CLEVELAND HEIGHTS

Cleveland Heights Climate Forward: An Action & Resilience Plan

December 2024

Table of Contents

Letter from Mayor Kahlil Seren

Dear Cleveland Heights Community Members,

I am proud to present the inaugural Cleveland Heights Climate Forward Plan, a roadmap that reflects our city's commitment to addressing one of the most pressing challenges of our time: climate change. As we experience the increasing impacts of climate-related events—whether it's severe weather, rising energy costs, or threats to our natural environment—there has never been a more critical moment to act. By prioritizing sustainability and equity, we are not only protecting our environment but also improving the quality of life for everyone in our community. This plan aims to ensure that Cleveland Heights remains a vibrant, healthy, and resilient place for current and future generations.

Our plan focuses on two main objectives: reducing local greenhouse gas emissions and increasing our resilience to the changing climate. To reduce local emissions, we are working to decrease our reliance on fossil fuels, enhance energy efficiency in our buildings, promote renewable energy, and expand our public transportation and active transportation networks. We will also encourage more sustainable land use, such as expanding green spaces and community gardens. By making these changes, we will cut carbon emissions while creating a cleaner, healthier environment for all.

Building resilience is just as important as reducing emissions. We will work to ensure our infrastructure, homes, and public spaces can withstand extreme weather events, from heavy storms to heat waves. This includes investing in stormwater management, improving emergency response capabilities, and promoting practices that protect our urban tree canopy. Together, these efforts will safeguard our city from future climate risks while building a more equitable and sustainable community.

I want to thank everyone in Cleveland Heights who has engaged with this process and helped us co-create this plan —whether by attending public meetings and workshops, offering feedback through our community survey and at community outreach events, or taking personal sustainability action in your own lives. Your involvement has been critical to the development of this living document and will continue to be essential to this plan's successful implementation. I encourage everyone to continue participating as we implement these strategies. Together, we can create a more sustainable and resilient Cleveland Heights for generations to come.

Sincerely,

Kahlil Seren
Mayor of Cleveland Heights, Ohio

Acknowledgements

We extend our sincere gratitude to the city leadership, the dedicated community members, and all stakeholders who played an integral role in the development of the first Cleveland Heights Climate Forward Plan. Your unwavering commitment, helpful insights, and ongoing collaboration have been vital in shaping a sustainable future for our city. Together, we have laid a strong foundation for addressing climate challenges and fostering resilience, ensuring that Cleveland Heights remains a vibrant and thriving community for generations to come. Thank you for your passion and support of this important initiative.

City Stakeholders:

- Mayor Kahlil Seren
- Allan Butler, Director of Housing
- Andrea Heim, Performance Coordinator
- Andrew Unetic, Former Finance Director
- Andy Boateng, Sustainability and Resilience Coordinator
- Anthony Mattox, Council Member
- Brian Anderson, Assistant Director of Economic Development
- Brian Iorio, Assistant Director of Community Development
- Brandon Upchurch, Former Mayor's Action Center Coordinator
- Brooke Siggers, Planner
- Chris Britton, Police Chief
- Chris Heltzel, Assistant Law Director
- Collette Clinkscale, Director of Public Works
- Craig Cobb, Councilmember
- Danny Williams, City Administrator
- Davida Russell, Vice President of Council
- Eric Elmi, Chief Building Official
- Eric Zamft, Planning and Development Director
- Gail Larson, Councilmember
- James Harry, Fire Chief
- Jim Petras, Councilmember
- Jim Posch, Councilmember
- Ken Bernard, GIS Administrator
- Marc Lefkowitz, Public Relations Specialist
- Mike Thomas, Director of Communications and Public Engagement
- Patrick Costigan, Special Assistant to the Mayor
- Ryan Prosser, IT Director
- Samira Rhodes, Special Events Coordinator
- Lt. Sean Corrigan, Police Department
- Steve Barker, Digital Coordinator
- Tara Schuster, Acting Finance Director
- Todd Walburn, Mayor's Action Center Coordinator

- Tom Fidanza, Assistant Director of Parks and Recreation
- Tony Cuda, City Council President
- William Hanna, Law Director
- Xavier Yozwiak, Planner/Zoning Inspector

Community Stakeholders:

- Jodi Sourini, Cleveland Heights-University Heights City School District
- Carly Beck, Climate and Environmental Sustainability Committee
- John Barber, Climate and Environmental Sustainability Committee
- Mohammad Irfan, Climate and Environmental Sustainability Committee
- William Hanavan, Climate and Environmental Sustainability Committee
- Catalina Maddox-Wagers, Climate and Environmental Sustainability Committee, Cleveland Heights Green Team
- Tami Masuoka, Climate and Environmental Sustainability Committee, Cleveland Heights Green Team
- Sean Terry, Climate and Environmental Sustainability Committee, Trust for Public Land
- Joe DeWitt-Foy, Heights Bicycle Coalition
- Keesha Allen, Home Repair Resource Center
- Deepa Vedavyas, NOPEC
- Jon-Paul d'Aversa, Power A Clean Future Ohio
- Nat Ziegler, Power A Clean Future Ohio

Thank you to our project consultants and lead plan authors, Melanie Nutter and Katherine Lee from Nutter Consulting LLC. We appreciate the other contributors from Power A Clean Future Ohio and Nutter Consulting to the development of the plan's content as well including Jon-Paul d'Aversa, Patrick Marchman, Silvia Pac Yurrita, Elena Stachew, Benjamin Cavalier, Nat Ziegler and Catherine Pappas.

Glossary

The City of Cleveland Heights recognizes that there are many terms used throughout this document that have complex and sometimes dynamic meanings. This glossary contains meanings and definitions that are industry standard, while ensuring that terminology is accessible for all audiences.

Acronyms

- **CEJST:** Climate and Economic Justice Screening Tool
- **DOE:** Department of Energy
- **EPA**: Environmental Protection Agency
- **EPPS**: Environmentally Preferable Products or Services
- **ESPC:** Energy Savings Performance Contract
- **GHG**: Greenhouse Gas
- **IRA:** Inflation Reduction Act
- **LEED**: Leadership in Energy and Environmental Design, a voluntary rating system developed by the US Green Building Council to certify a buildings low or net-zero emissions status
- **NEORSD**: Northeast Ohio Regional Sewer District
- **NAAQS**: National Ambient Air Quality Standards
- **PCFO**: Power A Clean Future Ohio
- **PPA:** Power Purchase Agreement
- **RTA**: Regional Transit Authority of Cleveland

Glossary of Key Terms

- **Brownfield**: Former industrial sites with high levels of pollution or contamination, that are currently vacant or unused
- **Carbon neutrality**: The state of having an equal or lesser amount of greenhouse gas emissions produced by a region, organization, or entity, than the amount of emissions that are removed through the Earth's natural absorption
- **Carbon neutrality fund**: A dedicated fund of City resources to implement carbon reduction measures
- **Climate adaptation**: The adjustments that communities and ecosystems make to limit the negative impacts of climate change and increase resiliency
- **Climate equity**: Principle that recognizes that disadvantaged communities are disproportionately affected by climate change and strives to ensure that all individuals have access to the resources to protect themselves from the impacts of climate change and share the benefits of climate protection efforts
- **Climate migrants/refugees**: People that relocate from their home area due to negative effects of climate change
- **Climate resiliency**: The capacity for societies and their systems to adjust prepare for, recover from, and adapt to climate change

- **Dark Sky compliant lighting:** Outdoor lighting fixtures and designs that minimize light pollution and its adverse effects on the environment, human health, and astronomical observations
- **Dig once policy:** Dig once policies require local utilities and agencies to coordinate upgrades and repairs that require on street construction
- **Environmental justice:** The principle ensuring just treatment and meaningful involvement of all people in decision making so that protection from disproportionate human health and environmental effects is equitable, while also ensuring everyone has access to a healthy and resilient environment in which to live
- **EPA disadvantaged community**: Communities that are marginalized, underserved, and overburdened by pollution
- **EV Readiness**: Local and state-level preparation that addresses the increasing prevalence of EV usage, typically considering factors like available infrastructure, policies, and services
- **Flood plain**: Areas along a river or stream that are susceptible to flooding
- **Fugitive emissions:** Unintentional releases of gasses. The greenhouse gas inventory accounts for leaks that are common when natural gas and other gaseous fuels are transported or used, including small leaks that you can smell when turning on a gas stove.
- **Greenhouse gas (GHG) inventory**: The quantification of the amount of heat-trapping gases released by human activity within a specific region over the course of a year
- **Greenhouse gasses**: Gasses like carbon dioxide, methane, and nitrous oxide, often produced by human activity, that trap heat in the atmosphere and contribute to a warming climate
- **Heat island**: Urbanized areas that experience higher temperatures than surrounding areas due to lack of tree cover and concentration of concrete surfaces
- **Impervious cover:** Any type of human-made surface that does not absorb rainfall
- **Justice40**: A federal initiative through which 40% of certain climate, clean energy, affordable housing, and other investments must flow to disadvantaged communities
- **Microgrid**: A self-sufficient, energy system that serves a small, specific geographic footprint that can be connected with a larger grid or operate independently
- **Ozone:** In high-levels of the Earth's atmosphere, ozone is a naturally occurring gas that reduces the amount of harmful UV radiation reaching the Earth's surface. Ozone is also a greenhouse gas produced by man-made processes, such as industry and motor vehicles, that is a pollutant and greenhouse gas at ground-level.
- **Rain gardens/bioswales**: A small depression in the landscape, often planted with native plants, that collects rainwater, filters pollutants, and allows it to soak into the ground
- **Solar co-op**: A group of individuals or businesses who used their combined purchasing power to procure solar panels for a lower, group price
- **Urban tree canopy**: A measurement encompassing the leaves and branches of trees that shelter the ground when viewed from above

Executive Summary

Cleveland Heights is embarking on a transformative journey to combat climate change and to build an equitable, resilient future. Through the co-creation of the Climate Forward Plan with the public, the City is committed to a community-wide goal of carbon neutrality by 2050 and taking meaningful action on climate and sustainability that the community strives for and expects. However, the City government cannot achieve this vision alone; this plan is a call to action for our residents, local businesses, organizations, and others in our passionate, dynamic community to join in collective climate action. As the city recently celebrated its 100th anniversary in 2021, Cleveland Heights is looking to build on its rich past and craft a vision for a future that is just, sustainable, and resilient.

In 2021, City Council took its first major step in climate action by passing a resolution to join Power A Clean Future Ohio and codify the city's goal to reduce greenhouse gas emissions by 30% by 2030, compared to the 2021 baseline. Mayor Seren and the City Council have made climate action a shared commitment, supported by the community's taking action, from planting native gardens to participating at higher levels of sustainable transportation use in the form of transit, walking, biking, and rolling. To ensure long-term success, in 2023 the City hired a full-time Climate Resiliency & Sustainability Coordinator in the Mayor's Office, emphasizing the importance of dedicated leadership on this issue.

The community has already experienced the impacts of climate change, from the severe storms of summer 2024 to the hazardous air quality caused by the 2023 Canadian wildfires. Extreme precipitation and flooding damages buildings and infrastructure, while ongoing air quality issues affect the health of residents. The events in East Palestine, Ohio and annual growth of

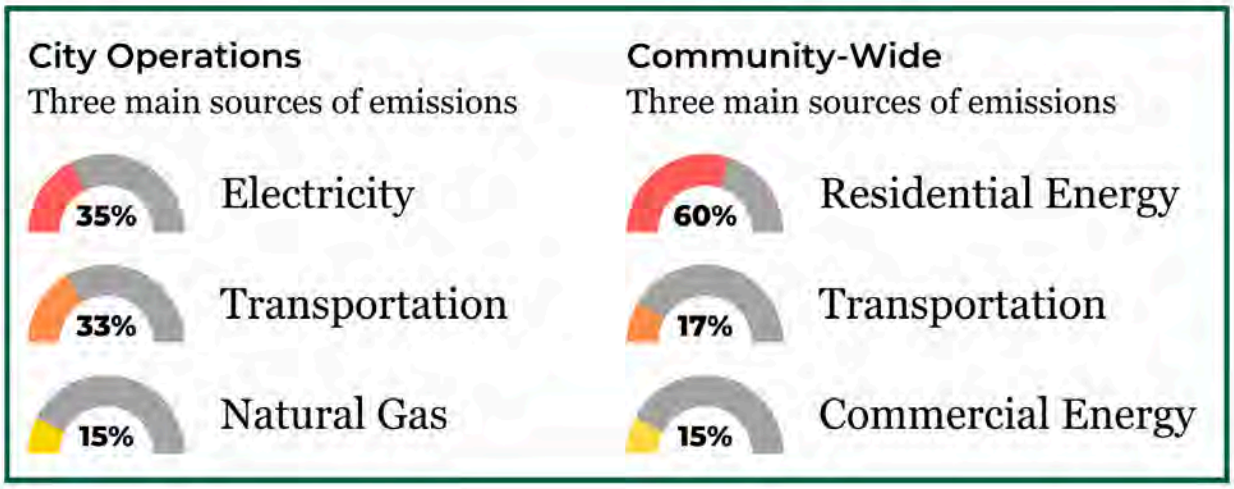
Harmful Algal Blooms from runoff into Lake Erie, have further underscored how local environmental conditions can have a broader impact on regional air and water quality, public and environmental health. Cleveland Heights is also preparing for the growing demands of climate migration, with the Great Lakes Region beginning to see "climate refugees" from the areas of the country more severely impacted by climate change.

In the Vulnerability and Risk Assessment, we assessed how our critical facilities, infrastructure, and community are vulnerable to climate change (see section *Climate Change in Cleveland Heights*). Using an approach based on the U.S. Climate Resilience Toolkit and data from the Cuyahoga County Climate Change Vulnerability Assessment, we identified several climate hazards, natural events that harm people or the environment, that are projected to increase in severity and probability over time. Severe weather events, including thunderstorms, extreme precipitation, and tornadoes and high wind, are the biggest threats to the community as climate change accelerates.

Climate change also has disproportionate impacts on members of our community. We mapped physical factors, like heat island effect and lack of tree canopy, as well as social factors, like percent of population below the poverty level and rental occupied units, to understand how neighborhoods are disparately impacted by climate change (see section *Vulnerability Assessment for Cleveland Heights*). In community feedback sessions, residents shared their lived experiences, identifying business owners, low-income households, mobility and transit-dependent populations, renters and multi-family households, seniors, and youth as groups that experience unique and disproportionate climate impacts. Addressing these impacts and challenges is crucial to ensure that Cleveland Heights's climate resilient future is equitable.

To understand the source of emissions from our city and community activities, we completed two greenhouse gas inventories: one focusing on city operations and other encompassing community-wide activities (see section *Greenhouse Gas Inventory*). For City operations, the three main sources of emissions are: electricity (35%), transportation and mobile sources (33%), and natural gas and stationary combustion (15%). Community-wide, the highest emitting sectors are: residential energy (60%), transportation and mobile sources (17%), and commercial energy

(15%). Targeting the highest-emitting sectors is critical to reducing greenhouse gas emissions and reaching the City's decarbonization goals.

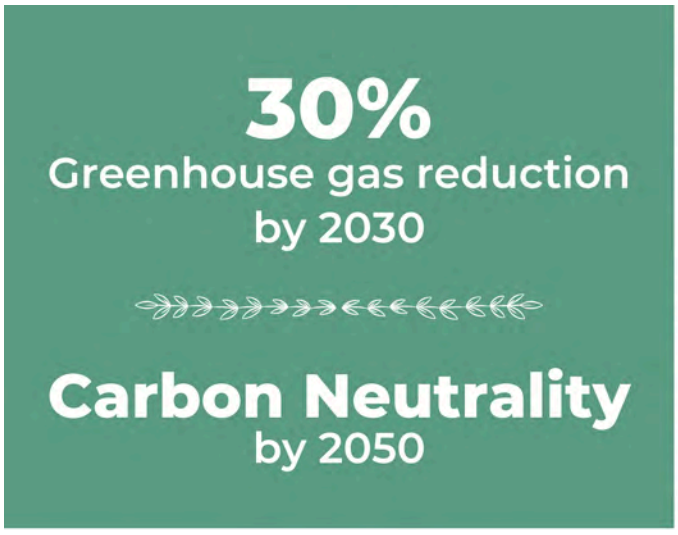


This plan is not just a product of city leadership; it's a reflection of the community's vision. Local organizations in Cleveland Heights have played a pivotal role in educating and mobilizing residents to reduce their impact to the planet and local environment, as well as embrace sustainable practices. To develop the plan, our project team hosted three community workshops, staffed ten community events, and facilitated a workshop with city staff. At these outreach events, we were met with an outpouring of community support and enthusiastic participation, with residents sharing their innovative ideas and solutions to advance climate action. The community's voice directly informed the vision, strategies, and actions of the Climate Forward Plan.

This plan, guided by a vision of creating a just, resilient, and sustainable future, outlines 28 strategies and 155 actions across seven key sectors, designed to reach carbon neutrality by 2050 through driving carbon emissions down and spurring economic and quality of life improvements. The strategies and actions are informed by the first two sections of the plan which analyze where vulnerable communities are located in Cleveland Heights and the main sources of carbon emissions within the city. The seven key sectors addressed in the strategies section are: 1) Buildings and Energy, 2) Transportation, 3) Materials and Waste 4) Water and Wastewater, 5) Air Quality and Public Health, 6) Food Systems, 7) Natural Areas and Land Use (see section *Taking Action: Climate and Resilience Strategies*). This plan is intended for the entire community and lays the groundwork for achieving this globally recognized, science-based goal and includes concrete short, mid and long-term action steps necessary to forestall the worsening impacts of the climate crisis.

Carbon neutrality is not the only goal of this plan; these strategies will also advance resilience, climate equity, and public health. Through action across the seven sectors, Cleveland Heights will help ensure its neighborhoods are prepared and its most vulnerable populations are protected from climate change's most likely impacts.

Cleveland Heights recognizes that the fight against climate change requires collaboration and leadership at all levels. Budget priorities may shift. Building codes, both commercial and residential, will be reviewed and likely updated. But by addressing the city's climate challenges through this comprehensive plan, we are poised to safeguard our environment, improve public health, and create a more resilient and equitable community for all. Not only do the strategies and actions in this plan offer many co-benefits such as making the community more resilient, equitable, and healthy, they will also enhance the city's overall aesthetics, charm, and livability - one of the prime reasons many have chosen Cleveland Heights as home. Together, Cleveland Heights is charting a path forward to protect the environment, improve public health, and ensure a thriving, equitable future for all residents.



These tables provide an overview of the seven sectors and 28 strategies included in the Climate Forward Plan. For additional detail on the cross-sector approach as well as the 155 actions, see the Taking Action: Climate and Resilience Strategies section.

Buildings and Energy	
1.1	Increase community access and use of renewable energy, including solar, wind, and geothermal
1.2	Improve energy efficiency and expand clean energy use for municipal buildings
1.3	Advance equitable energy efficiency programs for residential and commercial buildings
1.4	Increase the resilience of residential, commercial, and municipal buildings
1.5	Increase the resilience of local electricity infrastructure

Transportation	
2.1	Reduce transportation emissions from City operations
2.2	Encourage the community's transition to electric vehicles
2.3	Improve bicycle and pedestrian connectivity and safety
2.4	Expand accessibility and use of public transit and shared mobility services
2.5	Improve transportation infrastructure's resilience to climate change

Materials and Waste	
3.1	Expand local composting to reduce organics and food waste in landfills
3.2	Improve recycling waste diversion and reduce local plastic waste pollution
3.3	Prioritize the procurement of sustainable or recycled materials for City government operations and construction projects

Water and Wastewater	
4.1	Reduce overland flooding and water pollution by implementing green infrastructure and other stormwater management methods
4.2	Encourage the adoption of water efficient appliances and best practices
4.3	Protect the regional watershed
4.4	Improve the resilience of water infrastructure

Air Quality and Public Health	
5.1	Expand local air quality monitoring
5.2	Improve public engagement around air quality
5.3	Reduce local sources of air pollution
5.4	Protect public health during extreme weather events and other climate hazards

Food Systems	
6.1	Improve community food security and access to fresh foods
6.2	Expand community gardening and urban agriculture

Natural Areas and Land Use	
7.1	Revitalize brownfields, vacant lots, and vacant buildings
7.2	Nurture a healthy tree canopy
7.3	Identify opportunities to expand green spaces in all neighborhoods
7.4	Support native species, biodiversity, and healthy habitats in city parklands
7.5	Encourage denser, mixed-use development to create walkable neighborhoods

SECTION 1:
Introduction

About Cleveland Heights

Located in Cuyahoga County, Cleveland Heights is a vibrant and diverse suburb situated approximately eight miles east of downtown Cleveland. Spanning about eight square miles, the city is renowned for its historic architecture, tree-lined streets, vibrant, walkable commercial districts and rolling hills. Home to approximately 45,000 residents, the city's demographics reflect a blend of cultures and backgrounds, with 47.5% identifying as White, 41.7% as African American, 5.3% as Asian, and 2.7% as Hispanic or Latino.[1] About 10.6% of the community speaks a language other than English at home, showcasing Cleveland Heights' inclusivity and diversity.[2] The median household income in Cleveland Heights is $69,155, although 16.4% of residents live below the poverty line.[3] A key component of the community's vision for the future includes advancing equity, diversity, and inclusion so all residents can thrive.

The local economy is anchored by a blend of long-standing family-owned businesses and new enterprises, particularly in the community's eleven business districts. The city's active cultural scene is supported by various institutions, such as the Cleveland Heights-University Heights Public Library and the city's seven parks, including Cain Park, which houses the nation's first municipally owned outdoor theater. This rich cultural landscape, combined with its unique blend of historic charm and modern vibrancy, makes Cleveland Heights a welcoming and dynamic community.

The Federal and State Policy Landscape

In the United States, the national climate action and resilience policy landscape has shifted significantly in recent years, with growing federal efforts to address the escalating impacts of climate change. Key initiatives include the Biden administration's Inflation Reduction Act (IRA), which allocates substantial funding toward clean energy development, emissions reductions, and environmental justice. The Infrastructure Investment and Jobs Act also dedicates resources to climate-resilient infrastructure, emphasizing the modernization of transportation, water systems, and energy grids. Federal agencies like the Environmental Protection Agency (EPA) and the Department of Energy (DOE) have strengthened regulations on greenhouse gas emissions and promoted renewable energy adoption.

Additionally, the United States has rejoined international climate agreements like the Paris Agreement, committing to significant emissions reduction targets by 2030. These national policies emphasize equity and resilience, focusing on protecting vulnerable communities and promoting sustainable economic growth, while supporting states and cities in developing localized climate action plans. Equity priorities are operationalized through Justice40, a federal initiative that requires at least 40% of all benefits from federal grants and programs to support disadvantaged communities. Despite challenges, this growing federal commitment signals an important shift toward a more coordinated and comprehensive approach to climate change.

Taking action on climate change in Ohio presents several challenges, rooted in the state's economic structure, political landscape, and public perceptions. Ohio has a historically strong reliance on fossil fuels, particularly coal and methane or ‘natural gas’ from fracking, for energy production and jobs, making the transition to renewable energy difficult without affecting key industries and communities. Across Ohio, there are 30,542 workers in the fossil fuel industry, including power generation, coal, oil, and natural gas.[4] Political polarization also complicates climate action, as policies addressing GHG emissions or clean energy often face resistance from groups aligned with the fossil fuel industry and groups concerned about regulatory impacts on businesses and energy prices. Public perception and climate change awareness in the state are mixed, with some communities underestimating the issue’s urgency or prioritizing short-term economic concerns over long-term environmental sustainability. These challenges are compounded by a need for greater investment in renewable energy infrastructure and more comprehensive state-level policies to support local climate action. However, growing recognition of the economic benefits of clean energy and federal support for green initiatives offers an opportunity to overcome these barriers and move Ohio toward a more sustainable future.

With the outcome of the recent Presidential election, one thing is clear: municipalities can and will continue to lead the way on taking decisive action on climate change. While it’s too early to predict what impact the new administration will have on federal funding sources, agency capacity and current legislation, we must still keep pushing for and advocating for local action. Perpetual commitment to supporting local communities in this endeavor is critical regardless of which administration is in place at the federal level.

Developing the Climate Forward Plan

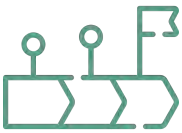
With these guiding project objectives, we've created the Climate Forward Plan that fits the unique needs and makeup of the Cleveland Heights community. Our approach included:

Identify the challenges in Cleveland Heights: To develop effective strategies, we quantified greenhouse gas emissions and uncovered local climate issues that are affecting the community through research and lived experiences from residents.

Align climate objectives with existing city programming: By researching ongoing efforts in the city and region, we identified cross-sector solutions to connect climate action with existing or planned projects and facilitate collaboration across departments.

Incorporate feedback from diverse stakeholders and community members: To co-create this plan with the community, we conducted three community workshops and attended ten community events throughout the plan development process, from visioning to strategic development.

Establish science-based targets: Using the GHG inventory and other climate and resilience data, we developed science-based targets that are feasible, but ambitious, to guide climate action in Cleveland Heights toward a decarbonized future.



Develop a strategic roadmap to accelerate implementation: We developed a comprehensive, actionable plan for Cleveland Heights to achieve its climate action and resilience goals, with opportunities for the city government, residents, businesses, and community partners to take action.

We conducted the development of the Cleveland Heights Climate Forward Plan over the past 12 months in 3 phases.

Discovery Phase

Our team analyzed over 25 plans, policies, assessments, and programs led by the City, Cuyahoga County, and the State of Ohio to benchmark Progress to Date and find alignment with existing goals (listed in Appendix C). In addition, we developed a greenhouse gas inventory for city operations and community-wide emissions, and evaluated the fleet analysis, climate vulnerability data, and environmental justice data.

Engagement Phase

Our team developed a Community Engagement Strategy to guide a comprehensive approach to gathering community feedback. Through three workshops, two surveys, three stakeholder interviews, and involvement at ten community events, we collected hundreds of community insights that informed our understanding of local climate impacts, equity considerations, local partners, and priority solutions for climate action and resiliency.

Strategy Phase

Our team leveraged nationwide best practices and regional case studies alongside local data and community member insights to develop a comprehensive strategic plan. With 28 strategies and 155 actions across seven key sectors, the plan lays out a community-driven approach to advancing climate action and resilience locally.

Co-Creating the Plan: Community Engagement Timeline

A core priority in developing the Climate Forward Plan was co-creating the plan alongside Cleveland Heights community members. We adopted an inclusive, comprehensive approach to engagement, which included hosting three public workshops, conducting a Climate Action Day survey, facilitating stakeholder interviews, and participating in eight community events. Through these efforts, we gathered hundreds of valuable insights that informed our understanding of local climate impacts, equity priorities, and community-driven solutions. Cleveland Heights is a vibrant, forward-thinking community deeply committed to advancing climate action and resilience. The enthusiastic participation of residents was instrumental in shaping a plan that not only meets the unique needs of our community, but also creates a foundation for lasting, impactful action. We are grateful to everyone who contributed to this important endeavor.

440+
Community participants

11
Community events

230+
Survey responses

October 24, 2023: Climate Action Day

In alignment with Global Climate Week, the City of Cleveland Heights hosted its first Climate Action Day event at City Hall. Mayor Seren gave remarks officially launching the Climate Forward planning process and a public Climate Action Day Survey to gather insights from the community on local climate impacts and priorities for action. A drop-in information session was held at City Hall on how the city is addressing climate change and what the Climate Forward Plan will entail. The City's Sustainability and Resiliency Coordinator held an event at the Heights Public Library to engage with residents on the role of cities and its residents in climate action.

February 24, 2024: Black History Month Celebration

At the Black History Month Celebration, the project team hosted an informational table to engage attendees on climate issues as part of the city's Climate Forward Plan. Our team had one-on-one discussions with about 15 participants, collecting feedback on climate change concerns like blackouts, rising electricity prices, and extreme weather events. Although many attendees were unfamiliar with terms like “climate justice,” the event helped raise awareness about Cleveland Heights' climate action efforts and sparked conversations on local climate impacts.

April 20, 2024: Earth Day

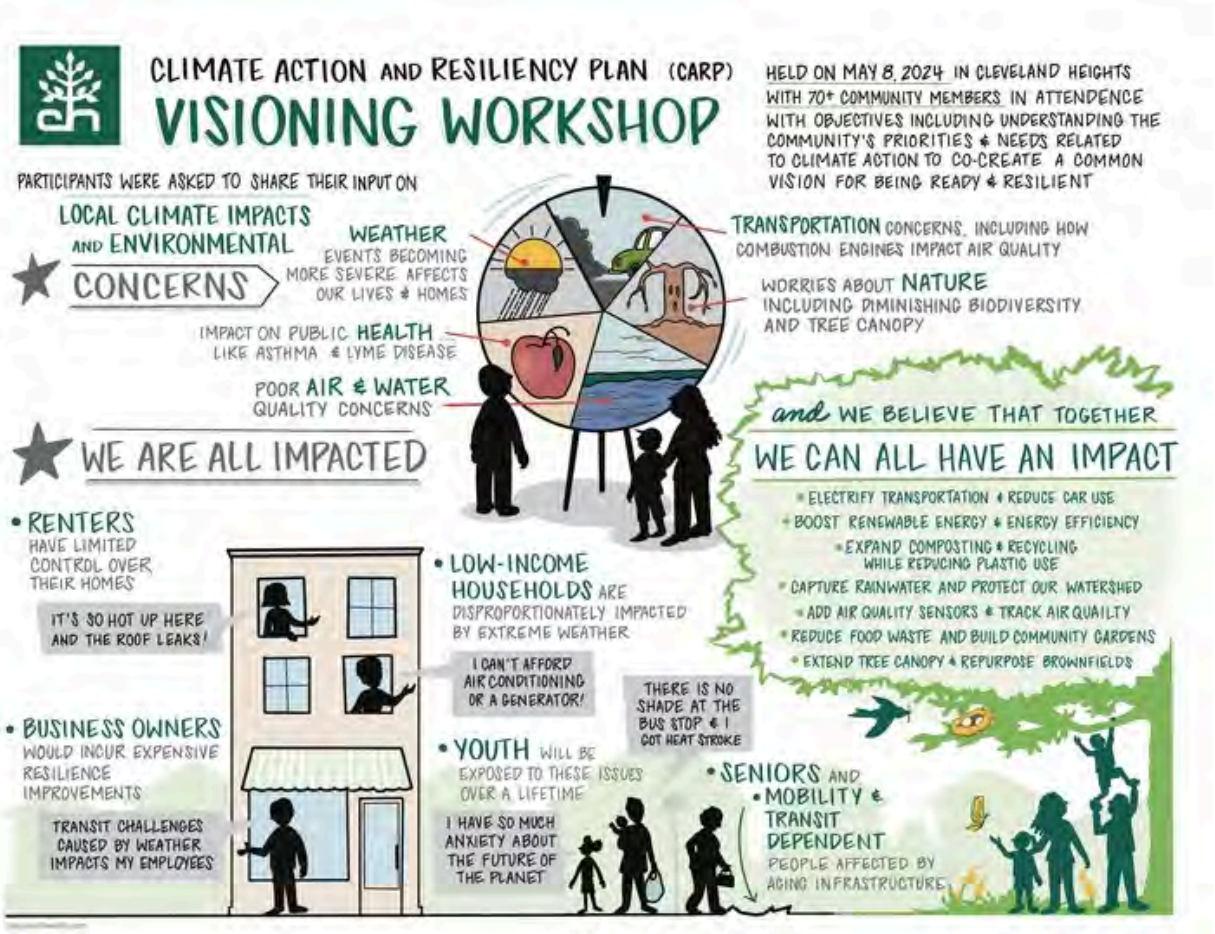
Cleveland Heights staff tabled at the local Earth Day celebration to distribute fliers promoting the May 8th workshop and also collected additional names for the community mailing list.

April 29, 2024: Article in the Heights Observer

Marc Lefkowitz, Public Relations Specialist with the City of Cleveland Heights, published an article in the Heights Observer to publicly announce the community engagement phase of the plan and to invite residents to attend the first community workshop.

May 8, 2024: Community Visioning Workshop

The City hosted the inaugural community visioning workshop for the Climate Forward Plan at the Cleveland Heights Community Center with about 70 participants. The workshop aimed to gather insights on residents' experiences with climate change, identify community priorities, and co-create a vision for a climate-ready and resilient future. It included a presentation introducing Climate Forward, followed by breakout discussions that engaged attendees in exploring the impacts of climate change on various populations and generating innovative ideas for local climate action. A visual summary of the Visioning Workshop is included below.



June 15, 2024: Juneteenth Celebration

At the community's Juneteenth Celebration, we hosted a Climate Forward Plan table to engage residents in interactive activities and one-on-one discussions. Participants were asked to share their observations of climate impacts in Cleveland Heights and provide suggestions to ensure no one is left out of the plan. About 30-40 people noted issues like erratic seasons, poor indoor air quality, basement moisture leading to mold, and the high cost of home insulation.

June 18, 2024: Second Annual Electric Lawnmower Exchange

Our project team shared information about the Climate Forward Plan at the second annual Electric Lawnmower Exchange, engaging 30-40 residents in discussions about the Plan while they exchanged their lawn equipment. Many residents expressed support for more electric lawnmower exchanges and ideas like composting expansion and improved bike lanes for safer transportation.

June 25, 2024: Noble Corridor Planning Session

Held at the Noble Library Branch, the City of Cleveland Heights hosted a community engagement event for the development of the Noble Road Corridor Comprehensive Planning study. Our team delivered 50 Climate Forward Plan flyers at the event to encourage residents to sign up for the project mailing list and increase awareness about opportunities to engage in the plan development.

July to August, 2024: Stakeholder Interviews

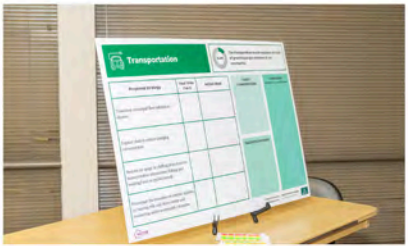
To gain insights from local leadership and community-based organizations, our project team conducted one-on-one stakeholder interviews with the Climate and Environmental Sustainability Committee, the Cleveland Heights-University Heights City School District, the Heights Bicycle Coalition, and the Home Repair Resource Center. Through these interviews, we gathered feedback on existing action on climate change, local impacts of climate change, the community's vision for a climate resilient future, and priority solutions to include in the plan.

