cleveland	102
Figure 14: Metered Water Use by City Department (2022)	103

Tables

Table 1: City Properties Most Vulnerable to Climate Hazards	33
Table 2: Combined Risk Scores for Climate Hazards in Cleveland	35
Table 3: Projected Changes to Climate Hazard Impacts in Cleveland	36
Table 4: Vulnerable Community Systems for Priority Climate Hazards	42
Table 5: MAP Goals by Focus Area	48
Table 6: Total Energy and Cost Savings from MAP Actions from 2030	55
Table 7: Estimated Annual Public Health Benefits from Air Quality Improvements due to Implementing MAP Actions	56

Land Acknowledgment

The City of Cleveland acknowledges that our boundaries exist on the ancestral homelands of Indigenous Peoples. We recognize the tribes and nations forcibly removed through treaties negotiated in bad faith and other acts of displacement, including the Odawa, Ojibwe, Potawatomi, Delaware, Seneca, Cayuga (Iroquois); Myaamia (Miami); Kaskaskia, Piankeshaw, Wea, Shawnee, and Wyandotte peoples. These lands also hold the histories of the Erie and Whittlesey peoples, whose deep connections to the land and water are integral to the identity and heritage of this region.

Cleveland sits along the shores of Lake Erie, the fourth largest of the Great Lakes and the City's biggest natural asset. Lake Erie is named after the Erie people. The Cuyahoga River, a defining feature of Cleveland's landscape is named after the Mohawk word "Cayagaga," meaning "crooked river," reflecting the winding, serpentine path the river takes through the land. Interconnected in their natural beauty, these waters remain vital to the health and well-being of the community.

Environmental sustainability is essential to Indigenous stewardship practices, rooted in respect, balance, and reciprocity. These teachings remind us to care for the Earth in harmony with its natural cycles, ensuring a sustainable and equitable future for generations to come. The City of Cleveland honors these connections by striving to protect and sustain our land, water, and air by advancing environmental stewardship and climate resilience.

We invite reflection on this shared history and encourage meaningful dialogue to promote reconciliation, environmental stewardship, and the celebration of resilience and strength in the past, present, and future.

This land acknowledgement was reviewed by members of the Lake Erie Native American Council (LENAC), whose insights and guidance were greatly appreciated.

Acronyms

BAU

Business as Usual

BEVs

Battery Electric Vehicles

BPS

Building Performance
Standard

CH₄

Methane

CIP

Capital Investment Plan

CMAQ

Congestion Mitigation and
Air Quality

CO₂

Carbon Dioxide

CPP

Cleveland Public Power

CPRG

Climate Pollution Reduction
Grant

CRVA

Climate Risk and
Vulnerability Assessment

CSWCD

Cuyahoga Soil and Water
Conservation District

CWD

Cleveland Division of Water

EECBG

Energy Efficiency and
Conservation Block Grant

EJ

Environmental Justice

EUI

Energy Use Intensity

EVs

Electric Vehicles

GHGs

Greenhouse Gases

GIG

Green Infrastructure Grant

HVAC

Heating, Ventilation, and Air
Conditioning

LCA

Life-Cycle Analysis

MAP

Municipal Action Plan

MOCAP

Mayor's Office of Capital
Projects

MOS

Mayor's Office of
Sustainability

MtCO_{2e}

Metric tons of CO₂
equivalent emissions

MWM

Motor Vehicle Maintenance
Division

N₂O

Nitrous Oxide

NEORS

Northeast Ohio Regional
Sewer District

NOACA

Northeast Ohio Areawide
Coordinating Agency

NRRCs

Neighborhood Resource
and Recreation Centers

O₃

Ozone

PHEVs

Parts per Million

PIOYYA

The Mayor's Office of
Prevention, Intervention
and Opportunity for Youth
and Young Adults

SC-MAP

Sustainable Cleveland
Municipal Action Plan

SOPEC

Sustainable Ohio Public
Energy Council

TDM

Transportation Demand
Management

U.S. EPA

U.S. Environmental
Protection Agency

VMT

Vehicle Miles Traveled

WUI

Water Use Intensity

Glossary

Business as Usual (BAU) Scenario

Scenario that considers what will happen if no additional climate actions are taken.

Carbon Emissions

Gases that come from burning fossil fuels into the atmosphere.

Climate Adaptation

The process of adjusting to actual or expected climate change and its effects. Climate adaptation can include changing agricultural practices, building sea walls, or developing drought-resistant crops.

Climate Change

Change in the average conditions — such as temperature and rainfall — in a region over a long period of time.

Climate Hazard

A natural or human-induced event or trend that has the potential to cause harm to people, property, or the environment. Climate hazards can be caused by climate change, but other factors, such as extreme weather events or natural disasters can also cause them.

Climate Justice

Being fair when dealing with climate change. It recognizes that some communities, especially those who did not cause the problem, are hurt the most. Climate justice focuses on protecting the people most at risk, making sure everyone is treated equally, and helping those who need it the most. It also supports moving to cleaner energy and creating a healthier, fairer future for everyone.

Climate Resilience

The ability of a human or natural system to adapt to climate change and minimize its negative impacts. Climate resilience can be enhanced by reducing greenhouse gas emissions, improving infrastructure, and protecting natural resources.

Climate Risk and Vulnerability Assessment (CRVA)

Process to understand the current and future climate risks facing the region.

Decarbonization

The process of switching from the use of fossil fuels such as coal, natural gas or oil to renewable energy sources such as solar.

Deforestation

The action of removing or cutting down a wide area of trees.

Environmental Justice

Environmental justice means making sure everyone — regardless of race, color, national origin, gender, religion, or income — is treated fairly and has a say in decisions about the environment. It aims to fix unfair treatment from the past and ensure all communities share the benefits of clean air, water, and land without being harmed more than others.

Equitable

Fair and reasonable in a way that gives equal treatment to everyone, while also accounting for differing circumstances.

Extreme Heat

Abnormally hot weather causing heat-related illnesses and death. The marker for extreme heat is above 90°F in temperature.

Extreme Weather Event

A weather event that is rare or unusual for a particular location. Extreme weather events include heat waves, droughts, floods, storms, and wildfires.

Fossil Fuels

Non-renewable energy sources such as coal, petroleum, and natural gas.

Greenhouse Effect

The process by which radiation from a planet's atmosphere warms the planet's surface. The greenhouse effect is caused by gases in the atmosphere that trap energy in the form of heat.

Greenhouse Gas

Types of gases that trap heat from the sun and contribute to global warming. The primary greenhouse gases in Earth's atmosphere are water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and some fluorinated gases.

Heat Wave

Abnormally high temperatures heat (90°F or above) for three days or more days in a row.

Heavy Precipitation and Flooding

Flooding occurs when there is a lot of rain or snow in a short period of time.

Industrialization

The process of changing the economy from mostly farming to making things in factories.

Invasive Plant Species

Plants that are not native to a particular area and that can cause harm to the environment or to human health.

Precipitation

Any form of water that falls to the Earth's surface from the atmosphere, including rain, snow, sleet, and hail.

Public Health

The health of a community or population. Public health is concerned with preventing disease and promoting health and well-being.

Resilience

The potential or ability of a system to adopt climate adaptation measures.

Science-Based Targets

Defined scientific targets that reduce greenhouse gas emissions in line with limiting global warming to 1.5°C.

Severe Summer Storms

Thunderstorms that produce heavy rain, strong winds, hail, or tornadoes.

Sulfur Dioxide (SO₂)

Sulfur dioxide is a colorless, reactive air pollutant with a strong odor. This gas can be a threat to plant life, and human & animal health. The main sources of sulfur dioxide emissions are from fossil fuel combustion and natural volcanic activity.

Temperature

The degree of hotness or coldness of a body or substance.

Urbanization

The process of making an area more urban – large numbers of people in one area.

Vulnerability

The tendency or susceptibility to suffer negative impacts from hazards. Vulnerability encompasses several things, including a sensitivity to harm and a lack of capacity to cope and adapt to those harms.



Letter from Mayor Justin Bibb

I am thrilled to introduce the City of Cleveland's **updated Municipal Action Plan (MAP), a comprehensive strategy designed to advance sustainability, reduce climate pollution, and strengthen the resilience of our city's operations through a whole of government approach.**

Over the past 18 months, City of Cleveland staff, led by the Mayor's Office of Sustainability, have thought deeply about the challenge climate change presents to our city and how we could achieve a sustainable, carbon-neutral future for City operations.

The result is a plan with ambitious but achievable goals, clear actions, and performance measures to guide implementation and track progress.

This MAP includes six focus areas: Built Environment, Clean Energy, Clean Transportation, Resilience and Empowerment, Resource Management, and Water and Green Space. It also examines how objectives and actions relate to issues spanning multiple focus areas, such as circularity and equity.

Through this comprehensive strategy, **we aim to cut the City of Cleveland's greenhouse gas (GHG) emissions by 63.3% through 2030 and achieve net zero emissions by 2050.** These targets position Cleveland as a climate leader, demonstrating the city government's commitment to building a resilient future, addressing long-standing environmental inequities, and proving that economic prosperity and a healthy environment can go hand in hand.

The actions outlined in this MAP establish the framework for Cleveland to address the significant challenges presented by the climate crisis. **Recent years have shown us first-hand the dangers climate change poses to our city, including poor air quality, extreme heat, torrential rains, severe storms, and tornadoes. No city, including Cleveland, is immune to these threats.** However, with our prime location along Lake Erie and the strength of our human, economic, cultural, and natural resources, Cleveland has the opportunity to turn this crisis into a chance to become a more prosperous, equitable, and thriving city.

I encourage you to study the details of this plan and commit to the steps it outlines as we strive to tackle climate change together. **It is only with collective strength and resolve that we can make Cleveland the city we all aspire for it to be.** I look forward to embarking on this journey with you, shaping a future we can all be proud of.

Sincerely,

A handwritten signature in black ink, appearing to read 'Justin Bibb', with a stylized flourish at the end.

Justin Bibb
Mayor of Cleveland



Executive Summary



There has never been a better time for Cleveland to act on climate change.

Over the past 10 years, the region has united to address this crisis, and the federal government has delivered the biggest investments in climate action ever.

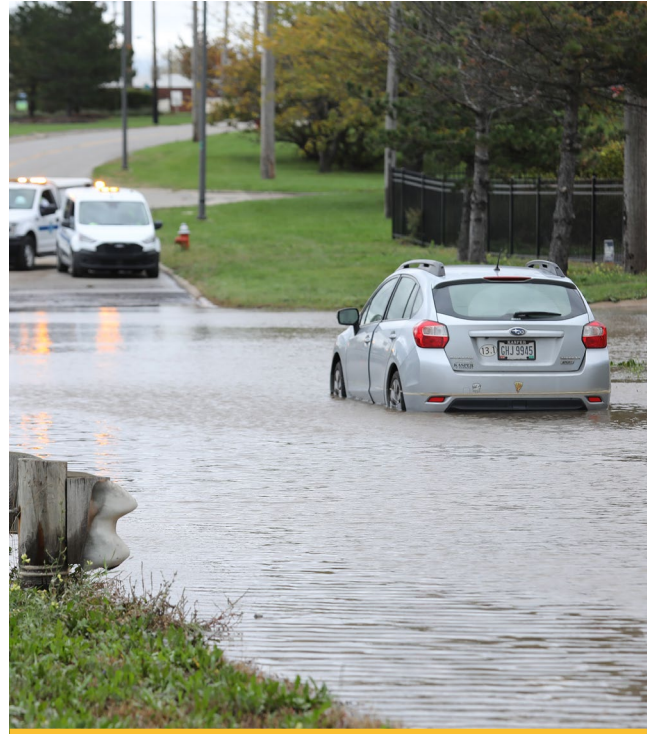
This updated Municipal Action Plan (MAP) is an ambitious strategy that builds upon our previous successes to center climate justice throughout the City of Cleveland's operations, but the City knows we cannot reach our goals without support from all staff members.

**The time for climate action is now.
Cleveland can't wait.**

Climate change is a crisis that is already harming Cleveland.

2024 was the warmest year on record globally and in Cleveland. Temperatures are currently 1.5°C warmer than normal, and every month from May 2023 to August 2024 was the warmest such month ever.

The City suffered its worst air quality on record in June 2023 due to wildfire smoke from Canada. Cleveland experienced its first tornado in nearly 30 years on August 23, 2023, and a group of tornadoes knocked out power for tens of thousands on August 6, 2024. Cleveland also had its mildest winter ever in 2023–2024, with ice cover reaching record lows on the Great Lakes.



Cleveland has made progress since 2010, but we have a lot of work left.

Since 2010, emissions of the pollution that causes climate change have gone down by 45% across City operations, 1.7 times faster than the City as a whole, allowing us to meet our previously set 2030 target nine years early.

This updated MAP adopts a more ambitious target: lowering climate pollution by 63.3% through 2030 and reaching zero emissions by 2050.



Every employee has a role to play in implementing this MAP, and the City wants to empower you to act.

Cleveland is committed to improving coordination across departments to implement this plan. We are also focused on educating and training employees

about climate change and what they can do to address it. **No one can do everything, but everyone can do something.**

Climate action will improve the lives of City of Cleveland employees.

The City would save nearly \$4.6 million per year in energy and operating costs.

MAP actions would benefit the health of City employees and residents. By 2050, Cleveland would avoid nearly 700 asthma

attacks and more than 80 missed days of work from illness due to breathing cleaner air. The combined health benefits from improved air quality alone would be worth as much as \$28 million each year.



**We need to
upgrade City
facilities to
reduce energy
waste.**

The facilities that the City owns and operates cause half of its climate pollution emissions.

Most of this comes from electricity use.

Currently, City buildings have outdated heating and cooling systems, forcing the City to spend extra taxpayer money on

wasted water and energy. Retrofitting buildings to upgrade energy systems, investing in energy efficiency, and replacing gas appliances like furnaces and stoves with newer, electric models as a part of planned capital improvements, will save the City money and make its employees healthier and more comfortable.

Increasing the amount of clean energy we create and use is the key to this plan.

Powering all City operations with clean energy, particularly City-owned clean energy, is vital to meeting our climate goals.

In 2022, electricity, including power for delivering drinking water, produced nearly three-quarters of climate pollution in Cleveland. While Cleveland currently purchases Renewable Energy Credits

(RECs) for our electricity, we need to get 100% of power for City operations from sources that do not create climate pollution to begin with, such as solar, wind, and batteries. **This switch will lower costs, improve health, and cut pollution.**

We also need to prepare the electric grid for more demand from electrifying City buildings and charging electric City vehicles.

We will strengthen Cleveland's public utilities.

The City's public utilities, particularly Cleveland Public Power (CPP) and the Cleveland Water Department (CWD), sit at the heart of this MAP. Delivering water to CWD customers made up one-third of total City operating emissions in 2022, and CPP provided more than 60% of the City's operational power.

Making our public utilities more efficient, modern, and climate resilient will help us meet our climate goals and benefit all Clevelanders, both employees and residents.

We have to convert the City's vehicles to pollution-free options.

City vehicles produced 11% of operational climate pollution during 2022, and the total emissions from these vehicles have barely changed since 2010.

Though the City has slowly begun introducing electric vehicles (EVs) into its fleet, we need to accelerate this transition. Shifting from gas and diesel powered vehicles to EVs will cut emissions and save the City money on fuel and maintenance. This shift will also

benefit the health and well-being of City employees, as pollution from gas and diesel vehicles and equipment negatively affects their health.



Cleveland will be strategic in how it uses its resources to address the climate crisis.

Cleveland will center climate action through all aspects of its government operations, from reviewing its strategic and operational needs, to attracting funding, to purchasing and operating its assets, to disposing of assets at the end of their useful lives.

The City must also be thoughtful in how it uses its resources to support climate justice for its residents by determining which residents are most at risk from the impacts of climate change and targeting funding toward them.



We must invest in protecting City operations from the impacts of climate change.

We know that the City's employees, operations, infrastructure – our roads, bridges, homes, schools, hospitals, and such – are at risk from climate hazards.

Nearly three-quarters of City employees are concerned that climate change will hurt City operations, according to our Climate Risk and Vulnerability Assessment (CRVA) survey.

The impacts of climate change have already affected the City, from severe storms damaging CPP's infrastructure to extreme heat forcing the City to cancel or postpone services.

Actions like hiring staff to focus on climate resilience, improving protections for City employees to keep them safe from climate impacts, and strengthening employee support systems can help protect City operations.

When City employees lead on climate action, communities thrive.



CHAPTER 1

Introduction



The City of Cleveland stands at a pivotal moment in its environmental journey.

Historically, the City has faced significant challenges due to urbanization and industrialization, including widespread deforestation and pollution.

When Congress passed the 1970 Clean Air Act, Cleveland did not meet a single federal air quality standard.

Businesses treated the Cuyahoga River as an open sewer for all manner of chemicals, contributing to at least 13 major fires on the river.

However, Cleveland's environmental story is also one of resilience and action. The City has a proud tradition of environmental leadership, being one of the first to establish a department dedicated to addressing air pollution.¹

As Cleveland moves forward, it has an opportunity to build on these historic successes while continuing to address current environmental challenges. The City's ongoing commitment to sustainability and environmental health is key to ensuring a more resilient and prosperous future for all its employees and residents.

As a result, air quality has improved dramatically, with SO₂ levels falling by nearly 90% since the 1970s.² Water quality has also improved, with the U.S. Environmental Protection Agency (U.S. EPA) removing four of nine beneficial use impairments from the Cuyahoga River.³

In 2019, the City celebrated the 50th anniversary of the 1969 Cuyahoga River fire, marking half a century of progress.

Yet, despite these obvious improvements, climate change threatens to delay or reverse some of these gains.

The repeated incursions of wildfire smoke during summer 2023 and the tornadoes that hit the region during August 2024 hampered City operations, damaged City-owned assets, and negatively affected City employees and residents.

These events and trends are a reminder that climate change constitutes a real and present danger to the City of Cleveland and our ability to provide vital services for our residents.

Fortunately, the City of Cleveland has been working to address climate change for well over a decade, creating the Office of Sustainability in 2005 and publishing the first Municipal Action Plan (MAP)—formerly known as the Sustainable Cleveland Municipal Action Plan (SC-MAP)—in 2013. The MAP has served

as a roadmap for climate progress across City operations for reducing energy consumption, increasing the use of renewable energy and making city-owned vehicles more efficient and less polluting.

Conditions have changed significantly in the past decade, and it is time for the City to update the MAP to reflect the current reality. Recent actions at the federal level have also laid the foundation for success, with the Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA) representing the largest investments in climate action in history. The City has already benefited from these investments, securing tens of millions of dollars in grants and funding from federal and state governments, as well as private sector partners. Cleveland will continue to advocate for retaining and expanding these investments.

Cleveland has the tools and resources available to position itself as a climate leader in the long-term, but we need to act decisively, as becoming a climate resilient city is not guaranteed without this action.

The City of Cleveland has already met its previous 2030 goal of cutting operational emissions by 45% in 2021 (based on 2010

baseline). **This updated plan builds upon that success to help Cleveland cut climate pollution by 63.3% through 2030** with a revised 2018 baseline year and fully decarbonize our operations by 2050, in alignment the updated community Climate Action Plan (CAP).

“

This is the biggest existential crisis of our time. Our response needs to match the severity of the problem we are facing.

— Planning Commission
Employee

”



Implementing MAP actions will not just establish Cleveland as a climate leader nationally; **it will also save the City money, empower employees to embed sustainability in their daily lives, benefit the health and quality of life for employees and residents, and make City operations more resilient to the impacts of the climate crisis.**

The rest of this plan proceeds as follows:

- **Chapter 2** outlines the current state of climate action and sustainability within the City of Cleveland, including a review of greenhouse gas (GHG) emissions from City operations during 2022, an analysis of the main threats that climate change poses to the City, and a discussion of what would happen if we do not implement this plan.
- **Chapter 3** dives into the goals, objectives, and actions that the City is committed to taking that will place us on a path to net zero emissions by 2050.
- **Chapter 4** outlines the ways that the City will implement those actions, as well as how it will track and report out on progress, and
- **Chapter 5** serves as a conclusion.



CHAPTER 2

Current Conditions



Business As Usual (BAU) Scenario

In order to track Cleveland's progress towards meeting its Science Based Targets (SBTs), the Mayor's Office of Sustainability (MOS) forecast greenhouse gas (GHG) emissions through 2030 and 2050. The MAP includes two analyses, a Business as Usual (BAU) scenario, which assumes that current conditions remain constant, and an Implementation scenario, where the City fully implements the climate actions presented in this plan.