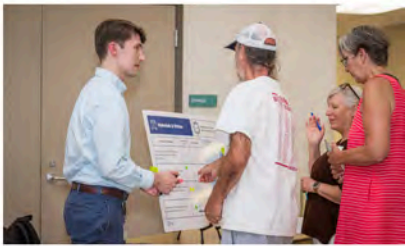
June 29, 2024: Pride in the Park

At the community's annual Pride in the Park celebration, our project team distributed about 40 pride-themed flyers to invite the community to the next Climate Action Community Workshop.

July 16, 2024: Climate Action Community Workshop

To gather specific community feedback on climate action strategies, the City hosted a second Climate Forward community workshop at the Cleveland Heights Community Center. Over 75 community members participated in an interactive feedback session, voting on proposed strategies, identifying equity considerations and potential partners, and offering additional solutions. The workshop featured seven feedback stations, each focused on a different sector of the plan.





July 23, 2024: Noble Road July Module on Transportation, Accessibility & Environment

The City of Cleveland Heights hosted an open house for the development of the Noble Road Corridor Comprehensive Planning study. The July meeting was focused on Transportation, Accessibility, and Environment, providing an opportunity for our project team to host a table engaging participants on issues related to the Climate Forward Plan. Using the presentation boards from the July community workshop, approximately 25 people gave feedback on four sectors: Transportation, Buildings & Energy, Natural Areas & Land Use, and Materials & Waste.

July 26, 2024: ARTFUL's Open Studios Night

At ARTFUL's Open Studios night, the project team engaged with 15 residents through three strategy boards from the second community workshop. The Food Systems board saw the most votes, with key interests in reducing food waste, aligning food distribution with resilience hubs, and utilizing vacant spaces for community gardens. Residents also focused on the importance of expanding green infrastructure and tree canopy, promoting denser mixed-use neighborhoods for walkability, and street calming measures. Suggestions included transforming Coventry PEACE into a resilience hub and improving the walkability of North Coventry and Noble Road neighborhoods.

September 18, 2024: City Staff Workshop

Our project team hosted a City Staff Workshop at City Hall, convening nine department leaders and city champions in a discussion around cross-departmental priorities related to climate action and resilience. At the workshop, staff discussed existing priorities across the seven sectors, alignment with departmental goals, and ideas for city-led projects and programs to include in the Climate Forward Plan.

September 18, 2024: Resilience Community Workshop

Held at Monticello Middle School, the project held the third community workshop focused on gathering community feedback on proposed resilience strategies. Through an informational presentation, the team presented initial findings from the Vulnerability and Risk Assessment to help the community understand the effects of climate hazards. Then, over 70 attendees participated in interactive feedback stations focused on resilience strategies across six sectors: Transportation, Buildings & Energy, Water & Wastewater, Air Quality & Public Health, Food Systems, and Natural Areas & Land Use. Participants voted on proposed strategies, shared their lived experiences with climate impacts, offered other resilience solutions, and identified priority locations for resilience projects.

October 24, 2024: Climate Action Day

Cleveland Heights hosted a table in the lobby at City Hall where City staff, including the City's Sustainability and Resilience Coordinator, previewed the release of the Climate Forward Plan for public feedback and spoke to residents that dropped by in an open house format.

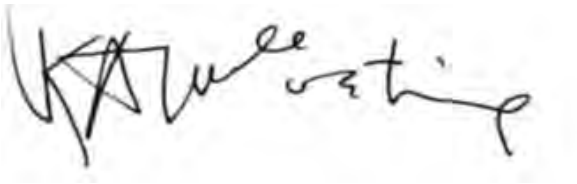
A Word from the Cleveland Heights Sustainability and Resilience Coordinator

Over the past year, the city has been working on the creation of its first Climate Forward Plan to reduce carbon emissions from City operations and the community, understand our exposure to climate hazards, assess our vulnerability and risk, and investigate and prioritize options to build resilience to climate change, while ensuring that equity is mainstreamed in this process. This has been a collaborative effort with the community to co-create a road map that ensures that our residents and resources are protected from climate hazards, prepare for and respond to these hazardous climate events sustainably and thrive in the wake of a changing climate.

Our work began by establishing ambitious yet achievable goals aligned with the latest climate science, ensuring that our efforts are consistent with best practices that position the city on the path to attaining carbon neutrality, adapting to current and projected climate impacts and strengthen our resilience. Throughout the process, we held public workshops, attended dozens of community outreach events, listened to your concerns and ideas, and integrated your feedback to ensure this plan reflects both the needs and values of our unique community.

I would like to extend my sincere gratitude to the city leadership, whose commitment to sustainability and climate action has been instrumental in this plan's development. The Mayor, City Council, and department heads have demonstrated visionary leadership in recognizing the importance of addressing climate change at the local level. Their support and active participation in this process ensured that our plan is robust, practical, and forward-looking. It is this shared commitment that will drive our progress as we move into the implementation phase.

As we transition from planning to action, we have established clear pathways to reduce our carbon emissions, adapt and build resilience by implementing the strategies outlined in the plan. We will work closely with residents, businesses, and local organizations to ensure that this is a truly collaborative effort and will be using this living document as our initial guide. Together, we will make Cleveland Heights a greener, more resilient, and a more sustainable city for all.



Andy Boateng
Cleveland Heights Sustainability and Resilience Coordinator

SECTION 2:
Climate Change in Cleveland Heights

Climate change is already having a significant impact in Cleveland Heights, affecting the local environment, community well-being, and the economy. One of its most visible effects has been the increasing frequency and intensity of extreme weather events. In the summer of 2024, a series of severe storms struck Northeast Ohio, causing extensive flooding, downed trees, power outages, and road closures across the region. As Cleveland Heights prepares for the worsening effects of climate change, it is critical to consider the impacts on our physical infrastructure, natural environment, and people, understanding that vulnerable groups and disadvantaged communities are disproportionately impacted by climate change.

Warmer temperatures have led to heavier rainfall and more severe storms, which strain our stormwater systems and contribute to localized flooding. This flooding can cause downed trees, power outages and road closures. It can also disrupt habitats, damage infrastructure and properties, and impact the health of our parks and green spaces, where many of our trees and plants are vulnerable to shifts in climate patterns. Rising temperatures also increase the risk of droughts, which further stress ecosystems and threaten biodiversity in our urban forest.

For the residents of Cleveland Heights, climate change poses both immediate and long-term challenges. Communities already facing social or economic disadvantages are hit hardest by these changes. Low-income families often live in older homes that are less energy-efficient, making it harder to stay cool during heat waves or keep heating costs down during longer, colder winters. Extreme heat and poor air quality disproportionately affect seniors, young children, and individuals with pre-existing health conditions, exacerbating health inequities across the city. Climate change also heightens public health risks, such as respiratory issues from increased air

pollution and vector-borne diseases as insects like mosquitoes expand their range due to warmer weather.

Prolonged periods of extreme heat can increase the prevalence of the urban heat island effect, where urban infrastructure such as buildings, roads and rooftops absorb and produce more isolated higher temperatures. Extreme heat days can also degrade air quality, increasing the chances of health impacts like asthma attacks as well as heat exhaustion and heat stroke. The increase in heat related illnesses puts stress on the health care system. It can put undue stress on the electric grid and cause power outages as well as cause higher electricity bills.

Vulnerable populations, including those with limited financial resources, face greater obstacles in adapting to these changes. For example, repairing flood damage or investing in energy-efficient upgrades can be cost-prohibitive for many residents. These inequities highlight the need for a climate resilience strategy that prioritizes the most vulnerable groups, ensuring that resources are distributed fairly and that everyone has the tools to withstand the impacts of climate change. Ensuring access to cooling centers during heatwaves, improving public transit, and supporting energy-efficiency in low-income housing - by pursuing multiple strategies including incentivizing landlords - are critical steps to protect the most affected populations.

The local economy is also deeply intertwined with the effects of climate change. As storms become more intense and temperatures fluctuate, businesses and infrastructure are at risk of damage, increasing the costs of repairs and maintenance. In addition, there is a risk of reduced worker productivity and raising energy demands, placing a strain on both businesses and municipal resources. In the long term, climate change could reduce property values in flood-prone areas (Figure 2) and increase insurance costs, making it more expensive to live and do business in Cleveland Heights. Additionally, the local tourism and recreation sectors, which rely on the city's parks and outdoor spaces, may suffer as rising temperatures and more frequent storms make outdoor activities less viable or accessible.

Addressing climate change in Cleveland Heights is not just about responding to environmental shifts—it's about safeguarding our community's future. By investing in climate action and resilience, we have an opportunity to protect our most vulnerable residents, reduce economic risks, and preserve the natural environment that defines our city. Through proactive efforts, Cleveland Heights can become a model for how smaller cities can thrive in the face of climate change, ensuring a healthy, equitable, and sustainable future for all.

Overview of Climate Vulnerability and Risk Assessment

In order to most effectively develop this plan for Cleveland Heights, we must first understand what assets and community members are most vulnerable to the impacts of climate change and which future hazards we'll most likely face.

> *"A climate risk assessment seeks to understand the likelihood of future climate hazards and the potential impacts of these hazards on cities spatially, and their inhabitants. This is fundamental information for prioritizing action and investment into climate adaptation and resilience." - C40 Cities*

This Cleveland Heights Vulnerability and Risk Assessment included below analyzes how these hazards will evolve due to climate change, and identifies which parts of the city and which communities are most vulnerable. This understanding is essential for prioritizing actions and investments aimed at reducing the risks and improving resilience.

This climate risk assessment also provides decision-makers and residents with detailed insights into the city's vulnerabilities, helping to guide the development of targeted strategies and actions for reducing risk. We used the U.S. Climate Resilience Toolkit 5-step approach (detailed below) for guidance on how to ensure that Cleveland Heights is not only addressing the source of climate change but proactively building resilience for the future. Steps included:

Explore Hazards: In this step, we identified the climate-related hazards that could impact the community. This involved analyzing historical climate data, consulting climate projections, and engaging with stakeholders to identify both current and future hazards. The goal is to understand the nature of these hazards—such as heatwaves, flooding and drought - and how they might evolve due to climate change.

Assess Vulnerability and Risks: This step involves evaluating how vulnerable our community is to the identified hazards. A climate risk assessment within this context looks at factors such as exposure (how much of the community or infrastructure is at risk), sensitivity (how severely they are affected), and adaptive capacity (how well they can cope with the impacts).

Investigate Options: After identifying and assessing risks, we focused on exploring adaptation and mitigation goals, strategies and actions that also provide co-benefits to the community. We evaluated different options to reduce vulnerabilities, manage risks and reduce GHG emissions.

4 **Prioritize and Plan:** We prioritized the most significant risks and further redefined the strategies and actions to address them. This step is informed by the risk assessment, ensuring that resources are allocated to the areas of greatest need.

5 **Take Action:** The final step will involve implementing the strategies developed in the previous step which will be codified in the Climate Forward Blueprint.

The basis for the City of Cleveland Heights' vulnerability assessment is the 2019 Cuyahoga County Climate Action Plan's Climate Change Vulnerability Assessment. Their assessment consists of an interactive map and associated database that integrates both social and physical risk factors to give an overview of residents' vulnerability by census tract.

The first part of the risk assessment consists of a detailed analysis of the 2019 Cuyahoga County Climate Action Plan's Climate Change Vulnerability Assessment. However, as described in the above definition from C40 Cities, natural hazard risk assessment, both climate-influenced and otherwise, requires an analysis of both how physical hazards are experienced from climate change and how the physical environment is impacted as well.

Vulnerability Assessment for Cleveland Heights

In May 2019, Cuyahoga County developed a Climate Change Vulnerability Assessment Map that evaluates physical and social risk factors for census tracts within the county's geography. Twenty of those census tracts comprise Cleveland Heights.

The County defines physical risk factors as "factors [that] identify the expected intensity of climate change impacts across the county." These five physical factors include:

1. Heat Island Effect: The heat island effect is when urbanized areas experience higher temperatures than outlying areas, resulting from a high concentration of structures such as buildings, roads, and other built infrastructure.
2. Flood Plain: Flood plains are areas adjacent to bodies of water that are at higher risk of flooding.
3. Older Residential Buildings: Older residential buildings are defined as residential buildings built before 1939.
4. Impervious Cover: Impervious cover refers to land that is covered by pavement or heavily compacted so that rainwater cannot soak into the ground.
5. Lack of Tree Canopy: Lack of tree canopy denotes areas where there is limited land area covered by trees.

The County defines social risk factors as "factors [that] identify certain socio-economic indicators that would make an individual and community more vulnerable to climate change impacts." These eight social factors include:

1. Population Under Age 5
2. Population Aged 65 and Over
3. Population Below Poverty
4. Minority Population
5. Households Without a Vehicle
6. Rental Housing
7. Population Lacking High School Diploma
8. Persons with Disability

To determine the relative risk for physical and social factors to each Census Tract, the County created a scoring system that assigned numeric values denoting how that Census Tract performed compared to the County mean:

- High Risk (More than one standard deviation greater than the mean) = 2
- Medium Risk (From the County mean to one standard deviation) = 1
- Low Risk (Less than the County mean) = 0

Every census tract was scored with a 0, 1, or 2 for the five physical risk and eight social risk factors. Those scores were totaled to generate a Physical Factor Composite Score and a Social

Factor Composite Score for each census tract. These composite scores provide a simple way of identifying the severity of climate changes' impact on each census tract.

Analysis of Physical Factors from the County's Assessment

Based on the County's scoring criteria, the highest possible Physical Composite Score for a census tract is 10. To receive a 10, each of the five physical factors for that census tract would have been scored as a 2—high risk.

In Cleveland Heights, the highest Physical Composite Score is 3 (Census Tract 1407.02) and the mean Physical Composite Score is 1.4. This indicates that based on the five physical risk factors Cleveland Heights is less vulnerable overall to climate change than the rest of Cuyahoga County based on the scoring.

Of the five physical factors, the most prominent in Cleveland Heights is 'Percent of Residential Buildings Built Before to 1939. Eighteen of 20 census tracts (CTs) in Cleveland Heights scored a 1 or 2 on this factor, indicating that the building stock of the community is older than the average across the County.

Below, we have ranked the physical factors from highest to lowest significance.

Physical Factor	Number of Low CTs (Score 0)	Number of Medium CTs (Score 1)	Number of High CTs (Score 2)	Cumulative Score for All CTs
Percent of Residential Buildings Built Before to 1939	3	16	1	18
Impervious Cover (Pct of Area)	14	6	0	6
Flood Plain (Pct of Area)	17	3	0	3
Lack of Tree Canopy Cover (Pct of Area)	19	1	0	1
Heat Island Effect (Pct of Area 2 degrees F or more above average)	20	0	0	0

Table 1: Physical Factors for Climate Vulnerability by Census Tract

The following maps provide a helpful visualization for where these physical asset vulnerabilities are most prevalent at the Census Tract level in Cleveland Heights.

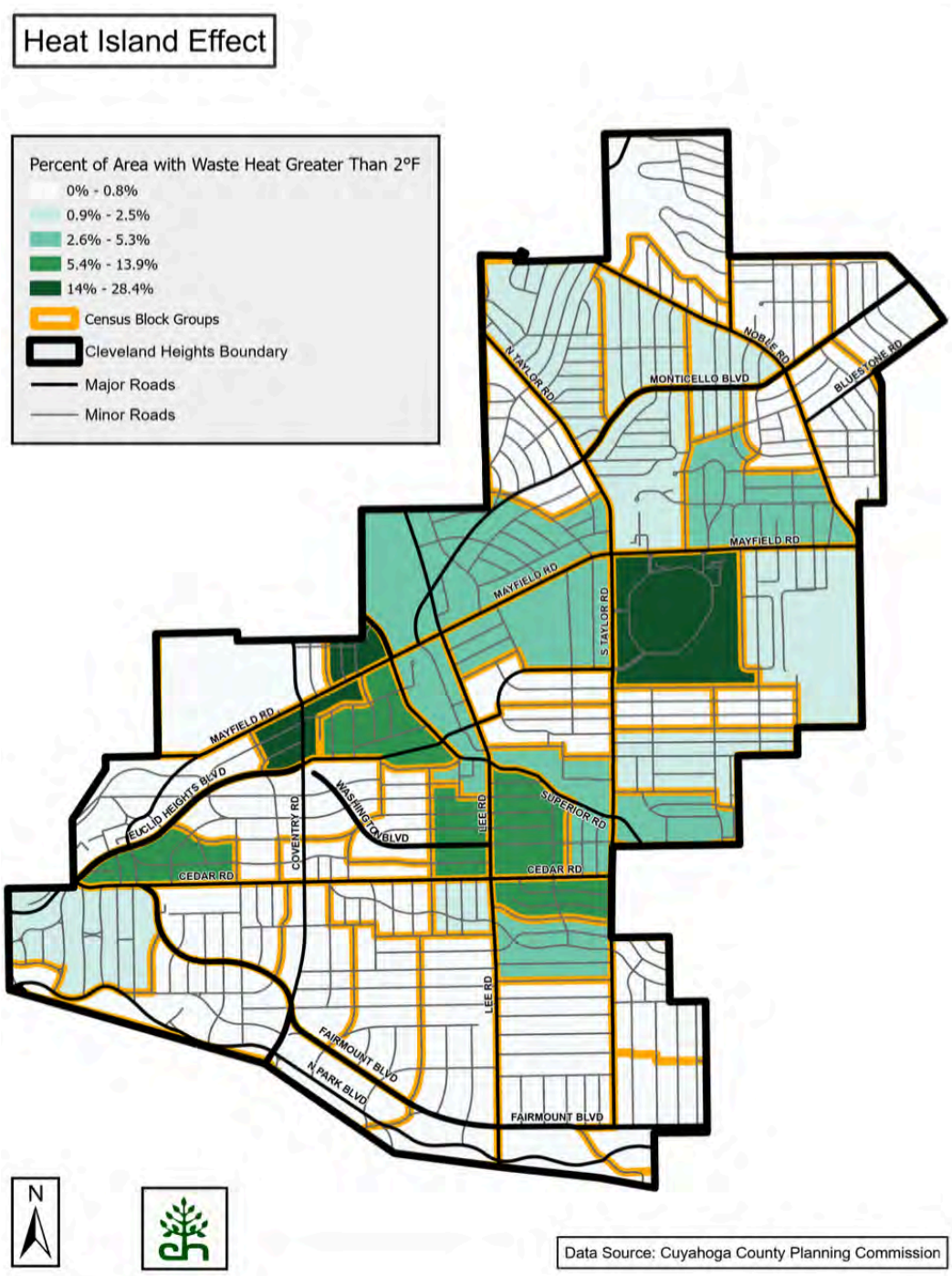


Figure 1: Map of heat island effect in Cleveland Heights

Several tracts in the center of Cleveland Heights have a higher percentage of surface area with heat above 2 degrees Fahrenheit. The census tract containing Severance Town Center has by far the highest percentage of this area in the city. Heat islands are areas of land where temperatures exceed the temperatures of outlying areas by an average of at least 2 degrees Fahrenheit, due to additions/ alterations to the physical landscape and/or human activity. Several census tracts near the center of Cleveland Heights have a high percentage of land that can be considered a heat island.

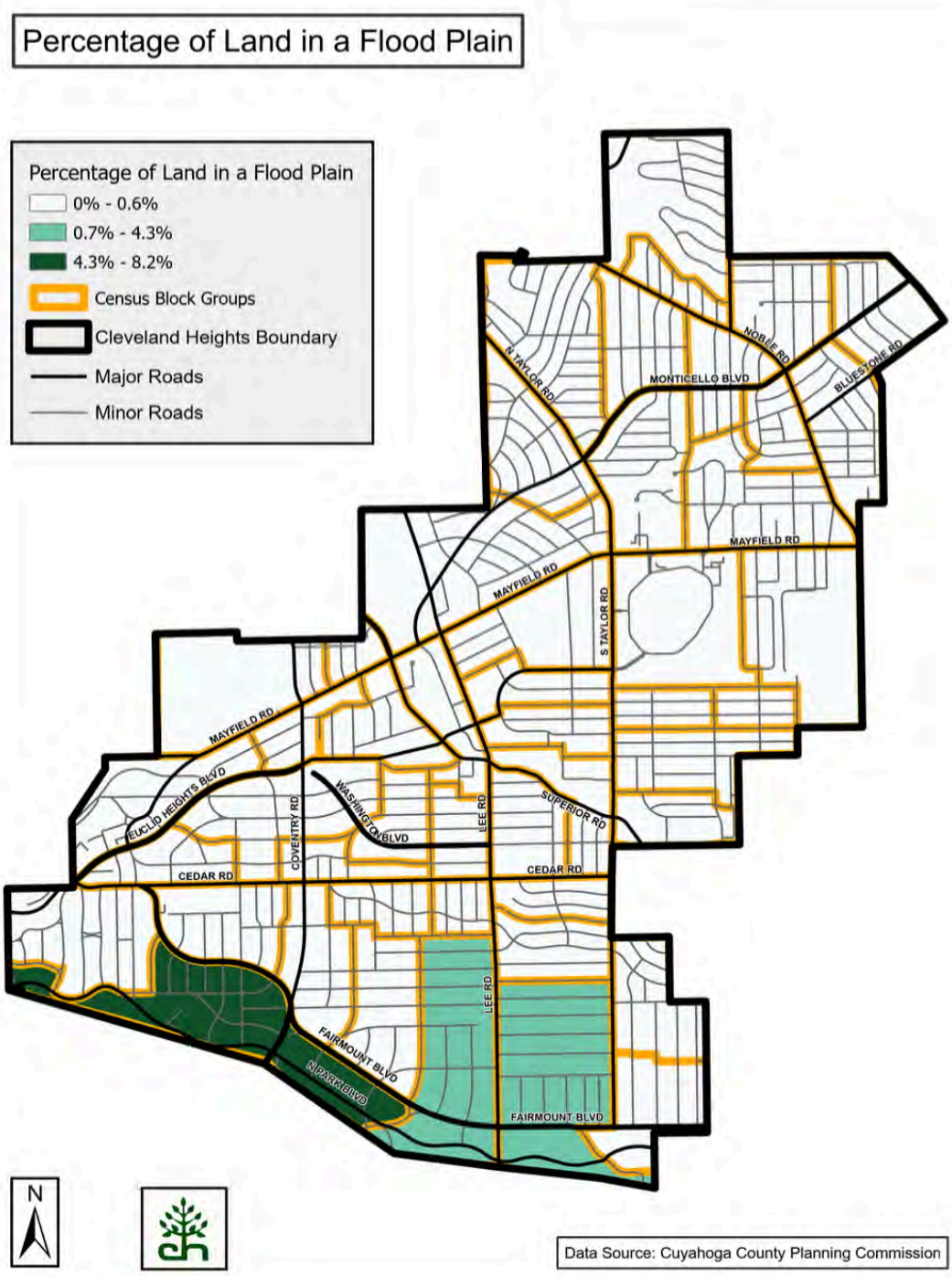


Figure 2: Map of flood plain in Cleveland Heights

The City as a whole is outside of recognized floodplains except for several census tracts at its southernmost boundary near Doan Brook and the Shaker Lakes natural area.

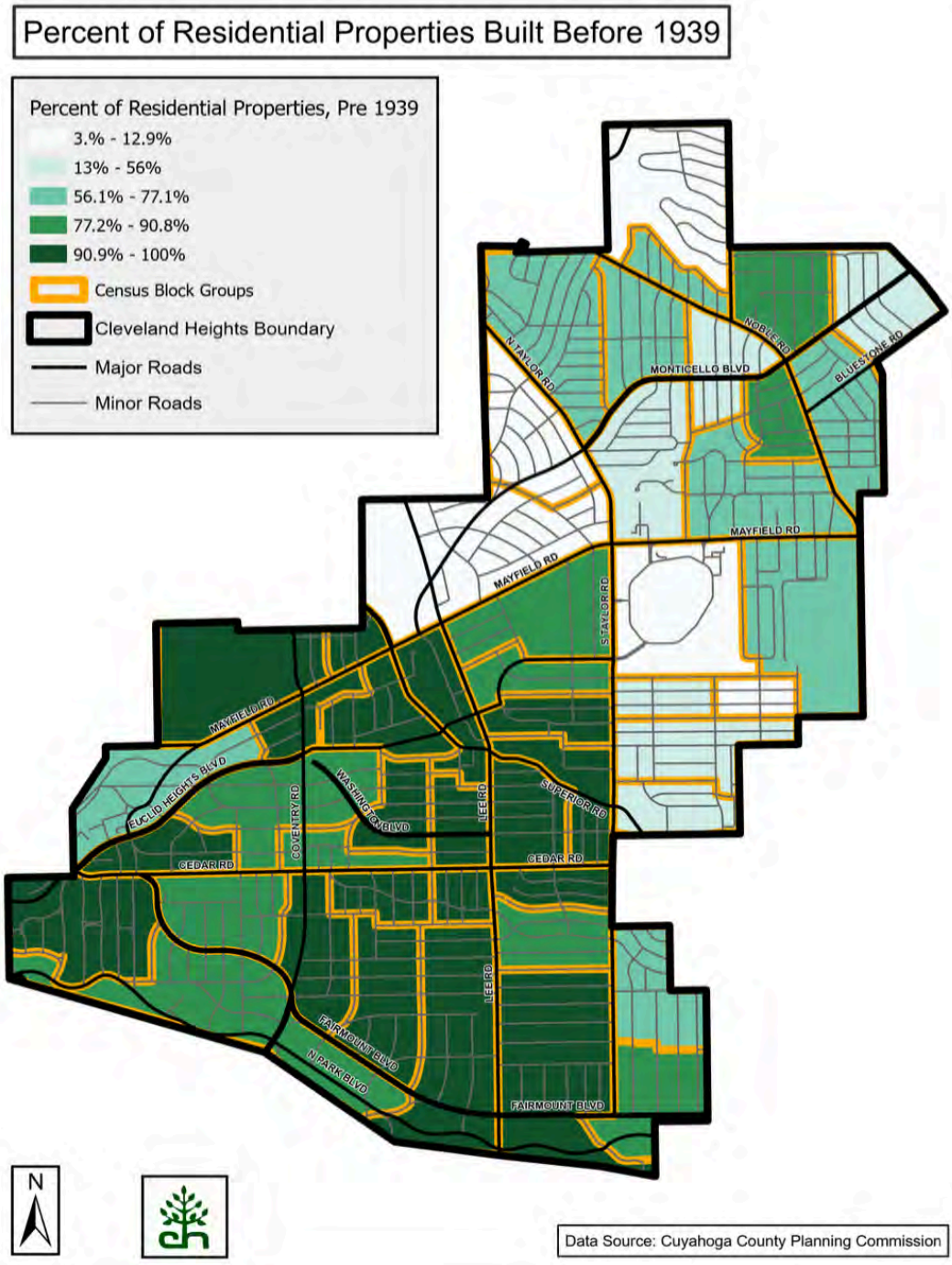


Figure 3: Map of residential properties built before 1939 in Cleveland Heights
Cleveland Heights has a significant percentage of residential buildings built before 1939, especially in its southern half. In more than half of Cleveland Heights' census tracts, more than 90 percent of the residential property was built before 1939.

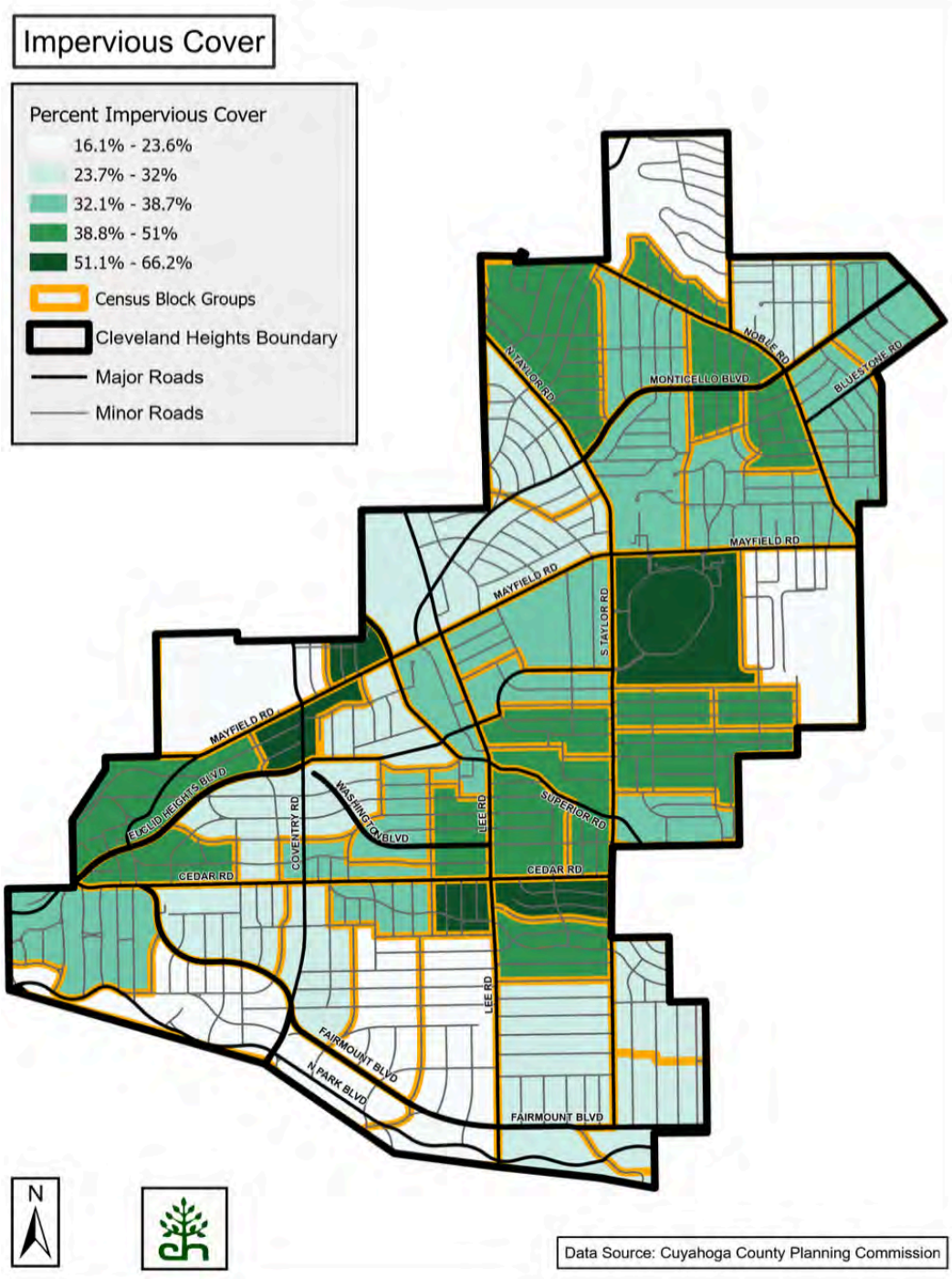


Figure 4: Map of impervious cover in Cleveland Heights

Impervious cover is scattered relatively evenly across the City, but there is a correlation between lower impervious cover and older residential areas due to the higher relative percentage of backyard and lawn space with older homes.

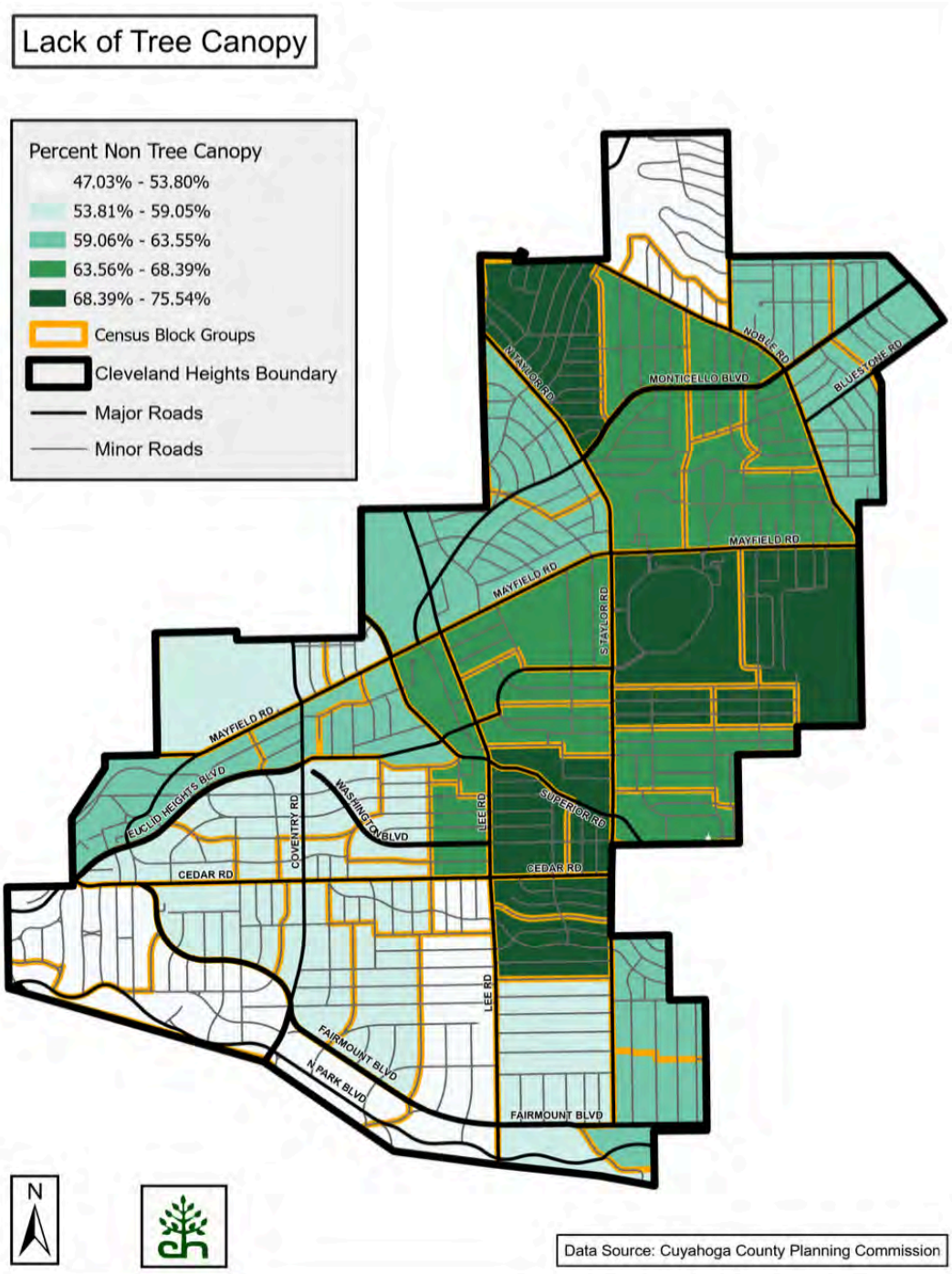


Figure 5: Map of the lack of tree canopy cover in Cleveland Heights

According to the 2019 Cuyahoga County Urban Tree Canopy Assessment, there is 37.86% tree canopy coverage community-wide in Cleveland Heights.[5] There is less tree canopy coverage in the center of the City. Residential areas in both the south and the north have higher tree cover.