To develop this BAU scenario, the City made a series of assumptions, including:

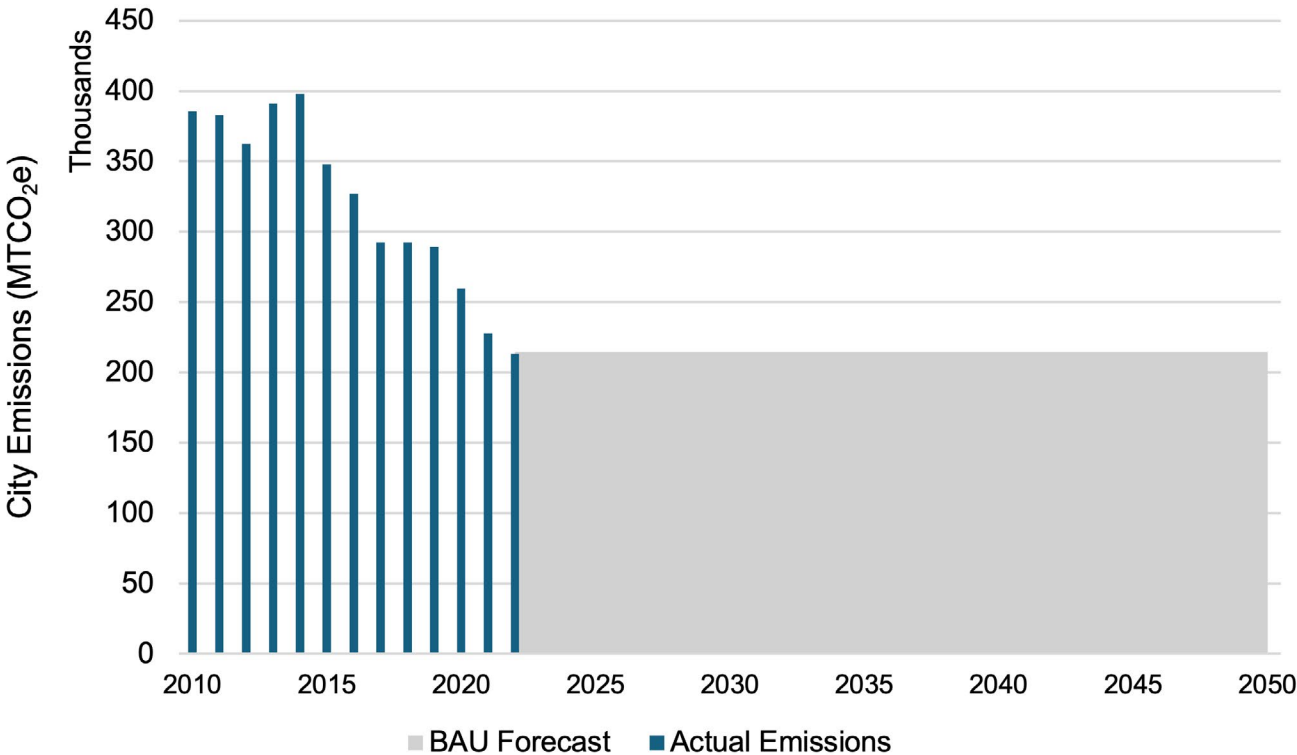
- The number of City of Cleveland employees will remain constant at 2022 levels through 2050;
- The number and type of City-owned and operated facilities will remain consistent, other than the construction of the new Police Headquarters and the Terminal Modernization Development Program (TMDP) at Cleveland Hopkins Airport;
- Electricity, natural gas, steam, and chilled water use will remain constant across City operations;
- Fuel use for transportation will remain constant across City operations;
- The amount of solid waste generated will remain constant across City operations; and
- The amount of water used will remain constant across City operations.

This analysis allows the city to establish a baseline to estimate the potential impacts of implementing climate actions, while also developing plans to meet its climate goals.

The results from the analysis of the BAU scenario are shown below in **Figure 1**. Based on this analysis, GHG emissions would remain constant through 2050. The City is forecast to emit just over 214,000

MtCO₂e annually, which represents a slight (less than 1%) increase over 2022 levels. Emissions would remain approximately 44% and 27% below 2010 and 2018 levels, respectively, through both 2030 and 2050. **Meanwhile, taking the actions outlined in the pages that follow will empower the City of Cleveland to achieve its ambitious SBTs and to reap the benefits of doing so.**

Figure 1: BAU Forecast Results for GHG Emissions through 2050



Greenhouse Gas Inventory

Beginning in 2010, the City of Cleveland has tracked and recorded GHG emissions produced by its municipal operations in order to determine its share of climate pollution emissions occurring in Northeast Ohio each year.

Cleveland organizes its GHG emissions into three scopes, as is recommended by the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC), the standard guidance document for GHG emissions tracking:⁴

- **Scope 1** emission sources consist of natural gas usage, the municipal vehicle fleet, refrigerant usage, and gas purchases;
- **Scope 2** emission sources consist of electricity, steam, and chilled water usage;
- **Scope 3** emission sources consist of employee commuting, municipal financed travel, solid waste production, water usage, and wastewater treatment.

For the creation of the MAP, the City has updated its GHG inventory with data from 2019–2022 in order to determine the quantity of emissions produced, the major sources of these emissions, and where Cleveland stands in the process of

achieving its set climate goals. A more in-depth analysis of the MAP GHG inventory, including an emissions calculation methodology and any updates to these methods made over the years, can be found in Appendix B: 2019–2022 City of Cleveland MAP GHG Inventory Methodology.

Greenhouse Gases (GHGs)

Gases that absorb and trap heat from the sun in the atmosphere, warming the planet. The main GHGs produced by human activities that are warming the planet are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and some fluorinated gases.

GHG Inventory

Tools that communities use to measure, calculate, and assess emissions of GHGs associated with activities and sources occurring within a community.

Source (of GHGs)

An activity type or process that produces GHG emissions. Examples include using electricity to power a computer or burning natural gas to heat your home.

Scope

A way of grouping GHG emissions based on where they occur. Scope 1 emissions occur within the City or organizational boundary. Scope 2 emissions are tied to grid energy use that may or may not happen within the City organizational boundary. Scope 3 emissions occur outside of the City or organizational boundary but are influenced by City or organizational activities.

Sector

Component of the community or economy that is associated with GHG emissions, such as the residential sector or solid waste.

MtCO₂e

Metric ton of carbon dioxide equivalent, a common unit of measurement for tracking changes in GHG emissions. The unit "CO₂e" represents an amount of a GHG whose atmospheric impact has been standardized to that of one unit mass of CO₂, based on the global warming potential (GWP) of the gas.

Cleveland 2022 MAP GHG Inventory

In 2022, municipal operations in the City of Cleveland were responsible for generating 213,178 metric tons of CO₂ equivalent emissions (MtCO₂e). This represents a 45% decrease in emissions from the 2010 value of 385,348 MtCO₂e when emissions tracking began.

Ultimately, the City met its original 2030 emissions goal nine years early during 2021. When using an updated baseline of 2018, this reduction corresponds to a 29% decrease in emissions.

Given this progress, the City has updated its climate targets to align with the citywide targets adopted from the updated Climate Action Plan (CAP). The City is committed to cutting operations related GHGs by 63.3% from 2018 levels through 2030, and to achieving net zero emissions by 2050.

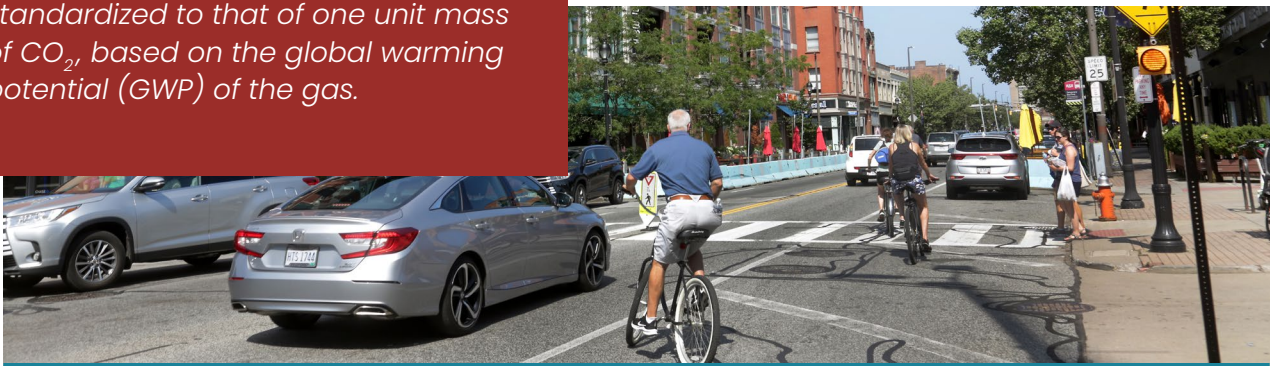
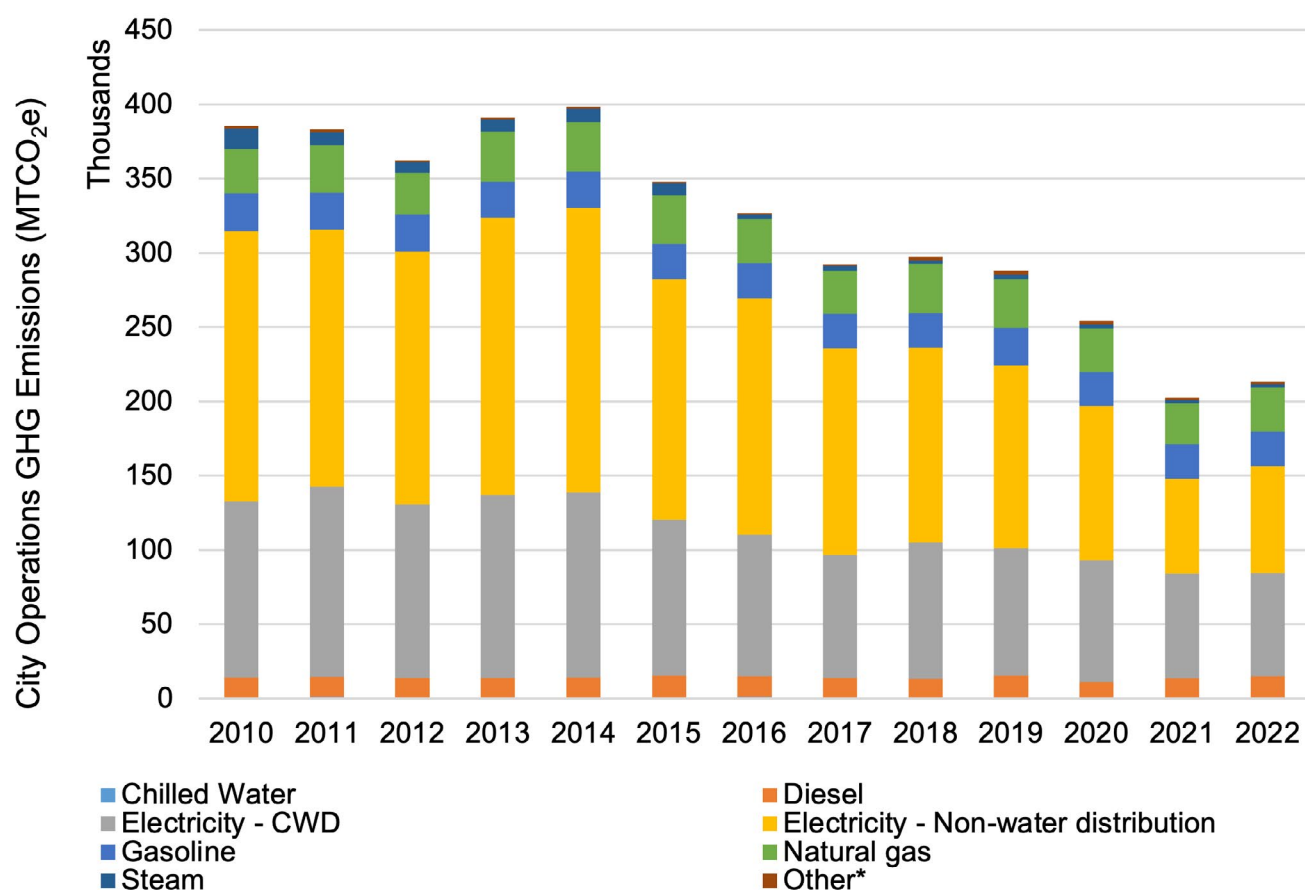


Figure 2, below, demonstrates that the City has experienced a relatively consistent downward trend in emissions since 2014. Cleveland experienced a significant drop of nearly 50,000 MtCO₂e in 2021, due to the effects of the COVID-19 pandemic. A slight rebound in total emissions occurred in 2022, as pandemic restrictions fully loosened and operations returned to normal. Nevertheless, emissions remained 45% below 2010 levels, demonstrating that the City

continued to meet its initial 2030 targets, even after lifting COVID-related mitigation measures.

The largest contributor to overall emissions has consistently been electricity usage. Electricity from all uses (buildings, airports, streetlights, etc.) other than Cleveland Water Department (CWD) distribution made up the single largest emissions source by a noticeable margin until 2020.

Figure 2: City of Cleveland Operations GHG Emissions by Source (2010–2022)



However, water distribution emissions decreased by only 4.4% from 2019 to 2020, while emissions from other electricity usage sources fell by 18%. From 2020–2021, CWD emissions fell by 14%, while non-water distribution emissions fell by over 38%, primarily due to conversion of the city’s streetlights to LEDs. This trend caused GHGs from CWD electricity use to surpass non-water emissions for the first time on record. In 2022, emissions from electricity usage by CWD and non-water distribution were roughly equal, accounting for 32% and 34% of total emissions, respectively.

Cleveland also breaks out its municipal GHG emissions by scope and department. **Figure 3**, below, details the specific 2022 emissions breakdown by scope.

As **Figure 2** makes clear, electricity usage makes up the vast majority of emissions, with scope 2 for nearly 70% of total GHG generation. Gasoline, diesel, and natural gas usage were responsible for virtually all scope 1 emissions in 2022, accounting for 10.7% and 14% of total emissions by source, respectively.

Figure 3: City of Cleveland Operations GHG Emissions by Scope (2022)

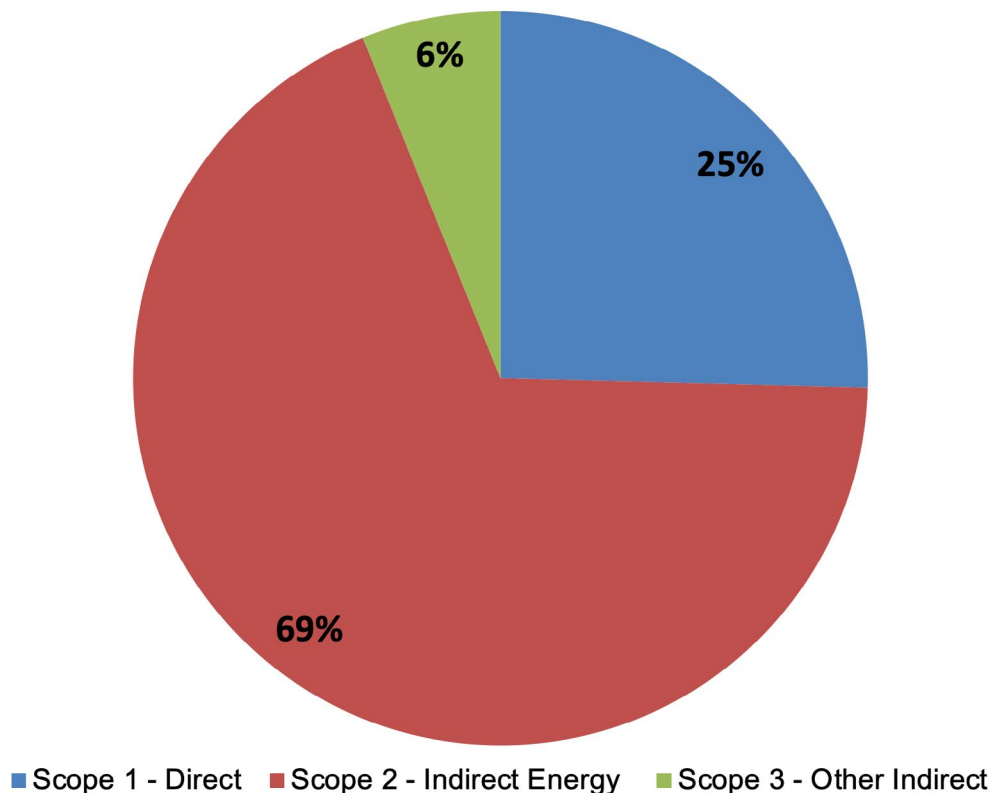
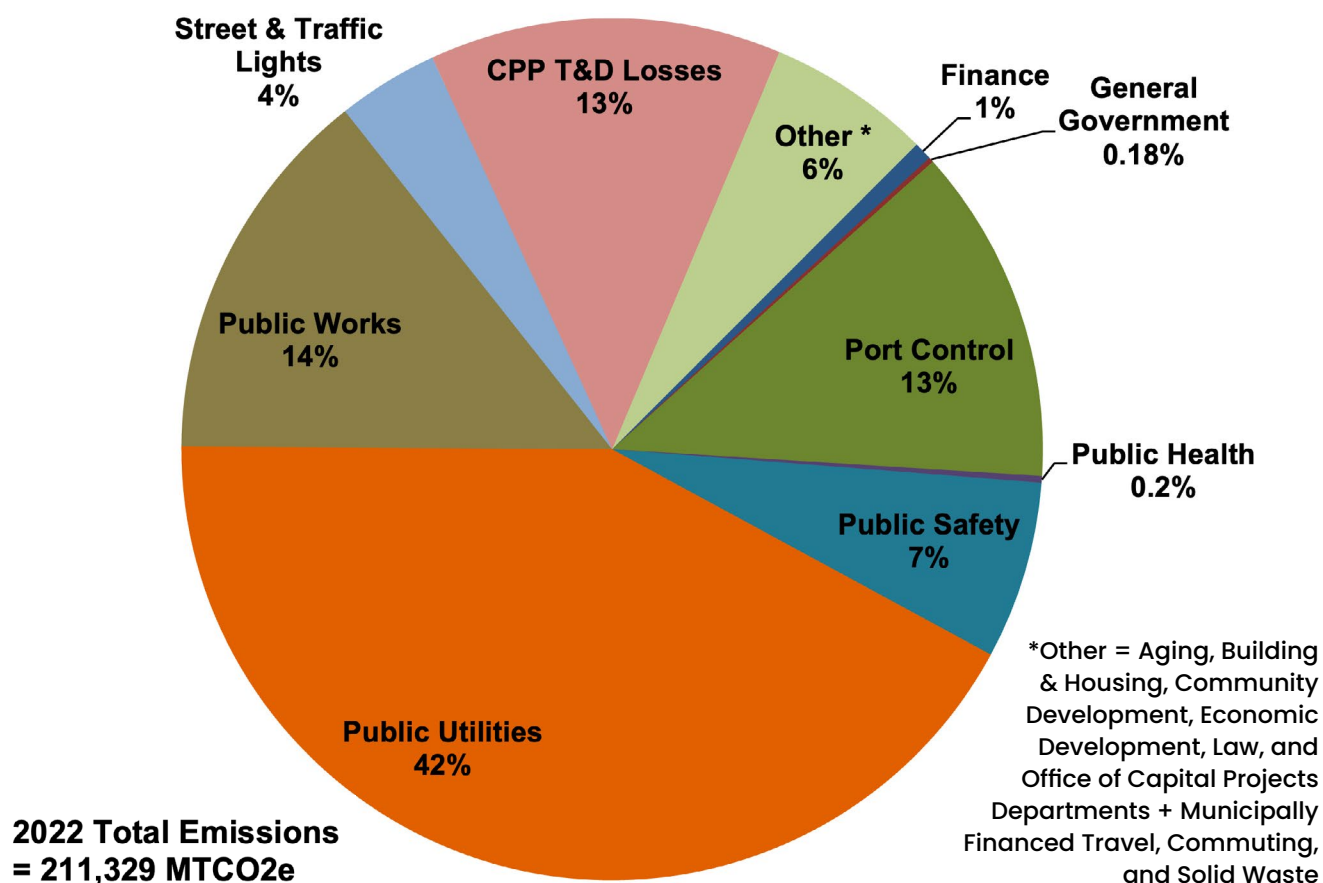


Figure 4, below, details 2022 GHG emissions by municipal department. Given the broad-based use of electricity and natural gas usage by all City departments, emissions in Figure 4 are more evenly distributed. **The departments with the largest shares of emissions during 2022 were the Departments of Public Utilities (55% including Cleveland Public Power's transmission and distribution (T&D) losses), Public Works (14%), and Port Control (12%).**⁵



Figure 4: City of Cleveland Operations GHG Emissions by Department (2022)



Because these three departments are responsible for a combined 82% of Cleveland’s operational GHGs, continuing to invest in energy efficiency and clean energy for their operations will be crucial to achieving the City of Cleveland’s climate targets in the coming years.

The Department of Finance accounts for 1% of total emissions, as it controls 205 St. Clair and the Print Shop, 205 St. Clair being one of the largest energy users among City facilities. (These facilities are soon to be controlled and managed by Public Works).



Assessing Climate Risks & Vulnerabilities

Climate hazards, such as extreme heat, poor air quality, and severe storms are already affecting the City’s ability to deliver services to residents.

Furthermore, because the City depends on over 7,000 employees (who all live in Northeast Ohio) to provide these essential services, it is vital for the City to consider the ways that a changing climate may affect the health and well-being of its employees.

If City employees cannot safely make it to work because roads are flooded or impassable from severe winter weather, suffer health problems from extreme heat, or have to deal with prolonged power outages due to storms and tornadoes, they will also struggle to carry out their essential roles serving the residents and businesses of Cleveland.

To begin addressing this issue, the Mayor’s Office of Sustainability (MOS) developed **the first Climate Risk and Vulnerability Assessment (CRVA) for City operations** beginning in Fall 2023. As part of this effort, MOS staff gathered information on the threats that climate change poses to the operations and employees of the City of Cleveland.

CRVAs represent “a critical component of a city’s climate risk management strategy and form the basis for developing adaptation actions and climate action plans.”⁶ This CRVA draws upon historical data for the region, the most up-to-date climate science and projections, and feedback from City employees to develop a fuller picture of existing and future vulnerabilities. This CRVA informed the development of the actions outlined in this MAP that the City intends to implement to enhance its resiliency.

CRVA Development Process

The City of Cleveland developed this CRVA based upon best practices, including guidance from the Global Covenant of Mayors for Climate and Energy (GCoM) and C40 Cities.⁷ This section discusses the process:

As a first step, MOS first evaluated the risk that City facilities and operations currently face from climate hazards.

- Risk is a function of the probability and consequence of a given hazard.
- Probability defines the likelihood that a climate hazard will affect a community.

In addition to reviewing projected changes in climate hazards, MOS staff consulted with City of Cleveland employees and internal subject matter

Using data from a wide array of sources, including the federal government (e.g. the National Climate Assessment, the National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), the U.S. Environmental Protection Agency (U.S. EPA) and private data providers (e.g. First Street Foundation), **MOS reviewed the risk posed to the City from 10 primary climate hazards:**

- 1. Changes to Lake Erie**
- 2. Changing seasonal conditions**
- 3. Drought**
- 4. Extreme heat/heatwaves**
- 5. Heavy precipitation and flooding**
- 6. Insect infestation**
- 7. Invasive plant species**
- 8. Poor air quality**
- 9. Severe summer storms**
- 10. Severe winter weather**

experts (SMEs). MOS collected survey responses from October 9 – November 17, 2023, with a total of 395 responses from 13 departments. MOS held three focus groups with staff and internal SMEs on November 28 and 30, 2023 and February 5, 2024.

Second, MOS evaluated the likely future risks from these climate hazards, including the likely changes in the frequency and intensity of each hazard over the immediate, short- (by 2030), medium- (2031-2050), and long-term (2051-2100).

Where possible, MOS assessed each climate hazard under both low and high warming scenarios. The low warming scenario used Representative Concentration Pathway (RCP) 4.5, in which global temperatures increase by an average of 1.8°C, while the high warming scenario uses RCP 8.5, in which temperatures increase by an average of 3.7°C.⁸

Third, MOS evaluated the public facilities owned by City entities that are most exposed to and thus potentially vulnerable to climate hazards.

To evaluate which facilities are most vulnerable to different climate hazards, MOS staff analyzed data from Risk Factor, a proprietary model that assesses

the risk of different locations to five climate hazards: air quality, extreme heat, flooding, wildfires, and wind. MOS reviewed Risk Factor scores for every facility and parcel owned by the City and related public entities, including properties owned by the City, City enterprise funds (e.g. Cleveland Public Power, Division of Water, and Port Control), the Cleveland Metropolitan School District (CMSD), and the Cleveland Land Bank, no matter the geographical location.⁹ The City has included all of these parcels in the analysis, as the City exerts some control or oversight over these parcels.

MOS combined Fire Factor, Flood Factor, and Heat Factor scores to identify the most vulnerable City-owned assets. **Table 1**, to the right, identifies the 15 properties at greatest risk.¹⁰



Table 1: City Properties Most Vulnerable to Climate Hazards

Property Name and Address	Fire Factor	Flood Factor	Heat Factor	Total Risk Score
Cleveland Police Department Riverbed Academy 1283 Riverbed Street, Cleveland, OH 44113	1	10	3	13
Hopkins Airport 5300 Riverside Road, Cleveland, OH 44135	1	10	3	13
Brookside Park/Urban Forestry Building 3900 John Nagy Blvd, Cleveland, OH 44112	1	9	3	12
Crown Water Treatment Plant 955 Clague Road, Westlake, OH 44145	1	9	3	12
Fire Station 21 1801 Carter Road, Cleveland, OH 44113	1	9	3	12
Rock & Roll Hall of Fame¹¹ 751 Erieside Street, Cleveland, OH 44114	1	9	3	12
Johnston Parkway Station 4701 Johnston Parkway, Cleveland, OH 44128	1	8	3	11
South High School (Old) 7415 Broadway Ave, Cleveland, OH 44105	1	8	3	11
Forest Hills Pool 12310 Arlington Ave, Cleveland, OH 44108	1	8	3	11
Parcel 10115018 1104 Center Street, Cleveland, OH 44113	1	8	3	11
Cleveland School of the Arts 2064 Stearns Road, Cleveland, OH 44106	1	8	3	11
Central Recreation Center 2526 Central Ave, Cleveland, OH 44115	1	7	3	10
High Tech Academy 2900 Community College Ave, Cleveland, OH 44115	1	7	3	10
Miles Park 4090 East 93rd Street, Cleveland, OH 44105	1	7	3	10
Kennel (Old) 2690 West 7th Street, Cleveland, OH 44113	1	7	3	10
Parcel 10608069 1471 East 66 th Street, Cleveland, OH 44103	1	6	3	9

Fourth, in order to determine which City of Cleveland systems are most vulnerable to climate hazards, **MOS asked City employees to identify the three systems most at risk from each of the 10 climate hazards included in the survey.** Respondents could choose from the following systems (and corresponding City departments/resources):

1. Community/Cultural (e.g. Department of Parks and Recreation, Neighborhood Resource and Community Centers)
2. Ecosystems/Environmental Health (e.g. Division of Air Quality, Urban Forestry)
3. Educational (e.g. Cleveland Metropolitan School District)
4. Energy (e.g. Cleveland Public Power)
5. Food and Agriculture (e.g. Summer Food Service Program)
6. Housing (e.g. Department of Building and Housing)
7. Information/Communications Technology (e.g. internet, 311)
8. Public Health & Safety (e.g. Department of Aging, Department of Public Safety)
9. Solid Waste (e.g. Division of Waste Collection and Disposal)
10. Transportation (e.g. Division of Streets)
11. Water/Wastewater Management (e.g. Division of Water)

Finally, MOS gathered feedback from City employees on what factors they thought were most important for enhancing (or weakening) the capacity of their departments to adapt to the impacts of climate change. Adaptive capacity is the ability of a person, asset, or system to adjust to a hazard, take advantage of new opportunities, or cope with change.¹² Respondents identified the five most important factors from a list of 23 options.



Priority Climate Hazards and Vulnerable Community Systems

According to this feedback, there are four priority climate hazards for the City: Poor Air Quality, Heavy Precipitation and Flooding and Severe Summer Storms, Severe Winter Weather, and Extreme Heat.¹³

Table 2 details the risk scores for each of the 10 hazards the City evaluated, including the average scores for likelihood and consequence. Table 3, in turn, outlines the projected changes to the intensity and frequency of each of these climate hazards in Cleveland due to climate change. It also describes the timeline on which these projected changes are likely to take place.

Table 2: Combined Risk Scores for Climate Hazards in Cleveland

Climate Hazard	Likelihood	Consequence	Total Risk
Poor Air Quality	2.3	2.4	5.6
Heavy Precipitation and Flooding	2.3	2.4	5.5
Severe Winter Weather	2.3	2.2	5.1
Severe Summer Storms	2.3	2.2	5.0
Extreme Heat	2.1	2.1	4.5
Changing Seasonal Conditions	2.1	2	4.0
Changes to Lake Erie	2	2.0	4.0
Drought	1.7	1.8	3.2
Insect Infestation	1.7	1.8	3.0
Invasive Plant Species	1.5	1.6	2.4

Table 3: Projected Changes to Climate Hazard Impacts in Cleveland

Climate Hazard	Intensity	Frequency	Timescale
Poor Air Quality	Increase	Increase	Immediate
Heavy Precipitation and Flooding	Increase	Increase	Short Term
Severe Winter Weather	Decrease	Decrease	Medium Term
Severe Summer Storms	Increase	Increase	Medium Term
Extreme Heat	Increase	Increase	Medium Term
Changing Seasonal Conditions	Increase	Increase	Medium Term
Changes to Lake Erie	Increase (algal blooms) Decrease (ice cover)	Increase (algal blooms) Decrease (ice cover)	Immediate
Drought	Increase	No Change	Medium Term
Insect Infestation	Increase	Not Known	Medium Term
Invasive Plant Species	Increase	Not Known	Medium Term

Short Term: 2030
Medium Term: 2031-2050

As **Table 3** suggests, each of the priority hazards is likely to see an increase in both intensity and frequency over the short- to medium-term, except for Severe Winter Weather.



POOR AIR QUALITY

The City is experiencing climate change's impacts on air quality, as the number of stagnant air days – during which hot, still air parks over an area, leading to a buildup in air pollution has risen to 25 per year by 2021, up from 14 per year in 1973.¹⁴ Levels of ground-level ozone, which irritates the respiratory system and can cause wheezing, shortness of breath, and asthma attacks, rose slightly from 2013 to 2022, reversing a consistent decrease since the passage of the Clean Air Act in 1970.¹⁵

While levels of fine particulate matter (PM_{2.5}) – which is tied to a wide range of health issues from asthma to heart attack to stroke to premature death – have fallen by 37% since the region began monitoring in 2000, the rate of improvement has slowed recently.¹⁶ Research shows that wildfire smoke from outside of Northeast Ohio is contributing to this slowed rate of improvement in pollution levels; the impact of wildfires on air quality in Cleveland was particularly clear during Summer 2023, when the City experienced its worst and second worst air quality days on record on June 28 and June 29, respectively.¹⁷ The air quality challenges on these days upended City operations, forcing the City to cancel all

outdoor work, including waste collection and street maintenance, and suspend outdoor recreation programming, including closing pools and splash pads and canceling summer lunch provision.

Going forward, **it is likely that climate change will further undermine Cleveland's air quality, as daily ozone levels may increase by 1–5 parts per billion (ppb) and up to 10 ppb by 2050 and 2100, respectively.¹⁸** The trend is more unclear for PM_{2.5}, as increased precipitation may reduce pollution under a low warming scenario and increase it under a high warming scenario.¹⁹



HEAVY PRECIPITATION & FLOODING AND SEVERE SUMMER STORMS

Given Cleveland's climate and location along Lake Erie, climate change will make itself felt through an excess amount of water, which can overwhelm the City's aging infrastructure, damaging property and threatening public safety.

Since 1950, annual precipitation in Cleveland has increased by nearly one-third (10.4 inches).²⁰ This additional precipitation is increasingly falling during heavy storms. Since the 1950s, the amount of rain falling during the heaviest 1% of storms has increased by 45% in the Great Lakes region.²¹ Seven of the 12 days in which Cleveland has experienced at least three inches of rainfall have occurred since 2005.²²

Heavy precipitation can trigger flash flooding events, and these events appear to be becoming more common. **Cleveland is a major flood risk, with one in six properties facing at least a 26% chance of being severely affected by flooding in the next 30 years.**²³ Critical public infrastructure, such as airports, hospitals, fire stations, and wastewater treatment facilities, are at an even higher risk.

Severe summer storms are also taking their toll on Cleveland.

From 2013–2022, Cleveland experienced 25 episodes of damaging winds, while another 13 episodes of thunderstorm winds caused additional damages.

Most recently, an EF1 tornado touched down on the East Side over the evening of August 24–25, 2023, and on August 6, 2024, a series of tornadoes significantly affected residents and City-owned infrastructure. Heavy winds knocked down roughly one-third of Cleveland Public Power's feeder lines, leaving thousands without power.



Damage from the August 6, 2024 tornadoes. Courtesy of David Petkiewicz, Cleveland.com.

Climate change will compound these risks further. **Annual precipitation will increase from 52.2 to 86.6 inches by 2100, under a high warming scenario.** Heavy rainfall events will also increase further. The share of precipitation falling in heavy storms could increase by another 20% under a low warming scenario, and

by more than 40% under a high warming scenario in the coming decades.²⁴ The share of properties at flood risk will increase by 8% through 2050, as nearly 60% of the City's roads may become impassable during severe flooding events.²⁵



SEVERE WINTER WEATHER

Severe winter weather, including freezing temperatures and ice and snow, has historically been the most dangerous climate hazard in Cleveland. From 2013 to 2022, the region experienced seven cold weather events that caused property damage, injuries, and deaths. During late January 2019, a cold front plunged wind chills to -31°F , causing \$100,000 in damages and three deaths. Seven residents died due to extreme cold temperatures in February 2021.²⁶

Severe winter weather is highly disruptive for residents and City operations. Snow and ice can make roads impassable, disrupt air travel, interfere with waste collection, and lead to school delays or closures.

While severe winter weather is still common, winters appear to be getting shorter and milder in Cleveland. The Accumulated Winter Season Severity Index (AWSSI) is a composite statistic that combines temperatures, snowfall, and snow depth to measure objectively the relative severity of winter.²⁷ AWSSI scores have decreased in Cleveland since the 1950s. It reached a record low in 2023–2024, and five of the six mildest winters have taken place since 2011–2012.

Over the short-term, rising temperatures and decreased Lake Erie ice cover could increase lake-effect snowfall, which would pose a serious challenge to City operations.²⁸ **Over the longer-term, however, this precipitation will shift towards lake-effect rainfall as temperatures continue to increase and the number of days below freezing declines.** By 2050, the number of days with high temperatures below the freezing mark will decrease by 42–51% under low and high warming scenarios, respectively.²⁹ This number will decline further by 2100.



EXTREME HEAT

While Cleveland's location along Lake Erie has historically buffered it from some of the worst impacts of extreme heat, **the City and its employees remain highly vulnerable to the impacts of this hazard.**

Since 2010, the City has experienced 10.5 hot days (days on which the high temperature reaches or exceeds 90°F) per year, an increase from the 50-year average of 7.8 days per year.³⁰

Record high temperatures have also become more common in recent years. Cleveland registered more daily record high (59) and monthly record high (four) temperatures during the 2010s than any other decade.³¹

While individual hot days are harmful for human health, the risk is greater during heat waves, which are periods of abnormally hot weather lasting two or more days.³² **The frequency, duration, and intensity of heat waves have all increased in Cleveland from 1961–2021.**³³

The City experienced a particularly dangerous early season heatwave from June 17–22, 2024, which was the warmest such stretch during June in the City's history and one of the warmest stretches on record during any month.³⁴ Higher humidity compounds the risks of extreme

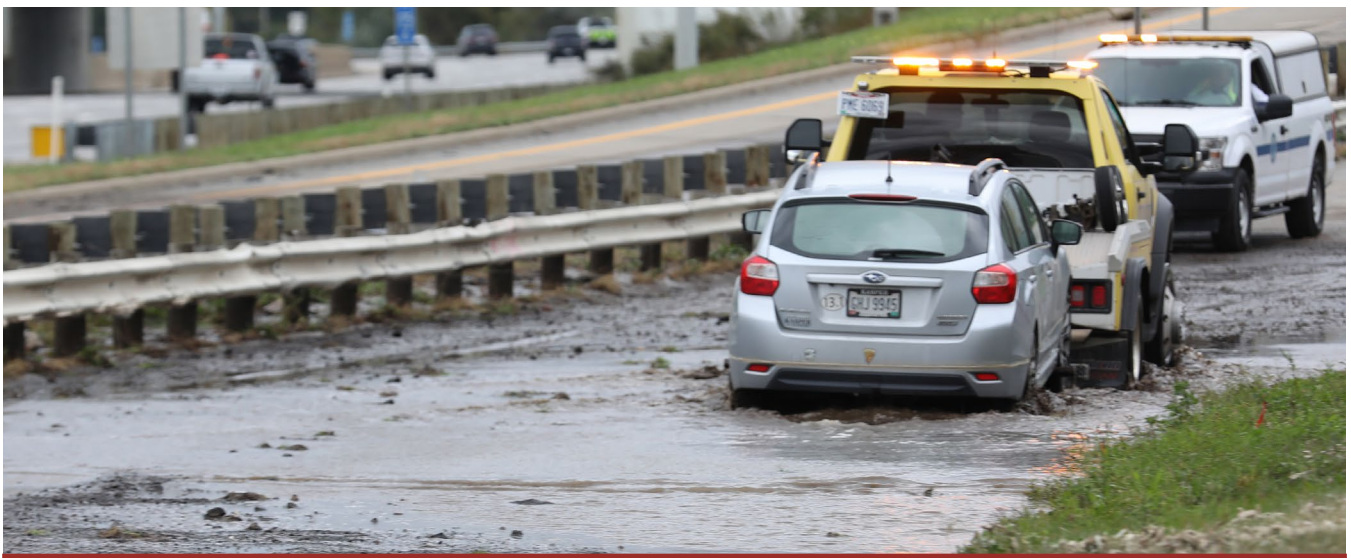
heat. Since the late 1970s, the average daily heat index, which accounts for both heat and humidity has risen from 75.6°F to 79.3°F during May–September.³⁵

Climate change will exacerbate the impact of extreme heat on the City of Cleveland significantly. Under low and high warming scenarios, average daily high temperatures in Cleveland increase to by 5.3°F–6.7°F and 6.8°F–11.8°F through 2050 and 2100, respectively.³⁶ The annual number of 90°F days is projected to increase to 27–34 and 41–82 days by 2050 and 2100, respectively. By the end of the century, Cleveland could experience more days with temperatures above 100°F on an annual basis (4–22) than it has experienced in its recorded history (seven).³⁷ **Such increases in extreme heat will likely take a serious toll on public health in Cleveland; U.S. EPA projects that heat-related mortality could increase by 670% under a low warming scenario and by more than 1,700% under a high warming scenario.**³⁸

Table 4 on the next page outlines the City of Cleveland systems that are most vulnerable to each of the priority hazards, based on the survey and focus groups.

Table 4: Vulnerable Community Systems for Priority Climate Hazards

Climate Hazard	Vulnerable Community Systems
Poor Air Quality	Public Health
	Ecosystems/Environmental Health
	Community/Cultural
Heavy Precipitation and Flooding, Severe Summer Storms	Waste/Wastewater
	Ecosystems/Environmental Health
	Public Health
Severe Winter Weather	Public Health
	Transportation
	Ecosystems/Environmental Health
Extreme Heat	Ecosystems/Environmental Health
	Public Health
	Food and Agriculture



Adaptive Capacity

As part of its survey of City employees, MOS asked respondents to evaluate factors that challenge their individual ability and the ability of their departments to adapt to the impacts of a changing climate. **Employees identified five key adaptive capacity factors affecting the City government, each of which had at least 100 survey responses:**³⁹

1. Access to Basic Services – 153 responses
2. Budgetary Capacity – 144 responses
3. Cost of Living – 106 responses
4. Safety and Security – 102 responses
5. Government Capacity – 100 responses

Each factor addresses one thing that may affect how City employees and their departments adjust to and cope with a changing climate.

For access to basic services, which was the top ranked factor, several survey respondents called for the City to provide additional flexibility and support to employees affected by climate hazards, including allowing remote work and providing financial assistance to employees. The City could adopt stronger labor protections to protect its employees from priority climate hazards. A number of survey respondents expressed support

for such protections. Respondents also called for prioritizing climate action when evaluating City resources as a way of addressing the budgetary capacity factor.

By identifying the highest priority factors, the City of Cleveland can better understand where to target interventions that will enhance the resilience of both its employees and its operations to priority climate hazards.





CHAPTER 3

Roadmap to Net Zero Emissions



The Mayor's Office of Sustainability (MOS), in partnership with dozens of employees from across City departments, has developed this action plan to slash City operating emissions by 63.3% through 2030, achieve net zero emissions by 2050, and make City operations resilient to the impacts of climate change.

This action plan includes 16 goals and 70 concrete actions divided across six focus areas.

Focus Areas are the main organizing structure of the Municipal Action Plan. Each focus area relates to a significant component of climate action that is key to addressing the climate crisis in Cleveland. The six focus areas are:

- Built Environment
- Clean Energy
- Clean Transportation
- Resilience and Empowerment
- Resource Management
- Water and Green Space

Within each **Focus Area**, the City of Cleveland has identified a set of goals and actions which define the steps the City will take to address climate change through 2030 and beyond.

Goals are broad vision statements that outline the desires Clevelanders have for each focus area. They are both aspirational and clear enough to allow the City to track its progress over time and to ensure we are moving in the right direction.

Actions are clear, specific, actionable steps that the City can take to put itself on the path to meeting our goals. The City of Cleveland has analyzed each action using the Evaluative Framework discussed in this section.

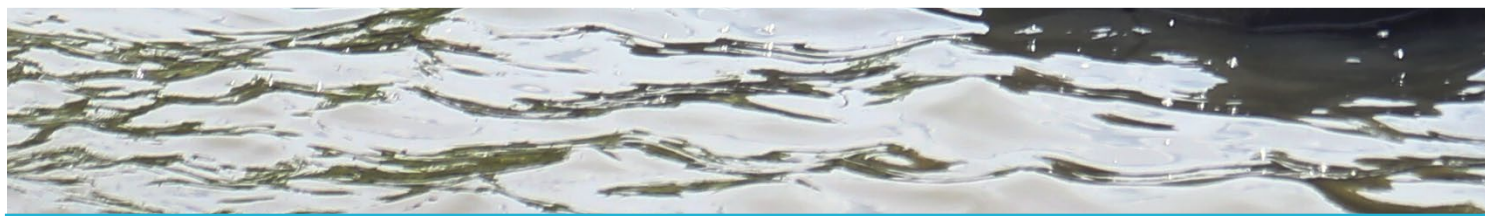
In addition, MOS worked with the Mayor's Administration to identify **Mayoral Priority actions within each Focus Area that the City will focus on implementing immediately.** These actions closely align with the City's Strategic Plan, and the City will place additional emphasis on implementing these actions in the next few years.

Evaluating Climate Actions

The City of Cleveland created an evaluative framework to help it review, score, and rank potential actions that it was considering for this MAP. The Mayor's Office of Sustainability reviewed the 2013 MAP, other relevant City plans, and climate plans from a number of peer cities to determine which components were most relevant and important for the City to include in its framework.