Analysis of Social Risk Factors from the County's Assessment

Based on the scoring criteria, the highest possible Social Composite Score is 16 in the County's Assessment. These are areas where people are less able to respond to climate hazards because of socioeconomic status, disability, or other social factors. In Cleveland Heights, the highest Social Composite Score is 10 (Census Tract 1410.00) and the mean Social Composite Score is 3.5. There are ten census tracts that have a high score for at least one social factor, compared to only one census tract that has a high score for physical factors. This indicates that social factors may be contributing more to climate vulnerability than physical factors; however, Cleveland Heights is less vulnerable to climate change based on the eight social factors compared to the rest of the County.

Of the eight social factors, the most prominent in Cleveland Heights is 'Percent Age 65 and Over.' Twelve of the 20 census tracts scored a 1 or 2 on this factor, indicating that the senior population is higher than the average across the County.

Below, we have ranked the social factors from highest to lowest significance in the Cleveland Heights community.

Social Factor	Number of Low CTs (Score 0)	Number of Medium CTs (Score 1)	Number of High CTs (Score 2)	Cumulative Score for All CTs
Percent Age 65 and Over	8	8	4	16
Percent Minority Population	9	10	1	12
Percent Population Below Poverty Level	13	4	3	10
Percent Rental Occupied Housing	12	6	2	10
Percent Under Age 5	14	5	1	7
Percent Households Without a Vehicle	16	2	2	6
Percent of Population Age 25+ With Less Than a High School Education	16	4	0	4
Percent Disabled Population	17	2	1	4

Table 2: Social Factors for Climate Vulnerability by Census Tract

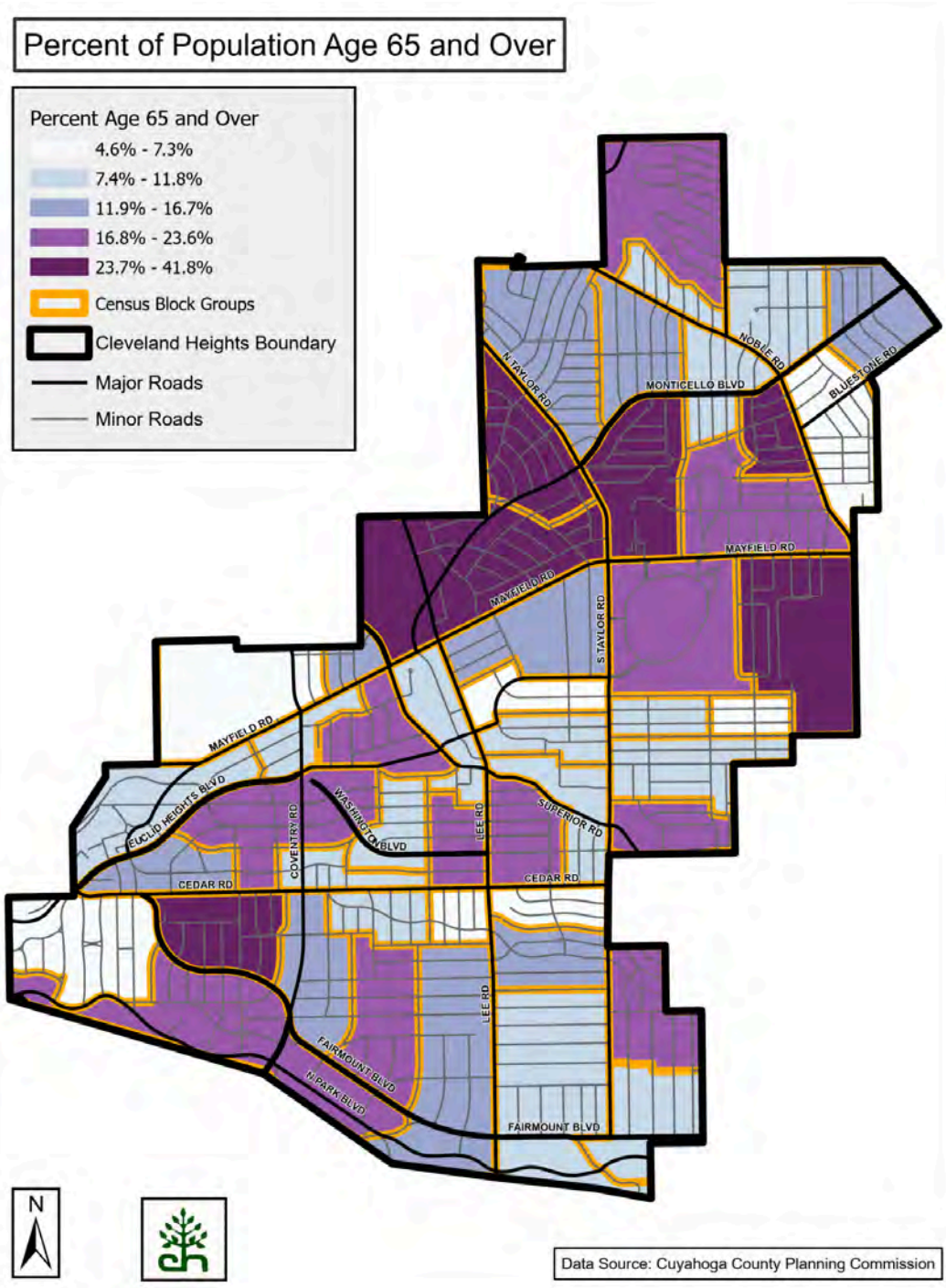


Figure 6: Map of population 65 years and older in Cleveland Heights

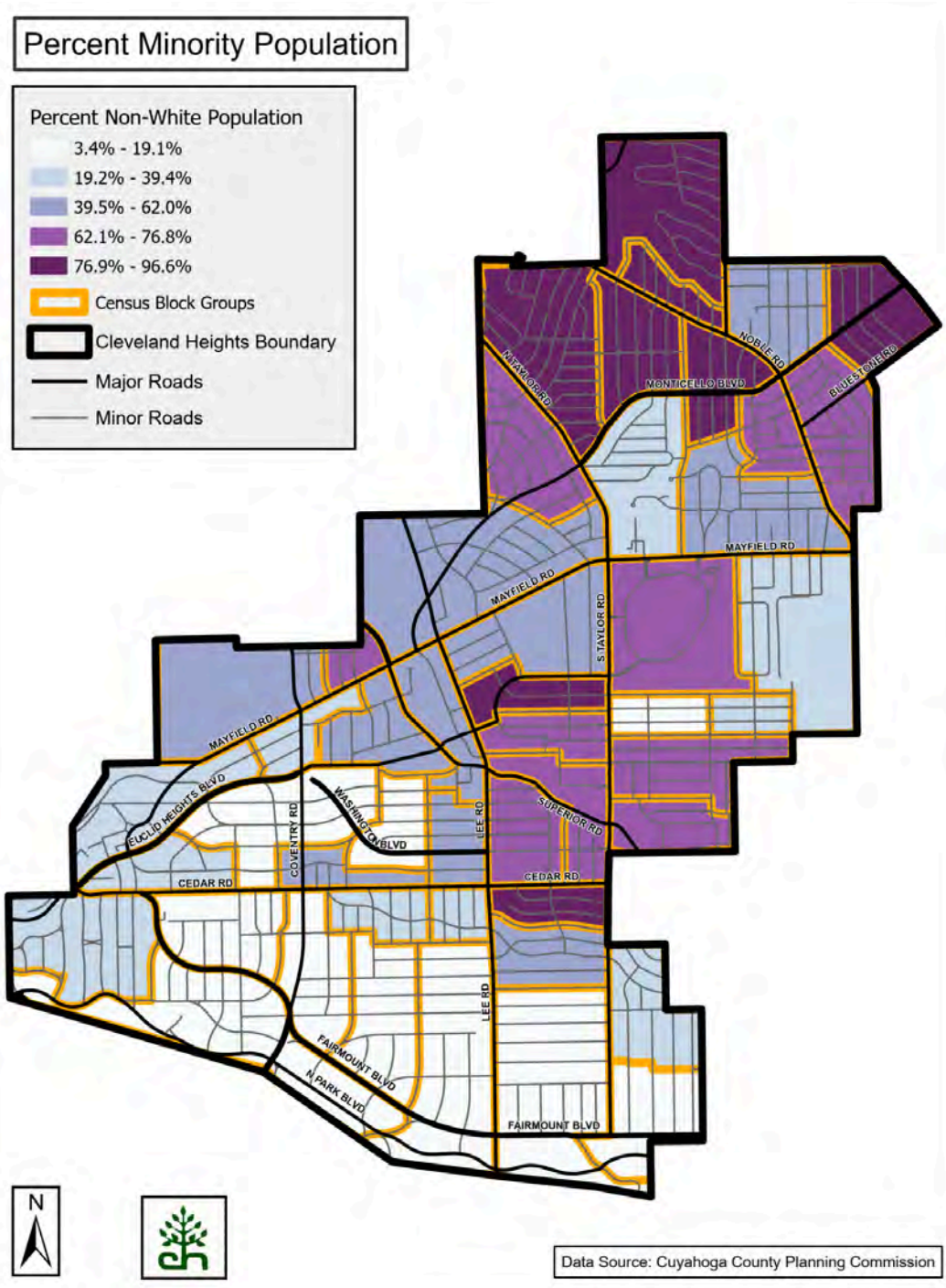


Figure 7: Map of minority population in Cleveland Heights

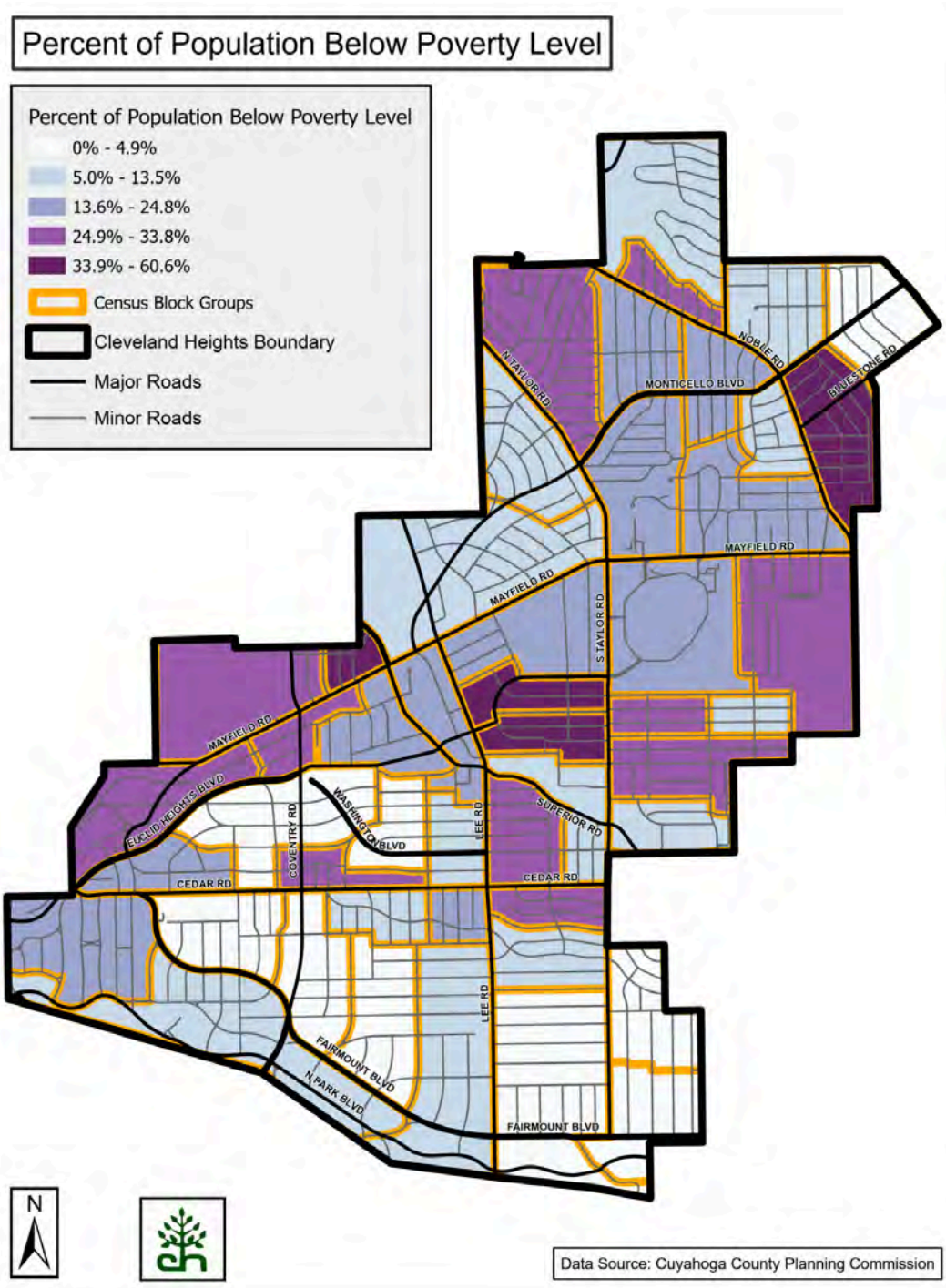


Figure 8: Map of population below the poverty level in Cleveland Heights

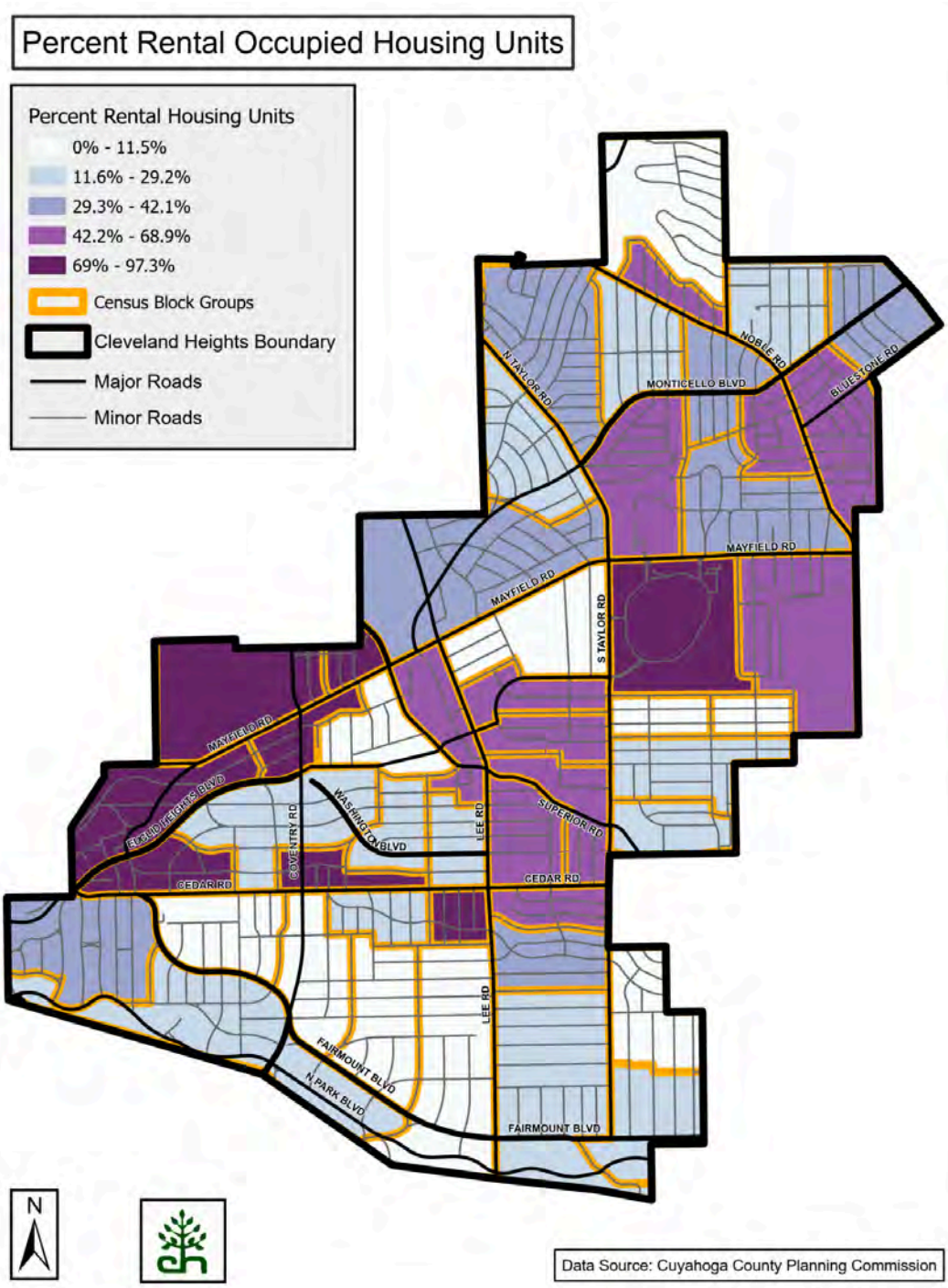


Figure 9: Map of rental occupied housing units in Cleveland Heights

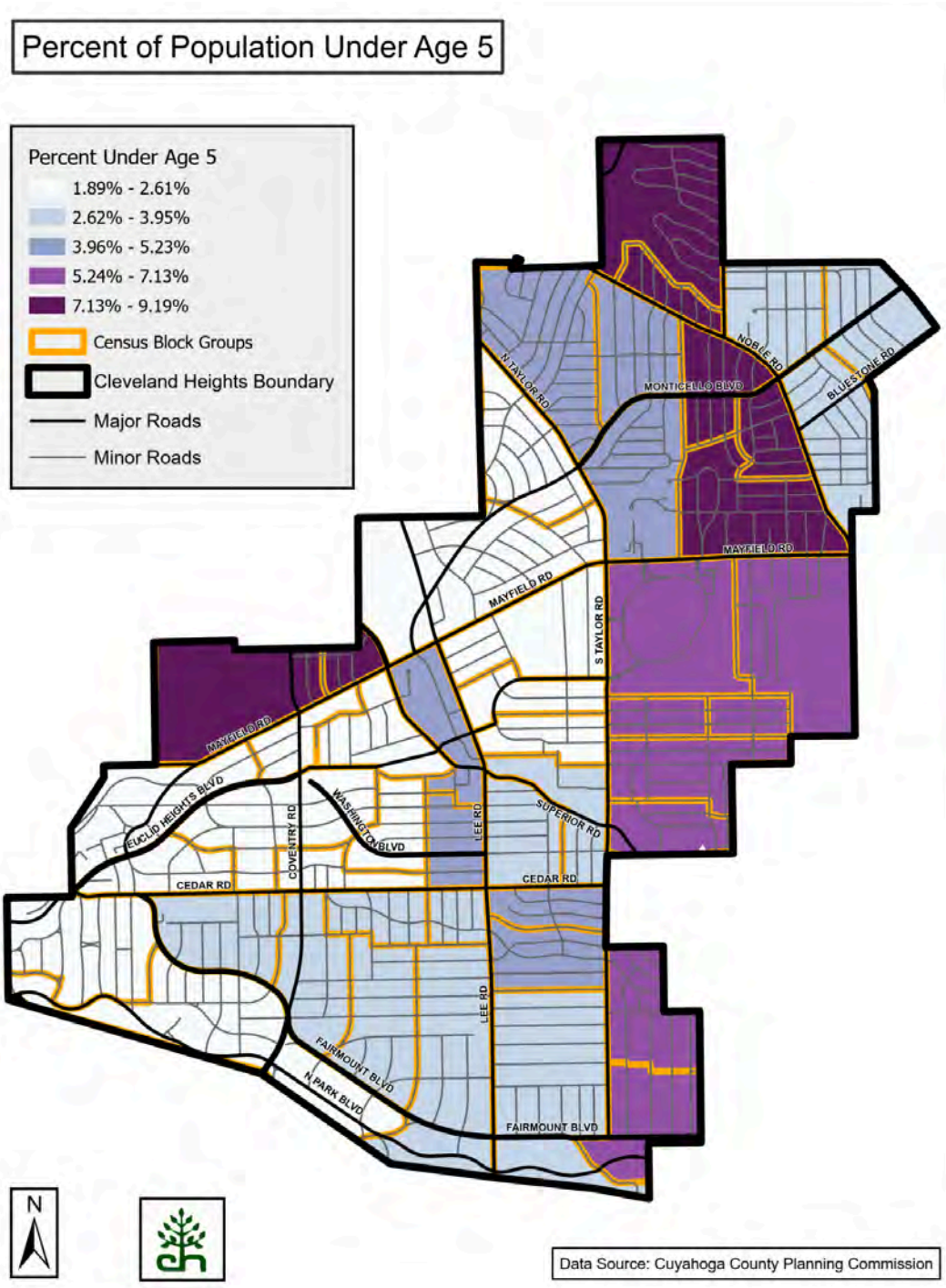


Figure 10: Map of population under 5 years old in Cleveland Heights

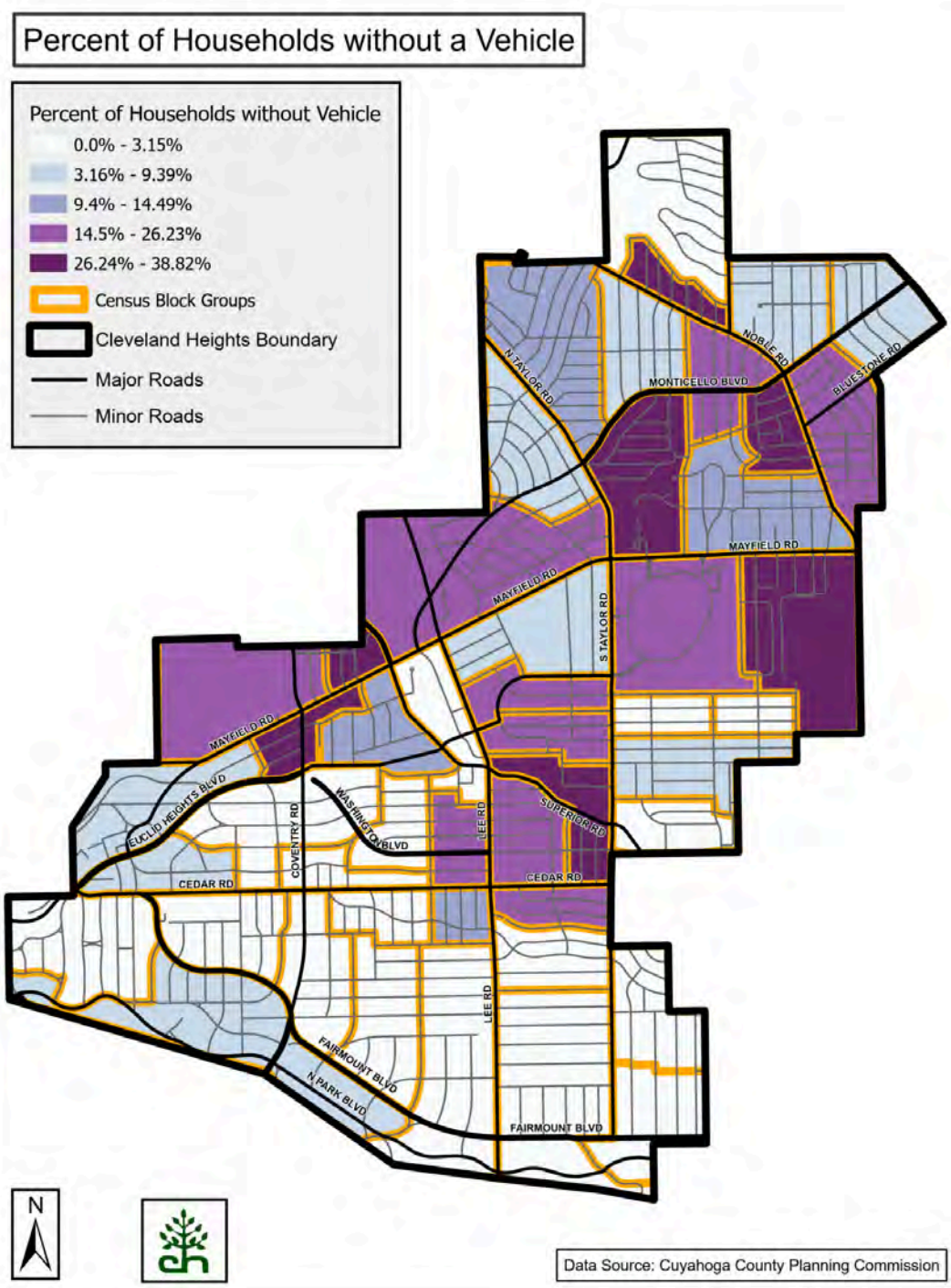


Figure 11: Map of households without a vehicle in Cleveland Heights

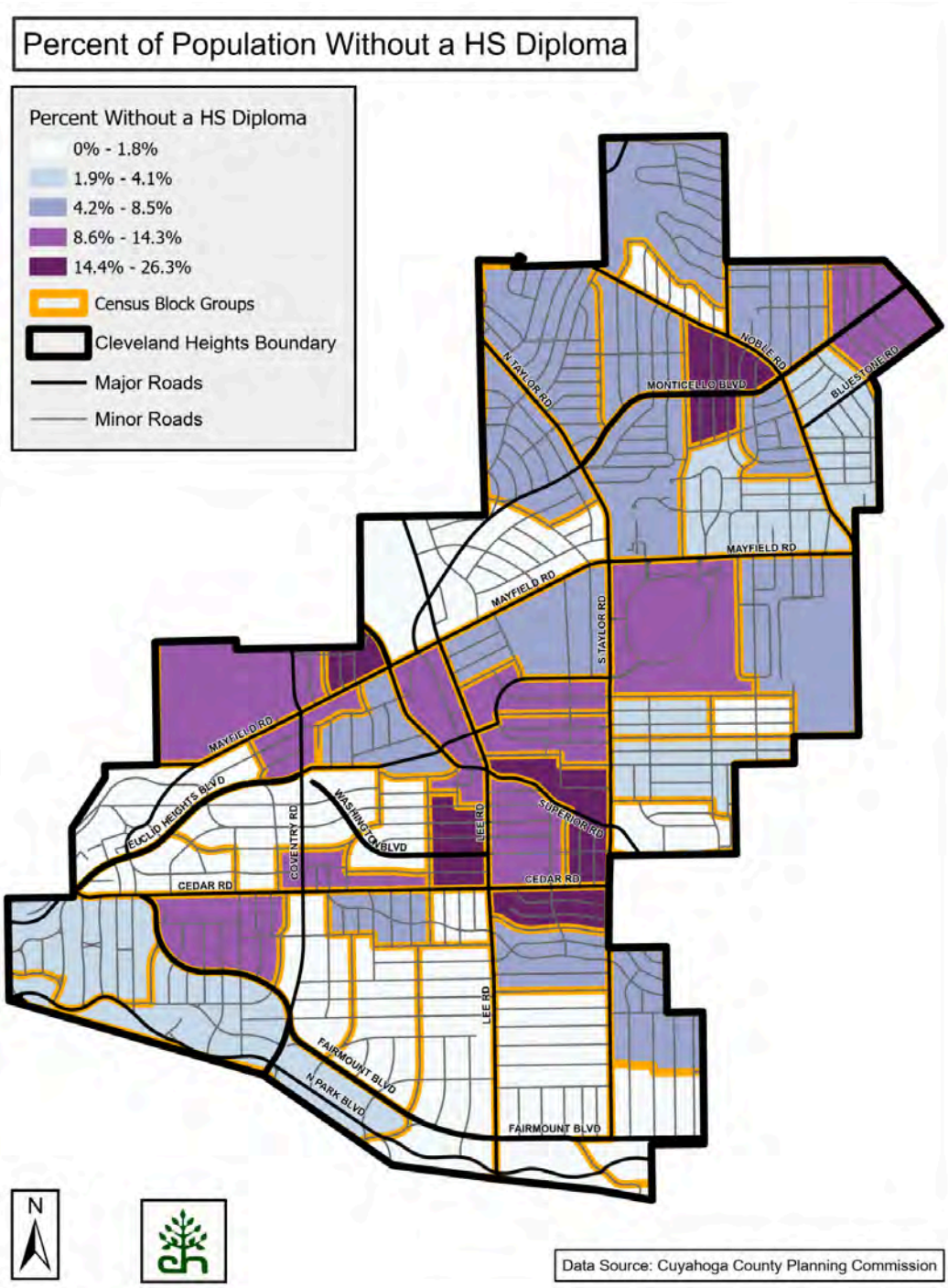


Figure 12: Map of population without a high school diploma in Cleveland Heights

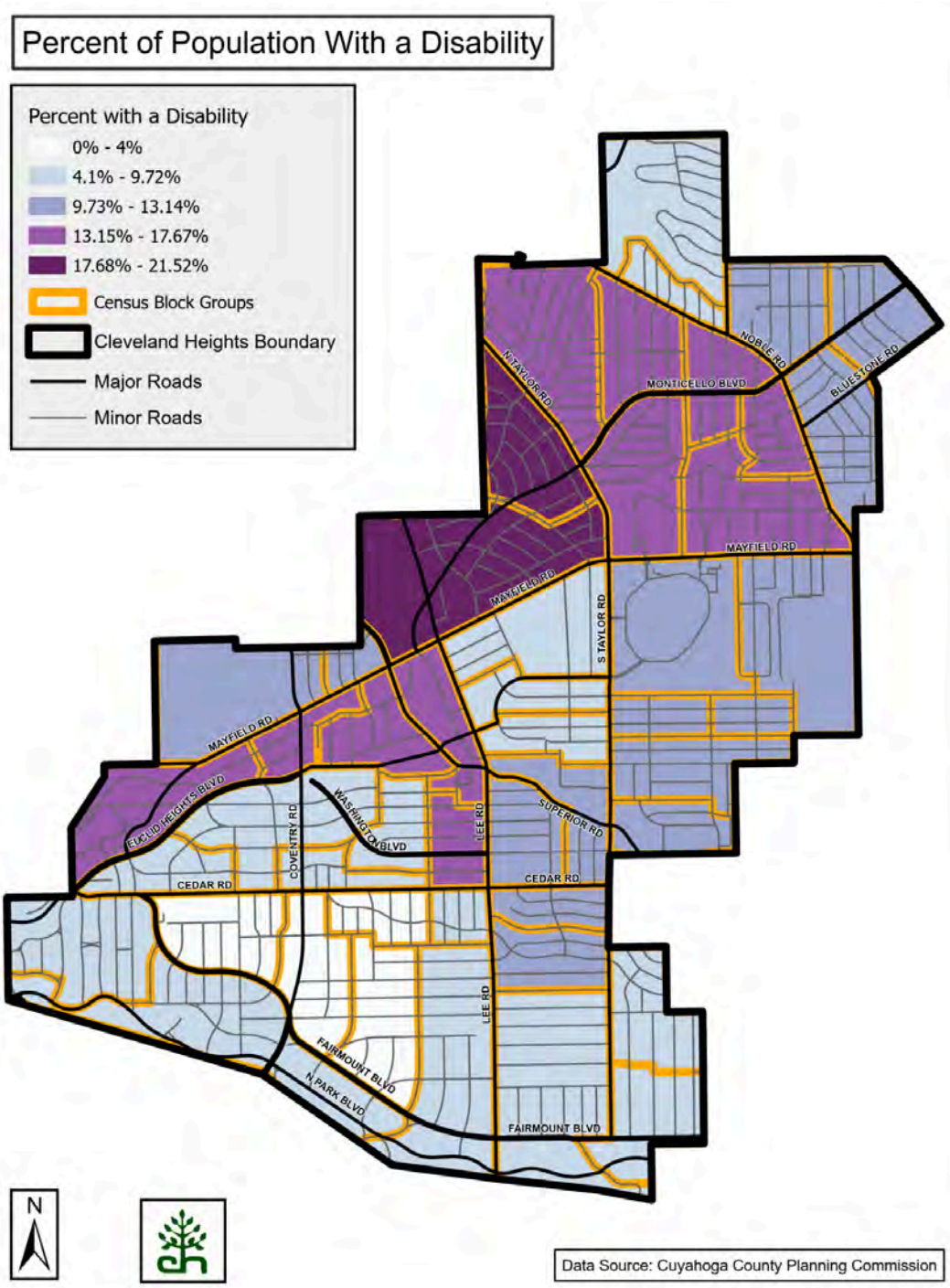


Figure 13: Map of population with a disability in Cleveland Heights

Hazards Analysis and Methodology

A Climate Vulnerability and Risk Assessment for Cleveland Heights includes two parts: an analysis of what areas of the city and what populations are vulnerable to the effects of climate change and an analysis of the hazards that are likely to threaten them. The Cuyahoga County Climate Change Vulnerability Assessment provides a useful means to identify who and what are most at risk from climate change. However, the study was last updated in May 2019 and the scores are limited to a direct comparison to the average Census Tract in the County. It also does not identify possible climate hazards.

To supplement the County vulnerability assessment, we conducted a hazard analysis. For details on other plans reviewed, methodology, and complete hazard analysis, please see Appendix A. A summary of this analysis is included below.

Climate Risk, Asset and Physical Factor Exposure Matrices

There are eight main hazards that are currently impacting Cleveland Heights and are projected to worsen with climate change. A hazard is a climate-related physical event or trend that can cause damage and impacts to the environment, people, and infrastructure.