The framework that the City of Cleveland used to review the climate actions in this plan, grouped 17 individual factors into four categories:

- 1. Impact:** to what extent can each action reduce GHG emissions over both the short-term (by 2030) and long-term (by 2050);
- 2. Funding:** what are the upfront costs and cost savings for the City, and is there funding available to help pay for implementing each action;
- 3. Feasibility:** how likely is it that the City of Cleveland can implement each



action readily, does each action align with other plans and priorities within the City, and have City departments expressed support for each action; and

- 4. Action Co-Benefits:** how likely is it that each action will deliver important benefits besides GHG reductions, such as enhancing equity, empowering employees, improving resilience, supporting local businesses, and benefiting public health and well-being.

The City of Cleveland reviewed the actions that City employees and departments proposed for each of the six focus areas and scored them out of a potential 50 total points.

In addition, the City identified whether each action aligned with Mayoral priorities, as expressed through the City Strategic Plan.⁴⁰

For a complete listing of all actions that the City evaluated, along with their scores, please review Appendix A.



Table 5: MAP Goals by Focus Area

Built Environment – 73k MtCO₂e reduced by 2030
Embed sustainability, including circularity and decarbonization, into the design, construction, maintenance, and operation of city facilities.
Invest in energy efficiency and energy conservation to reduce building energy use by 50% by 2030 and establish annual targets to track progress.
Electrify 100% of city-owned buildings by 2040, with interim targets of 25% by 2030, and 50% by 2035.
Clean Energy – 63.5k MtCO₂e reduced by 2030
Significantly expand the installed capacity of renewable energy on city controlled properties and facilities to ensure that 100% of City operations-related energy comes from renewable sources by 2045, with interim targets of 75% by 2035, and 90% by 2040.
Implement processes to increase efficiency, reduce costs, and enhance the reliability of City energy assets.
Clean Transportation – 4k MtCO₂e reduced by 2030
Establish systems and policies to reduce unnecessary vehicle trips.
Shift employee commuting trips to alternative modes to reduce vehicle miles traveled (VMT) by 15% by 2030.
Decarbonize the City’s vehicle fleet by 2045, with interim target of 50% by 2030.

Resilience & Empowerment

Enhance the resilience of City-owned assets to the impacts of priority climate hazards.

Minimize the impacts of climate change on City employees and partners in order to enhance the resilience of City operations.

Empower City of Cleveland employees and elected officials to advance climate action in their daily lives.

Resource Management - <1k MtCO₂e reduced by 2030

Embed circularity throughout City operations in order to reduce waste, lower costs, and minimize pollution.

Identify and secure sustainable funding to enable the achievement of Cleveland's climate targets.

Develop processes to ensure that City resources and funds directly advance decarbonization and climate justice throughout Cleveland.

Water & Green Space

Promote conservation and enhance water use efficiency to reduce water use 50% by 2030.

Expand the use of nature-based solutions and green infrastructure to enhance resilience while also reducing climate pollution.

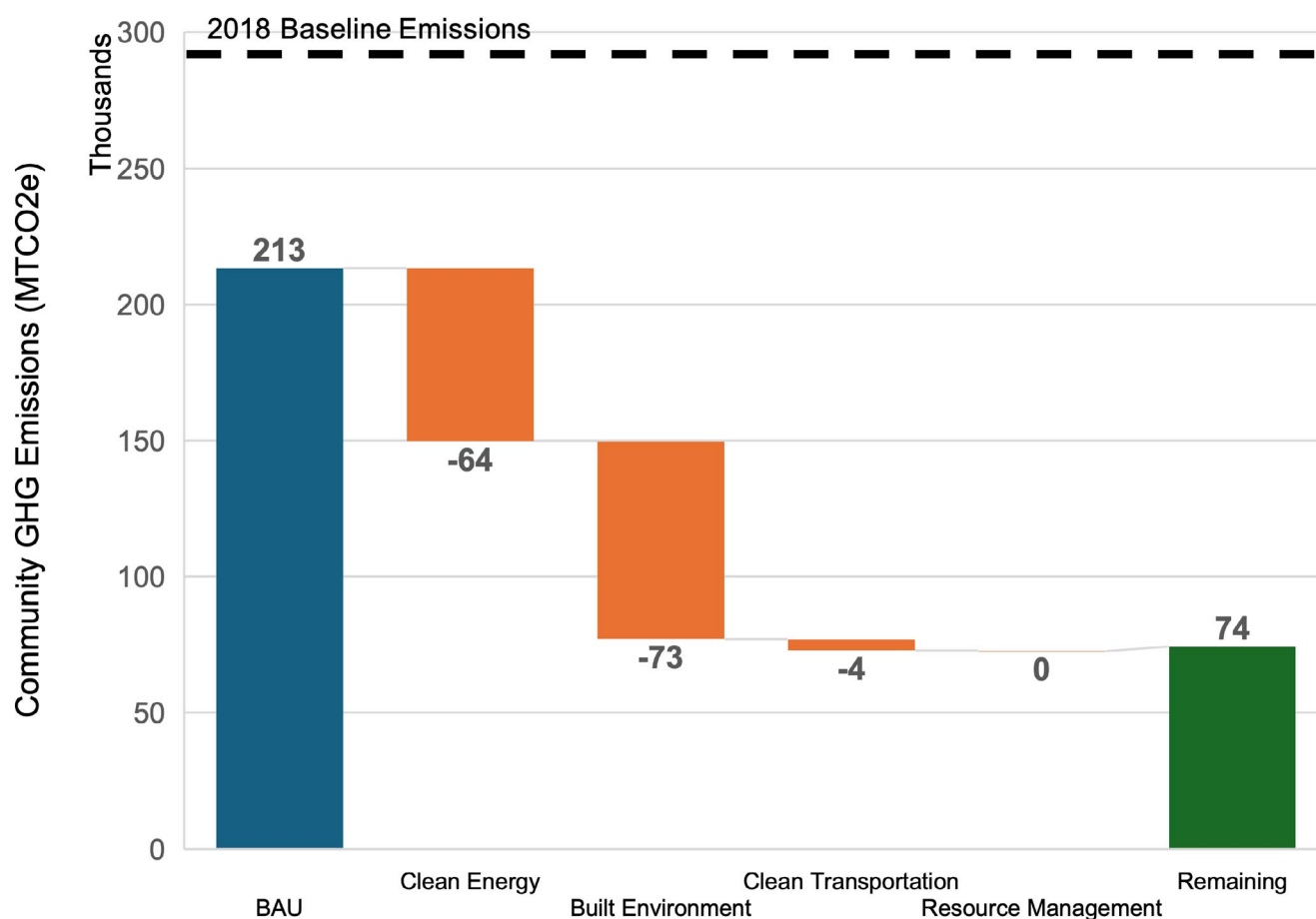
Impact and Benefits of the MAP

Overall, this MAP will cut GHG emissions by 65% and 93% by 2030 and 2050, respectively, from 2018 levels. Figures 5 and 6, in the following pages, break down the GHG reductions by MAP focus area for 2030 and 2050. **Figure 7** shows the GHG reductions from each of the MAP objectives.

Implementing these actions will enable the City to achieve its SBT through 2030, but they leave the City slightly short of achieving net zero emissions by 2050, as shown by the “remaining” column in **Figures 6**.

The City can expect that actions outlined in the community Climate Action Plan (CAP), such as the shift to personal EVs, expansion of public transit and active

Figure 5: GHG Emissions Impact by Focus Area (2030)



transportation, and the use of low-carbon aviation fuels, will help to eliminate many of these remaining GHGs. Compared to the BAU scenario, outlined in Chapter 2, these actions would prevent the release of nearly 4.2 MMtCO₂e through 2050. Combined, these emissions savings would generate social benefits of more than \$877 million.⁴¹



Figure 6: GHG Emissions Impact by Focus Area (2050)

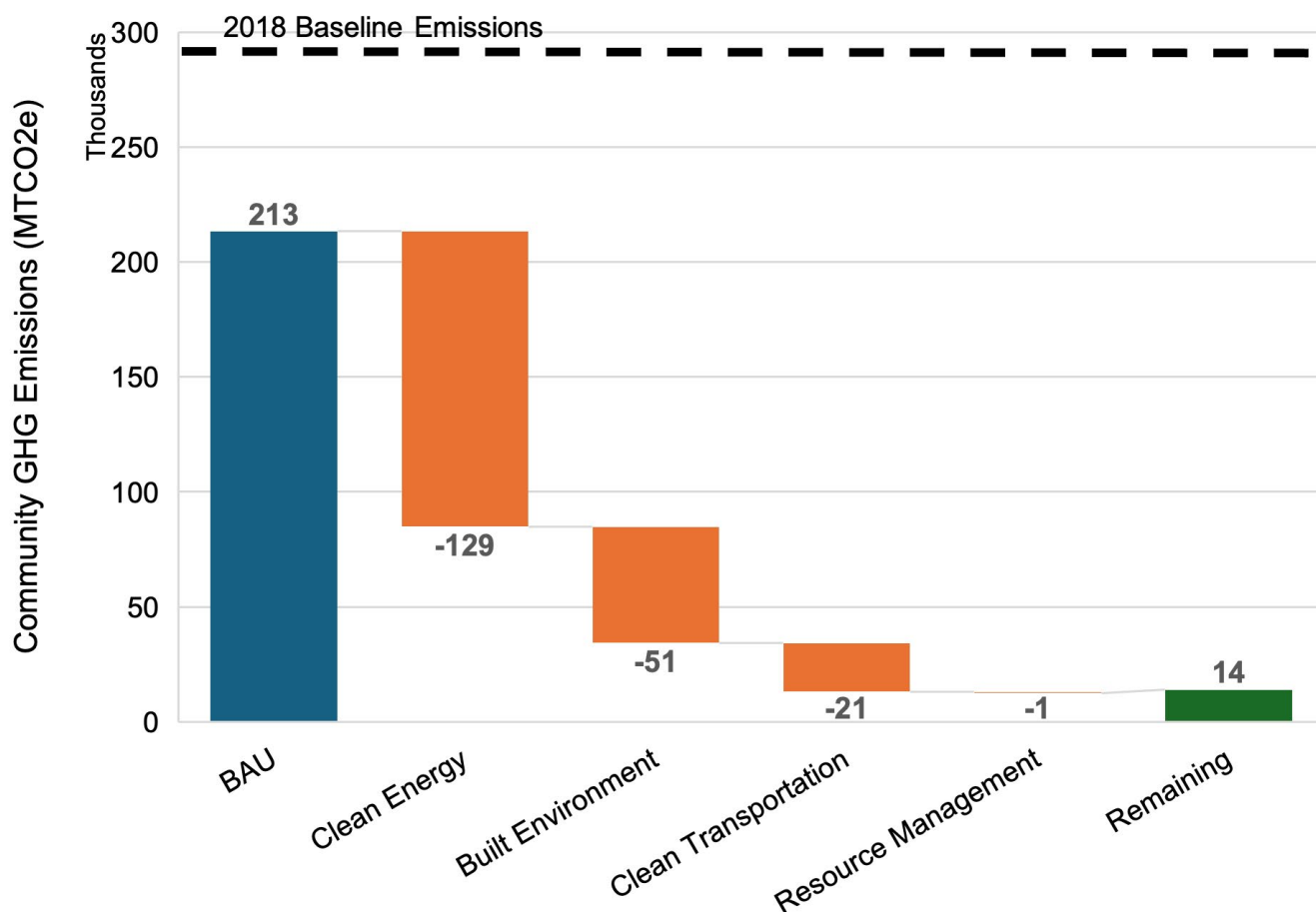
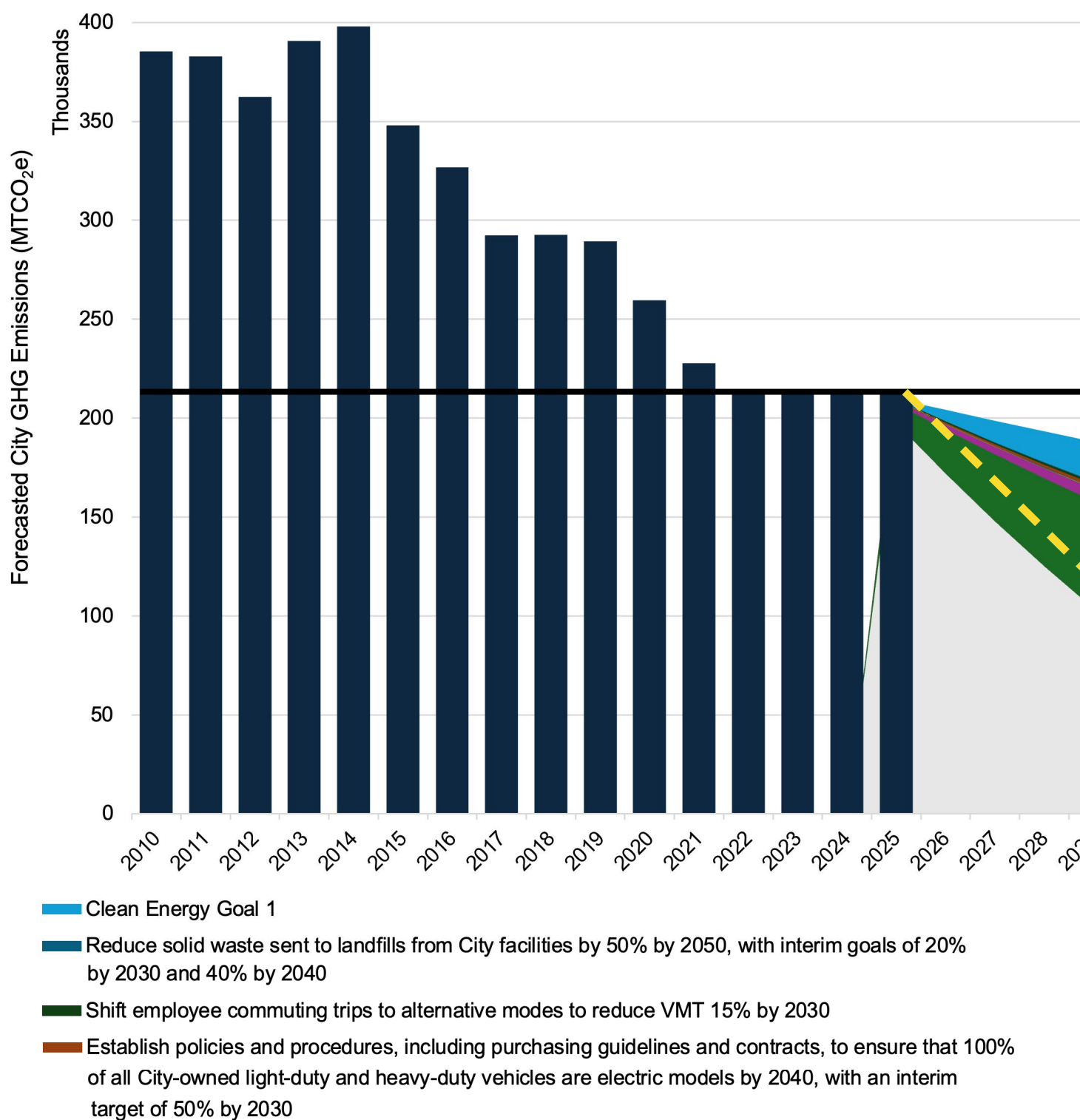
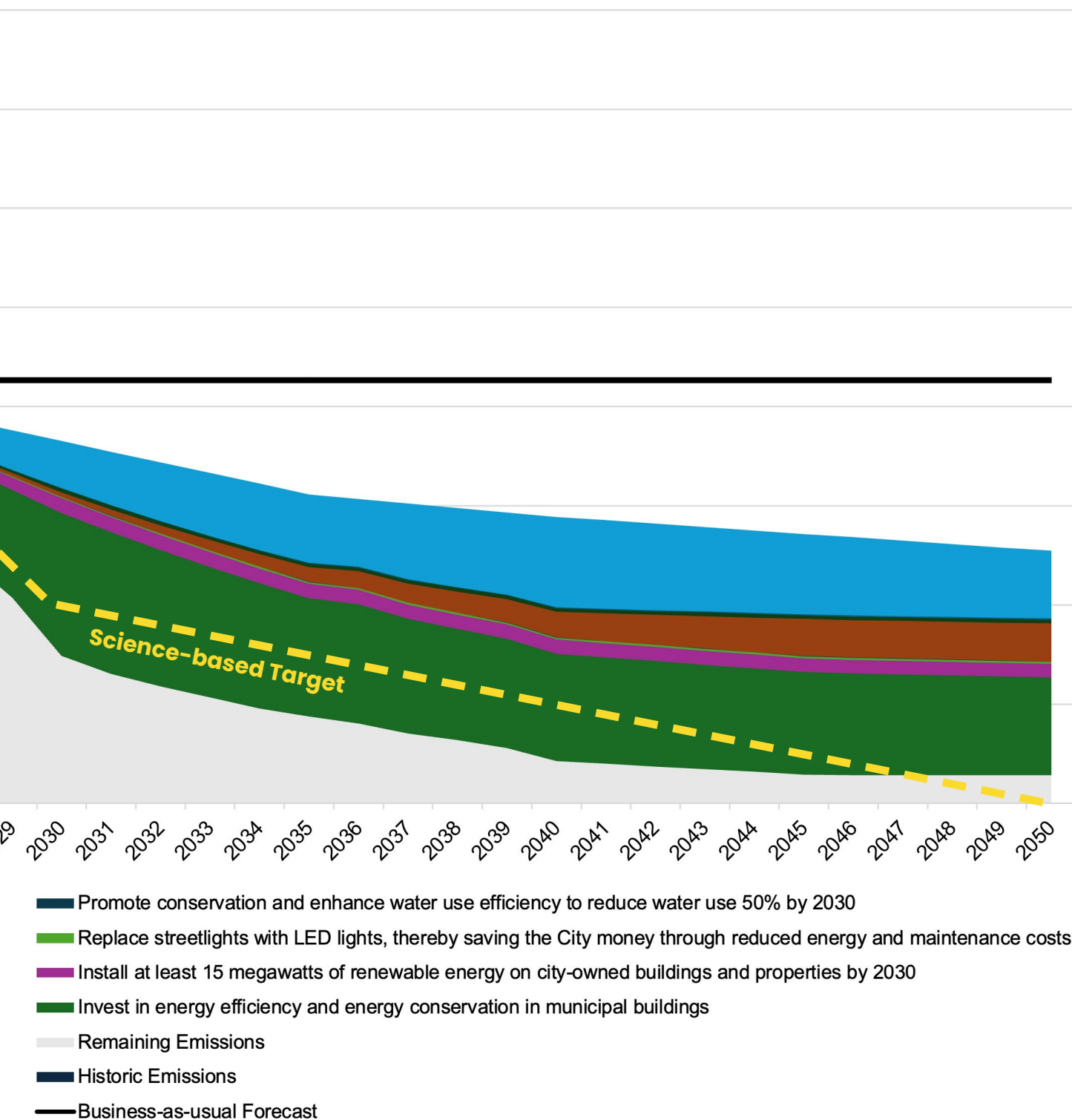


Figure 7: Projected GHG Savings from Cleveland MAP Actions through 2050





Co-Benefits of the MAP

While reducing GHG emissions and increasing resilience are the primary focuses of this plan, they are far from the only benefits of climate action.

Based on available data, the City has estimated the potential financial savings of MAP actions from energy and operational costs. **By enhancing energy and water use efficiency and investing in electrification, the City will reduce the total amount of energy it uses for its operations and reduce its maintenance costs, saving taxpayers millions of dollars and freeing up funds for more pressing needs.**



Co-Benefits

Shifting away from fossil fuels and reducing the vulnerability of City operations to climate hazards provides a number of co-benefits, including:

- Improving air, water, and soil quality;
- Reducing energy costs, particularly for electricity, heating, and transportation;
- Making residential and commercial buildings more comfortable and healthier;
- Strengthening the economy by keeping more money in Northeast Ohio and creating good, green jobs;
- Enhancing mental health by addressing external stressors and lowering climate change-related anxiety;
- Reducing traffic crashes by encouraging people to use alternative travel modes; and
- Minimizing habitat loss/ providing additional habitat for plant and animal species.

Table 6, below, outlines the energy and cost savings associated with MAP actions. Because electricity is significantly more efficient than fuel combustion (e.g. natural gas boilers, gasoline and diesel vehicles) in modern space and water heating applications such as air and ground source heat pumps, the City will use considerably less total energy, even as its electricity demand increases from the electrification of its equipment.

Due to improved energy efficiency and building electrification, City buildings will consume 28% and 45% less energy through 2030, and 2050, respectively, if the City fully implements the MAP.

Vehicle electrification will produce similar results, as the City's vehicle fleet will require 6% and 37% less total energy by 2030 and 2050 due to vehicle electrification. In total, MAP actions have the potential to lower City operating costs by nearly \$32 million through 2030.

Table 6: Total Energy and Cost Savings from MAP Actions through 2030

Focus Area	Total Energy/ Water Savings from BAU Scenario through 2030	Average Annual Cost Savings through 2030	Total Cost Savings through 2030
Built Environment	28%	\$3.4 million	\$23.3 million
Clean Transportation	6%	\$0.6 million	\$4.4 million
Water & Green Space	40%	\$0.6 million	\$4.2 million
Total		\$4.6 million	\$31.9 million

In addition, the City has worked to quantify the air quality benefits of reducing GHG emissions using U.S. EPA's CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool.⁴² **Table 7**, on the following page, outlines the air quality benefits associated with the actions identified in

this MAP through 2030 and 2050. These estimates represent a range of annual benefits compared to the BAU scenario, benefits that would not occur without these additional climate actions. **The City of Cleveland would continue to reap these benefits every year from 2030 and 2050 on.**



Table 7: Estimated Annual Public Health Benefits from Air Quality Improvements due to Implementing MAP Actions

Emissions Reduction (Year)	Avoided Asthma Attacks	Avoided Work Loss Days	Avoided Lost Schooldays	Total Health Benefits (Low)	Total Health Benefits (High)
65% Reduction (2030)	383	48	135	\$8.8 million	\$15.6 million
93% Reduction (2050)	689	86	243	\$15.9 million	\$28 million

The results in Tables 6 and 7 demonstrate that the City of Cleveland would benefit considerably from climate action. They also illustrate the significant impacts that reliance on fossil fuels place on the financial and physical health of City employees and residents. The combined co-benefits of implementing these MAP actions will likely offset implementation costs, as research suggests that **the public health benefits from improved air quality and reduced extreme heat are 5 to 25 times larger than the costs of climate action.**⁴³

The following sections delve into the goals, objectives, and actions for each Focus Area in detail. **They provide an overview of the challenges the City faces in each area, the progress we have made since the original MAP was published in 2013, and the GHG reductions and co-benefits associated with the actions.** For a complete breakdown of each action, including key implementing actors, funding sources, implementation timeline, its overall evaluation score, and Mayoral Priorities, please review Appendix A.

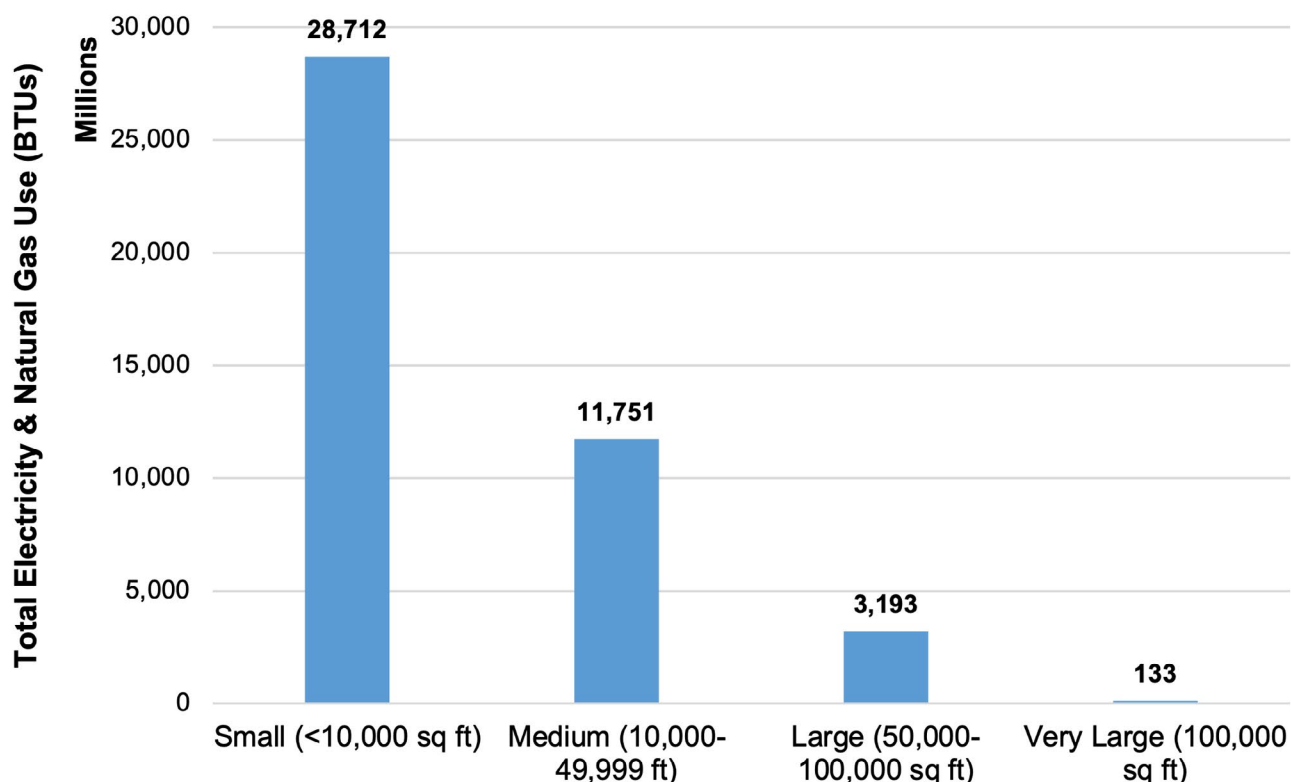
BUILT ENVIRONMENT

The built environment, which describes any human-made or modified structures where people live, work, play, recreate, or socialize, is central to this MAP.

Buildings represent a significant opportunity for Cleveland to reduce GHG emissions and improve sustainability in municipal operations. City facilities account for the vast majority of the

City's operational energy use and half of emissions during 2022. Since 2010, energy use (non-water distribution electricity, natural gas, chilled water, and steam) from buildings, including airports, accounted for 57% of total GHGs across City operations. **Figure 8** shows total energy use, in millions of British thermal units (MMBtus) across City-owned buildings, broken down by building size.

Figure 8: Total Energy Use by Building Size (2022)



As the chart suggests, small buildings accounted for nearly two-thirds of total energy use during 2022.

Electricity use is the largest source of energy use and GHG emissions from City-owned buildings. Due to investments in energy efficiency and conservation, this share has decreased, falling to 69% in 2022 from 80% in 2010. This trend may reverse in the coming years, because rising temperatures and the shift towards building electrification will increase electricity demand for City operations.

By integrating principles of sustainability, energy efficiency, and electrification into the design, maintenance, and renovation of City-owned facilities, Cleveland

can lead by example in combating climate change while reducing costs and improving public health. The City has made substantial progress in this area over the past decade. Going forward, building electrification will be a centerpiece of the effort to advance decarbonization in the Built Environment, as it both eliminates emissions associated with natural gas use and increases the efficiency of City operations. Replacing a gas furnace with an electric heat pump, for instance, can cut building energy use and GHG emissions by nearly 40% on its own.⁴⁴ **Focusing on improving operational efficiency will also allow the City to cut waste and reap cost savings in other areas, including water use and solid waste generation.**

KEY FACTS

- Municipal buildings were responsible for 50% of total City operational GHG emissions in 2022, primarily driven by fossil fuel-based energy use.
- HVAC systems in city-owned facilities often rely on outdated technology, contributing to higher energy consumption and poor indoor air quality.
- Cleveland's municipal buildings currently lack comprehensive decarbonization plans, with only limited use of renewable energy technologies.
- Renovation projects in City facilities present opportunities to align with sustainability and decarbonization goals while addressing community needs for health, equity, and resilience.

CHALLENGES

- Older facilities have inefficient building envelopes and outdated energy systems, increasing operating costs and emissions.
- The City continues to struggle with a lack of sufficient funding and policies to prioritize comprehensive energy efficiency upgrades in high-impact municipal facilities.
- Electrification efforts are constrained by aging infrastructure and the limited availability of renewable energy solutions in certain facility types.
- Many municipal properties are located in heat-vulnerable areas with insufficient shade structures, exacerbating heat risks for employees and visitors.

SUCCESS STORIES

Cleveland has committed to achieving a 50% reduction in building energy use intensity (EUI) from 2018 levels by 2030. From 2010 to 2022, **GHG emissions from buildings fell by 54%**, due to energy savings and a reduction in the carbon intensity of electricity.

The Bibb Administration has **prioritized sustainable building practices** by elevating decarbonization as a core focus in Cleveland's infrastructure projects, including the Cleveland Police Headquarters and the Hopkins Airport Terminal Modernization Development Project.

HVAC upgrades in select municipal facilities have already **demonstrated improved indoor air quality** and reduced energy costs.

Due partly to improvements in energy and water use efficiency, **the City saved approximately \$3.4 million** in 2022 in total utility costs, compared to 2010.

GOALS

1. Embed sustainability, including circularity and decarbonization, into the design, construction, maintenance, and operation of city facilities.
2. Invest in energy efficiency and energy conservation to reduce building energy use by 50% by 2030 and establish annual targets to track progress.
3. Electrify 100% of city-owned buildings by 2040, with interim targets of 25% by 2030, and 50% by 2035.

BENEFITS

- \$23.3 million in total energy cost savings through 2030.
- 28% reduction in building energy use by 2030, 45% reduction by 2050.
- 73,000 MtCO₂e reduced by 2030.



Climate change affects every aspect of operations at West Side Market, from our vendors' agricultural products to the building systems that need to be operable to keep the Market open.

— Department of Public Works Employee

GOAL 1

Embed sustainability, including circularity and decarbonization, into the design, construction, maintenance, and operation of city facilities.

MAYORAL PRIORITY ACTION 1

Update and enhance the existing Sustainable Building Policy.

Review, update, and enhance the City's existing Sustainable Building Policy to require all new construction and major renovations to City buildings to achieve climate emissions reductions.

Office of Sustainability, MOCAP, Division of Property Management, Department of Public Works, Department of Building and Housing, Department of Port Control

ACTION 2

Develop a sustainability punch list for all new construction and renovation projects to guide project development.

The Office of Sustainability will coordinate an effort to create a comprehensive sustainability punch list to guide all new construction and renovations of city-owned facilities to ensure they align with decarbonization and sustainability goals.

Office of Sustainability, MOCAP, Division of Property Management, Department of Public Works, Department of Building and Housing, Planning Commission, Department of Port Control

ACTION 3

Improve Indoor Air Quality.

Upgrade HVAC, ventilation, and air filtration systems in City-owned buildings, particularly neighborhood resource and community centers (NRCCs), in order to improve indoor air quality.

Division of Air Quality, MOCAP, Division of Property Management, Department of Public Works, Department of Building & Housing, Department of Port Control

ACTION 4

Shade Structure Requirements.

Require shade structures on all City-owned properties, particularly in communities with below average tree canopy and high heat risk.

Department of Building and Housing, Office of Sustainability, MOCAP, Urban Forestry

ACTION 5

Identify climate action priorities for all leased spaces.

Create a list of priorities for reducing climate pollution and/or enhance climate resilience that the City can negotiate into leases for all leased City offices/facilities.

Division of Property Management, Office of Sustainability, Department of Law, Division of Real Estate

GOAL 2

Invest in energy efficiency and energy conservation to reduce building energy use by 50% by 2030 and establish annual targets to track progress.

MAYORAL PRIORITY ACTION 6

Establish “worst first” policy to make energy efficiency upgrades in city-owned facilities.

Prioritize buildings with the highest energy use intensity (EUI) for efficiency upgrades/investments. The City may also prioritize buildings that are used more intensively (e.g. fire and police stations).

Division of Property Management, Office of Sustainability, MOCAP, Department of Finance

ACTION 7 Develop building performance standard (BPS) for city-owned facilities.

Create a BPS for all city-owned buildings that prioritizes highest impact buildings first (e.g. emissions reductions, cost savings), use benchmarking to track progress on reducing EUI, and report progress on at least an annual basis.

Division of Property Management, Office of Sustainability, Department of Building and Housing



We need better HVAC in all City buildings and an increased use of public recreation centers during extreme heat or cold.

— Department of Law Employee

ACTION 8

Conduct energy audits of facilities with highest baseline EUIs.

Complete comprehensive energy audits of the City-owned facilities with the highest baseline EUIs in order to identify priority efficiency upgrades.

Division of Property Management, Office of Sustainability, Department of Port Control

GOAL 3

Electrify 100% of city-owned buildings by 2040, with interim targets of 25% by 2030, and 50% by 2035.

ACTION 9

Develop a building electrification strategy.

Assess City-owned properties to prioritize buildings for electrification upgrades by 2030.

Division of Property Management, Office of Sustainability, MOCAP, Cleveland Public Power, Department of Port Control

ACTION 10

Assess city-owned facilities to install ground-source heat pumps.

Identify city-owned properties that are prime candidates for installing ground-source/geothermal heat pumps to take advantage of the Investment Tax Credit. Priority properties include large facilities that serve the public and lack air conditioning (e.g. NRRCs).

Division of Property Management, Office of Sustainability, MOCAP

CLEAN ENERGY

The City of Cleveland is committed to powering its municipal operations with clean energy, ensuring a healthier, more equitable, and resilient future for its employees and residents.

Without transitioning the energy used to heat, power, and sustain city operations to entirely carbon-free sources, Cleveland cannot meet its climate targets. Recognizing this, clean energy serves as the foundation for the MAP.

Electricity use accounted for the majority of GHG emissions from city operations in 2022, consistent with previous years. From 2010 to 2022, electricity was responsible for three-quarters of citywide GHG emissions, underscoring the critical role of clean energy in Cleveland's decarbonization strategy. Notably, GHG emissions from electricity dropped by 53% during this span, driven by a shift towards clean energy for electricity generation. These reductions in electricity emissions accounted for nearly all (91%) of Cleveland's total GHG emission cuts since the City began tracking GHGs in 2010.

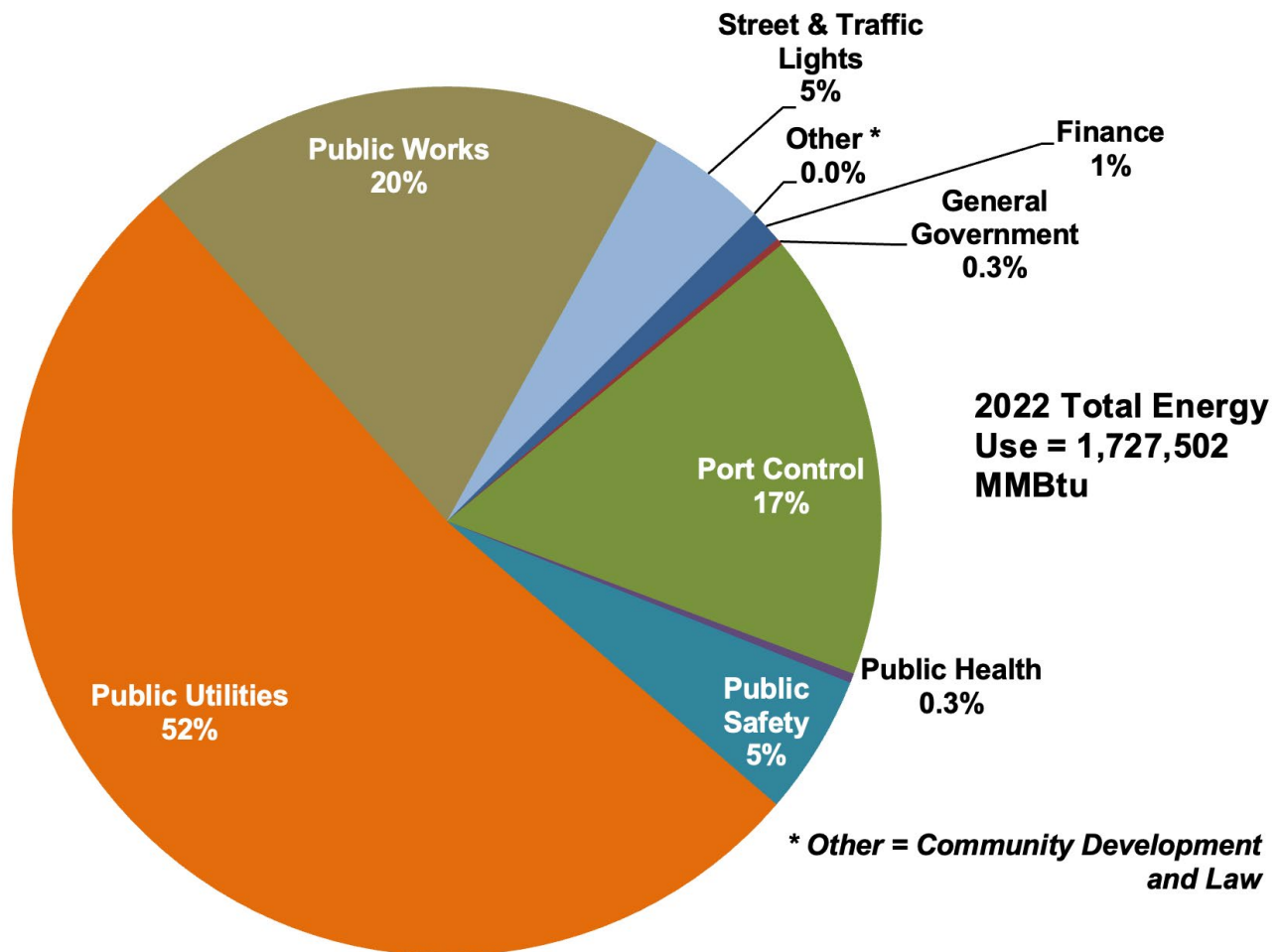
This MAP outlines a clear and strategic pathway for transforming city operations

to embrace clean energy. Through the implementation of energy efficiency measures, adoption of renewable energy sources, and integration of innovative technologies, Cleveland's municipal operations will set the standard for clean energy leadership.

Clean energy is not only an environmental necessity, it is a practical and forward-thinking solution for lowering operational costs, improving public health, and driving economic growth within the city.



Figure 9: City Operations Energy Use by Department (2022)



Clean energy sources have emerged as the lowest-cost options for new energy generation in recent years. According to the International Energy Agency (IEA), solar power is now the cheapest form of electricity in history, prompting energy markets to transition from fossil fuels to renewable energy sources.⁴⁵

To meet the City’s climate targets and power municipal operations sustainably, this MAP emphasizes accelerating access to clean electricity. Cleveland must lead by example in the transition to carbon-free energy sources, and **this plan outlines actionable steps to ensure municipal operations align with Cleveland’s broader clean energy and decarbonization goals.**

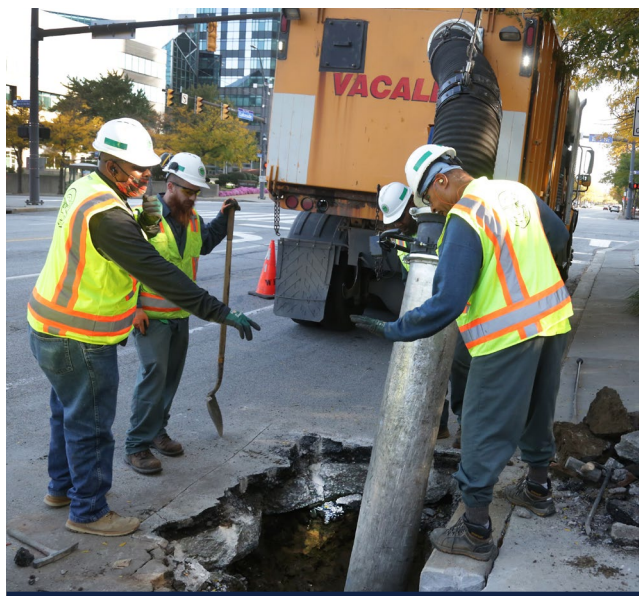
KEY FACTS

- In 2022, Cleveland's municipal operations consumed a total of 1,727,502 million British thermal units (MMBtu) of energy, a 15% reduction from 2010.
- The Department of Public Utilities accounted for 52% of municipal energy use during 2022, followed by the Departments of Public Works (20%) and Port Control (17%).
- Street & Traffic Lights were responsible for 5% of the total energy use during 2022.
- Natural gas use for heating made up the second largest source of energy use (33%) and GHG emissions (14%).

CHALLENGES

- The majority of electricity (61%) used in Cleveland comes from fossil fuels.
- FirstEnergy, which provides nearly 40% of the electricity used in City buildings, rolled back its goal of reducing its GHG emissions by 30% through 2030, due to its continued reliance on coal-fired power.
- It takes multiple years, on average, to connect clean energy to the electricity grid in Ohio, making it difficult to replace fossil fuels with cleaner electricity. This trend has also made electricity prices more unpredictable, leading to multiple price spikes for Clevelanders.
- The Lake Erie Energy Development Company (LEEDCo) suspended its

Icebreaker project, which would have installed offshore wind turbines in Lake Erie. As of October 2023, the U.S. Department of Energy (U.S. DOE) is not issuing additional funds to it.



SUCCESS STORIES *(since 2018)*

Cleveland Public Power (CPP) **achieved its Advanced Energy Portfolio Standard goal of getting 25% of its electricity from renewable energy by 2025** during 2021, when it provided more than 26% of its total electricity from hydropower, solar, and wind. In partnership with Cuyahoga County, CPP opened its 4 megawatt (MW) Brooklyn Landfill Solar Farm in late 2018.

Led by Cuyahoga County, the City of Cleveland, and the City of Painesville were collectively **awarded \$129.4 million in Climate Pollution Reduction Grant (CPRG) implementation funds** from U.S. EPA during 2024 for its Municipal Empowerment for Clean Energy and Conservation program. This program proposes to install roughly 13 MW of solar on landfills in the City of Cleveland.

Currently, **100% of the City's municipal buildings electric energy portfolio** powered by FirstEnergy is **backed by renewable energy certificates (RECS) thanks to specific energy procurement strategies used by the city.**

U.S. EPA has recognized Cleveland as a **Green Power Community (GPC)**, as the City meets the requirements for sourcing electricity from green power sources.

The City began converting its streetlights to LEDs during 2020. **From 2010 to 2022, the estimated energy use for street and traffic lights fell by 72%.**

GOALS

4. Significantly expand the installed capacity of renewable energy to ensure that 100% of City operations-related energy comes from renewable sources by 2045, with interim targets of 75% by 2035, and 90% by 2040.
5. Implement processes to increase efficiency, reduce costs, and enhance the reliability of City energy assets.

BENEFITS

- 64,000 MtCO₂e reduced by 2030, 129,000 MtCO₂e reduced by 2050.



GOAL 4

Significantly expand the installed capacity of renewable energy on City controlled properties to ensure that 100% of City operations-related energy comes from renewable sources by 2045, with interim targets of 75% by 2035, and 90% by 2040.