Hazard	Summary of Potential Impacts on Cleveland Heights
Severe Weather: Thunderstorms	Increase in Midwest storms and weather variability is predicted during the spring. Storm events may see greater intensity as well.
Severe Weather: Tornado and High Winds	Increase in Midwest storms and weather variability is predicted, with the highest increases in the spring. Tornado distribution may shift with overall weather patterns, moving areas with greater tornado frequency East.
Severe Weather: Extreme Precipitation	Increase in Midwest storms and weather variability is predicted, with the highest increases in the spring. Increase intensity of precipitation predicted and increasingly observed in Cuyahoga County and the Great Lakes region.
Severe Weather: Winter Weather	Jet stream movement may result in intense cold events with displaced Arctic air, even as average temperatures increase. Temperature increase and variability projected for Northeast Ohio will result in more frequent freeze-thaw cycles, impacting roads and infrastructure.
Flooding	Increase in intense precipitation events projected for Cuyahoga County and the Great Lakes region will result in increased flooding.
Extreme Heat	Overall increase in temperatures moderated by proximity to Lake Erie. Humidity may become a human health concern when compounded with heat.
Air Quality	Smoke from regional wildfires and increased surface-level ozone may adversely impact overall air quality.

Drought	Precipitation changes are expected to result in increased events, but longer dry spells as well with projected increases of up to 20 more dry days annually in Cleveland Heights. More extreme conditions increase the chance of drought.

Table 3: Climate Hazards and Summary of Potential Impacts on Cleveland Heights

We developed a Climate Risk Assessment Matrix for Cleveland Heights identifying various potential hazards, evaluating their current and future risks based on the probability of the hazard occurring and the severity of its impact, and assigning a modified Composite Risk Priority Index (CPRI) score. The Composite Risk Priority Index is a methodology commonly recommended by FEMA and used in hazard mitigation planning to assist communities in better understanding relative risk from hazards. The Modified CPRI incorporates both current and future projections of climate-related hazards by assigning weighted scores to the overall exposure to risk severity and probability of risk.

Scores are determined through a synthesis of a variety of sources, from historic data obtained from emergency management agencies and used in approved plans to climate projections from sources including the Fifth National Climate Assessment and other localized assessments. For Cleveland Heights, we also incorporated data from the Great Lakes Integrated Science Assessment hosted by the University of Michigan as well as data from the National Oceanic and Atmospheric Administration and presented by the National Environmental Modeling and Analysis Center (NEMAC) at the University of North Carolina Asheville.

The CPRI score ranks hazards but does not indicate the absolute importance of each priority. Instead, it serves as a tool to help decision-makers allocate resources. The matrix uses a red-to-blue color gradient to represent risk, from extreme (dark red) to minor (light blue).

Hazard	**Present**			**Future**			**Modified CPRI**
	Severity	*Probability*	*Risk Score*	*Severity*	*Probability*	*Risk Score*	
Severe Weather: Thunderstorms	3	4	12	4	5	20	6.15
Severe Weather: Tornado and High Winds	4	4	12	4	4	16	5.55
Severe Weather: Extreme Precipitation	3	2	6	4	5	20	5.25
Severe Weather: Winter Weather	3	4	12	3	3	9	4.95
Flooding	3	3	9	4	3	12	4.8

Extreme Heat	3	2	6	4	3	12	4.35
Air Quality	2	3	6	3	3	9	4.2
Drought	2	2	4	3	3	9	3.75

Table 4: Climate Risk Assessment Matrix for Cleveland Heights (source: Nutter Consulting)

The Asset Exposure Matrix below shows which climate hazards pose threats to different types of physical community assets (the buildings themselves, not the users). An "X" indicates that the climate hazard poses a threat to the type of community asset. (Note: air quality has specific impacts for healthcare facilities and associated equipment as well as plants and animals in the natural environment). Specific information about how these assets will be impacted by climate hazards is included in the Cleveland Heights Climate Hazards Analysis section of Appendix A.

	Severe Weather: Thunder-storms	Severe Weather: Tornado and High Winds	Severe Weather: Extreme Precipita-tion	Severe Weather: Winter Weather	Flooding	Extreme Heat	Air Quality	Drought
Residential Areas	X	X	X	X	X	X		X
Business Districts	X	X	X	X	X	X		X
Schools and Community Center	X	X	X	X	X	X		
Municipal Facilities	X	X	X	X	X			X
Major Roadways	X	X	X	X	X	X		
Healthcare Facilities	X	X	X	X	X	X	X	
Grocery Stores and Gas Stations	X	X	X	X	X	X		
Natural Environment	X	X	X	X	X	X	X	X

Table 5: Asset Exposure Matrix for Cleveland Heights (source: Nutter Consulting)

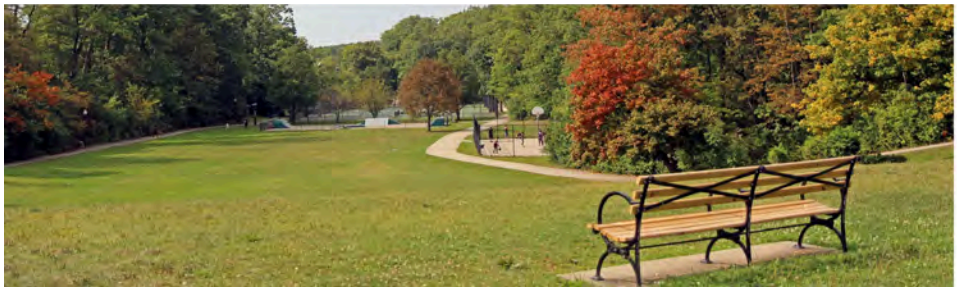
The Physical Factor Exposure Matrix shows how climate hazards impact the five physical factors identified in Cuyahoga County's Vulnerability Assessment. An "X" indicates that the climate hazard will impact the physical factor.

	Severe Weather: Thunder-storms	Severe Weather: Tornado and High Winds	Severe Weather: Extreme Precipita-tion	Severe Weather: Winter Weather	Flooding	Extreme Heat	Air Quality	Drought
Heat Island Effect						X	X	
Flood Plain	X		X	X	X			X
Older Residential Buildings	X	X	X	X	X	X	X	X
Impervious Cover	X		X	X	X	X		
Lack of Tree Canopy	X	XX	X		X	X	X	X

Table 6: Physical Factor Exposure Matrix for Cleveland Heights (source: Nutter Consulting)

Based on our vulnerability and hazard assessments above, which utilize data from Cuyahoga County, the State of Ohio, the Great Lakes Integrated Science Assessment, U.S. Fifth National Climate Assessment, NOAA National Centers for Environmental Information, and other leading climate resilience research organizations whose most granular data available is at the census tract or zip code level. Overall, vulnerability is a result of underlying social factors often compounded by the differences in physical factors such as impervious cover, lack of tree canopy and heat island effect.

The City must take action on the vulnerabilities that have been highlighted. Strategies and noted actions which address the physical components are detailed in the Taking Action: Climate and Resilience Strategies section.



Climate-Impacted Populations in Cleveland Heights

Climate-impacted populations are those who are disproportionately affected by climate change and/or experience unique challenges for climate adaptation. Climate justice and environmental justice are key priorities for the Cleveland Heights community. Climate justice acknowledges and addresses the fact that climate change disproportionately affects those who are disadvantaged and low-income, and communities of color.[6] Similarly, environmental justice entails equal treatment and meaningful involvement of all people so that everyone is fully protected from disproportionate health and environmental effects and have equitable access to a healthy, sustainable, and resilient environment.[7]

As reflected in the Cuyahoga County Climate Change Vulnerability Assessment Map included on page 27, Cleveland Heights must consider both physical and social factors that contribute to climate change vulnerability. To better understand who is impacted in Cleveland Heights and how, we analyzed climate, environmental, economic, and social data using two tools developed by the federal government aimed at understanding equity issues.

The Climate and Economic Justice Screening Tool (CEJST) identifies disadvantaged communities by measuring the burdens placed upon them using indicators in eight categories:

- Climate change
- Energy
- Health
- Housing
- Legacy pollution (historically polluted areas)
- Transportation
- Water and wastewater
- Workforce development

Map of the Disadvantaged Communities in Cleveland Heights

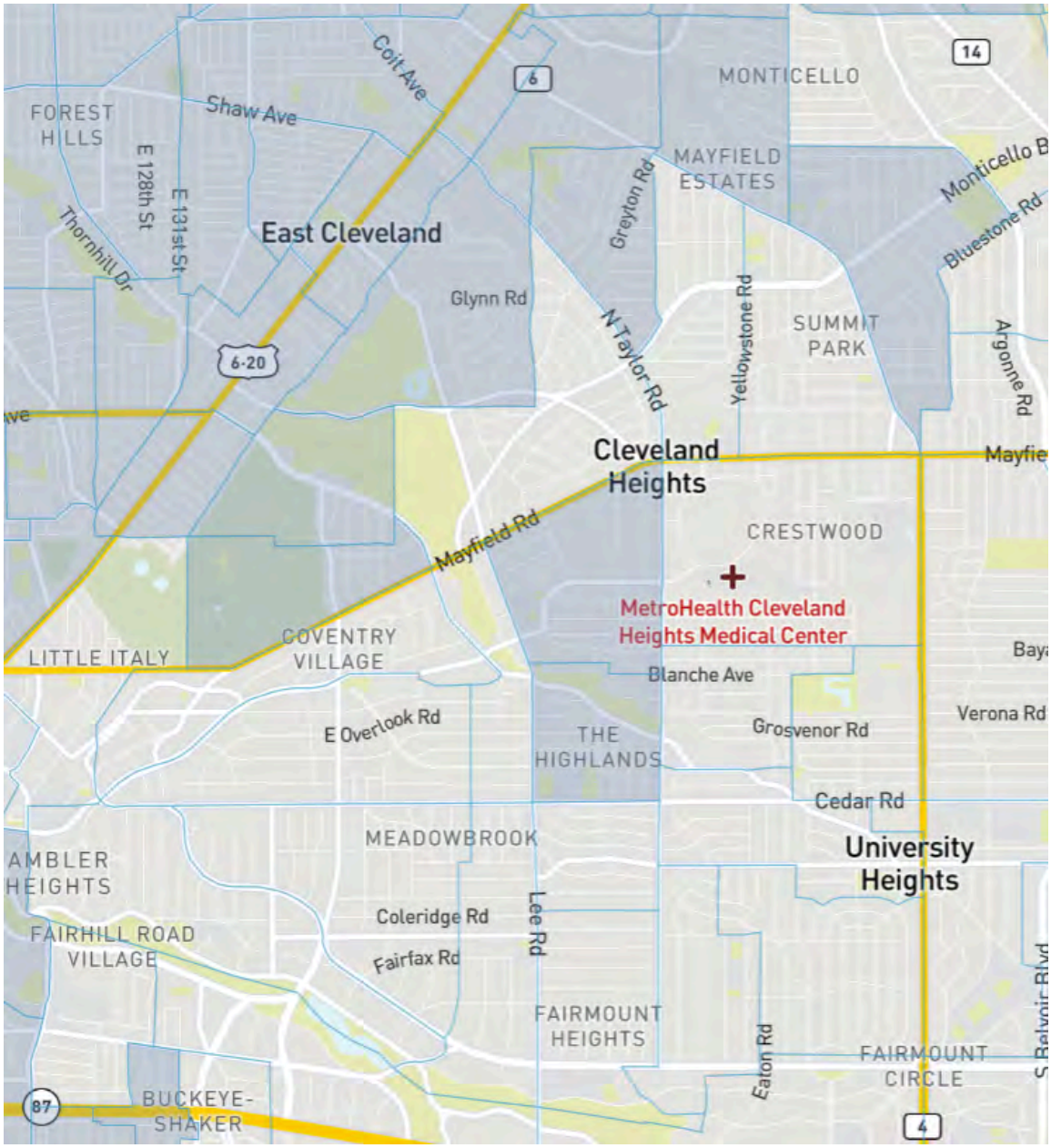


Figure 14: Climate and Economic Justice Screening Tool showing disadvantaged communities in Cleveland Heights shaded in blue

Through the CEJST, we identified six disadvantaged communities experiencing disproportionate climate and economic burdens within the 20 census tracts that comprise Cleveland Heights.

Across these burdens, lead paint and asthma have the most significant impact on Cleveland Heights. Seventeen census tracts are above the 90th percentile for prevalence of

lead paint and eight census tracts are above the 90th percentile for rates of asthma—indicating that those problems are worse than 90% of the census tracts in the country.

We also used the US EPA's environmental justice mapping and screening tool, EJScreen, to analyze eight environmental and socioeconomic indicators. The table below shows the number of census tracts that scored above the 90th percentile on specific indicators compared to the national average.[8]

EJScreen Indicator	# of CTs above 90th percentile
Lead Paint	5
Ozone	4
Toxic Releases to Air	4
Particulate Matter 2.5	3
Underground Storage Tanks	2
Diesel Particulate Matter	1
Traffic Proximity	1
Hazardous Waste Proximity	1

Table 7: EJScreen environmental indicators by Census Tract scoring above the 90th percentile

Map of Lead Paint in Cleveland Heights

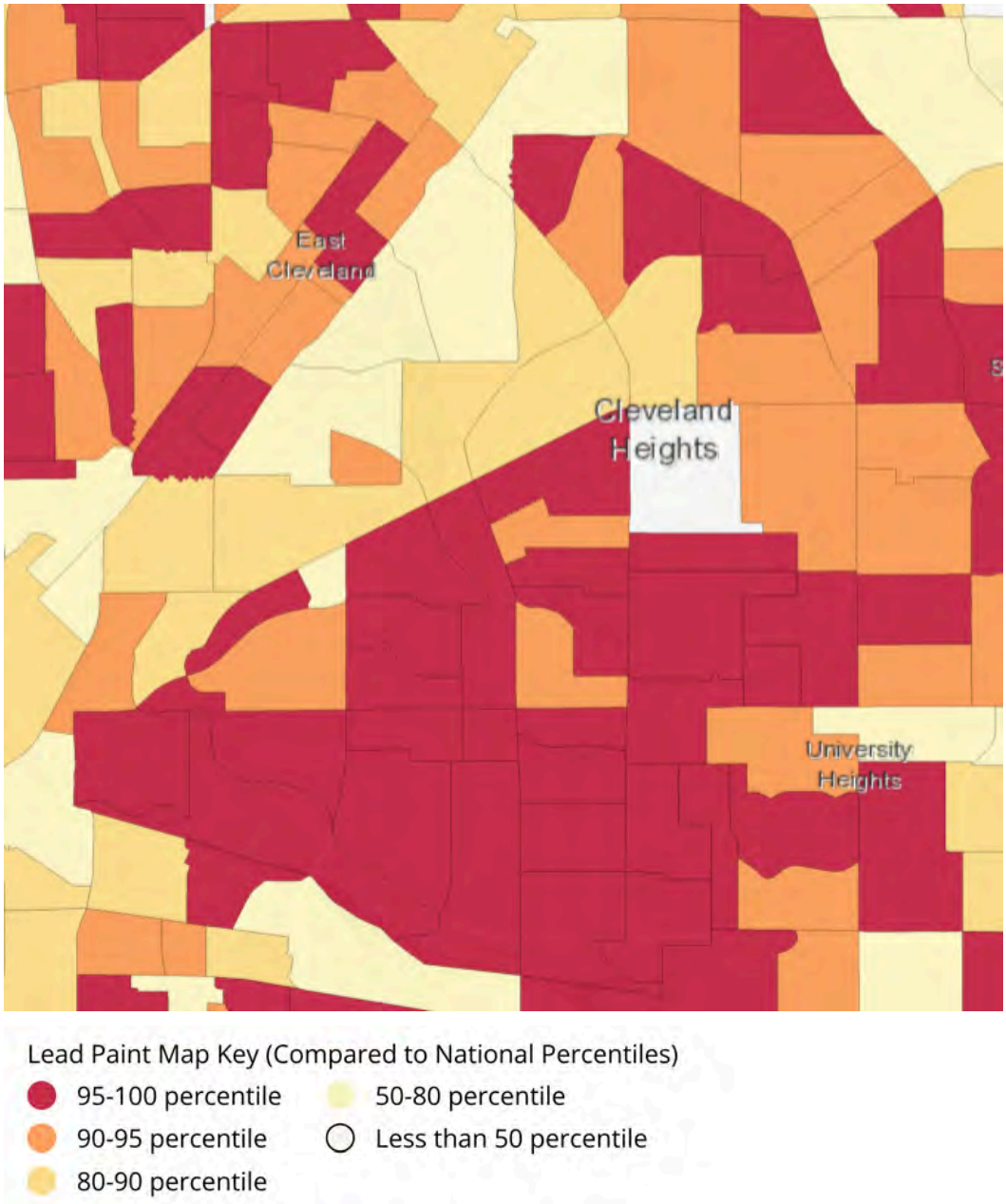


Figure 15: EJScreen Map showing the prevalence of lead paint in Cleveland Heights

From this analysis, it is clear that lead paint prevalence and air pollution from particulate matter, ozone, and toxic releases are the most significant environmental burdens affecting the Cleveland Heights community.

Reflections from the Community on Climate Change Impacts

In addition to analyzing this data, we gathered feedback on the community's lived experience to understand climate impacts on disadvantaged population groups. At the first community workshop held in May, participants joined breakout groups to discuss how disadvantaged groups are disproportionately impacted by climate change. The specific groups and the impacts they are currently experiencing from climate change include:

- Business Owners: Resilience improvements to buildings, such as fortifying structures against extreme weather, can be costly. Additionally, transit disruptions caused by severe storms or flooding can hinder employees' ability to commute and prevent customers from going to local businesses.
- Low-Income Households: Low-income households have limited financial ability to pursue home improvements that enhance resilience, making occupants more vulnerable to climate hazards like extreme hot and cold temperatures.
- Mobility and Transit-Dependent Populations: Severe storms and floods make travel difficult and dangerous for people with mobility challenges or who use public transit. Poor infrastructure, such as cracked sidewalks, creates additional barriers. Exposure to severe weather including extreme heat, poor air quality, and icy conditions, while waiting outdoors further increases health and safety risks for these populations.
- Renters and Multi-family Households: Renters and multi-family households often have limited control over building improvements, leaving them vulnerable to climate impacts such as increased moisture in basement apartments from flooding and excessive heat in attic units due to poor air circulation and roof quality. Additionally, incoming climate migration is likely to drive up rent prices, further straining affordable housing options.
- Seniors: Seniors experience the most climate-related health risks. Many seniors are aging in place and their homes need improvements to ensure resilience and safety. In addition, financing climate actions, like energy efficient appliances, is difficult, due to fixed income and lack of knowledge.
- Youth: Youth are particularly vulnerable to both the physical and mental health impacts of climate change. They face increased risks of asthma, allergies, and anxiety about the future climate crisis. Poor air quality, extreme heat, and severe storms not only damage their health, but also affect their education, sports, and activities.

SECTION 3:

Greenhouse Gas Inventory

What is a Greenhouse Gas Inventory?

A greenhouse gas (GHG) inventory is an accounting of the emissions which result from the different processes that support everyday life within Cleveland Heights. An inventory itself should not interpret results, but simply provide data in an objective manner for further analysis and contribute to a comprehensive understanding of the city's environmental footprint.
The analysis was conducted by Power a Clean Future Ohio (PCFO) through the no-cost technical assistance program. Please see Appendix B for the methodology used. The GHG inventory informs the strategies included later in the plan, by identifying those sectors that will make the biggest impact on GHG emissions in Cleveland Heights.

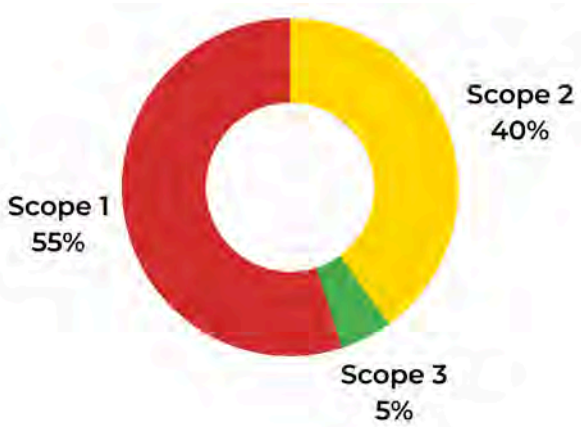
Scope of Emissions Included:

- Scope 1 emissions: Direct emissions from the combustion of fossil fuels and other processes, such as the use of gasoline for vehicles.
- Scope 2 emissions: Indirect emissions from purchased electricity, steam, or other forms of energy.
- Scope 3 emissions are generally those that happen outside of the city boundary, but are related to activities occurring in Cleveland Heights.

Community-wide Inventory

Total GHG Emissions

Total emissions for Cleveland Heights in 2022 were 286,633 MT CO2e (metric tons of carbon dioxide). With a population of 45,002, the per capita amount of emissions is 6.37 MT CO2e per person, which is generally considered low in Ohio among peer suburbs of a similar size. This is primarily due to the residential nature of the city. The lack of a significant industrial sector or airport also contributes to the low per capita emissions rate.



Scope	MT CO2e	Percent of Total
Scope 1	158,445	55%
Scope 2	115,279	40%
Scope 3	12,909	5%
Total	**286,633**	**100%**

Figure 16 and Table 8: Community-wide greenhouse gas emissions by scope

Sector Emissions

The analysis assessed emissions across eight different sectors. As would be expected because Cleveland Heights is a largely residential community and because buildings are a common source for carbon emissions in cities generally, the Residential Sector produced the majority of emissions (60%). Transportation and the Commercial Sector produced 17% and 16% of total emissions, respectively. Waste, the Industrial Sector, Process and Fugitive Emissions, and Water Treatment produced the remaining 8% of total emissions for the city. It should be noted that the tree canopy is sequestering around 1% of total emissions.

"Fugitive emissions" are unintentional releases of gasses. The greenhouse gas inventory accounts for leaks that are common when natural gas and other gaseous fuels are transported or used, including small leaks that you can smell when turning on a gas stove.

Sector	MT CO2e	Percent of Total	MT CO2e Per Capita
Residential Energy	171,348	60%	3.81
Transportation & Mobile Sources	48,142	17%	1.07
Commercial Energy	44,634	15%	0.99
Solid Waste	12,805	4%	0.28
Industrial Energy	7,856	3%	0.17
Process & Fugitive Emissions	3,244	1%	0.07
Water & Wastewater	380	0.1%	0.01
Tree Canopy	-1,500	-1%*	-0.03
Total Gross Emissions	**288,409**	**100%**	**6.41**
Total Net Emissions	**286,909**	**99%**	**6.38**

** A negative value indicates carbon removal through sequestration.*
Table 9: Community-wide greenhouse gas emissions by sector

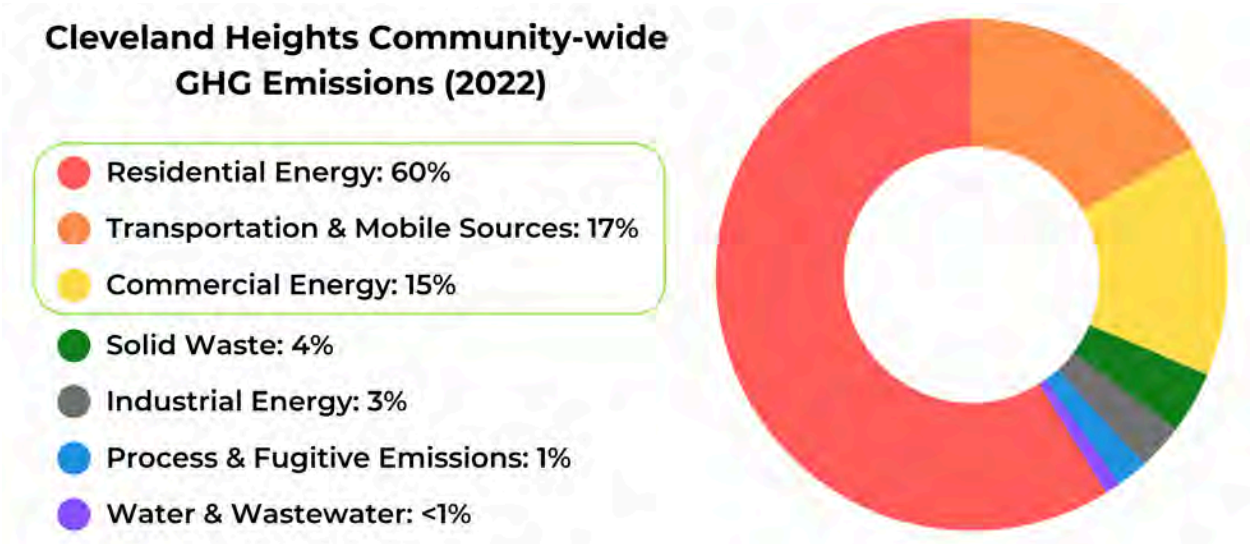
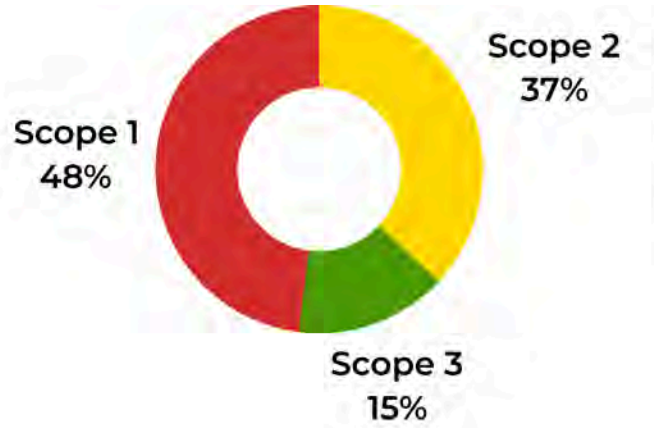


Figure 17: Donut chart of community-wide greenhouse gas emissions by sector

City Operations Inventory

Total GHG Emissions

Total gross emissions for Cleveland Heights from city operations in 2022 were 5,752 MTCO2e.



Scope	MT CO2e	Percent of Total
Scope 1	2,789	48%
Scope 2	2,101	37%
Scope 3	862	15%
Total	**5,752**	**100%**

Figure 18 and Table 10: City operations greenhouse gas emissions by scope

Sector Emissions

The analysis assessed the City's emissions produced across ten sectors. Electricity produced the majority of emissions (35% from direct use and another 2% from line loss). Transportation & Mobile Sources and Stationary Combustion were the next highest sources of emissions, producing 33% and 15% respectively. In the chart below, 'Mobile Combustion' encompasses emissions from the burning of fossil fuels by mobile sources, including fleet vehicle transportation. 'Stationary Combustion' includes emissions from the burning of fossil fuels by stationary sources, including natural gas use in buildings. The 'Other' category includes line loss, which occurs as electricity is transported across the grid, and fugitive emissions (unintentional gas leaks) from the use of natural gas. Emissions from city operations represent 2% of all city emissions so improving city emissions alone is not enough to reach our carbon goals. We must all work together community wide to make an impact.

Sector	MT CO2e	Percent of Total
Electricity	2,016	35%
Transportation & Mobile Combustion	1,894	33%
Natural Gas & Stationary Combustion	885	15%
Water & Wastewater Treatment	380	7%
Employee Commute	328	6%
Solid Waste	154	3%
Other	95	2%
RECS	0	0%
Agriculture & Land Management	0	0%
Urban Forestry	-866	-15%
Total Gross Emissions	**5,752**	**100%**
Total Net Emissions	**4,886**	**85%**

Table 11: City operations greenhouse gas emissions by sector

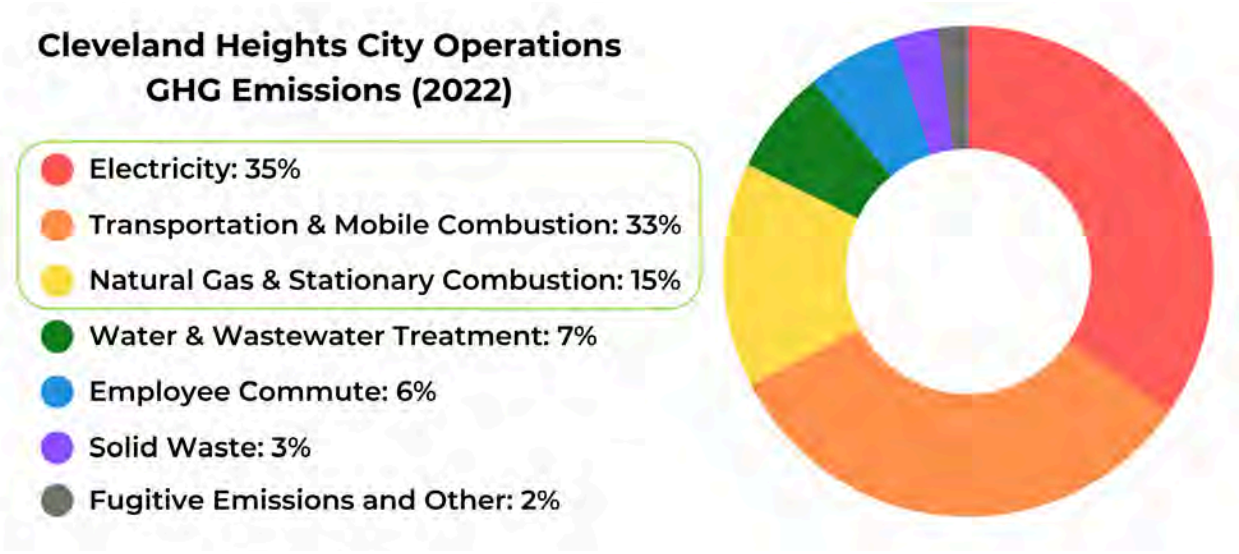


Figure 19: Donut chart of city operations greenhouse gas emissions by sector

Science-based Modeling and Forecasting: Pathways for Greenhouse Gas Reduction

The City of Cleveland Heights joined ICLEI (International Council for Local Environmental Initiatives) and has access to the ClearPath tool (a cloud-based software platform that helps local governments manage energy and emissions) to conduct both our Greenhouse Gas Emissions Inventory and the forecast for future projected emission reductions through 2030. One of the core components of our approach to climate action planning in our City is using science-based targets (below) aligned with the latest climate science to guide our development of the goals, strategies and action for this plan. Using these science-based targets also help us to align with the Paris Agreement and the United Nations commitment to keep global warming below 1.5 degree C. The Intergovernmental Panel on Climate Change (IPPC) asserts that in order to achieve this goal, communities around the world must reduce global emissions by 50% by 2030 and achieve carbon neutrality by 2050 *(the City of Cleveland Heights' currently codified near-term goal is to reduce GHG emissions by 30% by 2030. The City will be reviewing the 2030 goal to determine if the City would like to align with the IPPC goal of 50% by 2030).*

The ICLEI forecast modeling tool has recommended 6 specific "High Impact Pathways" which are defined as the ways that will provide the highest greenhouse gas emissions reduction in the areas with the most emissions - buildings and energy as well as transportation. These pathways and the estimated emission reductions are:

High Impact Pathway	**Reduction Target by 2030**	**Reduction by 2030 ($MTCO_2e$)**
Commercial Electrification and Efficiency - Natural Gas	5% by 2030- businesses receiving energy efficiency and electrification retrofits	4,323
Residential Electrification and Efficiency - Electricity	5% by 2030 - homes receiving energy efficiency and electrification retrofits	3,237
Commercial Electrification and Efficiency - Electricity	5% by 2030- businesses receiving energy efficiency and electrification retrofits	1,002
Residential Electrification and Efficiency - Natural Gas	5% by 2030 - homes receiving energy efficiency and electrification retrofits	24,999
Electric Vehicles and VMT reduction - Gasoline	10% reduction in VMTs by 2030 16% VMT done by EVs by 2030	7,460
Electric Vehicles and VMT reduction - Diesel	10% reduction in VMTs by 2030 16% VMT done by EVs by 2030	1,303
Total Emissions Reduced		**42,324**

Table 12: High Impact Pathways with reduction targets and greenhouse gas emissions

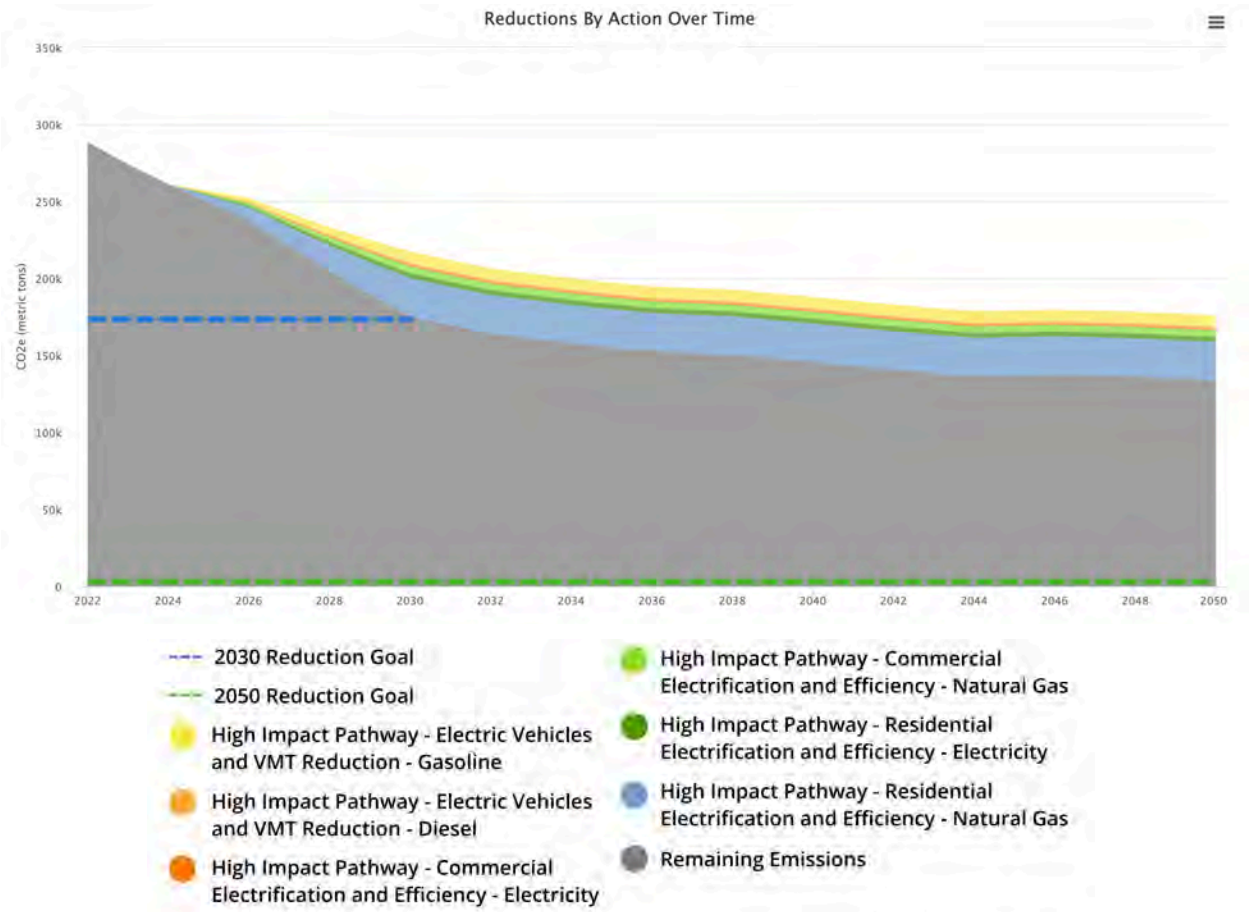


Figure 20: Chart of greenhouse gas emission reduction from High Impact Pathways

Cleveland Heights is projected to achieve a 39.3% reduction by 2030 compared to the 2022 baseline, exceeding the City's 30% reduction goal.

Figure 20 demonstrates the expected greenhouse gas emissions reduction resulting from the implementation of the High Impact Pathways, as well as the remaining community-wide emissions through 2050. The chart begins with the 2022 baseline of 288,410 $MTCO_2e$ (metric tons of carbon dioxide equivalent). Under a Business As Usual (BAU) scenario, meaning that no climate action is taken, Cleveland Heights's greenhouse gas emissions are projected to gradually decrease due to population decline and regional grid decarbonization (70,983 $MTCO_2e$ by 2030). These factors are based on population change projected by the Ohio Department of Development and regional grid decarbonization modeled by the National Renewable Energy Laboratory. With the additional 42,324 $MTCO_2e$ reduction from the High Impact Pathways, Cleveland Heights will achieve a 39.3% reduction by 2030, reducing carbon emissions to 175,103 $MTCO_2e$.

Based on the projected City GHG emissions that will remain through 2050, there are 133,617 MTCO2e that need to be mitigated to reach the 2050 carbon neutrality goal. The City's Greenhouse Gas Inventory will be updated every two years to evaluate the mitigation results of the High Impact Pathways, along with the other strategies in this living document. To address

remaining emission after plan implementation, the City can pursue carbon sequestration measures focused on ecosystem restoration, urban greening, and compost production. In addition, the city can also look into new technologies and/or by purchasing verified carbon offsets to reach carbon neutrality.

The Climate Forward Plan is a living document that will be updated every 3-5 years. Annual progress reports regarding the monitoring and verification of the results of implemented policies and measures will also be conducted. The two charts below show the impact of these pathways over time. Steps to reach this goal are shown in the Taking Action: Climate and Resilience Strategies section.

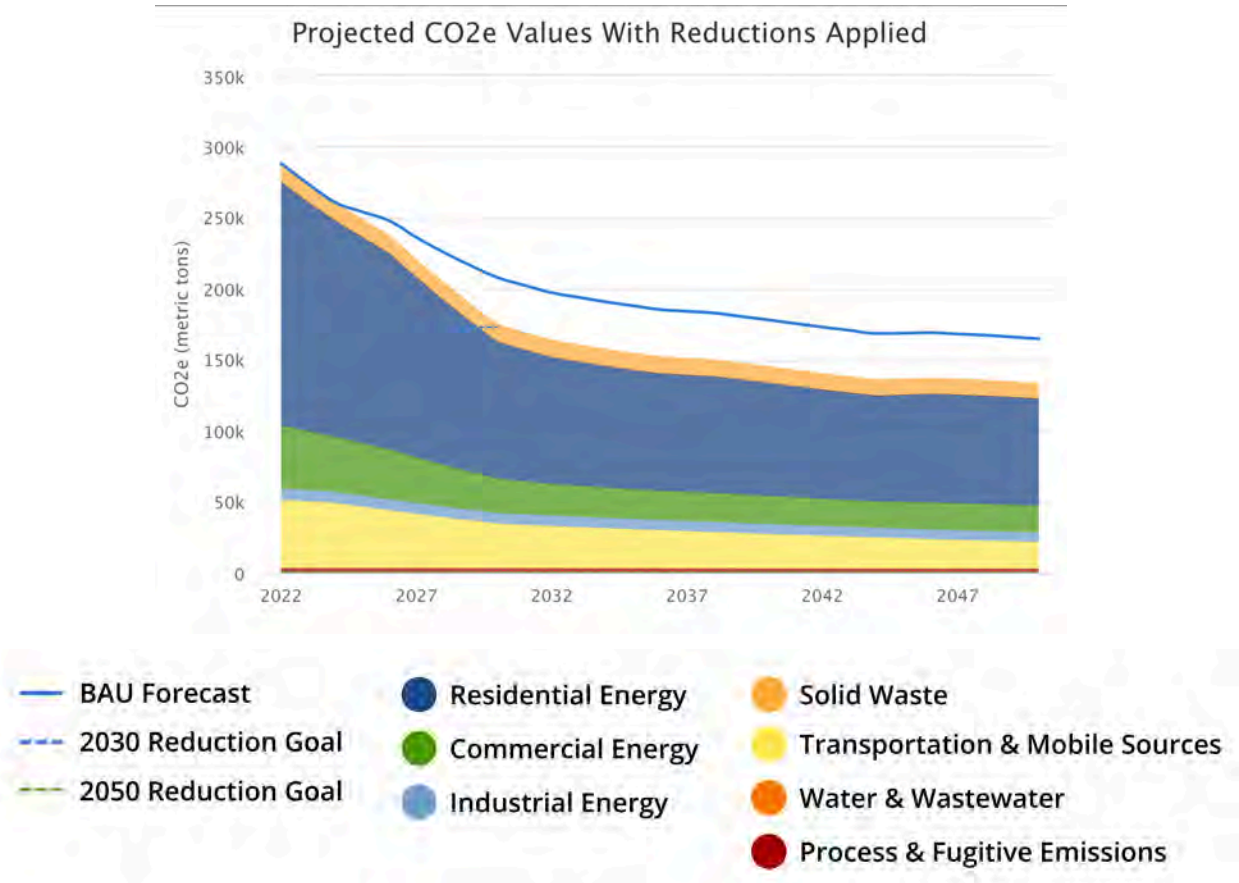


Figure 21: Chart of projected greenhouse gas emission reduction from High Impact Pathways by sector

Figure 21 displays the projected greenhouse gas emission reduction from the High Impact Pathways across seven sectors through 2050, with the greatest reduction achieved in the residential energy sector. Through the implementation of High Impact Pathways, the City can reduce emissions beyond the projected BAU scenario (depicted by the blue line).

SECTION 4:
Taking Action: Climate and Resilience Strategies

Informed by community feedback and City government priorities, we have identified four co-benefits for each action of the Climate Forward Plan. Co-benefits are the positive effects that a policy or action can have on multiple objectives, beyond its primary goal(Intergovernmental Panel on Climate Change, Assessment Report 3). It is important to highlight the co-benefits of the actions below to support the City in prioritizing implementation and understand how the actions will provide benefits to the community.

- **Greenhouse gas (GHG) mitigation** is the reduction in community emissions that contribute to climate change.
- **Resilience** is the capacity of individuals, businesses, institutions, and infrastructure to adapt and thrive in the face of climate impacts.
- **Climate equity** recognizes that disadvantaged communities are disproportionately affected by climate change and strives to ensure that all individuals have access to the resources to protect themselves from the impacts of climate change.
- **Public health** encompasses activities to improve the physical and mental health of the community.

The strategies are grouped into seven sections: Buildings and Energy, Transportation, Materials and Waste, Water and Wastewater, Air Quality and Public Health, Food Systems and Natural Areas and Land Use. The strategies and the action outlined below are intended for implementation by both the City government as well as the community as a whole.

Buildings and Energy

High Impact Pathway	Reduction Target by 2030	Reduction by 2030 ($MTCO_2e$)
Residential Electrification and Efficiency - Natural Gas	5% by 2030 - homes receiving energy efficiency and electrification retrofits	24,999
Commercial Electrification and Efficiency - Natural Gas	5% by 2030- businesses receiving energy efficiency and electrification retrofits	4,323
Residential Electrification and Efficiency - Electricity	5% by 2030 - homes receiving energy efficiency and electrification retrofits	3,237
Commercial Electrification and Efficiency - Electricity	5% by 2030- businesses receiving energy efficiency and electrification retrofits	1,002

Table 13: High Impact Building and Energy Pathways

Strategy 1.1: Increase community access and use of renewable energy, including solar, wind, and geothermal

In Ohio, fossil fuels dominate heating and electricity generation, with only 4% of in-state electricity generation powered by renewables in 2022.[9] Considering Ohio's reliance on fossil fuels, expanding the community's access and deployment of renewable energy is critical to decarbonizing our buildings and energy sector. Emissions from residential and commercial buildings in Cleveland Heights account for over 75% of the community's total emissions profile. In conversations with the community, residents were strongly supportive of expanding local clean energy generation, citing the importance of creating community-serving resources that reduce the city's reliance on the Ohio grid. By expanding the community's access to renewable energy in an equitable way, Cleveland Heights can reduce greenhouse gas emissions and lower utility costs.

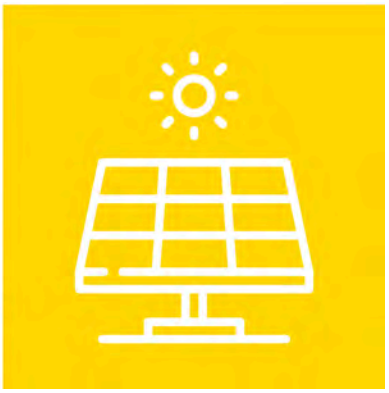
There are several sites within the community that can be leveraged for utility-scale solar development. The City can play a critical role in identifying these sites, engaging local partners and vendors, and developing the financing strategy for implementation. When identifying potential sites, the City will evaluate factors such as available land, ecological impact, existing electrical infrastructure, and proximity to residential and commercial properties. By taking a proactive role in selecting sites, the City can leverage existing developed, but underutilized sites,

such as the Severance Town Center, to reduce environmental impact and select a location that can maximize benefits to neighboring businesses and low-income residents. Additional strategies, like co-location of native plants and wildlife habitats, can also provide positive ecological benefits.

Under the Inflation Reduction Act (IRA), homeowners can access financial incentives for renewable energy systems, making clean energy more accessible and affordable. The Residential Clean Energy Credit provides a 30% federal tax credit for the installation of solar panels, solar water heaters, geothermal heat pumps, and other renewable energy systems. This credit covers not only the cost of the equipment but also installation expenses, helping homeowners significantly reduce their reliance on fossil fuels and transition to cleaner energy sources. Everyone is eligible to access this incentive through 2032, though since funds are provided in the form of a tax credit, the amount received cannot exceed taxes owed to the IRS.[10]

Progress to Date: Cleveland Heights has made progress in increasing the accessibility and implementation of solar for residential electricity. In 2018, the City of Cleveland Heights joined Northeast Ohio Public Energy Council (NOPEC), an energy aggregation nonprofit that utilizes bulk purchasing power to negotiate electric and natural gas rates. Starting January 2023, the City joined NOPEC's Green Community Choice Program, which provides 100% renewable energy for electricity aggregation.[11] From August 2023 to July 2024, 15,206 residential households participated in the 100% renewable option, purchasing a total of 8.9 million kWh. During the same period, 824 commercial participants purchased more than 1 million kWh.

Cleveland Heights residents have also installed solar power on their properties. As of 2023, 642.6 kW of solar installations on residential properties have been deployed through a total of 104 interconnected projects. Across the 20 census tracts in Cleveland Heights, there is an average household solar adoption rate of 0.56%.[12] Increasing this relatively low residential solar adoption rate can reduce household energy costs, expand local clean energy generation, decrease greenhouse gas emissions, and reduce reliance on fossil fuels.



Strategy 1.1 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 1.1.1: Increase adoption of NOPEC's local renewable energy aggregation program (and other energy aggregation providers)	High	Low	High	Medium
Action 1.1.2: Provide information to residents on how to access tax credits and other incentives to implement residential solar as well as heat pumps	High	High	High	Medium
Action 1.1.3: Encourage local business to conduct a solar feasibility assessment for their property	High	High	Low	Medium
Action 1.1.4: Create incentives such as fast tracked permitting for new multi-family and commercial buildings to install on-site solar	High	High	High	Medium
Action 1.1.5: Advocate for state policies that increase access and adoption of solar, including community solar	High	High	High	High
Action 1.1.6: Work with the regional green bank, GO Green Energy Fund, to provide access to solar energy for low-income households	High	Medium	High	Medium
Action 1.1.7: Collaborate with local partners to create a solar co-op for collective purchasing	High	Medium	High	Medium
Action 1.1.8: Establish a Carbon Neutrality Fund	High	Medium	High	Medium
Action 1.1.9: Invest in workforce development training for solar installations to benefit unemployed and underemployed community members	Medium	Medium	High	Low
Action 1.1.10: Review options to establish a baseline building performance standard for new construction	High	Medium	Low	Medium
Action 1.1.11: Identify sites for utility-scale solar developments and pursue implementation to provide clean energy to residential and commercial properties	High	High	High	Medium

Case Study: Cuyahoga Solar Co-op

In collaboration with Solar United Neighbors, a nonprofit solar organization, the 2023 Cuyahoga Solar Co-op provided residents with dedicated resources and support for installing solar panels on their home for a lower, group rate. Solar co-ops work by establishing a committee of its members to review proposals from solar providers in the area. The committee ensures that the installers have proper licensing, good references, and quality offerings for equipment and warranties. The committee then awards a contract to a single solar provider who will install the panels on each member's home, typically for a discounted group rate. By combining their purchasing power, the 70 members of the 2023 Cuyahoga Solar Co-op saved on the cost of transitioning to solar power, while doing so with support and expertise from Solar United Neighbors.

Strategy 1.2: Improve energy efficiency and expand clean energy use for municipal buildings

Electricity use accounts for 35% of the greenhouse gas emissions from City operations. Cleveland Heights has the opportunity to address energy usage intensity and emissions from its own buildings – the City's portfolio of municipally-owned buildings is an area of direct control and influence, and also offers a way to lead by example. By upgrading insulation, lighting, and HVAC systems, Cleveland Heights can lower energy consumption and reduce operational costs in our public buildings. Transitioning to renewable energy sources like solar, wind, or geothermal power for municipal buildings will help decrease reliance on fossil fuels and lower electricity costs. These measures will not only reduce the carbon footprint of city operations but also serve as a model for businesses and residents, encouraging broader adoption of sustainable practices across the community.

Progress to Date: Over the past five years, the City has undertaken several projects to implement clean energy and energy efficiency projects to reduce greenhouse gas emissions from city operations and capture cost savings. In 2020, the City of Cleveland Heights entered into a 30-year Power Purchase Agreement (PPA) with Enerlogics to install solar panels on City Hall, the Community Center, and the Service Garage. These solar installations were completed at no upfront cost to the City. Under the agreement, Cleveland Heights will purchase the electricity generated by the panels at 10 cents per kilowatt-hour (kWh) to begin, with a fixed annual rate increase of 1.75%. By the 30-year term's end, the rate will rise to about 17 cents per kWh. The agreement also provides the City with the option to purchase the solar panels and equipment at five-year intervals. After the first five years, the total purchase price for the equipment across all three buildings would be around $1.6 million, with the price decreasing every five years to about $143,000 in the final year of the contract.[13]

Solar on City Hall

In 2019, Cleveland Heights completed a $6 million comprehensive Energy Efficiency project that addressed outdated equipment. The project was made possible through an Energy Savings Performance Contract (ESPC), which allowed the City to make critical capital investments at no upfront cost to the city. This financing method uses energy savings from the facility upgrades to repay the initial costs over time. Through this project's deployment, the City prioritized reducing energy and maintenance costs by applying green solutions, upgrading aging equipment to reduce capital improvements costs, and facilitating greater stewardship of City resources. One of the key project elements was citywide lighting upgrades, replacing 3,495 interior lamps to energy efficiency LEDs. Upgrades to the city's traffic signals, HVAC systems, and other areas of inefficient energy usage resulted in a drop from baseline annual energy costs of about $750,000 to around $350,000, saving nearly $400,000. The emissions reduction that resulted from the project is similar in scale to the carbon sequestered by 3,300 acres of forest.[14]

The City is currently partnering with Leopardo Energy to implement additional energy efficiency upgrades to city facilities, including the Cain Park Amphitheater, City Hall, Police Station, Fire Station, Cumberland Pool, Service Center, and city-wide streetlights. The scope of the project includes over $19 million of building upgrades aimed to improve building weatherization and insulation, increase energy efficiency, address safety, and reduce overall energy use. The project will be financed at no upfront cost to the City through an Energy Savings Performance Contract. Under an Energy Savings Performance Contract, Leopardo Energy will conduct an energy audit and implement recommended building upgrades. The City will then pay for the upgrades over time from the realized cost-savings from energy reduction.[15]

	Potential Benefits and Co-Benefits			
Strategy 1.2 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 1.2.1: Expand the deployment of solar, wind or other renewable energy options at city-owned properties, such as the Fire Department, including rooftop solar and solar canopies	High	High	Low	Medium

Action 1.2.2: Require LEED certification (or comparable sustainability rating) for all new municipal construction and pursue retrofits for sustainability certification at existing buildings	High	Medium	Low	Low
Action 1.2.3: Continue to replace indoor and outdoor lighting at City facilities with energy efficient alternatives, such as motion-sensored lights and LEDs	High	Low	Low	Low
Action 1.2.4: Enact a policy to require Dark Sky compliant lighting in the community	Low	Low	Low	Medium
Action 1.2.5: Implement the Leopardo Energy Efficiency Improvement Project and complete the proposed energy efficiency upgrades	High	Medium	Low	Medium
Action 1.2.6: Develop an energy dashboard to monitor city building energy use, prioritize upgrades, and quantify energy and emissions savings	Medium	Medium	Low	Medium

Case Study: LEED Gold Certification for Heights High School

Heights High School achieved LEED Gold certification for improvements made during a redevelopment project, recognizing its commitment to sustainability. This achievement was driven by the school's use of a hybrid geothermal system to heat and cool the building, achieving 90% of the emissions savings at 60% of the cost compared to a full geothermal system. They have also incorporated innovative designs for maximizing energy efficiency, such as using waste heat from the natatorium's HVAC to warm the pool, triple-paned windows, as well as the incorporation of LED lighting in strategic locations. These improvements have significant energy savings, with 38% reduction in total consumption, 42% reduction in interior lighting, and 61% reduction in exterior lighting. The renovation, which preserved the original 1926 building, highlights the Cleveland Heights-University Heights communities' focus on sustainability and showcases leadership in building design.[16]

Strategy 1.3: Advance equitable energy efficiency programs for residential and commercial buildings

Energy use for residential and commercial buildings accounts for 75% of the community's greenhouse gas emissions. At the community workshops, residents expressed a need for reliable resources to help them use energy efficiency programs and implement needed home upgrades. By improving insulation, upgrading heating and cooling systems, and installing energy-efficient appliances, households and businesses can significantly reduce energy consumption and costs. These actions can be put into practice by offering rebates, promoting local contractors or enforcing energy efficiency in building codes for new construction. Additionally, energy efficiency measures improve community resilience. In times of extreme weather or grid disruptions, energy-efficient buildings are better equipped to maintain comfortable indoor temperatures.

Home efficiency upgrades can also reduce energy burden, particularly for low- and moderate-income households. Energy burden is defined as the percentage of a household's income that is spent on energy costs; a household is considered to have a high energy burden if the percentage exceeds 6%.[17] The average energy burden for residents in Cleveland Heights is 3%. Though this percentage is less than the average energy burden at 6% , low-income households in Cleveland Heights may still struggle with high energy costs and should be addressed.

Equitable access to energy efficiency programs is a key priority to ensure that communities most impacted by high energy costs can alleviate financial stress. There are several federal tax credits that can support homeowners and businesses in implementing energy efficiency improvements:

- The Energy Efficient Home Improvement Credit provides a 30% tax credit for home upgrades designed to reduce energy consumption. Homeowners can claim up to $1,200 annually for energy efficient home improvements and home energy audits or up to $2,000 for high-impact technologies, like heat pumps and biomass stoves.[18]
- For commercial properties, the 179D Commercial Buildings Energy-Efficiency Tax Deduction allows businesses to claim a tax credit for implementing energy efficiency upgrades. Businesses can claim up to $1 per square foot if they reduce energy by 50% or more.[19]

Progress to Date: Residents of Cleveland Heights can currently access County programs to implement energy efficiency upgrades for their homes. The Cuyahoga County Department of Development offers multiple low-income assistance programs for residents to help lower their gas and electric bills, and improve the energy efficiency of their homes.

- The Home Weatherization Assistance Program (HWAP) provides free home improvements including insulation, efficient appliances, and updated hot water tanks and furnaces to eligible county residents.
- The Home Energy Assistance Program (HEAP) works in tandem with HWAP to provide financial assistance for residents during the winter when extreme temperatures can lead

to large utility bills. For emergency assistance, the county also maintains an Energy Crisis Program for months with peak hot and cold temperatures. This ensures that financial roadblocks do not place community members at health risk during extreme weather.[20]

Under the Inflation Reduction Act, the Ohio Department of Development was awarded $249 million from the US Department of Energy to create two programs that will help Ohioans save on their energy bills: High-Efficiency Electric Home Rebate Act and Home Efficiency Rebates (HOMES). Expected to launch in 2025, low- and moderate-income households can access funds for retrofits, appliances, and equipment that improve building energy efficiency.[21]

Partner Highlight: Home Repair Resource Center

The Home Repair Resource Center is a non-profit organization in Cleveland Heights that provides home ownership resources, education, and assistance programs to promote sustainable and diverse communities. Their work focuses on home finance support and increasing accessibility for DIY home maintenance. Residents can get financial counseling, financial assistance in the form of grants and matched loans, and emergency foreclosure prevention assistance.

The HRRC hosts local classes that teach repair and maintenance skills in varying degrees of complexity. Additionally, they maintain a tool library, where residents can borrow tools for free or minimal cost, with the goal of expanding the agency of homeowners in caring for their property. HRRC has previously hosted classes on energy-related topics including insulation, winter heating-system maintenance, and general home energy-efficiency.

Strategy 1.3 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 1.3.1: Encourage installation of electric appliances, like heat pumps, for all new housing developments to reduce reliance on natural gas through local incentives, discounts, or rebates	High	Low	High	High
Action 1.3.2: Create a program to incentivize energy efficiency retrofits for existing multi-family and commercial properties	High	Medium	High	High
Action 1.3.3: Work with partners and identify funding sources to expand home weatherization, healthy home, and energy efficiency upgrades for low-income households	High	High	High	High
Action 1.3.4: Provide energy efficiency technical assistance to homeowners and businesses on financing options, tax credits, local contractors, and equipment with partners	High	Medium	High	Medium
Action 1.3.5: Review options to implement a voluntary energy benchmarking ordinance for municipal and commercial buildings	Medium	Low	Low	Low
Action 1.3.6: Invest in workforce development training for energy efficiency audits and installations to benefit unemployed and underemployed community members	Medium	Low	High	Low
Action 1.3.7: Explore opportunities to update the City's Building and Fire Codes through coordination with the Ohio Board of Building Standards	Medium	Medium	Medium	Medium
Action 1.3.8: Advocate for state policies that increase access and adoption of home electrification	High	Medium	High	High

Case Study: Empowered! Program in Columbus, OH

In 2023, the City of Columbus provided $1.5 million to IMPACT Community Action to help implement Empowered!, a clean-energy workforce development program for young adults in the area. The program was made possible by the City's "Sustainable Columbus" initiative, which has championed energy-friendly policies and action within the community. The

Empowered! program will host community participants in 12-week programs designed to develop career skills applicable to the clean-energy sector, during which they will be encouraged to investigate occupational interests. Participants have the opportunity to apply these skills through paid roles as energy advocates, performing energy audits and other related activities in the area, in addition to compensation for their training time. Columbus Mayor Andrew Ginther hopes that the program will bolster the City's mission of strengthening upward mobility and resiliency among their most vulnerable community members. The goal of the program is to have at least twenty graduates per group placed directly into apprenticeships or employment upon the program's completion.[22]

Strategy 1.4: Increase the resilience of residential, commercial, and municipal buildings

Increasing the resilience of residential, commercial, and municipal buildings is essential to protecting Cleveland Heights from the growing impacts of climate change, such as extreme weather events and heavy flooding. Making improvements to buildings, critical facilities, residential homes, and local businesses can help them better withstand severe storms, high winds, and excessive rainfall. Climate-resilient buildings are not only more durable but also safeguard the health and safety of residents, businesses, and public services during emergencies.

Exemplified by the severe storms in summer of 2024, Cleveland Heights is already experiencing severe weather events. Investing in resilience measures reduces the risk of costly damage, minimizes disruption, and ensures that the community remains prosperous and secure in the face of a changing climate. By lowering the cost of recovering from severe weather events and helping maintain continuity of essential services, these upgrades also will provide long-term economic benefits.

Progress to Date: Cuyahoga County offers resources that can help Cleveland Heights residents make critical home repairs for building resilience. Through the Heritage Home Program, the County and the Cleveland Restoration Society provide low-interest loans to fund home upgrades, including roof repairs, plumbing, insulation, and basement waterproofing.[23]

	Potential Benefits and Co-Benefits			
Strategy 1.4 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 1.4.1: Integrate resilient materials, such as reflective roofing and wind-resistant windows, into city-owned buildings	Low	High	Low	Medium
Action 1.4.2: Pre-approve and provide incentives for resilient materials for residential roof repairs	Low	High	High	High

Action 1.4.3: Educate the community on actions to improve building resilience, such as elevating furnaces and hot water heaters	Low	High	Medium	Low
Action 1.4.4: Install surge protectors and backup generators for critical City facilities and support residential adoption to handle power outages	Low	High	High	High
Action 1.4.5: Research and identify options for newer climate-resilient insurance for residents	Low	High	High	High
Action 1.4.6: Expand tree stewardship program to provide guidance and technical assistance for tree maintenance contracts	Low	High	Medium	Medium

Strategy 1.5: Increase the resilience of local electricity infrastructure

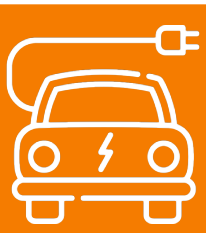
Increasing the resilience of local electricity infrastructure is crucial for Cleveland Heights as the city faces growing challenges from climate change. From the Climate Risk Assessment Matrix, severe weather events of thunderstorms, extreme precipitation, and tornadoes and high winds are projected to be the most significant climate hazards as the effects of climate change worsen (Appendix A). In feedback sessions, the community expressed that they are already experiencing long power outages during severe storms. Strengthening the local grid ensures that residents, businesses, and essential services have reliable access to power during extreme weather events, which can lead to outages. By investing in resilient infrastructure, the city can reduce the risk of prolonged outages and mitigate the public safety impacts of power disruptions. Additionally, resilient electricity systems can better support the growing demand for renewable energy and electric vehicles, further contributing to Cleveland Heights' sustainability and climate goals. Ensuring a reliable and adaptive energy grid - with the help of local renewable energy resources such as solar coupled with battery storage - can help safeguard the community against future disruptions, providing long-term security and stability.

Progress to Date: In 2023, Cuyahoga County launched the first microgrid electrical utility in the United States, Cuyahoga Green Energy. Their mission is to provide clean, reliable, locally-produced energy through the development of district microgrids. These microgrids will be able to operate independently from the main grid during power outages and will integrate power from local solar arrays and other types of renewable energy. Cuyahoga Green Energy has identified several pilot projects to deploy within the first five years of operation.[24]

Strategy 1.5 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 1.5.1: Develop local microgrids to support critical infrastructure during power outages	High	High	Medium	High
Action 1.5.2: Coordinate with First Energy to ensure that new or upgraded power infrastructure is resilient during extreme weather events	Low	High	High	High
Action 1.5.3: Implement a dig once policy to facilitate resilience measures to utility infrastructure	Low	High	High	High

Case Study: Microgrid Project in Fort Wayne, IN

In Fort Wayne, Indiana, the City's Department of City Utilities unveiled an innovative microgrid project that integrates solar panels, battery storage, biogas, and natural gas to boost resilience and supply power to essential facilities, including the Three Rivers Filtration Plant and Water Pollution Control Plant. The microgrid contains 12,000 solar panels installed on a floating array, and the system will generate more than 9 million kWh of renewable energy annually, contributing over 40% of the total energy required by the facilities. This project enhances reliability by allowing continued operations independent of the grid, and reduces greenhouse gas emissions by an estimated 4,600 tons per year, equivalent to that of 1,161 gasoline-powered vehicles. The City of Fort Wayne estimates that it will save between $8-$10 million in electricity costs over the first 20 years. Recognized for its unique capabilities, the microgrid has received multiple awards, reflecting its significant environmental and economic benefits, and exemplifying the City of Fort Wayne's commitment to responsible energy stewardship.[25]



Transportation

High Impact Pathway*	Reduction Target by 2030	Reduction by 2030 ($MTCO_2e$)
Electric Vehicles and VMT reduction - Gasoline	10% reduction in VMTs by 2030 16% VMT done by EVs by 2030	7460
Electric Vehicles and VMT reduction - Diesel	10% reduction in VMTs by 2030 16% VMT done by EVs by 2030	1303

Table 14: High Impact Transportation Pathways

*The High Impact Transportation Pathways are focused on reducing vehicle miles traveled (VMTs) from gasoline and diesel vehicles. This can be achieved by shifting to cleaner transportation modes and increasing the usage of electric vehicles.

Strategy 2.1: Reduce transportation emissions from City operations

Transportation and employee commutes account for 39% of greenhouse gas emissions from City operations in Cleveland Heights. Electrifying the municipal fleet and installing charging infrastructure will decrease reliance on fossil fuels, lower long-term operating costs, and improve public health by reducing local air pollution. Community members support the transition to electric vehicles in the city fleet, but stressed the importance of co-locating EV chargers with solar projects to power EVs with clean, locally-produced energy. Additionally, encouraging methods to reduce vehicle commuting, such as teleworking, carpooling, or public transit incentives, can further decrease emissions while promoting more sustainable commuting habits.

Under the Inflation Reduction Act, the City, and other tax-exempt entities, can access tax credits through a mechanism called elective pay. To support fleet electrification, the City can access up to a 30% credit for the purchase of clean vehicles (Commercial Clean Vehicle Credit) and up to $100,000 for each qualified charger (Alternative Fuel Vehicle Refueling Property Credit).[26]

Progress to Date: The City of Cleveland Heights has already made progress on reducing tailpipe emissions from fleet vehicles. As of September 2024, the City has integrated 14 electric vehicles in the municipal fleet and 10 hybrid vehicles for the Police Department (7 of which have been purchased in 2024 and are expected to be in service in early 2025).

14
Electric Vehicles
+
10
Hybrids

In May 2023, Power A Clean Future Ohio (PCFO) conducted a Fleet Electrification Analysis, which cataloged 223 City fleet vehicles and analyzed electrification potential. Using the Dashboard for Rapid Vehicle Electrification (DRVE) tool, PCFO estimated the cost-effectiveness and environmental impacts of replacing each conventional fleet vehicle with an equivalent EV model. Incorporating the market vehicle cost and the estimated operating and maintenance costs, PCFO determined that it would be economical to convert 60% of the city's fleet vehicles (133 vehicles) to electric now, with an additional 31% becoming economical in the near-term (around 2025). In addition, the Fleet Analysis concludes the city needs 87 Level 2 chargers and one Level 3 charger to support the 133 vehicles identified for possible near-term conversion. The analysis also includes eight recommended actions to advance fleet electrification.

Using the Fleet Analysis, the City can further develop a detailed timeline for replacing fleet vehicles and installing charging infrastructure that is right-sized to the fleet. The timeline should account for factors such as budget, vehicle age, procurement time, trade-in value, and market projections for medium- and heavy-duty vehicles.

	Potential Benefits and Co-Benefits			
Strategy 2.1 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 2.1.1: Use the Fleet Electrification Analysis to develop a vehicle replacement timeline for hybrid and electric vehicles that accounts for procurement periods and existing vehicle age	High	Low	Low	High
Action 2.1.2: Adopt an EV-first procurement policy	High	Low	Low	High
Action 2.1.3: Identify sites for municipal electric vehicle charging stations and explore implementation funding	High	Low	Low	High

Action 2.1.4: Pursue solar co-location with municipal electric vehicle charging stations	High	Low	Low	High
Action 2.1.5: Collaborate with neighboring jurisdictions to pursue bulk purchasing of EVs	High	Low	Low	High
Action 2.1.6: Update the City's telework policy to reduce employee commutes for positions where hybrid or remote work is feasible	Medium	Low	Low	Medium
Action 2.1.7: Conduct an employee commuter survey to understand staff commute methods and develop incentives to reduce high-carbon vehicle trips	Medium	Low	High	Low
Action 2.1.8: Provide a subsidized RTA pass for City employees	High	Medium	High	High

Case Study: EV-First Policy in Belmont, MA

In 2022, the Belmont Energy Committee introduced the Energy-First policy to support and accelerate the transition of Belmont's municipal vehicle fleet to electric vehicles (EVs). The policy requires the City of Belmont to consider purchasing EVs for lightweight town-fleet vehicles first and then consider plug-in hybrid vehicles. The policy aligns with the city's climate action goal of increasing the use of battery electric or plug-in hybrid vehicles. By switching to EVs, Belmont will reduce their greenhouse gas emissions, specifically from town fleet vehicles. Additionally, the investment in EVs will reduce the cost of ownership over the vehicle's lifetime. If the EVs are unavailable, too costly, or do not fit the department's needs, the policy allows departments to apply for exemption, and if approved, they must select "the most fuel-efficient class, drive train, and model available."[27]

Strategy 2.2: Encourage the community's transition to electric vehicles

Across the community, transportation and mobile sources account for 17% of greenhouse gas emissions. To support an equitable transition, Cleveland Heights needs to install adequate public charging infrastructure for residents—such as renters, residents of older buildings, and low-income families—who may not have resources to install private chargers. However, this strategy must be pursued alongside an effort to expand local clean energy resources that limit electricity used from the fossil fuel-intensive Ohio grid. Residential home charging powered by 100% clean energy from the NOPEC Green Community Choice Program can further maximize GHG emission reduction. In our project workshops, community members emphasized the need for expanded EV charging infrastructure, particularly in apartment buildings and business districts, as well as educational resources to help residents install EV chargers in their own homes.