ACTION 11

Renewable Energy on City Controlled Properties.

Install at least 15 megawatts of renewable energy on city controlled buildings and properties by 2030.

Cleveland Public Power, Department of Public Utilities, Department of Public Works, Division of Property Management, Port Control, Office of Sustainability

ACTION 12

Update CPP Advance Energy Portfolio Standard.

Adopt updated clean energy targets for CPP.

Cleveland Public Power, Department of Public Utilities, Office of Sustainability

MAYORAL PRIORITY ACTION 13

Source clean energy for non-CPP facilities.

Explore options to ensure that buildings powered by FirstEnergy can source their energy from renewable sources, including purchasing renewable energy credits, installing renewables, or switching to CPP.

Cleveland Public Power, Department of Public Utilities, Division of Property Maintenance, Office of Sustainability, FirstEnergy, Enbridge



If there are more solar, wind energy generating sources then the temperature outside would not be an issue.

— Department of Public Utilities Employee



GOAL 5

Implement processes to increase efficiency, reduce costs, and enhance the reliability of City energy assets.

ACTION 14

Smart Savings.

Maximize cost savings for the City through an energy demand management program.

Cleveland Public Power, Department of Public Utilities, Division of Property Maintenance, Department of Port Control, Office of Sustainability, Department of Finance, FirstEnergy, Enbridge

ACTION 15

Electric Grid Resilience.

Assess data on CPP outages to identify portions of the grid that would benefit most from interventions to increase resilience, including burying wires, installing stronger poles, and implementing traffic calming measures (to prevent pole damage).

Cleveland Public Power, Department of Public Utilities, MOCAP

ACTION 16

Demand Management Program.

CPP will develop and pilot demand management programs to reduce electricity use during peak demand periods and enhance overall grid resilience and reliability.

Cleveland Public Power, Department of Public Utilities, Office of Sustainability, Department of Law, Department of Finance

MAYORAL PRIORITY ACTION 17

Cleveland Division of Water (CWD) System Pumping and Treatment Optimization.

Create and finalize an energy management plan with implementation pathways to reduce energy consumption and costs for CWD.

Division of Water, Department of Public Utilities, Office of Sustainability

ACTION 18

Streetlight Upgrades, tracking and maintenance.

Complete the replacement of streetlights with LED lights, continue to maintain the LED lights and sensors, and track actual energy savings, thereby saving the City money through reduced energy and maintenance costs.

Department of Public Works, Cleveland Public Power



As storms get stronger and more frequent, the likelihood of power outages will grow. I'd love to see some proactive improvement to energy infrastructure so that power outages become less frequent and more easily repaired when damaged.

*— Department of Finance
Employee*



CLEAN TRANSPORTATION

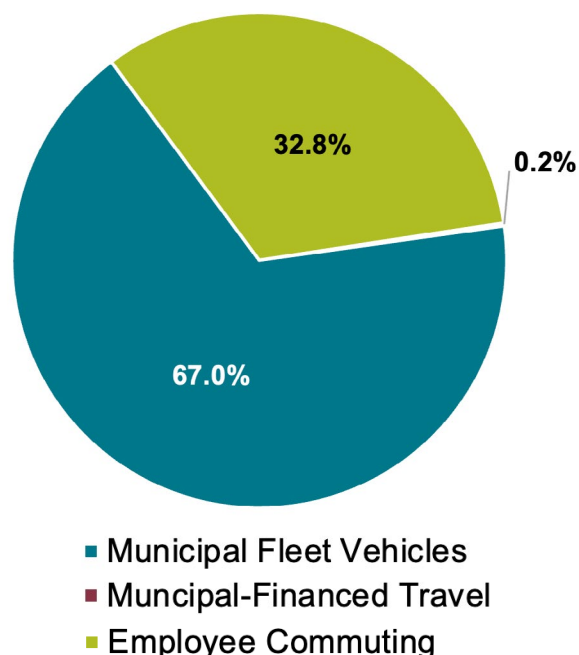
Transportation was responsible for more than one-sixth (16.8%) of GHG emissions from the City of Cleveland's operations during 2022.

Transportation-related emissions come from three main sources: municipal fleet vehicles, municipal-financed travel (e.g. traveling for work), and employee commuting. Municipal vehicles account for two-thirds of total transportation emissions, with employee commuting making up nearly one-third and municipal-financed travel responsible for just 0.2%.

From 2010 to 2022, GHGs decreased by 9% from transportation, with the largest relative reductions coming from municipal-financed travel (-35%), followed by employee commuting (-21%) and fleet vehicles (-2%).

The COVID-19 pandemic affected transportation more than any other sector in municipal operations in recent years. Emissions fell by nearly 20% during 2020 due to COVID mitigation measures, including stay-at-home orders and remote working. Reductions occurred for all travel modes, though the largest was from municipal-financed travel, which fell by 80%. Emissions increased by 7% and 2% in 2021 and 2022, respectively, but still remained below pre-COVID levels.

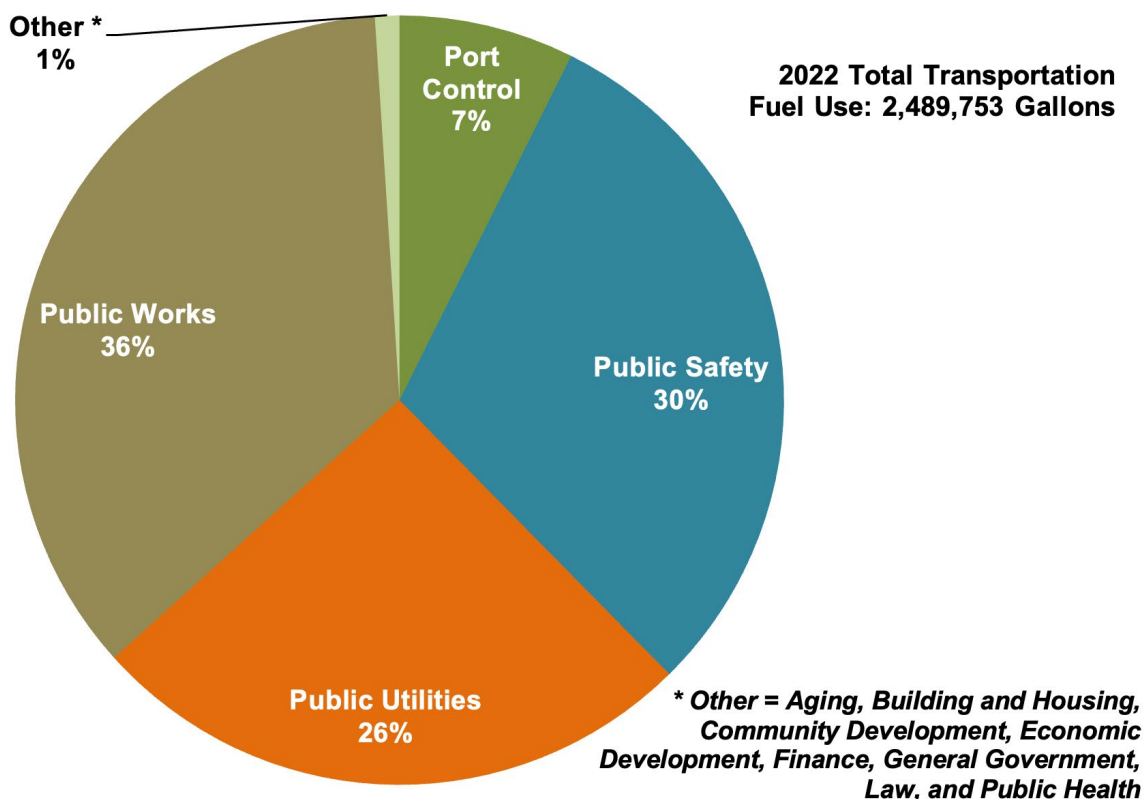
Figure 10: Transportation Sector GHGs by Mode (2022)



KEY FACTS

- Transportation makes up 7% of total GHG emissions from City operations, with 67% of these emissions from municipal fleet vehicles.
- The share of commuters driving alone to work fell slightly to 79% in 2022 from 80% in 2010.
- The total number of miles that City employees traveled for work fell by 86% from 2019 to 2020. Mileage increased in 2022, but it remained below pre-pandemic levels.
- Gasoline use from municipal fleet vehicles fell by 11% from 2010 to 2022; however, diesel use increased by 6% during that span.

Figure 11: Transportation Fuel Use by City Department (2022)



CHALLENGES

- The overwhelming majority of City fleet vehicles are internal combustion vehicles. As of 2022, less than 1% of the total fleet was made up of electric vehicles (EVs).
- The majority of City fleet vehicles run on diesel, and many of the medium- and heavy-duty vehicles (MDHVs) and specialty vehicles (e.g. fire trucks, construction vehicles) in the fleet lack affordable EV alternatives at the moment.
- Currently, the City does not have enough on-site EV charging stations to facilitate a rapid conversion of the fleet to EVs.
- While the City subsidizes parking for employees, it does not do so historically for alternative commuting modes, creating financial incentives for employees to drive to work.

SUCCESS STORIES *(since 2013)*

Per-capita GHGs from employee commuting **fell by nearly 9%** from 2010 to 2022.

Due to improved fuel efficiency and changes in fuel prices, **the City spent 15% less on fuel for fleet vehicles** during 2021 than in 2010. This change **saved the City more than \$1.1 million.**⁴⁶

The City has **expanded secured, protected bike parking** at City-owned facilities, making it easier and safer for employees to bike to work (including installing indoor bike parking at Erievue Plaza in 2023).

The City has **purchased 14 electric fleet vehicles** and is developing a plan to convert the fleet to alternative fuel options.

Cleveland has **three EV charging stations** for fleet vehicles and **five public EV charging stations** at City facilities. The City has also committed to electrifying half of municipal fleet vehicles by 2030.

Mayor Bibb elevated the City's first Senior Strategist for Transit and Mobility, and the City hired four new employees to **create a team focused on safety and mobility.**

GOALS

6. Establish systems and policies to reduce unnecessary vehicle trips.
7. Shift employee commuting trips to alternative modes to reduce vehicle miles traveled (VMT) by 15% by 2030.
8. Decarbonize the City's vehicle fleet by 2045, with interim target of 50% by 2030.

BENEFITS

- \$4.4 million in total energy cost savings through 2030.
- 6% reduction in transportation energy use by 2030, 37% reduction by 2050.
- 4,000 MtCO₂e reduced by 2030, 21,000 MtCO₂e reduced by 2050.

GOAL 6

Establish systems and policies to reduce unnecessary vehicle trips.

ACTION 19

Increase the use of technology solutions to reduce unnecessary employee trips.

Reduce employee commuting VMT through the increased use of technology solutions (e.g. teleconferencing, telecommuting), including existing City resources (e.g. Microsoft Teams).

Mayor's Office, Department of Human Resources, Division of Information Technology & Services, Department of Port Control

ACTION 20**Reduce VMT from the municipal vehicle fleet.**

Reduce municipal fleet VMT both for regular vehicle routes and for occasional staff travel.

Mayor's Office of Sustainability, Division of Information Technology Services, Department of Public Works, Department of Public Safety, Department of Public Utilities

ACTION 21**Develop Citywide policies to shift long-distance work-related travel to optimal modes for cost and emissions intensity.**

Establish policies to guide long-distance work-related travel in order to encourage employees to choose travel modes that are optimal for cost, efficiency, and emissions intensity.

Department of Human Resources, Department of Finance



The city should be moving towards a comprehensive hybrid remote or flex schedules for many employees to reduce emissions from daily commute into the city they serve.

— Department of Community Development Employee



GOAL 7

Shift employee commuting trips to alternative modes to reduce VMT 15% by 2030.

ACTION 22

Establish a citywide transportation demand management (TDM) program.

Work with NOACA to develop a citywide TDM program that incentivizes alternative commuting options for city employees in order to reduce VMT and GHG emissions and track progress through biannual employee commuting survey.

Department of Human Resources, Planning Commission, NOACA

ACTION 23

City E-Bike Fleet.

Purchase a fleet of e-bikes or memberships in shared mobility programs for city employees to use during work hours.

Office of Sustainability, MOCAP, Department of Finance, Department of Information Technology Services



[The City] should also be heavily incentivizing and subsidizing non-motorized travel modes for its employees, given that GHG are the main contributor to climate change in this area. This includes charging for and disincentivizing single-occupancy vehicular travel.

***— Department of Finance
Employee***

ACTION 24**Parking cash-out program.**

Develop an employee parking cash-out program to financially incentivize alternative commuting for city employees. Parking cash-out programs pay employees who receive free workplace parking to not drive to work.

Department of Human Resources, Planning Commission, NOACA

“

Charge everyone the actual market rate for their parking. This includes those higher up on the food chain. Provide benefits or allowances for employees to take mass transit or bike to work.

— Department of Building & Housing Employee

”

ACTION 25**Reimburse alternative transportation modes for city employees to attend meetings offsite.**

Reimburse employees that travel to work-related functions by alternative transportation modes, including transit, bike-share, scooter, etc.

Department of Human Resources, Planning Commission, Department of Finance, Office of Sustainability

ACTION 26**Provide information on alternative commuting options to all employees during employee orientation/on-boarding process.**

Share customized information for each employee about alternative commuting options, city transportation demand management policies, and ridesharing/Gohio Commute.

Department of Human Resources, Office of Sustainability

ACTION 27

Consider developing employee vanpool program.

Work with NOACA to study the feasibility of vanpools for City employees. If they are feasible, create vanpool program with subsidies for participants.

Department of Human Resources, Planning Commission, NOACA

GOAL 8

Decarbonize the City's vehicle fleet by 2045, with interim target of 50% by 2030.

MAYORAL PRIORITY ACTION 28

Fully electrify the city's fleet of light-duty vehicles by 2040.

Establish policies and procedures, including purchasing guidelines and contracts, to ensure that 100% of all City-owned light-duty vehicles (cars, light-duty trucks, vans) are electric models by 2040, with an interim target of 50% by 2030.

MOCAP, Office of Sustainability, Division of Motor Vehicle Maintenance, Department of Public Works, Department of Public Safety, Department of Public Utilities, Department of Port Control



**MAYORAL PRIORITY
ACTION 29****Fully electrify all City-owned medium- and heavy-duty vehicles by 2045.**

Establish policies and procedures, including purchasing guidelines and contracts, to ensure that 100% of all City-owned medium- and heavy-duty vehicles (garbage trucks, construction equipment, airport ground service equipment, etc.) are electric models by 2045, with an interim target of 50% by 2035.

MOCAP, Office of Sustainability, Division of Motor Vehicle Maintenance, Department of Public Works, Department of Public Safety, Department of Public Utilities, Department of Port Control

ACTION 30**Develop and implement EV training and maintenance programs for City employees.**

Coordinate with Division of Motor Vehicle Maintenance to ensure staff are trained and proficient in EV maintenance.

Division of Motor Vehicle Maintenance, Department of Port Control

ACTION 31**Develop fleet management software.**

Develop and implement city-wide fleet management software to assess and prioritize fleet for electrification.

Division of Motor Vehicle Maintenance, Office of Sustainability, Division of Information Technology & Services, Department of Port Control

ACTION 32

Enforce the City’s anti-idling policy using appropriate technology, education, and training.

Increase education, monitoring, and enforcement of the City’s existing anti-idling policy for employees. Review and update the policy if appropriate.

Department of Public Safety, Division of Air Quality, Office of Sustainability

ACTION 33

Expand EV charging infrastructure for city vehicles.

Dramatically expand availability of Level 2 and DC Fast Charging stations at City-owned facilities, with goal of 500% increase by 2035 for city vehicles. Coordinate work with peer cities in Climate Mayors’ cohort and with Electrification Coalition and ensure that build out aligns with fleet electrification actions.

MOCAP, Office of Sustainability, Department of Public Works, Division of Information Technology & Services, Department of Port Control

ACTION 34

Require City employees to select the most efficient model available when renting vehicles for work-related travel.

Develop policies that require City employees to select the most fuel-efficient and least carbon-intensive vehicle model when renting vehicles for work-related travel, with a particular emphasis on choosing battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs).

Department of Human Resources, Department of Finance, Mayor’s Office, Office of Sustainability

ACTION 35**Establish clean vehicle requirements for City contractors and vendors.**

Incorporate clean vehicle requirements into agreements for contractors and vendors that define fuel efficiency, fleet makeup, and/or vehicle operation standards (e.g. idle reduction).

Department of Law, Department of Finance, Office of Sustainability



RESILIENCE AND EMPOWERMENT

As Chapter 2 shows, climate change is already taking a toll on the City of Cleveland's operations. Climate hazards, such as the wildfire smoke in June 2023 and the tornadoes in August 2024, have disrupted City services, damaged City-owned assets, and negatively affected City employees and their families. While the 2013 MAP provided a valuable strategy for making City operations more sustainable and reducing GHG emissions, it did not focus directly on the threats climate change posed to the City or how to limit the impacts of those threats.

The City's 10-year *Operational Strategic Plan* makes it clear that enhancing resilience and empowering employees are core priorities for the City of Cleveland over the next decade.

This focus area embeds those twin priorities. It seeks to strengthen the ability of city infrastructure, operations, and systems to withstand and recover from priority climate hazards. It also focuses on motivating and enabling city staff to become active participants in climate action by providing training, resources, and opportunities for them to contribute their expertise and ideas.

KEY FACTS

- The City of Cleveland faces clear threats from poor air quality, flooding, severe storms, and extreme heat, all of which may disrupt City services and damage City-owned assets.
- **Nearly three-quarters (73%) of City employees are concerned that climate change will affect City operations.**
- A significant majority (72%) of City employees believe Cleveland should devote significant attention and resources to making the City more resilient to climate change.

CHALLENGES

- Cleveland is a major flood risk, with 19% of City-owned properties facing an elevated risk of flooding.⁴⁷
- City infrastructure is at a severe risk of flooding, with nearly 60% of roads at risk of becoming impassable due to flooding.
- Tornadoes and severe storms during August 2024 heavily damaged City-owned assets, including knocking down one-third of CPP feeder lines. Due to the smoke from Canadian wildfires during the summer of 2023,

PM2.5 levels increased in Cleveland from 2018 to 2023. The three-year average level rose by 13% across this span.

- Severe storms have damaged City Hall and Hopkins International Airport multiple times in recent years.

SUCCESS STORIES *(since 2013)*

The Office of Sustainability **completed the first assessment of climate risks** to City-owned properties during 2023.

The Cleveland Division of Air Quality (CDAQ) **initiated the first comprehensive update to City Air Code in 50 years.** The update will include the development of departmental plans for adjusting operations on days with poor air quality.

The City received an Energy Efficiency Community Block Grant (EECBG) for nearly **\$400,000 from the U.S. Department of Energy**, which it plans to use to invest in developing resilience hubs at NRRCs.

The City has **added staff focused on sustainability and climate justice** in multiple City departments, including the Office of Sustainability and the Departments of Port Control, Public Utilities, and Public Works.

GOALS

9. Enhance the resilience of City-owned assets to the impacts of priority climate hazards.
10. Minimize the impacts of climate change on City employees and partners in order to enhance the resilience of City operations.
11. Empower City of Cleveland employees and elected officials to advance climate action in their daily lives.



Knowledge is power, knowing what resources are available and how to access them is half of the battle.

— Department of Community Development Employee

GOAL 9

Enhance the resilience of City-owned assets to the impacts of priority climate hazards.

ACTION 36

Green Municipal Bonds for resilience projects.

Partner with the US Green City Bonds Coalition to access technical assistance and expertise in issuing green municipal bonds. These bonds will be used to fund critical infrastructure projects that enhance the city's resilience to climate change impacts, where appropriate.

Office of Sustainability, Department of Finance, Mayor's Office, Department of Law

MAYORAL PRIORITY ACTION 37

Resilience strategist.

Hire a Resilience Strategist to coordinate climate adaptation and resiliency work across the City of Cleveland in order to prepare and protect City residents and operations from the impacts of climate hazards.

Mayor's Office, Office of Sustainability, Office of Emergency Management, Department of Human Resources

ACTION 38

Assess vulnerability of City assets.

Complete comprehensive resilience and vulnerability assessment of City-owned assets every 3 to 5 years and prioritize investments for the most vulnerable.

Office of Sustainability, Office of Emergency Management, MOCAP

“

The effects of climate change are already here, and are continuing to grow. We should be proactive in dealing with them because long term this will lower the damage and cost of destruction.

— Department of Economic Development Employee

”



GOAL 10

Minimize the impacts of climate change on City employees and partners in order to enhance the resilience of City operations.

ACTION 39

Air Quality Action Day plan.

Develop a plan outlining specific actions employees can take to protect themselves on days with poor air quality.

Department of Public Health, Division of Air Quality, Office of Sustainability, Department of Human Resources

ACTION 40

Air Quality Action Day outreach.

Improve existing coordination and communication to the public and City employees for air quality action days.

Department of Public Health, Division of Air Quality, Office of Sustainability, Department of Human Resources



“

All employees that work outside in the field should be protected from climate conditions like poor air quality and smog through updated policies that are mandated and enforced by management.

— *Department of Economic Development Employee*

”



The City should set up a program to provide funds to educate both employees and residents regarding the potential hazards the City may face with the anticipated climate changes. That way we can take a more proactive approach rather than being reactive and only responding to emergency situations.

— Department of Public Works Employee

ACTION 41

Climate hazard workforce protections.

Adopt workforce protections for extreme heat and poor air quality days (e.g. mandatory rest and water breaks).