Residents and businesses can utilize several federal tax incentives to reduce the costs of purchasing electric vehicles and installing charging infrastructure:

- Residents can receive tax credits up to $7,500 for new electric vehicles and up to $4,000 for pre-owned electric vehicles.[28]
- Through the Commercial Clean Vehicle Credit, the businesses can access up to a 30% credit for the purchase of clean vehicles.[29]
- Under the Alternative Fuel Vehicle Refueling Property Credit, homeowners can receive up to $1,000 for each electric vehicle charger and businesses can receive up to $100,000 for each qualified charger.[30] (Depending on driving needs, EV owners may be able to charge their vehicle at home with a 120 V outlet without need for a special wall charger.)

Progress to Date: As of April 2023, EVs accounted for 3.5% of all new vehicle purchases in Cuyahoga County. Currently, Cleveland Heights has 226 registered EVs and 134 plug-in hybrid EVs, while the county overall has 4,332 EVs and 1,843 plug-in hybrids. According to a projection by UNPREDICTABLEcity, EVs will comprise 15% of all vehicles including private vehicles in Cuyahoga County by 2030. At present, 97 public EV charging stations are available throughout the county, with 26 located within 5 miles of Cleveland Heights.[31]

	Potential Benefits and Co-Benefits			
Strategy 2.2 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 2.2.1: Install publicly available electric vehicle charging infrastructure with a focus on high traffic areas, such as apartments and business districts	High	Low	High	Medium
Action 2.2.2: Adopt an EV Readiness Ordinance to expand public charging at multi-family buildings, commercial properties, and city-owned facilities	High	Low	High	Medium
Action 2.2.3: Create an EV charging start-up kit to engage and support residents in installing home charging infrastructure	High	Low	High	Medium
Action 2.2.4: Participate in the next cohort for the Charging Smart Electric Vehicle Charging Station Assessment	High	Low	High	Medium
Action 2.2.5: Engage the community on the benefits of transitioning to electric vehicles by hosting ride-and-drive events and developing educational resources	High	Low	High	Medium

Action 2.2.6: Provide resources to support residents in utilizing federal tax credits for EVs and home chargers	High	Low	High	Medium
Action 2.2.7: Enact mandate to include EV chargers in parking requirements	Medium	Low	Medium	Medium

Case Study: Equitable EV-Ready Parking Ordinance in Columbus, OH

As electric vehicle adoption increases, municipalities have passed EV Readiness Ordinances, which establish building requirements for the expansion of charging access. EV Readiness typically encompasses the modernization of building, zoning, and parking codes in ways that increase accessibility of electric vehicle charging for all community members. The City of Columbus, in partnership with the Electrification Coalition, hosted a series of "Equity EV Charging Roundtables" in 2022 to gather feedback from engaged community members. The sessions provided useful feedback and highlighted the need for charging infrastructure in multi-unit dwellings. In total, the city conducted over 85 engagement meetings with various stakeholders and successfully passed their Equitable EV-Ready Parking Ordinance which set standards for minimum amounts of parking spaces equipped with EV chargers throughout the city.[32]

Strategy 2.3: Improve bicycle and pedestrian connectivity and safety

Active transportation, such as bicycling and walking, offers zero-emission alternatives for getting around the community, helping to reduce Cleveland Heights' reliance on single occupancy vehicles and lowering greenhouse gas emissions. By investing in local solutions that enhance the safety and convenience of biking and walking, the City can encourage residents to take more trips without their cars.

During community engagement sessions for this plan, residents expressed concerns about the maintenance of sidewalks, noting that broken sidewalks pose challenges for people with disabilities. Bicyclists also recommended infrastructure improvements, including protected bike lanes and additional bike racks, to create a safer and more accessible environment for cyclists. These measures are essential to fostering a more sustainable and active transportation network in Cleveland Heights.

Progress to Date: Cleveland Heights has made notable strides in enhancing infrastructure and safety for bicyclists and pedestrians. In May 2018, the City adopted a Complete and Green Streets Policy, which was recognized as the best policy among 66 submissions by the National Complete Streets Coalition that year. This policy prioritizes sustainable and accessible transportation solutions for all users, including pedestrians, cyclists, and public transit users. As part of its ongoing efforts, Cleveland Heights has long been designated at the Bronze Level by the League of American Bicyclists, acknowledging its commitment to bicycle-friendly policies and infrastructure.

Building on these efforts, in 2021, the City became one of the few in Ohio to adopt Vision Zero, a strategy aimed at eliminating all traffic-related fatalities and serious injuries while increasing safe, healthy, and equitable mobility. In 2022, Cleveland Heights launched two key initiatives: the Neighborhood Traffic Calming program, which aims to reduce speeding and improve road safety, and the Shared Spaces Program, which reflects the principles of the Complete and Green Streets Policy to redesign streets to better accommodate pedestrians, cyclists, and public spaces.

Cleveland Heights also promotes mobility options for all ages by participating in Cuyahoga County's Shared Mobility Program, which includes bike and scooter sharing, and is exploring a partnership with the Senior Transportation Connection to support older residents' transportation needs. In 2023, the City was awarded the Federal Safe Streets For All (SS4A) Planning grant to develop a Comprehensive & Equitable Safety Action Plan, focusing on improving road safety for all users, especially vulnerable populations.

Cleveland Heights, South Euclid, and University Heights also received a grant from the Ohio Department of Transportation (ODOT) to create the Heights Regional Active Transportation Plan. This comprehensive plan will assess current pedestrian and bicycle conditions, develop base maps and analyses, and recommend an active transportation network with priority infrastructure projects. Stakeholder and public engagement will be integral to the plan's

development, which will also include an implementation and monitoring process to ensure long-term success.

Partner Highlight: Heights Bicycle Coalition

The Heights Bicycle Coalition's mission is to "build communities that are safe and accessible for bicycling through education, advocacy, and community events." They provide educational materials to teach residents about bicycle safety, laws, and registration, as well as a Heights Area Bike Map that shows bike lanes, bike fix-it stations, and key community locations. Through their local ride events, the Coalition brings the community together to promote bicycling as a safe, healthy, and sustainable form of transit.

	Potential Benefits and Co-Benefits			
Strategy 2.3 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 2.3.1: Establish a community-wide bike-to-everywhere day to encourage bicycle usage and increase visibility of cyclists to cars	Medium	Low	Medium	High
Action 2.3.2: Increase the number of dedicated bicycle lanes with a focus on high-traffic corridors	Medium	Low	Medium	High
Action 2.3.3: Implement traffic calming measures and sidewalk repairs to improve safety in alignment with the City's Vision Zero goal and the City's Complete and Green Streets Policy	Low	Low	Medium	High
Action 2.3.4: Complete and implement recommendations developed through the Comprehensive and Equitable Safety Action Plan (CESAP) and the Heights Regional Active Transportation Plan	Low	Low	Medium	High
Action 2.3.5: Assess current bike rack and storage infrastructure and increase through the business districts	Medium	Low	Medium	High
Action 2.3.6: Establish an Active Transportation Fund to support a sustained, year-after-year effort to build a multi-modal transportation network	High	Medium	High	High

Strategy 2.4: Expand accessibility and use of public transit and shared mobility services

Expanding the accessibility and use of public transit and shared mobility services in Cleveland Heights can reduce transportation emissions and offer more equitable transportation options. Public transit provides a low-carbon alternative to private vehicles and a low-cost solution for low-income households to access essential locations in the community. Cleveland Heights residents affirmed the need for additional transit stops, more frequent service to reduce wait times, and electric buses.

Shared mobility services such as bikeshare, scootershare, carshare, and rideshare have also seen rapid growth, providing additional transportation choices that can reduce car dependency. Cleveland Heights residents can access bikes and scooters through Bird, Lime, and Veo. With 16% of Cuyahoga County households lacking vehicle access, the program plays a critical role in enhancing mobility options and reducing carbon emissions. These services not only offer convenience but can also serve as a "last mile" connection to public transit hubs, increasing ridership and making sustainable transportation more accessible to the broader community.

Progress to Date: Across Cleveland Heights, residents can access public transit and shared mobility services, providing low-carbon alternatives to private vehicle use. The Greater Cleveland Regional Transit Authority (RTA) operates a number of conventional bus lines that connect the City of Cleveland Heights to the greater metropolitan area, as well as a Bus Rapid Transit (BRT) line known as the HealthLine. RTA operates primary bus lines along densely populated urban corridors around Cleveland, as well as numerous auxiliary lines that extend the transport system's reach into more suburban, residential areas.

Many of RTA's major bus routes intersect Cleveland Heights, offering some access and mobility but there are opportunities for expanding routes and increasing frequency. The HealthLine BRT operates on Euclid Avenue and provides an express route to and from downtown Cleveland yet it is still not within walking distance of some Cleveland Heights residents. Cleveland's RTA was recently awarded a $10.6 million federal grant by the Federal Transit Administration to replace 10 traditional buses with electric vehicles as a fleet electrification pilot program. It will serve as the first step towards a larger transition to zero-emission public transport.

The City participates in the Cleveland-Cuyahoga County Micro-Mobility Network Expansion program, which aims to improve accessibility and increase public awareness of shared mobility options. A collaboration between Cuyahoga County, the Northeast Ohio Areawide Coordinating Agency (NOACA), five municipalities and local community organizations, the program expands existing networks to serve a broader community and improve equity outcomes.

Key components of the program include the collective selection of scooter and e-bike providers and the installation of five different types of micro-mobility hubs at strategic locations across the county. These hubs vary in size and capacity, designed to support high-traffic areas,

neighborhood destinations, and public transit connections. The hubs will ensure scooters and e-bikes are organized and readily available for users. Additionally, the Cleveland Heights Zoning Code (Chapter 1161.065) permits a 10% reduction in the total number of required parking spaces in multi-family or mixed-use developments where car-sharing spaces are provided.

	Potential Benefits and Co-Benefits			
Strategy 2.4 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 2.4.1: Work with RTA to improve the frequency and reliability of public bus service while encouraging an expansion of ridership and patronage	Medium	Low	High	Medium
Action 2.4.2: Explore funding and operations feasibility for a free shuttle service that connects business districts	Medium	Low	High	Medium
Action 2.4.3: Continue to engage in the Cuyahoga County Micro-Mobility Network Expansion working group and expand scootershare, rideshare, and bikeshare options	Medium	Low	High	Medium
Action 2.4.4: Collaborate with the Cleveland Heights-University Heights School District to support the transition to electric school buses	Medium	Low	High	High
Action 2.4.5: Create a transit oriented development overlay to the zoning code to encourage greater density and transit use along transit corridors	Medium	Medium	Medium	Medium
Action 2.4.6: Adopt a Shared Parking ordinance to allow for an effective reduction in parking minimums for new construction	Medium	Low	Low	Medium
Action 2.4.7: Reduce parking minimums for construction within ¼ mile of high frequency transit stops	Medium	Low	Low	Medium
Action 2.4.8: Create incentives such as density bonuses for building owners who support active transportation choices with amenities like covered bike parking and discounted transit passes	Medium	Low	Low	Medium

Strategy 2.5: Improve transportation infrastructure's resilience to climate change

Cleveland Heights faces growing challenges to maintain its transportation infrastructure as the impacts of extreme weather events are already being felt and are projected to worsen. Strengthening infrastructure now will help mitigate damage, reduce service disruptions, and prevent dangerous conditions for residents and commuters. In the Visioning Workshop, residents shared their challenges with aging transportation infrastructure, identifying hazards such as uneven sidewalks, lack of transit stops, and flooding on roadways that endangers bicyclists. By investing in resilient transportation systems, the city can save on future repair costs and ensure that roads and public transit remain safe, reliable, and accessible.

Progress to Date: As part of its Complete and Green Streets Policy, the City established goals and key priorities for all transportation infrastructure and construction projects. These include prioritizing vulnerable users in infrastructure design and improvements, as well as taking measures to improve water quality and reduce the strain on the city's sewer system by implementing street trees and green infrastructure.[33] The policy reflects the City's commitment to both transportation safety, and proactive improvements for infrastructure resilience.

	Potential Benefits and Co-Benefits			
Strategy 2.5 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 2.5.1: Implement cool pavement strategies and materials to reduce heat islands and mitigate damage from extreme heat	Low	High	High	Medium
Action 2.5.2: Incorporate green infrastructure, such as swales, into sidewalk improvement projects	Medium	High	Medium	Medium
Action 2.5.3: Upgrade road drainage systems to prevent water pooling and reduce the risk to motorists and bicyclists during heavy thunderstorms	Low	High	Medium	High
Action 2.5.4: Work with RTA to ensure transit shelters are designed to withstand high winds and offer protection in extreme heat	Low	High	High	High
Action 2.5.5: Create a sidewalk improvement program for the preservation and repair of existing slate sidewalks	Low	High	Medium	Low

Materials and Waste

Strategy 3.1: Expand local composting to reduce organics and food waste in landfills

Organic materials in landfills decompose anaerobically (without oxygen) and produce methane, a potent greenhouse gas. By composting food scraps and other organic materials instead, the community can reduce greenhouse gas emissions from waste, which accounts for 4% of community-wide emissions. The resulting compost can also be used as a valuable soil amendment, enhancing soil health and providing an eco-friendly alternative to synthetic fertilizers. An additional way to reduce organics in landfill is to engage in "leave your leaves" practices, allowing fallen leaves to naturally decompose on lawns provided that it does not impact public safety. Through community engagement events, Cleveland Heights residents expressed enthusiasm for composting, with many participating in composting drop-off programs and citing support for expanded composting infrastructure. The City is interested in providing community-wide composing service to its residents in partnership with a qualified firm. A feasibility study and stakeholder engagement will inform the scope of this program.

Progress to Date: Under the City's Zoning Code, residents are allowed to install compost bins in side and rear yards. Compost must be generated and used on-site and are required to use an enclosed container to process organic waste.[34] Under this policy, Cleveland Heights residents can process their food scraps, yard waste, and other organic matter to generate compost for yards and gardens.

Within Cuyahoga County, there are several organizations that provide composting services with community drop off locations for residents. There is one Class II composting facility (2701 St. Clair Avenue NE, Cleveland) in the County that processes yard waste, agricultural waste, animal waste, and food scraps. In addition, there are ten sites designated as Class IV composting facilities that process yard waste.[35]

Partner Highlight: Rust Belt Riders

Rust Belt Riders is a worker-owned cooperative that collects and processes compost from residents, organizations, and businesses across the region. In operation since 2014, Rust Belt Riders provides compost drop-off locations that can be accessed by members who pay a monthly subscription fee. There are two community compost drop-off locations in Cleveland Heights at Marc's Grocery Store and Church of the Saviour. Rust Belt Riders also offers a home pick-up service; for an additional fee, they will collect a five-gallon bucket once a week.

Strategy 3.1 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 3.1.1: Explore the feasibility of implementing community-wide curbside composting, either in-house or through partnerships	Medium	Medium	Medium	Medium
Action 3.1.2: Educate residents on any safe, healthy and sanitary backyard composting systems that are low-cost and compliant with city code as well as on other city or partner composting programs	Medium	Medium	Medium	Medium
Action 3.1.3: Establish a program to guide and support small-scale, community-led composting initiatives	Medium	Medium	Medium	Medium
Action 3.1.4: Collaborate with partners to fund and implement a regional Level II composting facility	Medium	Medium	Medium	Medium

Strategy 3.2: Improve recycling waste diversion and reduce local plastic waste pollution

Reducing the use of disposables and curbing local plastic waste pollution is crucial to decrease waste sent to landfills and reduce harmful chemicals and microplastics that affect environmental and public health. Plastics are produced with petrochemicals, which contribute to environmental degradation and greenhouse gas emissions. Mitigating plastic waste is more effective than recycling, as it prevents the production of new plastics and reduces the energy and resources required for recycling processes. Plastic waste reduction is a key priority for Cleveland Heights residents, with many sharing concerns and solutions for mitigating plastic waste produced locally.

Progress to Date: The Cuyahoga County Department of Sustainability has been working with support from the Department of Consumer Affairs and the County Solid Waste District to implement a Sustainable Stores Program. This program incentivizes stores to eliminate plastic bags from retail operations through financial assistance and emphasizes the importance of plastic waste pollution reduction. Municipalities, chambers of commerce, and nonprofits are eligible to apply for grants to fund the transition away from plastic checkout bags, and previous projects have included reward programs for customers using reusable bags, to checkout area redesigns that account for reusable bags.[36] The program aligns with the county's Disposable Bag

Ban, a measure enacted in 2019 but has not been enforced due to the State of Ohio's policy prohibiting local governments from banning single-use plastic bags, cups, and other plastics.

Partner Highlight: Cleveland Heights Green Team

Established in 2021, the Cleveland Heights Green Team connects residents, businesses, local advocacy groups, and City officials to advance sustainability in the community. Their three focus areas - advocacy, stewardship, and education - engage the community in greenspace cleanups, recycling and waste reduction, and taking individual climate action. One of their most notable efforts is on local plastic waste reduction; in 2023, the Cleveland Heights Green Team became a local affiliate of the national Beyond Plastics project. Through this partnership, the Green Team collects local data on plastic waste and educates the community on ways to reduce their plastic consumption.

	Potential Benefits and Co-Benefits			
Strategy 3.2 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 3.2.1: Eliminate single use plastics, utensils, and bags at city led events and encourage the use of compostable or reusable alternatives	Low	Low	Low	Medium
Action 3.2.2: Require that permitted events and events held on City-owned property have recycling containers as well as compost bins alongside garbage bins	Low	Low	Low	Medium
Action 3.2.3: Encourage restaurants to adopt policies that minimize the use of single use plastic in the restaurant by implementing an "upon request" program for straws, offering condiments in bulk and discontinuing use of styrofoam and plastic bags	Low	Low	Low	Medium

Action 3.2.4: Host tables at community events to educate residents on best practices to minimize recycling contamination and methods to recycle items not eligible for curbside pickup	Low	Low	Low	Medium
Action 3.2.5: Ensure that recycling bins are paired with garbage bins in every business district	Low	Low	Low	Medium
Action 3.2.6: Collaborate with the Cuyahoga County Solid Waste District to expand the types of recyclables that can be collected	Low	Low	Low	Medium
Action 3.2.7: Explore feasibility of implementing a tiered waste collection rate with multiple bin sizes	Low	Low	Low	Medium
Action 3.2.8: Coordinate with local businesses, including grocery stores and restaurants, to reduce plastic bag use and provide paper alternatives	Low	Low	Low	Low
Action 3.2.9 Explore the development of a pilot program to offer a recycling program to areas with "recycling deserts" including business districts and some apartments	Medium	Low	Medium	Low

Strategy 3.3: Prioritize the procurement of sustainable or recycled materials for City government operations and construction projects

From paper and toner to construction materials for new buildings, the City conducts procurement for a wide variety of materials and projects. By setting goals and standards for procurement, the City can be a leader in reducing waste and choosing sustainable products first. Procurement policies can prioritize material reuse, recycled materials, and/or other sustainable materials that reduce the impact to the environment, such as bird safe glass. This strategy promotes a circular economy, reusing quality material for new developments and reducing the demand for virgin resources.

Progress to Date: The Cleveland Heights Zoning Code (Chapter 1165.06), outlines sustainability guidelines that are to be considered for all development plans. These include the recycling and reuse of building materials during demolition projects and the use of sustainable design and architecture, such as LEED certification.[37]

Strategy 3.3 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 3.3.1: Implement a Sustainable Purchasing Policy to prioritize environmentally preferable products and services in all city procurement	Medium	Low	Low	Low
Action 3.3.2: Develop a policy to establish a minimum diversion rate for construction and demolition sites	Medium	Low	Low	Low
Action 3.3.3: Encourage developers to utilize sustainable materials for all projects that receive city incentives	Medium	Low	Low	Low

Case Study: City of Columbus's Sustainable Purchasing Policy

In 2018, the City of Columbus amended their City Code to implement policies and procedures that require materials, supplies, equipment, and services procured for city projects to have a reduced negative impact on the environment and public health. Through the code revisions, city agencies are now required to develop specifications for environmentally preferable products or services (EPPS) that can be utilized as the default, unless a determination is made that there is not an acceptable substitute. The City's Director of Finance and Management established default EPPS specifications for commonly used goods and services and retains the authority to waive EPPS specifications or customize them on a case by case basis for unique situations and scenarios. Columbus's revision of the City Code is a forward thinking measure with the potential to have a large cumulative impact over time, and it demonstrates the city's commitment to alignment with modern sustainability practices.[38]

Water and Wastewater

Strategy 4.1: Reduce overland flooding and water pollution by implementing green infrastructure and other stormwater management methods

In Cleveland Heights, severe weather events, including thunderstorms and extreme precipitation, are projected to intensify, according to the Great Lakes Integrated Science Assessment (see Cleveland Heights Climate Hazards Analysis in Appendix A). Cleveland Heights also has a high proportion of impervious surfaces, ranking in the 68th percentile compared to the national average. A high concentration of impervious surfaces, such as roads and parking lots, increases stormwater runoff and exacerbates the urban heat island effect.[39] Implementing green infrastructure such as rain gardens, permeable pavements, and bioswales can significantly mitigate these effects by enhancing water absorption and reducing runoff. These methods not only alleviate pressure on the city's combined sewer systems but also improve water quality by filtering pollutants before runoff reaches natural waterways. At the community workshops, residents voiced support for efforts to expand green infrastructure with a focus on native plant utilization and expressed interest in resources to help them implement these solutions on their properties.

Progress to Date: In the City Zoning Code (Chapter 1165.05), the City established sustainable regulations for large-scale residential developments. For these sites, the City requires that 30% of the development site is active or passive open space, which includes natural water features, wetlands, conservation areas, trails, recreation facilities, fitness courses, parks, playgrounds, greenbelts, greenways, and community gardens. Buildings must also be cited to prevent impacts to water sources from runoff through adequate on-site water management practices.[40]

Additionally, the Zoning Code (Chapter 1121.12) and Building Code (Chapter 1351.25), allow residential properties to implement rain barrels and above ground cisterns in the rear, front, and side yards. Rain barrels installed in the front or corner side yard that are visible from the public street must get approval from the Architectural Board of Review.[41] Rain barrels must be covered and incorporate a drainage system that directs overflow into the public storm sewer or into a rain garden.[42]

The Northeast Ohio Regional Sewer District (NEORSD) also offers a Stormwater Fee Credit program to encourage the adoption of sustainable practices to mitigate stormwater runoff. NEORSD charges a stormwater fee to all customers based on the square feet of impervious surface on the property. NEORSD created a stormwater fee credit program to incentivize the

adoption of stormwater control measures that mitigate the volume of runoff, including rain gardens, on-site stormwater storage, impervious surface reduction, pervious pavement, and vegetated filter strips. The incentive is available for individual residential properties, Home Owner Associations, commercial, industrial, mix-use development and other non-residential entities such as public/private schools (K-12). Participants can receive credits for up to 100% of the property's stormwater fee.[43]

	Potential Benefits and Co-Benefits			
Strategy 4.1 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 4.1.1: Promote the increased use of the NEORSD residential stormwater credit	Medium	High	High	Medium
Action 4.1.2: Provide educational resources to residents on how implement code-compliant rain barrels, rain gardens, and native plants	Medium	High	High	Medium
Action 4.1.3: Conduct an assessment of city-owned and -operated properties to identify new places to install pervious pavement and green infrastructure	Medium	High	High	Medium
Action 4.1.4: Establish a healthy balance of pervious and impervious surface ratio in new construction or repair projects	Medium	High	High	Medium
Action 4.1.5: Set minimum requirements for pervious surfaces for all new developments through a code update	Medium	High	High	Medium
Action 4.1.6: Implement green infrastructure projects in neighborhoods most affected by the urban heat island effect and overland flooding	Medium	High	High	High
Action 4.1.7: Encourage residents and commercial property owners to implement green roofs by providing educational resources and incentives	Medium	High	High	High

Strategy 4.2: Encourage the adoption of water efficient appliances and best practices

Improving water efficiency can reduce the environmental impact and utility costs across municipal, residential, and commercial properties. Decreasing unnecessary water usage also reduces the strain on the sewer system and reduces greenhouse gas emissions from wastewater treatment. Though Cleveland Heights does not have a local wastewater treatment plant, there are still greenhouse gas emissions resulting from the movement and processing of wastewater produced by facilities within the community. The water and wastewater sector accounts for <1% of the community's greenhouse gas emissions and 7% of the emissions from city operations.

Progress to Date: The City Zoning Code (Chapter 1166.02) requires planned developments to submit landscape plans to the Zoning Administrator for approval. The landscape plan must include an on-site water management plan, among other requirements. Sites must also use drought-tolerant plant species wherever possible and irrigation systems must be designed to minimize the use of water.[44]

	Potential Benefits and Co-Benefits			
Strategy 4.2 Actions	*GHG Mitigation*	*Resilience*	*Climate Equity*	*Public Health*
Action 4.2.1: Assess appliances in city-owned buildings and replace older, inefficient appliances with water efficient models	Medium	Low	Low	Low
Action 4.2.2: Develop a rebate program for water efficient appliances to low-income households	Medium	Low	Medium	Low
Action 4.2.3: Amend the code to require water-efficient fixtures in all new City and commercial construction projects	Medium	Low	Low	Low
Action 4.2.4: Identify landscaped areas on municipal properties that can be replaced with low-water, native plants	Medium	Medium	Low	Medium
Action 4.2.5: Educate residents on water conservation techniques, including reducing lawn watering and fixing leaks.	Medium	Medium	Medium	Low
Action 4.2.6: Monitor and publish results of ordinances requiring on-site water management	Low	Medium	Low	Low

Case Study: Water Efficiency Rebate Program in Apple Valley, MN

With funding from the Water Efficiency Grant Program, the Minnesota Metropolitan Council awarded a grant of $43,000 to the City of Apple Valley to assist with water conservation efforts. Apple Valley is utilizing the funding to set up a Water Efficiency Rebate program for its residents. Residents can apply for rebates for WaterSense certified water-efficient appliances and fixtures in the following amounts: $100 for toilets, $150 for irrigation controllers and system audits, and $150 each for washing machines and dishwashers. The City of Apple Valley has become a water-stressed community in recent years, and the Water Efficiency Program aims to both help the city conserve water and provide financial incentives for community members to upgrade their appliances and reduce their water bills.[45]

Strategy 4.3: Protect the regional watershed

In Cleveland Heights, there are three local watersheds: the Doan Brook Watershed, the Dugway Brook Watershed, and the Nine Mile Creek Watershed. A watershed encompasses all the land and water bodies that drain into a common waterway, such as rivers, lakes, or oceans. The Doan Brook Watershed sits at the edge of Lake Erie and is protected parkland in a populated, urban setting. The level of surrounding development puts it at constant risk of pollution and flooding from stormwater runoff. Most of the Dugway Brook was culverted, or diverted to underground pipes, for urban development; approximately 94% of the watershed has been developed. Similarly, only small areas of Nine Mile Creek are openly flowing.[46]

Healthy watersheds also support biodiversity, mitigate the effects of droughts, and strengthen natural carbon sinks. In the face of climate change, safeguarding the regional watershed is essential to maintaining a stable water supply, protecting local wildlife, and continuing to provide beautiful natural areas for residents to enjoy.

Progress to Date: As one of the regions in the EPA-classified Cuyahoga River Area-of-Concern, there have been a number of efforts over the years to improve watershed protection near Cleveland Heights. In 2008, the City of South Euclid retrofitted the Langerdale detention basin, a 7.5 mile long flood control basin built in the 1960s. The basin was designed as a “dry pond” which destroyed biodiversity and relegated the stream to a concrete channel. To counter these issues, the city retrofitted the basin to include naturally vegetated wetland zones and create areas for aquatic life, returning it to a natural channel.[47] To the Northeast, the Village of Bratenahl was experiencing large-scale erosion, sediment pollution, and diminishing natural habitat due to high-volume stormwater flows attributed to its location at the end of Nine Mile Creek’s underwater culvert. In 2019, the Village worked collaboratively with the Northeast Ohio Regional Sewer District, the Chagrin River Watershed's Partnership, Bluestone Conservation, and the Central Lake Erie Basin Collaborative to secure a grant and matched-cash upwards of $700,000. Using this funding, the Village of Bratenahl then restored 2,200 feet of stream using nature-based approaches and enhanced 3.5 acres of riparian area. These improvements have helped to mitigate the negative impacts of urban stormwater.[48]

Partner Spotlight: Doan Brook Watershed Partnership

The Doan Brook Watershed sits at the edge of Lake Erie and is protected parkland in a populated, urban setting. The level of surrounding development puts it at constant risk of pollution and flooding from stormwater runoff. The Doan Brook Watershed Partnership (DBWP) is a nonprofit, community alliance organization formed in 2001 and works to maintain the stream's health and encourage local involvement with the 45,000 residents living in the 12-square-mile watershed. The DBWP serves as a collective voice for the Doan Brook and its constituencies through its development of organizational infrastructure — board, committees, and volunteers — and its ensuing facilitation of restoration projects with an emphasis on environmental justice.[49] These projects include water quality monitoring, installation and maintenance of debris racks, as well as dam and erosion infrastructure improvements.

	Potential Benefits and Co-Benefits			
Strategy 4.3 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 4.3.1: Work with partners to identify opportunities for residents and businesses to engage in protecting the regional watershed	Low	Medium	Medium	High
Action 4.3.2: Daylight streams where previously culverted and covered	Low	Medium	Medium	Medium
Action 4.3.3: Create incentives for residents to use native plants on lawns	Low	High	Low	Medium
Action 4.3.4: Educate residents and businesses on the negative effects of synthetic fertilizer use to reduce runoff into local waterways	Medium	Low	Low	High

Strategy 4.4: Improve the resilience of water infrastructure

Improving water infrastructure in Cleveland Heights will help to ensure the community's resilience to current and future climate change impacts. Given the increasing frequency and intensity of extreme precipitation events and storms, robust water infrastructure mitigates flood risks, protects homes and businesses, and maintains the integrity of essential water services, including residential and business supply. At the Resilience Workshop, residents shared their challenges with sewer backups and basement flooding during the severe storms in June of 2024, identifying a need to improve the city's water infrastructure to be better equipped to handle heavy rains.

There are two essential partners in improving local water infrastructure: the Northeast Ohio Regional Sewer District (NEORSD) and Cleveland Water. NEORSD is the largest wastewater treatment provider in Ohio, serving 63 communities and operating three major wastewater treatment plants across the region. NEORSD plays a crucial role in treating nearly 90 billion gallons of wastewater annually, ensuring the cleanliness and safety of the region's water resources. Additionally, Cleveland Water maintains, manages, and operates critical water infrastructure across 72 communities, serving 1.5 million customers. Cleveland Water ensures the delivery of safe, clean water. Collaboration with these partners will help to ensure that the city has a secure, safe water supply even under climate stress; protect local ecosystems; and reduce the financial burden of emergency repairs or replacements in the long run.

Progress to Date: The Northeast Ohio Regional Sewer District (NEORSD) has launched Project Clean Water, a 25-year program aimed at reducing sewage discharge into Lake Erie from 4.5 billion gallons to 494 million gallons annually. The program will implement large storage tunnels, treatment plant expansion, and green infrastructure projects to reduce impacts to residents and the environment.[50]

Through its Member Community Infrastructure Program, NEORSD is also working with the City of Cleveland Heights to implement $3.7 million in projects to improve the sanitary sewer system and control overflows. This initiative directly addresses community priorities of basement flooding relief, critical repairs on failing infrastructure, and removing illicit connections from the system. The city will implement five projects; one of the most impactful projects that has already been completed is the Delamere Drive Basement Flooding Relief Project which replaced and expanded sanitary and storm sewers to increase storage during heavy rain events. This reduces the risk of basement backups and sanitary sewer system overflows.

Strategy 4.4 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 4.4.1: Coordinate with Cleveland Water and NEORSD to increase climate resilience of water and sewer infrastructure, such as utilizing bigger pipes, investing in upgrades that reduce leakage and potential water main breaks, improving stormwater infrastructure, separating combined sewer overflows (CSOs), and installing home-to-utility connections	Low	High	High	High
Action 4.4.2: Provide incentives to support residents in installing sump pumps and backwater valves	Low	High	High	High
Action 4.4.3: Install green infrastructure to help fulfill the City's EPA consent decree for reducing contaminated storm/sewer overflow in local waterways	Low	High	High	High

Case Study: Basement Backup Protection Program in Detroit, MI

Eleven neighborhoods around Detroit have experienced a high frequency of basement sewage backups and flooding during heavy rain. In 2022, the City implemented the Basement Backup Protection Program to provide resources and support for residents in these neighborhoods. Eligible homeowners in single family homes and duplexes were provided risk assessments by city inspectors. Licensed plumbers were then dispatched to at-risk homes where they serviced sewer lines, installed downspout extensions to reduce water around the building foundations, and implemented a variety of valve and pump fixture improvements on a case by case basis to help mitigate water influx into the homes, all at no cost to the homeowner. The program, funded by the Detroit Future Fund through the American Rescue Plan Act, was brought online as a response to the increasing prevalence of severe weather events in the region.[51]

Air Quality and Public Health

Strategy 5.1: Expand local air quality monitoring

Efforts to expand local air quality monitoring in Cleveland Heights can gather essential public health data, inform data-driven public health decisions, and safeguard the community against health hazards. In recent years, Cleveland Heights has been affected by regional wildfires, including the Canadian wildfires of June 2023, causing unhealthy air quality conditions. Additionally, the Cleveland Nonattainment Area, which includes Cuyahoga County, has been designated by the US Environmental Protection Agency (EPA) as a region that does not meet the National Ambient Air Quality Standards (NAAQS) for ozone. This means that the region has higher levels of ground-level ozone than what is considered safe for public health.[52]

With the city already experiencing periods of poor air quality, enhanced monitoring will provide real-time data to inform residents and policymakers. This information is essential for taking timely actions to reduce exposure to harmful air pollutants, especially for sensitive groups such as children and seniors. Improved air quality monitoring can also help track progress in reducing emissions and guide implementation of effective air quality management strategies.