Department of Public Health, Division of Air Quality, Office of Sustainability, Department of Human Resources, Office of Emergency Management

ACTION 42

Expand support systems for employees affected by climate hazards.

Expand the availability and awareness of mental healthcare and emotional support systems for employees affected by climate hazards, including first responders.

Department of Human Resources, Office of Emergency Management, Office of Sustainability

GOAL 11

Empower City of Cleveland employees and elected officials to advance climate action in their daily lives.

ACTION 43

Inclusive job descriptions.

Adjust City job descriptions to be more inclusive of alternatives to formal college degrees and limit unnecessary requirements, including access to a private vehicle, where possible.

Department of Human Resources

MAYORAL PRIORITY

ACTION 44

City Climate Action Working Group.

Establish City Climate Action Working Group to monitor and oversee MAP implementation.

Mayor's Office, Office of Sustainability

ACTION 45

Climate change trainings.

Provide climate change trainings and listening sessions with City employees, elected & public officials.

Mayor's Office, Office of Sustainability, Department of Human Resources

“

Create an extra budget for research and development of the climate changes effecting people's life.

— Department of Water Employee

”



RESOURCE MANAGEMENT

The manner in which the City of Cleveland manages government resources is intricately connected to the sustainability of its operations and the community as a whole.

The City cannot hope to decarbonize its vehicle fleet if it does not evaluate its options, secure funding, and procure the vehicles and equipment needed to achieve that goal. The City cannot advance the circular economy if it does not understand where and how its materials are produced or track how it uses and disposes of (or reuses) those materials. The City also cannot hope to advance climate justice across the community if it does not understand fully existing environmental inequities and how its programs can alleviate them.

While the City has made significant strides since developing MAP in 2013, it has not yet taken a whole-of-government approach to evaluating how it can identify, use, and manage its resources to achieve decarbonization. **Cleveland cannot achieve the ambitious goals outlined in this MAP by tacking climate action onto existing operations. It will require fully integrating this work into all facets of City government.**

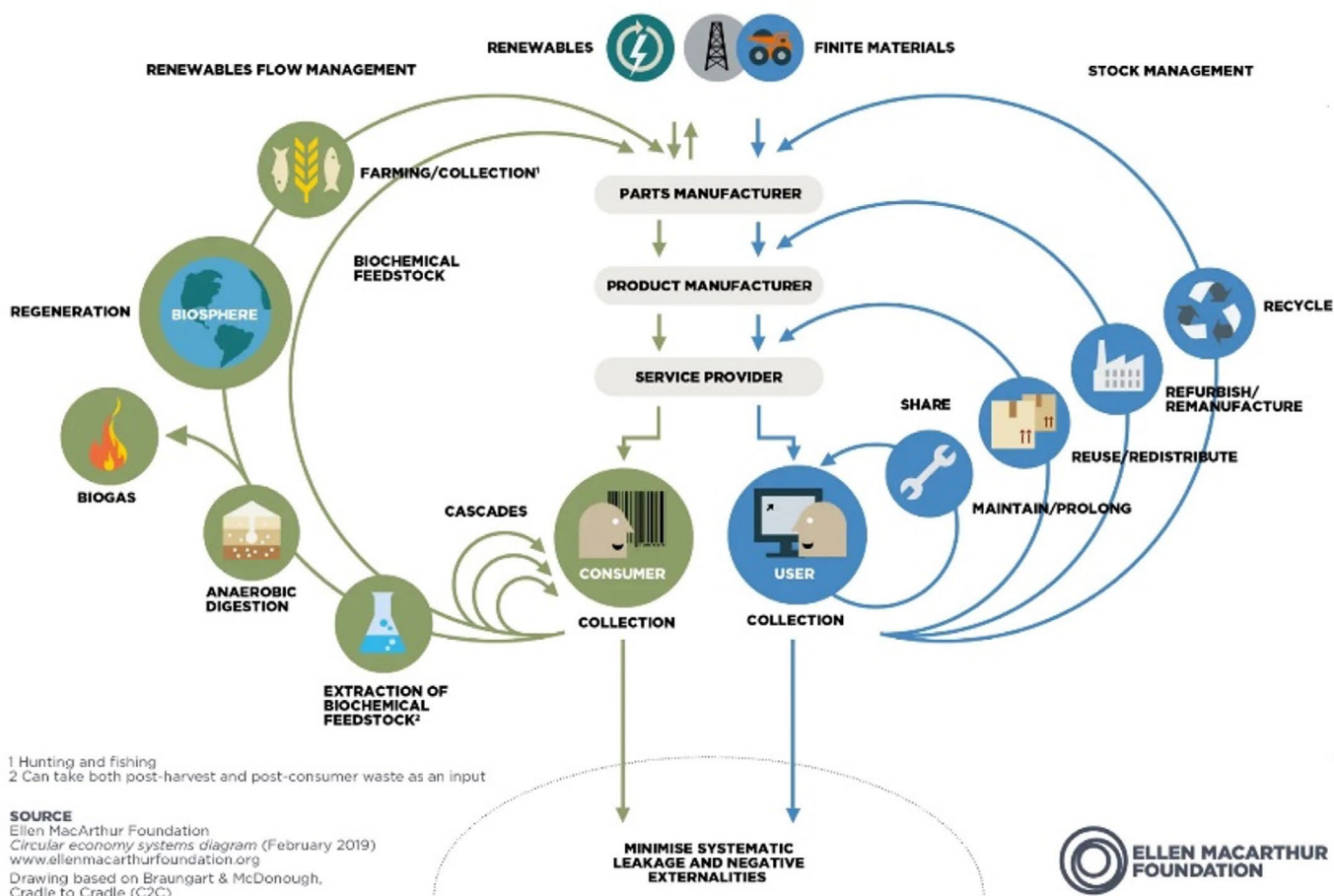
The Resource Management focus area seeks to address this issue by identifying strategies to integrate decarbonization, circularity, and climate justice into its finance, budgeting, procurement, and materials management processes.



At the heart of this focus area is circularity. **Our current economy can be described as 'TAKE-MAKE-WASTE'.**

We take resources from the ground (take), create a product or item (make), then throw it away (waste). This linear economy is extremely resource intensive and dependent on fossil fuels.

Figure 12: Circular Economy Butterfly Diagram



In a circular economy, we reduce or eliminate waste and pollution, keep products and materials in use as resources, and restore and renew nature.

The principles of a circular economy can be applied in a number of ways, such as in the initial design of a product or in the reuse, repair, or remanufacture of a product. Whereas in a linear economy

people think about reducing, reusing, and recycling, a circular economy incorporates several other 'Rs', including recover, remanufacture, redistribute, refuse, and rethink. The City of Cleveland needs to strategically embed these principles throughout its operations as it implements the actions in this focus area.

KEY FACTS

- City operations generated approximately 2,560 metric tons of mixed solid waste during 2022. This waste accounted for 1,220 MtCO₂e, or less than 1% of total GHGs.
- Under the Biden Administration's Justice40 Initiative, entities like the City of Cleveland that received federal funding for climate, clean energy, affordable and sustainable housing, and other investments were required to ensure that at least 40% of those funds go to low-income and disadvantaged communities (LIDAC).
- Cleveland reports information on its GHG emissions, sustainability and climate action initiatives, and progress towards achieving its goals to a number of third party groups, such as CDP, ICLEI USA, and the American Council for an Energy-Efficient Economy (ACEEE).

CHALLENGES

- The City has not adequately tracked its waste stream over the past decade, making it difficult to determine what progress it has made towards meeting its waste reduction and diversion goals from the 2013 MAP.
- City staff already have full workloads, and most lack training or experience in how to integrate circularity, climate justice, and decarbonization principles into their jobs.
- Low- and no-carbon alternatives to fossil fuel-powered equipment (e.g. heat pumps, EVs) still have a price premium, often making it difficult for City departments to afford or justify these options.

SUCCESS STORIES *(since 2013)*

Solid waste generated from City operations **decreased by 39%** from 2010 to 2022. GHG emissions from solid waste **declined by 20%** across this span.

The Mayor's Office of Sustainability worked with a team of graduate students to **develop a proposed sustainable purchasing policy for City operations.**

The Inflation Reduction Act (IRA) updated the tax code to **allow local governments to get directly refunded (Direct Pay) for the value of tax credits on certain qualifying expenses**, including installing renewable energy and purchasing EV charging stations.

The Cleveland Division of Air Quality developed an **environmental justice index** as part the outreach for its 'CleanInCLE' program, and it is building upon this work to establish a process to assess the cumulative impacts of multiple social and environmental burdens.

The City introduced recycling and composting at several City-owned facilities, including the West Side Market.

GOALS

12. Embed circularity throughout City operations in order to reduce waste, lower costs, and minimize pollution.
13. Identify and secure sustainable funding to enable the achievement of Cleveland's climate targets.
14. Develop processes to ensure that City resources and funds directly advance decarbonization and climate justice throughout Cleveland.

BENEFITS

- 250 MtCO₂e reduced by 2030, 600 MtCO₂e reduced by 2050.

GOAL 12

Embed circularity throughout City operations in order to reduce waste, lower costs, and minimize pollution.

MAYORAL PRIORITY ACTION 46

Reduce solid waste sent to landfills by 50% from City facilities by 2050.

Reduce solid waste sent to landfills from City facilities by 50% by 2050, with interim goals of 20% by 2030 and 40% by 2040.

Department of Public Works, Office of Sustainability, Department of Port Control

ACTION 47 Complete annual waste audits of City buildings to track waste diversion rates.

Begin conducting waste audits in City buildings to collect baseline data to track amount of waste sent to the landfill.

Department of Public Works, Office of Sustainability



RECYCLE IN CITY HALL.

— Department of
Community Development
Employee



The City needs to convert to a more paperless environment. We are significantly contributing to climate change.

— Department of Public Utilities Employee



ACTION 48

Expand existing recycling programs to increase waste diversion in city facilities.

Create recycling programs in City buildings to increase the rate of recyclable waste diverted from the landfill.

Department of Public Works, Office of Sustainability, Division of Property Management

ACTION 49

Establish pilot composting programs in select city facilities.

Create pilot programs to compost organic waste from select City facilities in order to reduce waste sent to the landfill.

Department of Public Works, Office of Sustainability, Division of Property Management

ACTION 50

Reduce waste from permitted events on city property.

Educate organizers of permitted events on the City's waste reduction and litter prevention guidelines for permitted events beginning with a set of priority events during 2025.

Office of Sustainability, Division of Property Management, Department of Public Works, Division of Public Auditorium, Special Events

ACTION 51

Implement sustainable purchasing policy citywide.

Implement a comprehensive sustainable purchasing policy across City departments.

Mayor's Office, Office of Sustainability, Department of Finance, Department of Port Control



Climate change will present challenges that will be unique to our current operations. We need to have procurement systems in place that will allow us to immediately engage professional and contractual services to address unknown issues that may arise from climate change impacts.

*— Department of Public Utilities
Employee*





GOAL 13

Identify and secure sustainable funding to enable the achievement of Cleveland's climate targets.

ACTION 52

Climate action funding.

Identify and secure dedicated climate action funding source as part of City budget process.

Mayor's Office, Office of Sustainability, Department of Finance

ACTION 53

Direct Pay/Sustainability Revolving Fund.

Earmark some or all of revenues from Inflation Reduction Act direct payments and related funding sources for future climate action projects. Establish a dedicated fund for these revenues.

Mayor's Office, Office of Sustainability, Department of Finance, Department of Law

GOAL 14

Develop processes to ensure that City resources and funds directly advance decarbonization and climate justice throughout Cleveland.

ACTION 54

Cleveland Justice40.

Establish citywide definition of environmental justice (EJ) and ensure that at least 40% of sustainability-related investments flow to designated EJ neighborhoods.

Office of Sustainability, Department of Public Health, Department of Finance

ACTION 55

Climate budgeting process.

Develop a pilot program to utilize the social cost of carbon in city budgeting processes for specific departments in order to ensure climate is brought into budgetary discussions. Roll out program to rest of City following the completion of this pilot program.

MOCAP, Department of Financing, Office of Sustainability, Department of Law



**MAYORAL PRIORITY
ACTION 56****Incorporate Decarbonization into Capital Investment Planning.**

Update Capital Investment Plan (CIP) development process to require life-cycle analysis (LCA) assessments, consider the impact of green financing (including direct pay), etc.

MOCAP, Department of Financing, Office of Sustainability, Department of Port Control

**MAYORAL PRIORITY
ACTION 57****Capital Investment Carbon Budget.**

Establish a carbon budget for the Capital Improvement Plan and track emissions against this budget.

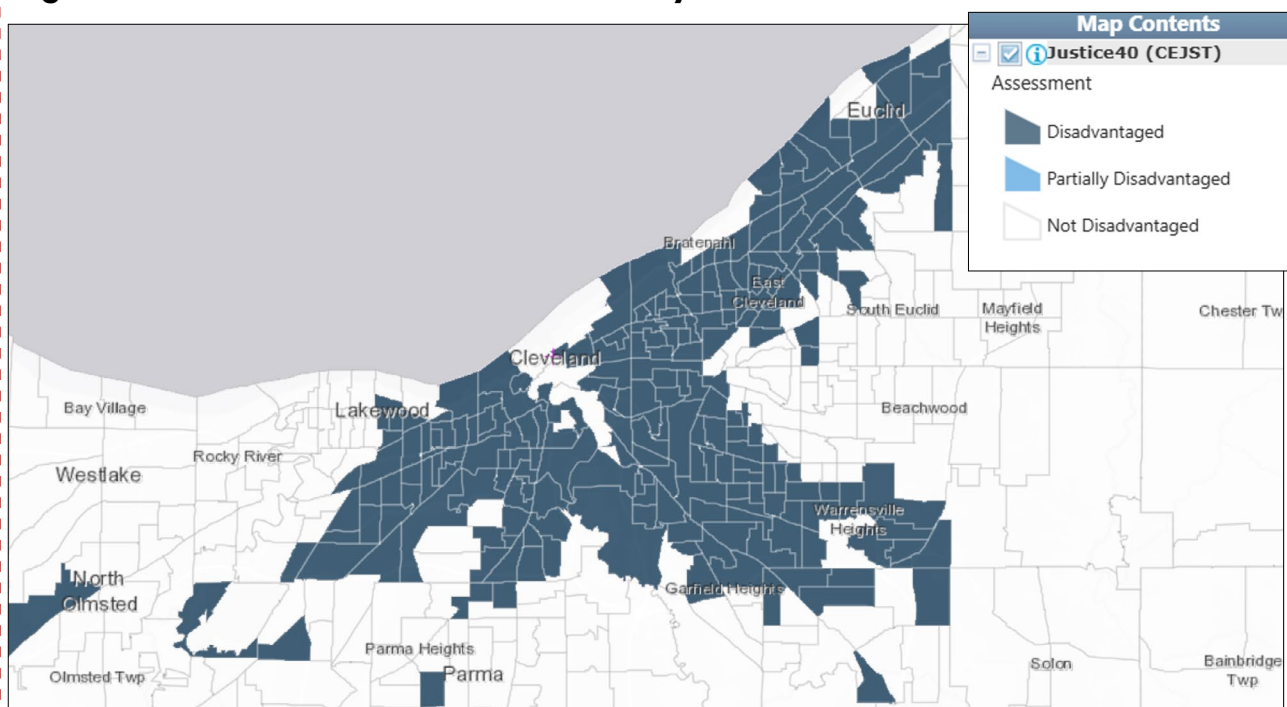
MOCAP, Department of Financing, Office of Sustainability

ACTION 58**Environmental Justice Index.**

Develop a climate/environmental justice index of City neighborhoods to guide sustainability-related investments.

Office of Sustainability, Department of Public Health, Planning Commission

Figure 13: Justice40 Census Tracts in the City of Cleveland



ACTION 59

Tracking Environmental Justice/Justice40 Spending.

Track the annual share of sustainability-related investments, including of federal funds, into designated EJ neighborhoods.

MOCAP, Department of Financing, Office of Sustainability

ACTION 60

Fossil fuel divestment.

Implement a practice to screen any municipal insurance policyholders for fossil fuel investments and other investments that do not meet socially responsible standards. Divest the City from existing insurers that do not meet these standards.

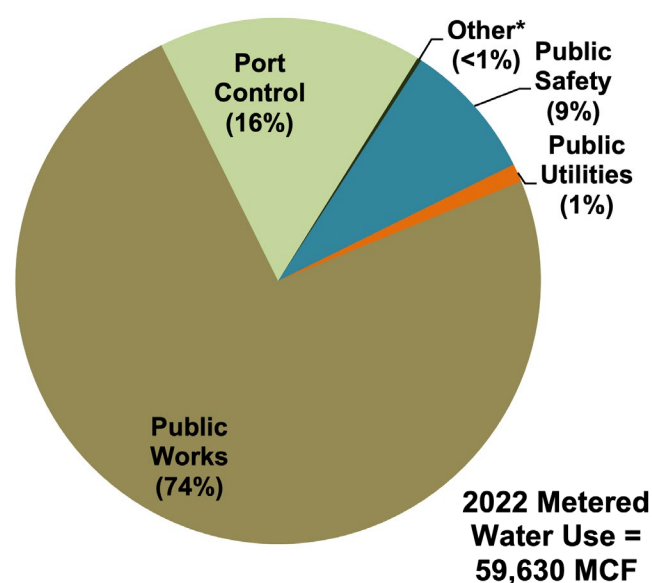
Department of Law, Department of Financing, Office of Sustainability

WATER & GREEN SPACE

At the heart of building a green city on a blue lake are two resources – water and green space. **In order to make its operations more sustainable, enhance the resilience of City government and Cleveland residents, slash climate pollution, and improve the delivery of public services, the City must guarantee that it protects its natural resources and expands affordable and equitable access to them for all.**

Water is central to climate action in Cleveland. **As the United Nations has argued, the climate crisis is primarily a water crisis.**⁴⁸ The changing climate fundamentally alters the quantity and quality of water by changing where, when, and how much is available. The quantity of water in Cleveland is changing, as more rain falls in heavy storms, snow shifts to rain, and Lake and river levels fluctuate. The quality of water has also changed as heavier rains create stormwater runoff, filling Lake Erie with agricultural pollution and causing combined sewer overflow (CSO) events. Effectively managing the quantity and quality of water available to Clevelanders will be a key challenge for the City of Cleveland throughout this century.⁴⁹

Figure 14: Metered Water Use by City Department (2022)



Reducing climate pollution and enhancing climate resilience will also require making Cleveland greener and more equitable. Residents, stakeholders, and City employees have consistently identified nature-based solutions – actions to address societal challenges like climate change and environmental health challenges by protecting, sustainably managing, and restoring ecosystems – like expanding the City’s tree canopy and protecting natural areas as top priorities for the City.⁵⁰

These natural solutions can capture and store GHGs; improve air, water, and soil quality; moderate urban heat; absorb stormwater runoff; enhance mental health and well-being; improve property values; lower energy costs; offer areas for recreation; and provide habitat for plants and animals. However, nature-based solutions often conflict with other priorities. For example, the need to increase or retain parking spaces can limit opportunities to expand tree lawns

or green infrastructure, and the need to protect power lines from outages may run up against the desire to protect and expand the tree canopy.

This MAP recognizes that water and green space are key to allowing Cleveland to meet its climate targets. If we want to create a green city on a blue lake, we need to make Cleveland greener and keep Lake Erie blue and healthy.

KEY FACTS

- Electricity from the Cleveland Water Department's distribution of drinking water accounts for 33% of the City of Cleveland's carbon emissions, or 78,929 MtCO₂e. This represented the single largest source of City operating emissions during 2022.
- The Department of Public Works was responsible for nearly three-quarters of metered water use during 2022, three times all other departments combined.
- Tree cover in the City of Cleveland has declined to just 17.9%, and this lack of tree cover is particularly serious in low-income neighborhoods and communities of color.
- The Division of Urban Forestry inspects 8,000–9,000 trees per year.
- Cleveland received a 2024 park score of 57.9 from the Trust for Public Land, ranking it 31st of the top 100 U.S. cities.⁵¹
- There are nearly 34,000 vacant lots across the City of Cleveland, equal to 21% of total land parcels.⁵²



CHALLENGES

- A large number of City buildings lack water meters, making it difficult to properly track and manage water use across City operations.
- Despite efforts to expand the City's tree canopy, total tree cover has decreased in Cleveland, falling by 5% from 2011 to 2017.
- The Cuyahoga River remains affected by the legacy of pollution. The River remains a U.S. EPA designated Area of Concern (AOC), and it has four Beneficial Use Impairments.
- Lake Erie faces ongoing threats from agricultural runoff and climate change. The Lake experiences significant harmful algal blooms (HABs) on an annual basis, with the HAB severity exceeding the target of 3.0 in 10 of 13 years occasions since 2010.⁵³
- This increase in HABs on Lake Erie is forcing the Cleveland Water Department to spend additional money on water testing and treatment to protect users from toxins.
- There are nearly 26,000 acres of impervious surfaces in Cleveland. These surfaces, which prevent water from flowing into the ground, cover 51% of the City's land area.⁵⁴

SUCCESS STORIES

(since 2013)

GHG emissions from water distribution fell by 42% from 2010 to 2022 due to investments in operational efficiency and the shift away from fossil fuels for electricity generation.

The City introduced **recycling and composting** at several City-owned facilities, including the West Side Market.

The City also **reestablished a standalone Department of Parks and Recreation** and **hired a new Director** of Parks and Recreation to oversee the design and implementation of the Parks and Recreation Master Plan.

The City of Cleveland received a **\$3.4 million Urban and Community Forestry grant** from the U.S. Department of Agriculture (USDA) to develop an updated public right-of-way tree inventory and tree care strategy and expand tree maintenance and planting with partner organizations.

GOALS

15. Promote conservation and enhance water use efficiency to reduce operational water use 50% by 2030.
16. Expand the use of nature-based solutions and green infrastructure to enhance resilience while also reducing climate pollution.

BENEFITS

- \$4.2 million in total water cost savings through 2030.
- 40% reduction in water use by 2030.



As a city, we need to invest in not only increasing our tree cover, but also maintaining and protecting the trees we already have. With the major storm we had over the summer, it was concerning that parts of the city were left without power for nearly a week.

— PIOYYA Employee



GOAL 15

Promote conservation and enhance water use efficiency to reduce water use 50% by 2030.

ACTION 61

Establish “worst first” policy to make water use efficiency upgrades in city-owned facilities.

Assess all city-owned facilities to identify those with highest water use intensity (WUI) and prioritize these for efficiency upgrades/investments.

Division of Property Management, Office of Sustainability, Division of Water, Department of Public Utilities

MAYORAL PRIORITY ACTION 62

Track and report water consumption at all City-owned facilities.

Install smart water meters at all City-owned facilities that currently lack them in order to track and report consumption over time. Target major water users, including splash pads and community gardens.

Division of Water, Division of Property Management, Department of Public Utilities

ACTION 63

Use water consumption data to create plan to expand water conservation measures.

Use water consumption data to create plan to expand water conservation measures.

Division of Water, Division of Property Management

ACTION 64

Water reuse and recycling.

Use captured rainwater and process water to supply irrigation, cooling tower, and other non-potable water uses, such as controlling construction dust and washing fleet vehicles.

Division of Water, Division of Property Management, Water Pollution Control, Department of Port Control



I would teach the community how to conserve water to lessen the strain on the sewer/water department.

— Water Pollution Control Employee

GOAL 16

Expand the use of nature-based solutions and green infrastructure to enhance resilience while also reducing climate pollution.

MAYORAL PRIORITY

ACTION 65

Increase investments in stormwater management on City-owned property.

Improve stormwater management on City property to take advantage of credits (financial assistance) offered by the Northeast Ohio Regional Sewer District (NEORS). Expand use of green infrastructure, including green roofs, living walls, stormwater collection systems (e.g. cisterns), and rain gardens on City properties.

Division of Property Management, Office of Sustainability, Water Pollution Control, Department of Public Utilities

ACTION 66

Expanding Green Space during Construction.

Provide a net increase in the total amount and quality of green space, biomass, and soil on public redevelopment and reconstruction projects.

MOCAP, Department of Building and Housing, Department of Public Works, Urban Forestry



Budget more for street tree planting. Remove as much excessive hardscape as possible on all roadway projects.

— MOCAP Employee

ACTION 67

Sustainable Green Infrastructure Maintenance and Treatment.

Pilot innovative green infrastructure treatments, such as tree pits and alternative ground cover, on City-owned property. Follow WEDGE and SITES design guidelines.

Department of Public Works, Urban Forestry, Office of Sustainability

ACTION 68

Tree Maintenance Plan.

Establish an Urban Forestry Management Plan that prioritizes maintenance and planting on City-owned properties in areas that are most climate-vulnerable.

Department of Public Works, Division of Urban Forestry, Office of Sustainability

ACTION 69

Electrify lawn and garden equipment by 2035.

Electrify all City-owned lawn and garden equipment by 2035 and require contractors to utilize electric equipment in contracts.

Department of Public Works, Department of Parks and Recreation, Division of Urban Forestry, Office of Sustainability, Division of Motor Vehicle Maintenance, Department of Port Control

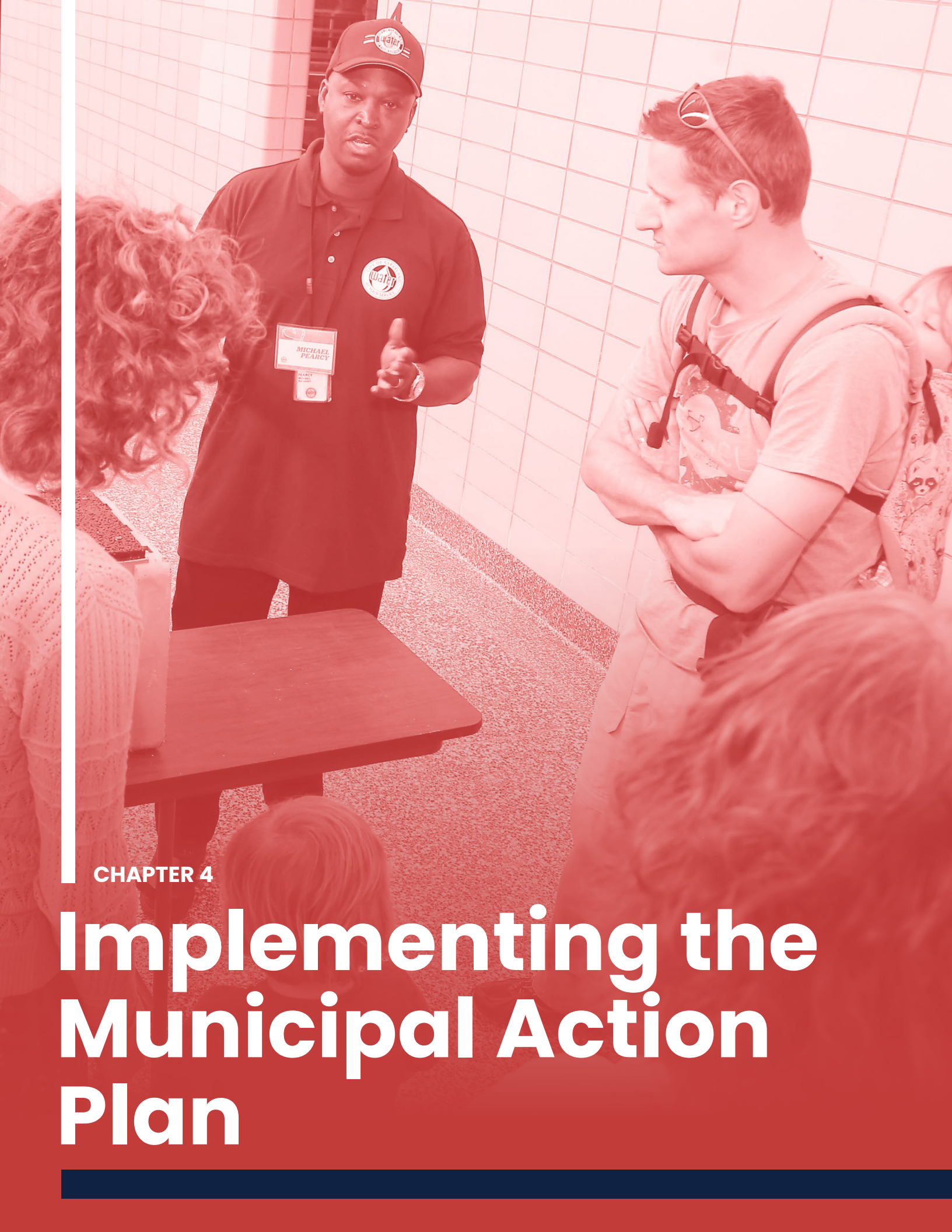
MAYORAL PRIORITY ACTION 70

Partner with local providers on both ends of the composting life cycle.

Partner with local providers to implement organic waste diversion (composting) initiatives at City-owned facilities and purchase composted materials from providers for use in City operations.

Office of Sustainability, Department of Public Health, Department of Public Works, Department of Parks and Recreation





CHAPTER 4

Implementing the Municipal Action Plan



In order to achieve the ambitious targets outlined in this plan, the City of Cleveland must fully adopt a whole-of-government approach to climate action.

While the Office of Sustainability is responsible for developing and overseeing the execution of this plan, **all City employees, starting with the Mayor and Cabinet, need to appreciate that taking steps to reduce climate pollution and enhance the resilience of City operations are not an add-on or a nice to do; instead, they must be fully integrated into the daily work of each of the City's nearly 7,000 employees.**

Implementing the MAP is a core objective included in the [Cleveland Operational Strategic Plan](#) for 2024-2034. As that plan states, the City will “pursue environmentally sustainable practices that will reduce operating costs in the long-run, explore less expensive nontraditional ways to deliver services and empower employees to implement cost-saving and avoidance measures.”⁵⁵ The City of Cleveland recognizes that sustainability and climate action are central elements of providing quality, cost-effective services to residents and safeguarding Cleveland's assets from the impacts of climate hazards.

MOS will work with other City departments, including Urban AI, to fully integrate the goals and actions included in the MAP into the Organizational Performance Management system for City operations. This system is rooted in Results-Based Accountability, which is a data-driven decision-making process for organizations that begins with the ends the organization seeks to achieve and works backwards to identify the means to achieve them.⁵⁶

As part of this process, each City department that is listed as a key stakeholder or implementer for MAP actions will develop key performance indicators (KPIs) or metrics that will enable them to track their progress towards implementing this plan.

As outlined in the Resilience and Empowerment focus area, the City of Cleveland will also establish a Climate Action Working Group to monitor and oversee MAP implementation. This working group will be composed of representatives from key implementing departments that are focused on sustainability and climate justice. Departments will report on their progress meeting MAP-related KPIs through their Operational Dashboards

In order to empower employees to implement MAP actions, the City recognizes that it needs to give them the information and resources they need to understand the climate crisis and they ways they can integrate sustainability into their work.



The Office of Sustainability will coordinate with other departments, including Human Resources, to develop and provide climate trainings and educational materials to staff. The City will integrate climate trainings into employee onboarding and other routine training platforms, including BizLibrary.

The City of Cleveland is committed to transparency and accountability in the implementation of this MAP and the communitywide Climate Action Plan.

Sustainability is built on trust, and City recognizes that we cannot expect residents, stakeholders, and partners to commit to climate action if the City does not share clear and accurate data to track progress; give regular updates on implementation progress; and provide honest information on the City's own actions to address the climate crisis.



“

Although climate change is critically important, we need to show the community that addressing it now, not later, is vital. We also need to help them understand that being climate-smart isn't a luxury, but a necessity and that the city has many resources to assist them with those basic needs.

— Department of Public Utilities Employee

”

Since developing MAP in 2013, Cleveland has joined several local, national, and international partnerships to advance and report on climate action. The City reports on its progress meeting its operational climate targets to a number of third-party reporting entities, including:



AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE)

Cleveland reports data on its climate action work to ACEEE for its biannual City Clean Energy Scorecard. ACEEE, a nonprofit research organization focused on advancing energy efficiency and tackling climate change, ranks cities based upon their success implementing actions across the built environment, transportation, and government operations. In 2024, Cleveland ranked 46th out of 75 cities with a total score 61 points.



BETTER BUILDINGS CHALLENGE AND BETTER CLIMATE CHALLENGE

The U.S. Department of Energy hosts these nationwide challenges to help communities ramp up efforts to reduce building energy use and cut GHG emissions. **Cleveland reports data on energy use and GHGs from its own operations on an annual basis.**



CDP

The City of Cleveland also reports annually to CDP, a global nonprofit organization that runs a comprehensive disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. **In 2018, Cleveland was recognized by CDP as one of the cities globally leading on climate disclosure.** The City has received an A or A- score from CDP every year since 2018.



CLEVELAND 2030 DISTRICT

The City of Cleveland is a founding member of the Cleveland 2030 District, the local chapter of a national effort to improve energy and water use efficiency in buildings in commercial buildings. Cleveland reports data on its energy and water use and employee commuting to the District on an annual basis, helping it to track its progress towards the District's goals of cutting energy consumption, water use, and transportation emissions by 50% through 2030.



GLOBAL COVENANT OF MAYORS FOR CLIMATE AND ENERGY (GCoM)

Cleveland joined the Covenant of Mayors for Climate and Energy, an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change and move to a low emission, resilient society. Participation in the Covenant requires using a common reporting framework and making action plans publicly available. **Cleveland became compliant with the Covenant in 2017, becoming one of the first 10 U.S. cities to accomplish this.**



LOCAL GOVERNMENTS FOR SUSTAINABILITY (ICLEI USA)

As part of its CDP reporting, Cleveland also reports to ICLEI, which is the first and largest network of local governments working to address sustainability challenges. **In 2023, Cleveland became a member of ICLEI USA, the local chapter of the global organization, and joined its Cities Race to Zero initiative.** Cleveland also worked with ICLEI USA to launch the Northeast Ohio Resilient Cities Cohort, a peer-to-peer network of local governments from across the region working to advance climate action.

Cleveland will continue to share information with several of these entities going forward in order to secure third-party validation of our work implementing this plan.

Additionally, the City will also make information on **MAP progress available to the public** via:

1. Public reporting dashboards, including, but not limited to, the City's Open Data Portal;
2. Annual reports to the public and public-facing platforms; and
3. Periodic presentations to the public and stakeholders, including, but not limited to, the Cleveland Environmental Advocacy Coalition (CEAC) and the Cleveland-Cuyahoga Monthly Sustainability Meeting.







CHAPTER 5

Conclusion



The City of Cleveland has worked to incorporate sustainability and climate action into its operations for nearly 20 years, dating back to the creation of the Office of Sustainability in 2005.

Over that period, the City has made significant progress, including developing three community Climate Action Plans (CAP) and the original MAP in 2013, expanding its use of clean energy, implementing energy saving practices and investments, and introducing EVs into its vehicle fleet. As of 2022, the City has reduced its GHG emissions by 45%, meeting its original 2030 climate targets nine years early.

This MAP update builds upon this progress, recognizing that addressing the climate crisis will require dedicated, consistent action across all facets of City government.

Decarbonizing City government means we must rethink and reshape all of the ways that we produce and consume energy, from the way that we heat our buildings to the way that we maintain parks and green space to the ways that employees travel to work and to their job sites. This will require a whole-of-government approach, and **every City employee has a role to play in meeting our goals.**

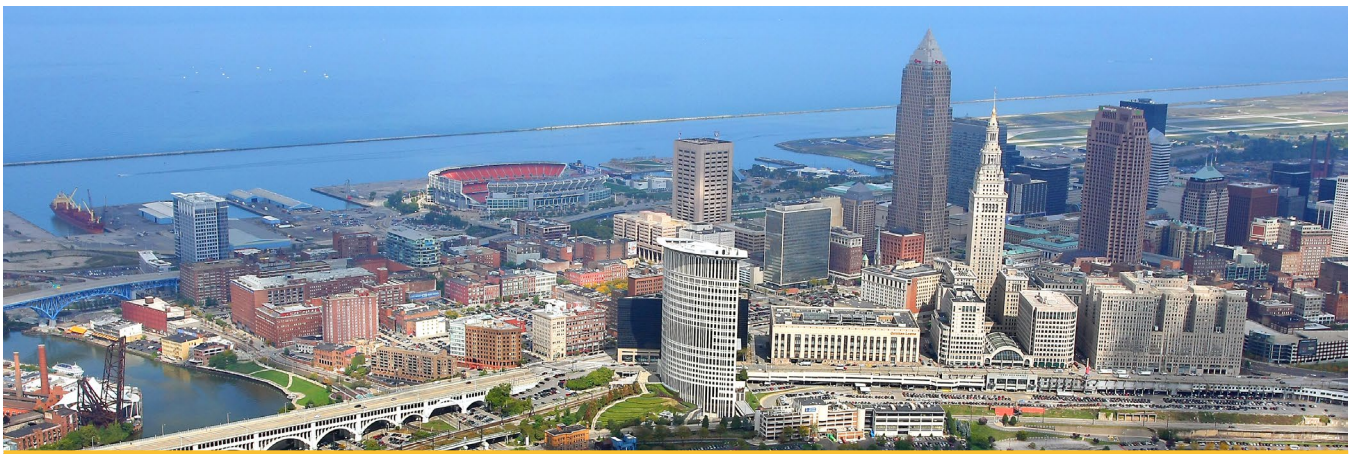
This MAP also points out the obvious – climate change presents an enormous threat the City of Cleveland’s operations, its assets, and its employees. Nevertheless, climate action represents an unprecedented opportunity to envision a new future.

A future in which:

- **CPP is a national model** for municipal utilities powered by locally generated clean energy.
- **Public Works staff do not suffer** the lingering health impacts of air pollution from doing their jobs.
- **Public Safety employees are protected** from climate hazards like extreme heat and flooding
- City employees across departments and job type can know that they are playing their role in **making Cleveland a growing, thriving green city on a blue lake.**

Achieving this vision will not be easy by any means, and there will be numerous hurdles along the way. But this plan provides the City of Cleveland with a MAP on how to reach goals that benefit employees and the community at a fundamental level.

Throughout the development of this plan, the City has learned more about the threats climate change poses our operations, the solutions available to it, and the aspirations of our employees.



This process has identified a number of priorities, which we have laid out in this plan, including:

- **Implementing a “worst first” approach** to making our buildings more energy and water use efficient;
- **Installing clean energy** on City-owned properties;
- Providing employees with **financial incentives to choose more sustainable travel options**, like biking, walking, and public transit;
- Educating and training employees to **empower them to take ownership of implementing climate actions** in their work;
- Strategically managing City resources to **reduce waste and prioritize climate justice**; and
- **Expand and sustainably manage Cleveland’s natural assets**, like urban trees and green spaces.

Cleveland recognizes that no employee or department can complete all of these MAP actions on their own. But all of us can do something. It’s time to prioritize actions and get to work.



Endnotes

- 1 Cleveland Department of Public Health, “Cleveland Historical Air Quality,” <https://www.clevelandhealth.org/programs/air/history/>, accessed January 1, 2025.
- 2 Northeast Ohio Areawide Coordinating Agency, 2023 Air Quality Trends Report, Cleveland: NOACA, <https://www.noaca.org/home/showpublisheddocument/31466/638526662462270000>, accessed January 1, 2025.
- 3 Ohio EPA, “Cuyahoga River Area of Concern Impairment One Step Closer to Restoration,” Columbus, OH: Ohio EPA, <https://epa.ohio.gov/about/media-center/news/cuyahoga-river-area-of-concern-impairment-one-step-closer-to-restoration>, accessed January 1, 2025.
- 4 Greenhouse Gas Protocol, 2021, GPC Version 1.1, https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf, accessed January 1, 2025.
- 5 T&D losses are included in the MAP, as they are associated with CPP’s operation, despite the fact that CPP provides power to users across the City, not just City operations.
- 6 CDP, 2022, Climate Risk and Vulnerability Assessment Training Guide for Cities, New York City, https://cdn.cdp.net/cdp-production/comfy/cms/files/files/000/006/058/original/CDP_Resourcepack.pdf, page 6, accessed January 1, 2025.
- 7 GCoM, 2019, Guidance Note: Explanatory Note accompanying the Global Covenant of Mayors Common Reporting Framework, Version 9, Brussels: GCoM, https://www.globalcovenantofmayors.org/wp-content/uploads/2019/04/Data-TWG_Reporting-Framework_GUIDANCE-NOTE.pdf, accessed January 1, 2025.
- C40 Cities, 2018, Climate Change Risk and Assessment Guidance, https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ab410fb74c4833febe6c81a/5b17dd2614ad660612c5dc54/files/C40_Cities_Climate_Change_Risk_Assessment_Guidance.pdf?1541689629, accessed January 1, 2025.
- 8 IPCC, 2014, Climate Change 2014: Synthesis Report, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Geneva: IPCC, <https://ar5-syr.ipcc.ch/index.php>, accessed January 1, 2025.
- 9 First Street Foundation introduced Air Factor after the analysis for this CRVA was complete. Accordingly, it is not included in this report. Additionally, because Wind Factor focuses on the risks of tropical storms and tornadoes, neither of which poses a

significant threat to the City of Cleveland, every property had the same score for wind risk. As a result, the City did not include wind in this analysis.

10 Because certain City-owned properties include multiple parcels, some of which have the same risk profile, MOS staff consolidated multiple parcels from Hopkins Airport and the Urban Forestry Building into one entry per property.

11 The City of Cleveland is the owner of the parcel on which the Rock & Roll Hall of Fame sits (101-03-035).

12 USGCRP, "U.S Climate Resilience Toolkit: Glossary."

13 The City has combined Heavy Precipitation and Flooding with Severe Summer Storms due to their substantial overlap; as a result, this CRVA also includes Extreme Heat as a priority hazard.

14 Climate Central, 2022, "Summer Air: Hot, Stagnant, Polluted," <https://www.climatecentral.org/climate-matters/stagnant-air>, accessed January 1, 2025.

15 U.S. EPA, "Air Quality System," <https://www.epa.gov/aqs>, accessed January 1, 2025.

16 Ibid.

17 Burke, Marshall, et al. "The contribution of wildfire to PM_{2.5} trends in the USA." *Nature* 622.7984 (2023): 761-766.

18 Nolte, Christopher G., et al. "Regional temperature-ozone relationships across the US under multiple climate and emissions scenarios." *Journal of the Air & Waste Management Association* 71.10 (2021): 1251-1264.

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Recreation, Division of Waste Collection & Disposal, Economic Development, Emergency Management, Finance, Human Resources, Intervention and Opportunity for Youth and Young Adults (PIOYYA), Office of Government Affairs, Office of Prevention, Operations, Port Control, Public Health, Public Safety, Public Works, Taxation, Urban Forestry, and Water Pollution Control.

Finally, we acknowledge the community partners and organizations that helped bridge the connections between our municipal planning efforts and broader community priorities. While the MAP focuses on internal city operations, it is informed by the same values of equity, inclusion, and climate justice that guide our community-wide Climate Action Plan.

Thank you to all who made this Municipal Action Plan possible. Together, we are charting a more sustainable future for Cleveland, from the inside out.



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