Progress to Date: In 2023, the City of Cleveland Heights built its own air quality monitoring system by installing Purple Air quality sensors at five key community locations: Beaumont School on North Park Boulevard, City Hall on Severance Circle, Cleveland Heights Community Center, Fire Station No. 2 on Cedar Road, and Police Precinct Station No. 3 at Noble and Greyton roads. These sensors allow residents to access real-time air quality data.

5

PurpleAir Quality Sensors in Cleveland Heights

Strategy 5.1 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 5.1.1: Expand PurpleAir air quality sensor program with a focus on disadvantaged neighborhoods and schools	Low	Medium	High	High
Action 5.1.2: Integrate publicly gathered data from citizen-science projects for data analysis, public education, and decision-making	Low	Medium	High	High
Action 5.1.3: Promote the ability for the public to buy Purple Air sensors and join indoor and outdoor air quality monitoring	Low	Low	Medium	High

Strategy 5.2: Improve public engagement around air quality

Alongside technical efforts to track and gather air pollution data, it's important to involve the public in understanding and addressing air quality issues. Residents are then more informed and proactive in protecting themselves and their families. Understanding what actions to take during unhealthy air quality days is particularly beneficial for vulnerable populations, such as children and seniors, who are most affected by poor air quality.

Progress to Date: In 2023, the City of Cleveland Heights launched its first Air Quality Awareness week from May 1-5, aimed at educating and engaging the public on air quality issues that can affect public health. In both years, the City has engaged residents in a variety of events and educational opportunities, including the launch of the Purple Air monitoring system and the second annual lawn mower exchange program, which provided 90 battery-operated mowers in exchange for gas-powered models. In 2024, the City hosted a workshop for the Climate Forward Plan where residents to provide their ideas for local solutions to improve air quality for the Plan.

Strategy 5.2 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 5.2.1: Provide early warning alerts for poor air quality days to protect vulnerable residents	Low	Medium	High	High
Action 5.2.2: Display air quality data on the City's website or on a dashboard, with GIS maps or interactive charts, to engage residents	Low	Medium	High	High

Strategy 5.3: Reduce local sources of air pollution

Reducing local sources of air pollution by targeting gas-powered lawn equipment, generators, and other machinery, alongside promoting anti-idling efforts, could offer significant environmental and public health benefits for the Cleveland Heights community. Throughout our community engagement sessions, residents expressed strong support for efforts to reduce local air and noise pollution from gas-powered lawn equipment and other activities impacting air quality. These measures lower emissions of harmful pollutants like nitrogen oxides (NOx) and particulate matter (PM), which can exacerbate respiratory conditions and other health issues. While the City is committed to its gas-powered lawn equipment replacement program, the City is mindful of not replacing all lawn mowers on a 1:1 basis in consideration of improved native species support, biodiversity and healthy habitats. By transitioning to electric equipment alternatives and minimizing unnecessary idling, the community can improve air quality, benefiting vulnerable populations.

Progress to Date: The City of Cleveland Heights's Annual Lawnmower Exchange program, offered in partnership with MetroHealth and the Cuyahoga County Board of Health, is a forward-thinking initiative aimed at reducing air pollution and promoting environmental sustainability. Launched on May 2, 2023, the program allows residents to exchange their working gas-powered lawnmowers for electric versions at no cost, with the city responsible for scrapping the old mowers. The inaugural events served 60 residents, and the second annual event saw a significant increase, swapping 90 mowers. This program not only helps to reduce harmful emissions but also raises awareness about the benefits of using cleaner, battery-operated equipment.

Strategy 5.3 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 5.3.1: Expand the electric lawnmower exchange program to include other lawn equipment, such as leaf blowers, and expand the number of participants	Medium	Low	Medium	High
Action 5.3.2: Catalog gas-powered city equipment, such as lawn equipment and generators, and develop a timeline to transition to electric	Medium	Low	Medium	High
Action 5.3.3: Curtail use of gas-powered lawn equipment for maintenance of city properties during poor air quality days or events	Medium	Low	Medium	High
Action 5.3.4: Identify and implement green solutions to phase out gas generators to power traffic signals at major intersections during power outages	Medium	Low	Medium	High
Action 5.3.5: Provide incentives and financial support to local landscaping businesses to switch to electric lawn equipment	Medium	Low	Medium	High
Action 5.3.6: Launch an anti-idling education campaign with emphasis on streets near schools, libraries and health facilities	Medium	Low	Medium	High
Action 5.3.7: Review existing anti-idling policy for city vehicles and further develop a process for compliance	Medium	Low	Medium	High

Case Study: St. Louis Park, MN

The City of St. Louis Park, MN launched an idling-reduction campaign in 2022, in collaboration with St.Louis Park Middle School and Park Nicollet, a health-focused philanthropy group. The program's goal was to improve the community's air quality by educating residents on the health, environmental, and financial impacts of engine idling, and reducing air pollution from idling. With a focus on community wide advertising, local businesses supported the movement through free advertising materials provided by the city. Community buy-in is critical with these campaigns, and the EPA maintains an Idle-Free Schools toolkit that provides strategy and project management advice for launching an effective idling reduction campaign for schools specifically.[53]

Strategy 5.4: Protect public health during extreme weather events and other climate hazards

As climate change increases the frequency and intensity of extreme weather events, it's essential to establish systems that help the community prepare for and endure these hazards. By creating resilience hubs—community spaces equipped with resources such as backup power, cooling and heating areas, food, water, and medical supplies—the city can provide vital support to residents during emergencies. These hubs offer a safe place for vulnerable populations, including the elderly, low-income families, and individuals with medical needs, ensuring their access to essential services during extreme weather. Feedback from the community indicated strong support for resilience hubs, identifying several sites including the library and public schools that the community can easily access. By implementing this strategy, Cleveland Heights can strengthen its preparedness and reduce the risk of health emergencies while fostering a more resilient community capable of withstanding future climate-related challenges.

Progress to Date: ReadyNotify, administered by the Cuyahoga Office of Emergency Management is Cuyahoga County's emergency notification system that allows residents to receive critical, time-sensitive information to prepare accordingly for emergency situations. It is a voluntary opt-in system that sends messages to users via email, text messages, mobile app notifications, and automated phone calls. The service is available for all County residents, and includes notifications for inclement weather, boil alerts, and county safety messages.[54]

	Potential Benefits and Co-Benefits			
Strategy 5.4 Actions	*GHG Mitigation*	*Resilience*	*Climate Equity*	*Public Health*
Action 5.4.1: Designate public buildings such as the library and community center as Resilience Hubs that provide cooling and heating, clean, renewable backup power with battery storage, and air filtration systems	Low	High	High	High
Action 5.4.2: Establish a Resilience Hub Taskforce with other public agencies and community-based organizations to centralize public service delivery at hubs during extreme weather events	Low	High	High	High
Action 5.4.3: Loan free fans and/or air conditioners for low-income residents during extreme heat events	Low	High	High	High
Action 5.4.4: Offer a volunteer registration system for of vulnerable individuals in the community to	Low	High	High	High

be checked on by the City and community partners during extreme heat events				
Action 5.4.5: Implement early warning systems that alert residents of severe thunderstorms and high winds, enabling better preparedness and response	Low	High	High	High
Action 5.4.6: Create mutual-aid agreements with neighboring jurisdictions	Low	High	High	High

Case Study: Community Resilience Hubs in Ann Arbor, MI

The City of Ann Arbor has been awarded a $1 million grant by the EPA's Environmental Justice Government-to-Government program to support government activities that will create measurable environmental and public health improvements in local communities that are disproportionately affected by environmental issues such as air quality, repeated flooding, and increasing energy burdens. Managed by the City's Office of Sustainability and Emergency Management, the grant will focus on three primary objectives: launching a regional resilience network, investing in three additional resilience hubs in Washtenaw County, and launching a resilience grant program for community-based organizations. The resilience hubs will be community-serving facilities that support residents through coordinated resource distribution and services. Additionally, the hubs will help to establish community channels for resource pooling, collective emergency response, and more. The award will allow the City to invest directly into residents and community-based organizations, bringing resilience efforts to the most underserved populations.[55]

Food Systems

Strategy 6.1: Improve community food security and access to fresh foods

Strengthening community food security and expanding access to fresh foods can improve public health and resilience in Cleveland Heights. There are food deserts, defined as areas within urban cities with limited access to fresh food, in Cleveland Heights, causing inequitable access to fresh foods. Access to nutritious, fresh foods supports healthier lifestyles, reduces diet-related diseases, and strengthens overall well-being. Ensuring that this access is equitable is particularly important, as low-income households and marginalized communities often face barriers to obtaining fresh produce. By increasing access to fresh foods for all, Cleveland Heights can create a more just and inclusive food system. Additionally, ensuring that fresh food is readily available during extreme weather events bolsters community resilience by providing consistent food access and supporting a reduction of food waste.

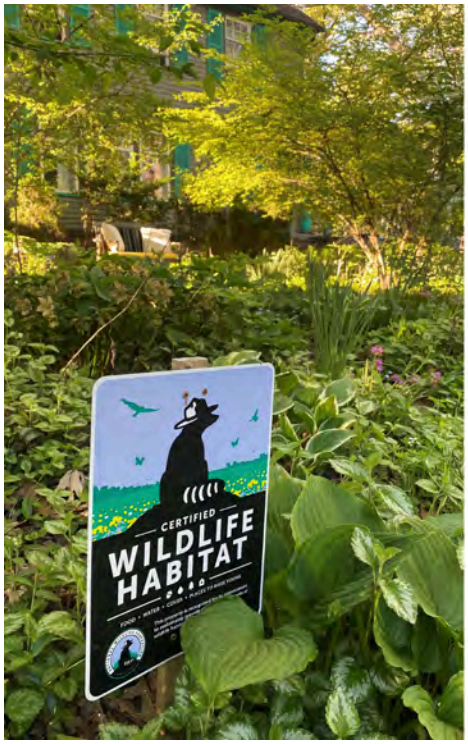
Progress to Date: The Cleveland Heights Municipal Court organizes a food co-op that provides fresh produce in the City Hall atrium on the first Wednesday of every month.

Strategy 6.1 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 6.1.1: Design and implement a food rescue program with partners to reduce food waste and serve residents in need	Medium	High	High	High
Action 6.1.2: Expand capacity and community awareness of the produce food co-op at City Hall	Low	Medium	High	High
Action 6.1.3: Integrate existing or future food distribution sites into Resilience Hub resource deployment	Low	High	High	High
Action 6.1.4: Equip community resilience hubs with public refrigeration to preserve fresh food during power outages	Low	High	High	High
Action 6.1.5: Provide other public refrigeration options including dry ice during extreme heat to protect fresh foods	Low	High	High	High

Strategy 6.2: Expand community gardening and urban agriculture

Community gardening and urban agriculture programs offer numerous benefits to environmental sustainability and community well-being. By transforming underutilized spaces into thriving community gardens, the City can create more accessible green spaces that increase access to nutritious, fresh foods and improve food security, particularly for low-income households who may face barriers to obtaining healthy produce. Cleveland Heights residents demonstrated excitement and interest in community gardening, highlighting the demand for these community spaces. Additionally, community gardens are a community touchpoint to engage residents in environmental education and foster stewardship of shared spaces.The community should ensure that sustainable best practices are used for maintenance and upkeep, including eco-friendly alternatives to synthetic pesticides and fertilizer. Partnership with the Cleveland Heights-University Heights School District can also provide an opportunity to engage schools and students in native gardening, sustainable landscaping, and composting.

Progress to Date: The Urban Garden Project in Cleveland Heights is a citywide initiative to increase local biodiversity by converting areas of traditional turf lawn to native plants and ground coverings that do not require mowing. The Urban Garden Project aims to provide assistance and helpful resources to residents in making this transition, with the hopes of supporting local biodiversity and managing stormwater.[56]



Strategy 6.2 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 6.2.1: Create and manage a city-run community garden program	Low	Low	Medium	High
Action 6.2.2: Plant fruit trees in the public right-of-way	Medium	Low	Medium	High
Action 6.2.3: Provide incentives to increase fresh food markets in underserved neighborhoods	Low	Low	Medium	High
Action 6.2.4: Develop a program to provide small grants to community-run urban gardens for schools and underserved communities	Low	Low	Medium	High
Action 6.2.5: Restore and adapt underutilized spaces such as vacant lots for community gardens and urban agriculture	Medium	Medium	Medium	High
Action 6.2.6: Encourage the use of heat-tolerant crop varieties in local urban agriculture and gardens	Low	High	Medium	High

Natural Areas and Land Use

Strategy 7.1: Revitalize brownfields, vacant lots and vacant buildings

Transforming underutilized and often contaminated sites into productive spaces can reduce blight, improve public health, and offer new community spaces. By remediating brownfields, the city can eliminate environmental hazards, making the land safer for residents and future development. Revitalized vacant lots can be repurposed for community-serving projects, such as parks, community gardens, or new commercial and residential developments, which can stimulate local economic growth and increase property values. Additionally, these efforts promote sustainable land use by maximizing available space and supporting the city's broader goals of environmental resilience and urban renewal.

Progress to Date: The City of Cleveland Heights was recently awarded a grant of $274,000 through the Ohio Department of Development's Demolition and Site Revitalization Grant program to demolish the former Hillside Dairy building and prepare the property for redevelopment.[57] The structure has been vacant since 2021, when structural issues and asbestos were identified.The city had previously set aside $300,000 to rehabilitate this site, of which $160,000 will be used on immediate site improvements following demolition. It is part of the city's plan to revitalize the Noble Road Corridor.

Additionally, the Cuyahoga County Land Reutilization Corporation received a 2024 Ohio Brownfield Remediation Grant for the Taylor Tudor Plaza Redevelopment. Grant funds will focus on the rehabilitation of three historic mixed-use buildings in Cleveland Heights. The project will address asbestos, lead-based paint, and mold, and install a sub-slab depressurization system. The redevelopment project as a whole will transform the site into 44 apartments, eight work/live units, and retail spaces, creating 65 new jobs.[58]

Strategy 7.1 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 7.1.1: Conduct a community wide brownfields assessment to identify parcels for green spaces and renewable energy	Medium	Medium	Medium	High
Action 7.1.2: Pursue state and federal grant funding for brownfield inventory, assessment, cleanup, and redevelopment	Medium	Medium	Medium	High
Action 7.1.3: Invest in workforce development training for brownfield site remediation to benefit unemployed and underemployed community members and City employees	Medium	Medium	High	High
Action 7.1.4: Expand park space including mini parks, pocket parks and overall parkland	Medium	Medium	High	High
Action 7.1.5: Identify vacant property to use for compost sites and community garden sites	Medium	Medium	High	High

Case Study: Solar Brownfield Project in Cleveland, OH

Cuyahoga Metropolitan Housing Authority (CMHA) developed a 1.1 MW, 4,212-panel solar project on a previously vacant brownfield next to the agency's headquarters in Cleveland. The project was built at no upfront cost to CMHA; Carbon Vision will lease the land from CMHA and own the solar farm for 15 years. CMHA will then have the option to buy it after the first 15-year period. The developers secured a low-interest loan from KeyBank because the project is located in a targeted community redevelopment area. Cleveland Public Power will buy electricity produced by the solar arrays and sell it to CMHA at a discounted rate. FirstEnergy will also buy the renewable energy credits.[59]

Strategy 7.2: Nurture a healthy tree canopy

Supporting a healthy tree canopy offers numerous environmental and community benefits for Cleveland Heights. A well-maintained tree canopy acts as a carbon sink, absorbing carbon dioxide and helping to reduce the city's overall net greenhouse gas emissions. In one year, a single tree can sequester over 48 pounds of carbon dioxide. In Cleveland Heights, the tree canopy sequesters 1,500 MTCO2e annually. Across the city's 20 Census Tracts, the existing tree canopy is 37%; however, the tree canopy declined by an average of nearly 15% between 2011-2017.[60]

In community engagement sessions, residents identified a need to address dying trees, as they pose a risk during severe storms and high winds. Additionally, residents support efforts to expand the tree canopy, with an emphasis on sustainable landscaping practices to maximize environmental benefits. Finally, residents were concerned about ensuring that healthy, mature trees do not get removed unnecessarily and preserving existing natural areas. One suggestion was to ensure that any City tree maintenance staff or contractors have the proper training to determine viability of uprooted trees. The State of Ohio's Department of Natural Resources offers a Tree Commission Academy that provides formal training to volunteer tree commissioners, public managers, and elected officials that can be leveraged to build City expertise and ensure that the canopy is managed in accordance with best practices.

Ensuring that trees are healthy also reduces the risk of storm damage from fallen dead trees, making neighborhoods safer during severe weather events. Additionally, trees provide critical shade to reduce the urban heat island effect and contribute to building energy efficiency by providing natural cooling. Overall, maintaining a healthy tree canopy enhances climate resilience, promotes sustainability, and improves quality of life for residents.

Progress to Date: The City of Cleveland Heights is currently looking into developing an Urban Forestry Master Plan. The plan, when developed, will include an inventory of existing trees, an analysis of canopy health, and set goals for increasing tree canopy coverage to improve community resilience. The City has also been a member of Tree City USA for 46 years and has a program for installing free trees into the trees lawns for residents who make the request,

Strategy 7.2 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 7.2.1: Utilize native tree varietals, trees appropriate for future USDA hardiness zones projections, or the best tree for the site on city-owned properties as determined by the City forester	Low	High	Medium	Medium
Action 7.2.2: Conduct a new tree canopy assessment to determine the health and preservation of all viable trees in the near and long term while identifying trees most at risk to uprooting and damaging structures during severe weather	High	High	Medium	Medium
Action 7.2.3: Regularly trim trees and maintain landscaping on city property to minimize tree damage and downed power lines during high winds and tornadoes	High	High	Medium	Medium
Action 7.2.4: Set a goal to increase tree canopy with a priority in areas of low tree canopy percentage and plant native, climate resilient trees community-wide to maintain a vibrant urban tree canopy	Medium	Medium	High	High
Action 7.2.5: Encourage public participation and stakeholder engagement to ensure that vibrant green space and watershed riparian corridors in Cleveland Heights are preserved and protected	Medium	High	High	Medium

Partner Highlight: Heights Tree People

Heights Tree People is a volunteer organization that works to plant trees and engage residents in Cleveland Heights and University Heights. They lead community tree planting projects and have programs to supply and plant trees in residents' front yards for free. In addition to tree planting, Heights Tree People is dedicated to educating the community on how to care for trees and engaging residents on caretaking for the local habitat and planet.

Strategy 7.3: Identify opportunities to expand green spaces in all neighborhoods

Expanding green spaces in all neighborhoods can enhance public health by providing areas for physical activity, reducing stress, and improving mental well-being. From a climate perspective, green spaces act as carbon sinks, sequestering carbon and reducing the city's overall carbon footprint. Green spaces can also mitigate the urban heat island effect by lowering temperatures in densely developed areas, which often experience higher heat levels due to a lack of vegetation and an abundance of paved surfaces. Across the community, an average of 39% of the land area is covered by impervious surfaces. However, development is concentrated in certain areas, with some covered up to 52% by impervious surfaces.[61] Residents of Cleveland Heights deeply value access to green space and voiced their support to maintain and expand green spaces.

Progress to Date: There are a total of 135 acres of city-managed parks and open spaces within Cleveland Heights. The Coventry PEACE Park, Spirit Park, Sunset Park, and Noble Park are additional spaces not managed by the city. To ensure these resources are safeguarded for the future, the City is developing a 10-year Parks, Recreation, and Open Space Master Plan that will focus on locating new parks and open space opportunities, as well as address current natural resource management and park landscaping strategies among other initiatives.

In Chapter 1165.05 of the Zoning Code, large-scale residential developments are required to have a minimum of 30% of the net area dedicated to active or passive open space. This includes features such as natural water features, parks, playgrounds, greenbelts, greenways, and community gardens.[62]

	Potential Benefits and Co-Benefits			
Strategy 7.3 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 7.3.1: Prioritize greenspace investments in disadvantaged communities and communities most impacted by the urban heat island effect	Medium	Medium	High	High
Action 7.3.2: Develop minimum requirements for greenspace in commercial developments through a code update	Medium	Medium	Medium	High
Action 7.3.3: Complete and implement the Cleveland Heights Parks, Recreation, and Open Space Master Plan	Medium	Medium	High	High
Action 7.3.4: Expand landscape requirements in new parking lots	Medium	High	Medium	Medium

Strategy 7.4: Support native species, biodiversity and healthy habitats in city parklands

Promoting native species and biodiversity can support local environmental health and advance sustainable landscaping practices. Native plants and trees are naturally suited to the local environment, which can reduce or eliminate the need for synthetic fertilizers and watering. Expanding native species supports local wildlife, including essential pollinators which are at risk due to climate change.

Progress to Date: In the City Zoning Code (Chapter 1166.02), planned developments must submit landscape plans to the Zoning Administrator for approval. The landscape plan must consist of at least 30% native plants and trees.[63] The Planning and Development Department is currently working with landscape architects to propose updates on the City's codes for 2025 regarding native plant use.

Partner Highlight: Friends of Heights Parks

Friends of Heights Parks is a nonprofit organization that engages with the community to inspire and build appreciation for the parks in Cleveland Heights. FoHP has presented numerous talks within the community that were co-sponsored by the City Parks and Recreation Department to educate the public on the importance of supporting native species and biodiversity. They have hosted five native plant sales, and frequently lead "Walks in the Parks" throughout the year. These are opportunities for residents to learn about native species on a guided tour of the parks with historians and naturalists. The organization has plans to expand its activities in the coming year to support the Climate Forward Plan and increase its impact.

Strategy 7.4 Actions	Potential Benefits and Co-Benefits			
	GHG Mitigation	*Resilience*	*Climate Equity*	*Public Health*
Action 7.4.1: Collaborate with local partners to host educational events for residents on pollinator gardens, native species, and environmentally-friendly landscaping	Medium	High	Medium	Medium
Action 7.4.2: Generate local compost at City Hall to decrease the use of synthetic fertilizer	Medium	Medium	Low	Medium
Action 7.4.3: Eliminate synthetic fertilizer and pesticide use on city-owned property	Medium	Medium	Low	Medium
Action 7.4.4: Create an annual recognition program for residential gardens and yards that exemplify environmentally-friendly landscaping practices and native plants	Medium	Medium	Low	Low
Action 7.4.5: Prioritize using vacant properties to plant native trees to increase canopy, and plant native shrubs and perennials to increase pollinator habitat	Medium	Medium	High	High

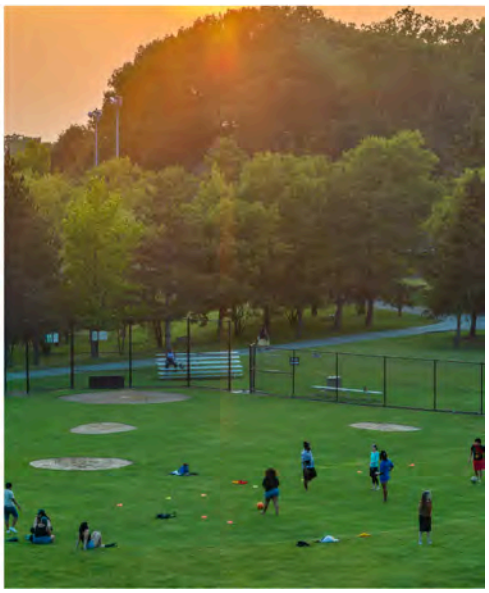
Strategy 7.5: Encourage denser, mixed-use development to create walkable neighborhoods

Promoting denser, mixed-use development to create walkable neighborhoods can reduce transportation-related emissions and provide numerous social and economic benefits. Mixed-use development integrates residential, commercial, and recreational spaces within a single area, promoting accessibility and reducing reliance on cars. During the Climate Action Workshop, community members highlighted that mixed-use development would help decrease their reliance on cars and suggested that new developments should be located adjacent to existing green spaces and parks for residents to easily access. Walkable neighborhoods foster social interaction, creating vibrant communities where residents can connect easily. Additionally, they offer health and social benefits by encouraging physical activity and providing convenient access to amenities and services.

Progress to Date: In the City Code, Cleveland Heights has established three special districts with the goals of creating an opportunity for new, innovative development, encouraging sustainable development, and expanding residential, commercial, and mixed-use development.[64]

One of the most prominent new developments is the Cedar Lee Meadowbrook Project. In March 2023, the City finalized a financial agreement with the developer to redevelop a 4.8-acre parcel between Cedar Road and Meadowbrook Road. The developer will invest $66 million to create 206 luxury apartments, 8,500 square feet of commercial, retail, and restaurant space, and public park and greenspace.[65]

	Potential Benefits and Co-Benefits			
Strategy 7.5 Actions	***GHG Mitigation***	***Resilience***	***Climate Equity***	***Public Health***
Action 7.5.1: Re-evaluate zoning code to identify areas where increased density or mixed-use buildings could be appropriate (in growing neighborhoods, areas near existing higher densities or near commercial areas)	Medium	Low	Medium	Low
Action 7.5.2: Reduce parking minimums to allow for denser, mixed-use development	Medium	Low	Low	Low
Action 7.5.3: Streamline permitting for mixed-use developments that incorporate sustainable design elements	Medium	Low	Low	Low



SECTION 5:
Implementation

Now that the Climate Forward Plan has been completed, it's important to note that ongoing public education and outreach are vital components of implementing the Cleveland Heights Climate Forward Plan to ensure community engagement, understanding, and participation. In addition, utilizing and operationalizing the Implementation Roadmap that has been developed for the Climate Forward Plan will be a critical part of ensuring that the recommendations in this report come to fruition. Important next steps for implementation include:

1.) Establishing City Communication Channels: By establishing a robust website presence, the City can create a central hub for information, resources, and updates that empower residents to contribute to climate action and resilience. The website should serve as an educational tool, featuring user-friendly sections that explain the plan's goals, timelines, and environmental impacts in accessible language. Interactive features, such as a tracking dashboard, volunteer sign-ups, and forums for community feedback, will foster a further sense of ownership among residents. Additionally, the website will highlight success stories, share progress metrics, and provide a calendar of upcoming workshops, events, and public hearings. Effective outreach through this platform builds trust, values transparency and inspires collective action, ensuring that climate initiatives are embraced as a shared responsibility across the community.

2.) Conducting Ongoing Public Outreach and Engagement Activities: Similar to the development phase of this plan, community engagement will remain an integral part of the implementation of each part of this plan. They City will take the lead on engaging with stakeholders through periodic workshops, focus groups and one-on one interviews, where applicable.

3.) Connecting the Strategies and Actions to Funding Sources: The one time and on-going costs for each action contained in the Climate Forward Plan has been modeled. In addition, the Implementation Plan has funding and other resources listed where available. The City will need to make a concerted effort to identify grant writing resources to pursue additional funding for implementation. In addition, as part of its on-going Capital Improvement Program (CIP), the Implementation Roadmap will be taken and converted into projects.

4.) Establishing an interdepartmental working group: The Mayor's Office and the Sustainability and Resilience Coordinator will provide direct input on all strategies and actions during the implementation phase. To streamline this process, there are assigned implementation leads for each action included in the Implementation Roadmap, along with key local stakeholders to engage, including other City departments, public agencies, nonprofit organizations, labor, and resident groups. In order to avoid a siloed approach and ensure collaboration, the City should create an interdepartmental working group for staff to regularly communicate and work together on the implementation of the Climate Forward Plan.

Implementation Roadmap

The Implementation Roadmap was created as a tool for the City of Cleveland Heights to leverage for the implementation of the strategies and actions included in the Climate Forward Plan. The Roadmap is intended to be a flexible, evolving document that the City revisits and refines throughout the implementation phase. Each of the Roadmap columns are described below:

- **Implementation/Oversight Authority (Authority):** The Sustainability and Resilience Coordinator and the Mayor's Office will provide direct input on all Roadmap strategies and actions during the implementation phase. The City departments and staff listed in this column are intended as a guide for who would be best suited to oversee the implementation of the action.
- **One-time Costs:** This column includes an estimate of the one-time, upfront costs for implementation. Costs are provided in a range and may vary depending on the scale of implementation. The one-time cost estimate is provided as a guide for budget allocation, implementation prioritization, and procurement. The budget categories include:
    - Low: Less than $100,000
    - Medium: $100,000 - $500,000
    - High: Over $500,000
- **Ongoing Costs:** This column includes an estimate of the ongoing costs associated with each action. This may include operations, maintenance, or funds for annual programming. Similar to one-time costs, required budget amounts are provided in a range and may change depending on the scale of implementation. The estimate can provide a guide for budget allocation, implementation prioritization, and procurement.
    - Low: Less than $100,000
    - Medium: $100,000 - $500,000
    - High: Over $500,000

- **Funding and Implementation Resources:** This column includes funding opportunities, technical assistance resources, and case studies to support implementation of each action. The status of funding may change over time, depending on the budget allocated from the county, state, and federal government.
- **Timeline:** This column includes an estimated time it would take to implement each action.
    - Short: Less than 1 year
    - Medium: 1-3 years
    - Long: Over 3 years
- **Potential Key Performance Indicators (KPIs):** This column includes a list of potential KPIs that the City can utilize to measure and track success. The City will determine the feasibility and priority of the KPIs per action during the implementation phase.

Buildings and Energy

Strategy 1.1: Increase community access and use of renewable energy, including solar, wind, and geothermal

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 1.1.1: Increase adoption of NOPEC's local renewable energy aggregation program	Communications and Public Engagement Department	Low	Low		Short	- Number of residential households participating in 100% renewable energy option (#) - Total kWh residential participants purchased through the 100% renewable option (kWh) - Number of commercial customers participating in 100% renewable energy option (#) - Total kWh commercial participants purchased through the 100% renewable option (kWh) - Number of multi-family and commercial buildings with on-site renewable energy source (#) - GHG reduction (MT CO_2e)
Action 1.1.2: Provide information to residents on how to access tax credits and other incentives to implement residential solar as well as heat pumps	Communications and Public Engagement Department	Low	Low	PCFO has an IRA Resource Hub with comprehensive information on tax credits. Environmental Health Watch is select vendor of USEPA on accessing tax credits from the IRA for home energy efficiency and electrification and could be an additional resource.	Short	- Number of residents reached with communications on solar tax credits and incentives (#) - Number of residents claiming tax credits for solar (#) - Number of residential solar installations (#) - Residential tax credit dollars leveraged ($)
Action 1.1.3: Encourage local business to conduct a solar feasibility assessment for their property	Communications and Public Engagement Department	Low	Low	Ohio State University has compiled online tools that businesses can utilize to assess the feasibility of small-scale renewable energy.	Medium	- Number of businesses engaged on solar feasibility assessments (#) - Number of businesses with completed solar feasibility assessments (#)
Action 1.1.4: Create incentives such as fast tracked permitting for new multi-family and commercial buildings to install on-site solar	Building Department	Low	Low	SolSmart provides technical assistance to help cities reform their solar permitting processes.	Medium	- Number of multi-family and commercial buildings with on-site solar (#) - Total solar installed on multi-family and commercial buildings (kW) - Average time for solar permit approval (# of days)
Action 1.1.5: Advocate for state policies that increase access and adoption of solar, including community solar	Mayor's Office	Low	Low		Medium	
Action 1.1.6: Work with the regional green bank, GO Green Energy Fund, to provide access to solar energy for low-income households	Sustainability and Resilience Coordinator	High	High	GO Green Energy Fund is the regional green bank.	Long	- Total solar implemented (kW) through green bank partnership - Number of low and middle-income households served by solar energy (#) - Average annual energy cost savings for low-income households ($) - Usage metrics of electricity from the renewable source (#)
Action 1.1.7: Collaborate with local partners to create a solar co-op for collective purchasing	Sustainability and Resilience Coordinator	Low	Low	Solar United Neighbors (SUN) facilitates and supports solar co-ops throughout Ohio.	Long	- Number of residential households that purchased solar through a co-op (#) - Total solar installed through solar co-op (kW)

Action 1.1.8: Establish a Carbon Neutrality Fund	Sustainability and Resilience Coordinator	High	Medium	Federal and state grant funding is limited. Foundations or city funds will likely be needed to capitalize the fund. Cost savings from implemented projects can be revolved into the fund. The City of Toledo created a 1% for the Environment Fund, allocating 1% of the City's annual General Fund for climate projects.	Long	- Dollars invested from the Carbon Neutrality Fund ($) - Number of projects funded through the Carbon Neutrality Fund (#) - GHG emissions reduced from projects funded through the Carbon Neutrality Fund (MT CO2e)
Action 1.1.9: Invest in workforce development training for solar installations to benefit unemployed and underemployed community members	Economic Development	High	Medium	IBEW operates the Cleveland Electrical Joint Apprenticeship and Training Center that offers electrical and solar training programs. The Midwest Renewable Energy Association (MREA) offers several renewable energy training programs and serves the state of Ohio. The State of Ohio previously funded two rounds (2023 and 2024) of Industry Sector Partnership Grants. These grants provided funding and support to local communities interested in starting or accelerating an industry sector partnership.	Long	- Number of CH residents who complete a solar training program (#) - Job placement rate for participants who complete the training (%) - Average wage increase for participants who are placed in solar jobs ($) - Number of CH residents in local solar workforce (#)
Action 1.1.10: Review options to establish a baseline building performance standard for new construction	Building Department	Low	Low	University of Cincinnati received a Resilient and Efficient Building Codes (RECI) grant to support the design and implementation of an equitable building performance standard, with partner cities of Cincinnati, Cleveland, Columbus, and Dayton. Findings will support BPS implementation statewide. Building on the work of RECI, the City of Cincinnati received an IRA Building Codes grant to develop and adopt a BPS and create the Ohio High Performance Buildings Hub – a “one stop shop” connecting building owners to financing solutions and incentives along with the support, education, and training needed meet BPS targets.	Medium	- Implementation of a building performance standard
Action 1.1.11: Identify sites for utility-scale solar developments and pursue implementation to provide clean energy to residential and commercial properties	Planning and Development Department	High	Medium	The City can leverage the 30% Investment Tax Credit through IRA Direct Pay, as well as bonus credits as applicable. Direct Pay can potentially be a source of finance for utility scale solar PV at the municipal level. The City could also pursue creative public-private partnership models, such as PPAs, to implement local distributed energy without upfront costs.	Long	- Number of sites identified for utility-scale solar (#) - Total solar capacity installed (kW or MW) - Number of households served (#) - Number of commercial properties served (#)
Strategy 1.2: Improve energy efficiency and expand clean energy use for municipal buildings						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 1.2.1: Expand the deployment of solar, wind, and other renewable energy options at city-owned properties, such as the Fire Department, including rooftop solar and solar canopies	Building Department	High	Medium	The City can leverage the 30% Investment Tax Credit through direct pay, as well as bonus credits as applicable. The City could also pursue creative public-private partnership models, such as PPAs, to implement local distributed energy without upfront costs.	Long	- Number of solar installations at city-owned properties (#) - Total solar installed (kW or MW) - Annual energy cost savings ($) - GHG emissions reduced (MT of CO2e)

Action 1.2.2: Require LEED certification (or comparable sustainability rating) for all new municipal construction and pursue retrofits for sustainability certification at existing buildings	Building Department	High	Low	The Ohio Energy Efficiency Program (applications due July 31, 2025) provides grants for energy efficiency upgrades that achieve a 15% or greater reduction in energy usage. The Ohio Advanced Energy Fund Grant (applications due Feb 17, 2025) provides grants for upgrading buildings for energy savings, with an expanded scope of eligible costs compared to the Ohio Energy Efficiency Program/ Projects must achieve a 15% or greater reduction in energy usage. The Ohio Energy Loan Fund provides loans to finance energy efficiency improvements that reduce energy consumption by at least 15%. The City can also utilize public-private financing opportunities, like a Guaranteed Energy Savings Contract (GESC), to finance energy efficiency improvements at no upfront cost.	Long	- Number of city-owned buildings with LEED certification at each level (#) - Annual energy savings realized through LEED standards (kWh) - Average cost savings realized through LEED standards ($) - GHG reduction from the implementation of LEED standards (MT CO2e)
Action 1.2.3: Continue to replace indoor and outdoor lighting at City facilities with energy efficient alternatives, such as motion-sensored lights and LEDs	Planning and Development Department	Medium	Low	The Ohio Energy Efficiency Program (applications due July 31, 2025) provides grants for energy efficiency upgrades that achieve a 15% or greater reduction in energy usage. The Ohio Advanced Energy Fund Grant (applications due Feb 17, 2025) provides grants for upgrading buildings for energy savings, with an expanded scope of eligible costs compared to the Ohio Energy Efficiency Program/ Projects must achieve a 15% or greater reduction in energy usage. The Ohio Energy Loan Fund provides loans to finance energy efficiency improvements that reduce energy consumption by at least 15%. The City can also utilize public-private financing opportunities, like a Guaranteed Energy Savings Contract (GESC), to finance energy efficiency improvements at no upfront cost.	Short	- Number of lights at city facilities replaced with LEDs (#) - Annual energy savings from LED conversion (kWh) - Annual cost savings from LED conversion ($)
Action 1.2.4: Enact a policy to require Dark Sky compliant lighting in the community	City Council, Mayor	Low	Low	DarkSky International has a model outdoor lighting ordinances and codes.	Short	- Dark Sky policy enacted
Action 1.2.5: Implement the Leopardo Energy Efficiency Improvement project and complete the proposed energy efficiency upgrades	Sustainability and Resilience Coordinator	Low	Low		Medium	- Annual energy savings from completed upgrades (kWh) - Annual cost savings from completed upgrades ($) - GHG reduction from completed upgrades (MT CO2e)
Action 1.2.6: Develop an energy dashboard to monitor city building energy use, prioritize upgrades, and quantify energy and emissions savings	Sustainability and Resilience Coordinator	Low	Low	ENERGY STAR provides a free online tool, Portfolio Manager, that can be used to benchmark building energy, water, waste, and emissions.	Short	- Number of buildings tracked in the energy dashboard (#) - Total energy consumption of the building portfolio (kWh) - Annual energy savings achieved through building upgrades (kWh) - Annual cost savings achieved through building upgrades ($) - GHG reduction from building upgrades (MT CO2e)

Strategy 1.3: Advance equitable energy efficiency programs for residential and commercial buildings						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 1.3.1: Encourage installation of electric appliances, like heat pumps, for all new housing developments to reduce reliance on natural gas through local incentives, discounts, or rebates	Building Department	High	High	For commercial properties, the 179D Commercial Buildings Energy-Efficiency Tax Deduction allows businesses to claim a tax credit for implementing energy efficiency upgrades. Businesses can claim up to $1 per square foot if they reduce energy by 50% or more.	Long	- Financial incentives provided for electric appliances ($) - Adoption rate of electric appliances for new housing developments (% of units) - Reduction in residential natural gas emissions (MT CO2e)
Action 1.3.2: Create a program to incentivize energy efficiency retrofits and identify barriers of entry for existing multi-family and commercial properties	Building Department	High	High	The Ohio Energy Efficiency Program (applications due July 31, 2025) provides grants for energy efficiency upgrades that achieve a 15% or greater reduction in energy usage. The Ohio Advanced Energy Fund Grant (applications due Feb 17, 2025) provides grants for upgrading buildings for energy savings, with an expanded scope of eligible costs compared to the Ohio Energy Efficiency Program/ Projects must achieve a 15% or greater reduction in energy usage. The Ohio Energy Loan Fund provides loans to finance energy efficiency improvements that reduce energy consumption by at least 15%. For commercial properties, the 179D Commercial Buildings Energy-Efficiency Tax Deduction allows businesses to claim a tax credit for implementing energy efficiency upgrades. Businesses can claim up to $1 per square foot if they reduce energy by 50% or more.	Medium	- Number of multi-family and commercial property owners engaged (#) - Number of properties with completed energy efficiency retrofits (#) - Energy savings from completed energy efficiency retrofits (kWh) - Household cost savings from completed energy efficiency retrofits ($) - GHG reduction from completed energy efficiency retrofits (MTCO2e) - Incentives provided for energy efficiency retrofits ($)
Action 1.3.3: Work with partners and identify funding sources to expand home weatherization, healthy home, and energy efficiency upgrades for low-income households	Sustainability and Resilience Coordinator	Low	Low	Cuyahoga County's assistance programs Home Weatherization Assistance Program (HWAP) and Home Energy Assistance Program (HEAP). Ohio Department of Development's assistance programs High-Efficiency Electric Home Rebate Act and Home Efficiency Rebates (HOMES) (expected to launch in early 2025.	Medium	- Number of homes with implemented weatherization and energy efficiency improvements (#) - Energy savings realized (kWh) - Average household energy cost savings ($)
Action 1.3.4: Provide energy efficiency technical assistance to homeowners and businesses on financing options, tax credits, local service providers, and equipment	Sustainability and Resilience Coordinator	Low	Low	PCFO has an IRA Resource Hub with comprehensive information on tax credits.	Medium	- Number of homeowners and businesses receiving energy efficiency technical assistance from the City (#) - Number of households utilizing tax credits for home energy efficiency (#) - Tax credits received for residential home energy efficiency ($) - Number of businesses utilizing tax credits for energy efficiency (#) - Tax credits/rebates received for business energy efficiency ($) - GHG reduction in the residential energy sector (MT CO2e) - GHG reduction in the commercial energy sector (MT CO2e)

Action 1.3.5: Review options to implement a voluntary energy benchmarking ordinance for municipal and commercial buildings	Planning and Development Department	Low	Low	University of Cincinnati received a Resilient and Efficient Building Codes (RECI) grant to support the design and implementation of an equitable building performance standard, with partner cities of Cincinnati, Cleveland, Columbus, and Dayton. Findings will support BPS implementation statewide. Building on the work of RECI, the City of Cincinnati received an IRA Building Codes grant to develop and adopt a BPS and create the Ohio High Performance Buildings Hub – a "one stop shop" connecting building owners to financing solutions and incentives along with the support, education, and training needed meet BPS targets.	Medium	- Voluntary energy benchmarking ordinance passed
Action 1.3.6: Invest in workforce development training for energy efficiency audits and installations to benefit unemployed and underemployed community members	Economic Development	High	Medium	IBEW operates the Cleveland Electrical Joint Apprenticeship and Training Center that offers electrical and energy efficiency training programs. The State of Ohio previously funded two rounds (2023 and 2024) of Industry Sector Partnership Grants. These grants provided funding and support to local communities interested in starting or accelerating an industry sector partnership.	Medium	- Number of CH residents who complete an energy efficiency training program (#) - Job placement rate for participants who complete the training (%) - Average wage increase for participants who are placed in energy efficiency jobs ($) - Number of CH residents in local energy efficiency workforce (#)
Action 1.3.7: Explore opportunities to update the City's Building and Fire Codes through coordination with the Ohio Board of Building Standards	Building Department	Low	Low		Medium	- Building and Fire Code updates
Action 1.3.8: Advocate for state policies that increase access and adoption of home electrification	Mayor's Office	Low	Low		Medium	

Strategy 1.4: Increase the resilience of residential, commercial, and municipal buildings

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 1.4.1: Integrate resilient materials, such as reflective roofing and wind-resistant windows, into city-owned buildings	Building Department	Medium	Medium	EPA has offered two rounds of the Equitable Resilience Technical Assistance program. Though the most recent cohort has closed, it may open again for future rounds.	Medium	- Number of buildings retrofitted for resilience (#) - Reduction in maintenance costs ($)
Action 1.4.2: Pre-approve and provide incentives for resilient materials for residential roof repairs	Building Department	Medium	Low	Ohio Department of Aging offers assistance to seniors for critical home repairs, including roofing. The City of Toledo has a Rooftops Repair Program which provides financial assistance and construction management for roof repair or replacement for up to 650 LMI households. Though there isn't an explicit focus on resilient materials, it is a potential model for implementation.	Long	- Number of incentive applications approved (#) - Number of residential roofs repaired (#)

Action 1.4.3: Educate the community on actions to improve building resilience, such as elevating furnaces and hot water heaters	Communications and Public Engagement Department	Low	Low	HUD developed a set of actionable guidelines for resilient residential buildings.	Medium	- Number of households reached with communications and educational materials (#)
Action 1.4.4: Install surge protectors and backup generators for critical City facilities and support residential adoption to handle power outages	Building department	Medium	Low	The FEMA Hazard Mitigation Grant Program allows funding to be used for the purchasing of backup generators for critical facilities if the correct project criteria are met.	Medium	- Number of surge protectors installed (#) - Number of critical City facilities with backup power (#) - Number of residents reached with educational materials (#)
Action 1.4.5: Research and identify options for newer climate-resilient insurance for residents	Communications and Public Engagement Department	Low	Low	PWC developed a report on 'Climate Risk and Insurance'.	Short	- Number of climate resilient insurance programs identified (#) - Number of residents reached with communications on climate resilient insurance options (#)
Action 1.4.6: Expand tree stewardship program to provide guidance and technical assistance for tree maintenance contracts	Public Works	Low	Low	As a recognized Tree City USA, Cleveland Heights has access to technical assistance from the Arbor Day Foundation.	Medium	- Number of contractors engaged in technical assistance (#)

Strategy 1.5: Increase the resilience of local electricity infrastructure						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 1.5.1: Develop local microgrids to support critical infrastructure during power outages	Sustainability and Resilience Coordinator	High	Low	The City can leverage the 30% Investment Tax Credit through direct pay, as well as bonus credits as applicable. ITC can support solar integration in the microgrid.	Long	- Microgrid capacity installed (MW) - Reduction in the duration of power outages (hours) - Solar capacity installed (kW or MW) - Energy cost savings ($) - Energy savings (kW)
Action 1.5.2: Coordinate with First Energy to ensure that new or upgraded power infrastructure is resilient during extreme weather events	Mayor's Office	Low	Low	The Public Utilities Commission of Ohio's Preventing Outages and Enhancing the Resilience of the Electric Grid grant program provided grants to implement resilience improvements to electric grid infrastructure. The program was funded through the Bipartisan Infrastructure Law.	Medium	- Number and duration of power outages during extreme weather events (#, hours) - Energy reliability (uptime %)
Action 1.5.3: Implement a dig once policy to facilitate resilience measures to utility infrastructure	City Council, Mayor	Low	Low	Though dig once policies are typically focused on broadband, this policy can notify utility providers of all types when there is a major street excavation process. This resource from the Federal Highway Administration provides an overview of dig once policies and joint trench agreements.	Short	- Dig Once policy passed - Number of organizations on a dig once notification list (#)

Transportation

Strategy 2.1: Reduce transportation emissions from City operations						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**

Action 2.1.1: Use the Fleet Electrification Analysis to develop a vehicle replacement timeline for hybrid and electric vehicles that accounts for procurement periods and existing vehicle age	Planning and Development Department, Mayor's Office	Low	Low	The Charging Smart Program, led by the Great Plains Institute, is free to join. One of the technical assistance resources is support in developing an EV Roadmap for municipal vehicles.	Short	- Fleet Electrification Timeline complete
Action 2.1.2: Adopt an EV-first procurement policy	Planning and Development Department, Mayor's Office	Low	Low	PCFO may be able to provide technical assistance in supporting the development of or reviewing a policy.	Short	- EV-first procurement policy passed
Action 2.1.3: Identify sites for municipal electric vehicle charging stations and explore implementation funding	Planning and Development Department, Mayor's Office	Medium	Low	Through elective pay, the City can access tax credits up to $100,000 for costs associated with implementing qualified chargers.	Medium	- Number of EV charging sites identified (#) - Implementation funding secured ($) - Number of EV chargers installed (#) - Fuel cost savings for municipal vehicles ($) - GHG reduction for EVs compared to internal combustion engine vehicles (MT CO2e)
Action 2.1.4: Pursue solar co-location with municipal electric vehicle charging stations	Planning and Development Department, Mayor's Office	High	Low	The City can leverage the 30% Investment Tax Credit through direct pay, as well as bonus credits as applicable.	Long	- Solar capacity installed (kW) - Energy cost savings ($) - Fuel cost savings ($) - GHG reduction (MT CO2e)
Action 2.1.5: Collaborate with neighboring jurisdictions to pursue bulk purchasing of EVs	Sustainability and Resilience Coordinator	Medium	Medium	Atlas Public Policy has a detailed report with information regarding how bulk purchases of Electric Vehicles can reduce the per-unit pricing. The IRS also maintains a Commercial Clean Vehicle Tax credit to assist with costs associated with buying a qualified clean vehicle, and there is no limit to how many credits can be claimed.	Long	- Number of EVs purchased (#) - Percentage of municipal fleet electrified (%) - Cost savings through bulk purchasing ($) - Maintenance and operations cost savings for municipal vehicles ($) - Carbon Emissions Reduced (MTCo2e)
Action 2.1.6: Update the City's telework policy to reduce employee commutes for positions where hybrid or remote work is feasible	Mayor or Council	Low	Low		Short	- GHG reduction from avoided commute (MT CO2e)
Action 2.1.7: Conduct an employee commuter survey to understand staff commute methods and develop incentives to reduce high-carbon vehicle trips	Planning and Development Department, Mayor's Office	Low	Low	The Minnesota Department of Administration conducted a Commuter Survey that can be referenced for inspiration on topics to cover, important demographic information, and general rhetoric and tone of the survey. It also has information regarding methodology and important considerations when administering a survey.	Medium	- Percentage of employee commute trips taken by single-occupancy vehicle (%) - Percentage of employee commute trips taken by bike (%) - Percentage of employee commute trips taken by public transit (%) - Percentage of employee commute trips taken by carpool (%) - GHG reduction (MT CO2e)
Action 2.1.8: Provide a subsidized RTA pass for City employees	Mayor's Office	Low	Low	RTA and Cuyahoga County partner to provide subsidized transit passes for employees of the Cuyahoga County Government.	Short	- Percentage of employee commute trips taken by public transit (%) - GHG reduction (MT CO2e)
Strategy 2.2: Encourage the community's transition to electric vehicles						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**

Action 2.2.1: Install publicly available electric vehicle charging infrastructure with a focus on high traffic areas, such as apartments and business districts	Planning and Development Department, Mayor's Office	Medium	Low	Tax-exempt entities can qualify for direct pay for the Federal Alternative Fuel Infrastructure Tax Credit for up to $100,000 per eligible project site.	Medium	- Number of public EV chargers installed (#) - GHG reduction (MT CO2e) - Number of annual users (#) - Energy delivered (kWh)
Action 2.2.2: Adopt an EV Readiness Ordinance to expand public charging at multi-family buildings, commercial properties, and city-owned facilities	Planning and Development Department	Low	Low	PCFO may be able to provide technical assistance in designing an EV Readiness Ordinance.	Medium	- EV Readiness Ordinance passed
Action 2.2.3: Create an EV charging start-up kit to engage and support residents in installing home charging infrastructure	Communications and Public Engagement Department	Low	Low	Individuals can qualify for an Alternative Fuel Infrastructure Tax Credit to cover 30% of the cost of acquisition and installation of at-home charging equipment, up to $1000.	Short	- Number of residents engaged in
Action 2.2.4: Participate in the next cohort for the Charging Smart Electric Vehicle Charging Station Assessment	Planning and Development Department	Low	Low	The Charging Smart Program, led by the Great Plains Institute, is free to join.	Short	- EV Charging Station Assessment complete - Number of community EV charging sites identified (#)
Action 2.2.5: Engage the community on the benefits of transitioning to electric vehicles by hosting ride-and-drive events and developing educational resources	Planning and Development Department	Low	Low	Smart Columbus created a best practices guide based on learnings from the Smart Columbus Ride & Drive Roadshow.	Medium	- Number of ride and drive events completed (#) - Number of ride and drive attendees (#) - Number of residents reached with educational resources (#) - EV ownership (#)
Action 2.2.6: Provide resources to support residents in utilizing federal tax credits for EVs and home chargers	Communications and Public Engagement Department	Low	Low	Individuals can qualify for an Alternative Fuel Infrastructure Tax Credit of up to $7,500 for qualified new electric vehicles, and $4,000 for qualified pre-owned vehicles. Individuals can qualify for an Alternative Fuel Infrastructure Tax Credit to cover 30% of the cost of acquisition and installation of at-home charging equipment, up to $1000.	Short	- Number of residents engaged (#) - EV ownership (#) - Number of households with EV chargers - Tax credits leveraged ($)
Action 2.2.7: Enact mandate to include EV chargers in parking requirements	Planning and Development Department	Low	Low	Great Plains Institute published a "Summary of Best Practices in Electric Vehicle Ordinances" that covers EV charging requirements for parking.	Short	- Policy on EV charging requirements for parking passed

Strategy 2.3: Improve bicycle and pedestrian connectivity and safety						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 2.3.1: Establish a community-wide bike-to-everywhere day to encourage bicycle usage and increase visibility of cyclists to cars	Planning and Development Department	Low	Low	Bay Area Bike to Work hosts annual bike-to-work and bike-to-wherever days in partnership with the nine bay area counties. Their program can be used to inform best practices on hosting community-wide events.	Short	- Number of participants in community-wide bike-to-everywhere day (#) - Number of organizations in community-wide bike-to-everywhere day (#)

Action 2.3.2: Increase the number of dedicated bicycle lanes with a focus on high-traffic corridors	Planning and Development Department	High	Low	The Ohio Department of Transportation provides funding for bike infrastructure improvements, such as bike lanes, through their Transportation Alternatives Program each year. The OH DOT is also currently hosting a special solicitation for bike-related projects that improve safety, convenience, and accessibility. NOACA's TLCI Program is another potential source of funding for the City's bike network.	Long	- Dedicated bike lanes installed (miles)
Action 2.3.3: Implement traffic calming measures and sidewalk repairs to improve safety in alignment with the City's Vision Zero goal and and the City's Complete and Green Streets Policy	Planning and Development Department	High	Medium	The Ohio Department of Transportation provides funding for pedestrian safety improvements and traffic calming measures, such as new sidewalks and roundabouts, through their Transportation Alternatives Program each year.	Long	- Annual traffic fatalities (#) - Annual traffic injuries (#)
Action 2.3.4: Complete and implement recommendations developed through the Comprehensive and Equitable Safety Action Plan (CESAP) and the Heights Regional Active Transportation Plan	Planning and Development Department	High	Medium	The US Department of Transportation maintains the Safe Streets and Roads for All (SS4A) Grant Program. The implementation track of SS4A can be used to fund projects that help prevent roadway deaths and injuries and increase general safety.	Long	- Percentage of CESAP actions implemented (%) - Percentage of Heights Regional Active Transportation Plan actions implemented (%)
Action 2.3.5: Assess current bike rack and storage infrastructure and increase through the business districts	Planning and Development Department	Low	Low	The Ohio Department of Transportation provides funding for bike-related improvements, including bike racks, through their Transportation Alternatives Program each year.	Medium	- Number of publicly accessible bike racks
Action 2.3.6: Establish an Active Transportation Fund to support a sustained, year-after-year effort to build a multi-modal transportation network	Planning and Development Department	Medium	Medium	The US Department of Transportation maintains an information page about active transportation that highlights which of its departments provide funding for different types of projects, as well as additional resources for bolstering active transportation.	Long	- Dollars invested in the local multi-modal transportation network ($) - Percentage of trips taken by public transit (%) - Percentage of trips taken by bicycle (%) - Percentage of trips taken by walking (%)

Strategy 2.4: Expand accessibility and use of public transit and shared mobility services						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 2.4.1: Work with RTA to improve the frequency and reliability of public bus service while encouraging an expansion of ridership and patronage	Mayor's Office	Low	Low	The State of Ohio's Office of Transit provides an annual grant program to support improvements in transportation options and mobility for Ohioans. Eligible project categories include bus shelters, expansion vehicles, intercity buses, mobility management, operating assistance, pilot demonstration projects, and more.	Medium	- Number of buses per hour (#) - RTA ridership (#) - Percentage of trips taken by public transit (%)
Action 2.4.2: Explore funding and operations feasibility for a free shuttle service that connects business districts	Mayor's Office	Low	Low	The State of Ohio's Office of Transit provides an annual grant program to support improvements in transportation options and mobility for Ohioans. Eligible project categories include bus shelters, expansion vehicles, intercity buses, mobility management, operating assistance, pilot demonstration projects, and more.	Medium	- Feasibility assessment of a free shuttle service complete

Action 2.4.3: Continue to engage in the Cuyahoga County Micro-Mobility Network Expansion working group and expand scootershare, rideshare, and bikeshare options	Planning and Development Department	Low	Low		Long	- Number of shared-mobility providers operating in Cleveland Heights (#) - Average cost per ride ($) - Number of annual shared-mobility users (#)
Action 2.4.4: Collaborate with the Cleveland Heights-University Heights School District to support the transition to electric school buses	Sustainability and Resilience Coordinator	Low	Low	The EPA administers the Clean School Bus Program which provides rebates for the replacement of up to 50 school buses with new, battery electric models.	Medium	- Number of electric school buses (#)
Action 2.4.5: Create a transit oriented development overlay to the zoning code to encourage greater density and transit use along transit corridors	Planning and Development Department	Medium	Medium	The US Department of Transportation has previously administered a pilot program for Transit-Oriented Development Planning. New rounds of funding could prove opportunities to develop a transit-oriented development overlay,	Medium	- Changes to the Zoning Code passed
Action 2.4.6: Adopt a Shared Parking ordinance to allow for an effective reduction in parking minimums for new construction	Planning and Development Department	Low	Low	The City of Zanesville, OH has a Shared Parking policy in the City's zoning code that allows up to 40% of a parking lot to be used for shared parking.	Short	- Shared Parking ordinance passed
Action 2.4.7: Reduce parking minimums for construction within ¼ mile of high frequency transit stops	Planning and Development Department	Low	Low	Cleveland passed a policy removing parking minimums within a quarter-mile or 5-minute walk of a high frequency transit stop.	Short	- Parking minimums amended
Action 2.4.8: Create incentives such as density bonuses for building owners who support active transportation choices with amenities like covered bike parking and discounted transit passes	Planning and Development Department	Low	Low	The City of Plain City, OH has codified a density bonus of up to 25% for new developments that have dedicated open space, additional amenities, and significant natural features. Though this does not include active transportation options, it can be used as a model policy to tailor to Cleveland Heights's priorities.	Medium	- Number of buildings that participate in incentive bonus (#)

Strategy 2.5: Improve transportation infrastructure's resilience to climate change

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 2.5.1: Implement cool pavement strategies and materials to reduce heat islands and mitigate damage from extreme heat	Public Works	High	Medium	The EPA published a report that outlines methods of utilizing cool pavement technology to reduce heat islands in urban and suburban environments. Through the Northeast Ohio Regional Sewer District, Green Infrastructure Grants are also available for projects such as pervious pavement and rain gardens that can contribute to reducing heat islands.	Medium	- Pavement with reflective coating applied (sq yards) - Percentage of impervious surface (%) - Reduction in surface temperature (degrees C)
Action 2.5.2: Incorporate green infrastructure, such as swales, into sidewalk improvement projects	Public Works	Medium	Low	The EPA maintains a webpage that includes information for currently available green infrastructure funding opportunities.	Medium	- Number of green infrastructure projects completed (#) - Green infrastructure projects implemented (sqft)

Action 2.5.3: Upgrade road drainage systems to prevent water pooling and reduce the risk to motorists and bicyclists during heavy thunderstorms	Public Works	High	Low	The US DOT's PROTECT Grant Program provides funding for improving transportation infrastructure, with a specific emphasis on improvements that increase resilience to weather and natural events	Long	- Number of 311 reports of water pooling on roads (#) - Number of traffic accidents during extreme weather events (#)
Action 2.5.4: Work with RTA to ensure transit shelters are designed to withstand high winds and offer protection in extreme heat	Public Works	Low	Low	The Sacramento Regional Transit District received a $449,900 state grant to implement 20 heat-resilient shelters that serve disadvantaged communities. The design will focus on heat resilience, ventilation, and sun protection.	Long	- Number of reinforced transit shelters installed
Action 2.5.5: Create a sidewalk improvement program for the preservation and repair of existing slate sidewalks	Planning and Development Department	Low	Low	The Ohio Department of Transportation provides funding for pedestrian safety improvements such as improvements to sidewalks, through their Transportation Alternatives Program each year.	Long	- Number of sidewalk improvement projects completed (#) - Number of 311 reports of sidewalk damage (#)

Materials and Waste

Strategy 3.1: Expand local composting to reduce organics and food waste in landfills

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 3.1.1: Explore the feasibility of implementing community-wide curbside composting, either in-house or through partnerships	Sustainability and Resilience Coordinator	Low	Low	The USDA operates the Composting and Food Waste Reduction Cooperative Agreement program which assists local and municipal governments with developing and implementing community composting projects.	Short	- Community-wide curbside composting feasibility study completed - Number or residents engaged (#) - Organic waste diverted (lbs) - Carbon emissions reduced (MTCO2e)
Action 3.1.2: Educate residents on any safe, healthy and sanitary backyard composting systems that are low-cost and compliant with city code as well as on other city or partner composting programs	Communications and Public Engagement Department	Low	Low	The EPA is currently administering the Consumer Recycling Education and Outreach Grant Program which provides funding for projects that increase local knowledge of waste-reduction strategies, and increase the market for composting.	Short	- Number of residents engaged (#) - Number of residential backyard composting systems (#) - Organic waste diverted from landfill (tonnage) - Waste diversion rate (%)
Action 3.1.3: Establish a program to guide and support small-scale, community-led composting initiatives	Sustainability and Resilience Coordinator	Low	Low	The USDA operates the Composting and Food Waste Reduction Cooperative Agreement program which assists local and municipal governments with developing and implementing community composting projects.	Medium	- Number of small-scale composting projects (#) - Organic waste diverted from landfill (tonnage) - Waste diversion rate (%)
Action 3.1.4: Collaborate with partners to fund and implement a regional Level II composting facility	Public Works	Medium	Low	The USDA operates the Composting and Food Waste Reduction Cooperative Agreement program which assists local and municipal governments with developing and implementing community composting projects.	Long	- Level II composting facility implemented - Organic waste diverted from landfill (tonnage) - Waste diversion rate (%)

Strategy 3.2: Improve recycling waste diversion and reduce local plastic waste pollution

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 3.2.1: Eliminate single use plastics, utensils, and bags at city led events and encourage the use of compostable or reusable alternatives	Council	Low	Low	The Zero Waste Event Planning Guide offers comprehensive best practices for hosting a zero waste event.	Short	- Number of plastic-free city events (#)

Action 3.2.2: Require that permitted events and events held on City-owned property have recycling containers as well as compost bins alongside garbage bins	Council, Public Works	Low	Low	The Zero Waste Event Planning Guide offers comprehensive best practices for hosting a zero waste event.	Short	- Number of events on City-owned property with recycling and composting containers (#)
Action 3.2.3: Encourage restaurants to adopt policies that minimize the use of single use plastic in the restaurant by implementing an "upon request" program for straws, offering condiments in bulk and discontinuing use of styrofoam and plastic bags	Communications and Public Engagement Department	Low	Low	Hold the Plastic, Please: A Restaurant's Guide to Reducing Plastic is a comprehensive resource to help restaurants reduce plastic waste.	Short	- Number of restaurants engaged (#) - Number of restaurants participating in plastic reduction efforts (#)
Action 3.2.4: Host tables at community events to educate residents on best practices to minimize recycling contamination and methods to recycle items not eligible for curbside pickup	Communications and Public Engagement Department	Low	Low	The Recycling Partnership has an extensive resource bank for topics related to community recycling. They also offer technical assistance for community recycling programs.	Short	- Number of events with recycling tables (#) - Number of residents engaged (#)
Action 3.2.5: Ensure that recycling bins are paired with garbage bins in every business district	Public Works - Division of Refuse/Recycling	Low	Low	The EPA's Solid Waste Infrastructure for Recycling Grant Program provides funding to increase available recycling infrastructure in a variety of ways.	Short	- Number of publicly-accessible recycling bins in business districts - Waste diversion rate (%)
Action 3.2.6: Collaborate with the Cuyahoga County Solid Waste District to expand the types of recyclables that can be collected	Public Works - Division of Refuse/Recycling	Low	Low	The Cuyahoga County Solid Waste District hosts additional special collections for materials that present opportunities for expanded at-home collection. Additionally, they host the ZeroLandfill Cleveland seasonal materials exchange which promotes expanded recycling practices.	Medium	- Types of accepted materials for recycling (#) - Waste diversion rate (%)
Action 3.2.7: Explore feasibility of implementing a tiered waste collection rate with multiple bin sizes	Public Works - Division of Refuse/Recycling	Low	Low	Pennsylvania's Pay As You Throw Program outlines the benefits and best practices for tiered waste collection to incentivize waste diversion.	Short	- Tiered waste collection feasibility assessment completed
Action 3.2.8: Coordinate with local businesses, including grocery stores and restaurants, to reduce plastic bag use and provide paper alternatives	Sustainability and Resilience Coordinator	Low	Low	Beyond Plastics has a Plastic Bag factsheet that can be used as talking points for local business engagement.	Short	- Number of businesses engaged (#) - Number of businesses participating in plastic bag reduction (#)
Action 3.2.9: Explore the development of a pilot program to offer a recycling program to areas with “recycling deserts” including the business districts and some apartments	Public Works - Division of Refuse/Recycling	Low	Low	Ohio EPA offers a Recycle Ohio grant program provides grants to install or expand recycling programs, encourage sustainable practices, stimulate economic growth and support litter prevention efforts.	Medium	- Number of recycling deserts identified (#) - Number of new properties served (#) - Increase in recycling collected (tonnage) - Waste diversion percentage (%)

Strategy 3.3: Prioritize the procurement of sustainable or recycled materials for City government operations and construction projects						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**

Action 3.3.1: Implement a Sustainable Purchasing Policy to prioritize environmentally preferable products and services in all city procurement	Mayor, Council	Low	Low	Columbus has adopted a similar Sustainable Purchasing Policy to increase procurement of materials with a lesser or reduced negative environmental impact.	Short	- Number of City contracts that include environmentally preferable products (#)
Action 3.3.2: Develop a policy to establish a minimum diversion rate for construction and demolition sites	Building Department	Low	Low	The Environmental Protection Agency maintains an information page on the sustainable management of Construction and Demolition Materials that includes strategies and best practices.	Short	- Minimum diversion policy passed - Waste diversion from construction and demolition sites (tonnage)
Action 3.3.3: Encourage developers to utilize sustainable materials for all projects that receive city incentives	Building Department	Low	Low	New Albany's Green Building Incentive Program entitles companies to a reduction of up to twenty-five percent (25%) on building permit fees for eligible projects that advance sustainable development goals. New construction and substantial renovation projects must satisfy at least twelve (12) of the twenty-four (24) green building standards and must satisfy at least one (1) standard in every category (HVAC, Lighting, Plumbing, Environment, Energy and Materials).	Short	- Number of projects receiving city incentives that use sustainable materials (#)

Water and Wastewater

Strategy 4.1: Reduce overland flooding and water pollution by implementing green infrastructure and other stormwater management methods

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 4.1.1: Promote the increased use of the NEORSD residential stormwater credit	Communications and Public Engagement Department	Low	Low	Stormwater Fee Credits compound the value of improving residential stormwater resilience by providing financial incentives to property owners that will help expand their utilization.	Short	- Number of residents engaged (#) - Number of residents utilizing the NEORSD residential stormwater credit program (#)
Action 4.1.2: Provide educational resources to residents on how implement code-compliant rain barrels, rain gardens, and native plants	Communications and Public Engagement Department	Low	Low	The OH Department of Natural Resources maintains a webpage with information about rainwater harvesting methods and other water conservation tips.	Short	- Number of residents engaged (#) - Number of rain barrels implemented (#) - Number of rain gardens implemented (#)
Action 4.1.3: Conduct an assessment of city-owned and -operated properties to identify new places to install pervious pavement and green infrastructure	Planning and Development Department	Low	Low	The EPA maintains a webpage that includes information for currently available green infrastructure funding opportunities.	Short	- Assessment of city-owned properties complete - Number of city-owned properties analyzed (#)
Action 4.1.4: Establish a healthy balance of pervious and impervious surface ratio in new construction or repair projects	Building Department	Low	Low	The EPA has a Stormwater Best Management Practice guide that contains information about permeable pavement best practices.	Short	- Minimum target for pervious surfaces passed - Percentage of pervious surfaces on city-owned properties (%)
Action 4.1.5: Set minimum requirements for pervious surfaces for all new developments through a code update	Planning and Development Department	Low	Low	The EPA has a Stormwater Best Management Practice guide that contains information about permeable pavement best practices.	Short	- Minimum requirement for pervious surfaces on new developments passed - Percentage of pervious surfaces on new developments (%)

Action 4.1.6: Implement green infrastructure projects in neighborhoods most affected by the urban heat island effect and overland flooding	Public Works	Medium	Low	The EPA maintains a webpage that includes information for currently available green infrastructure funding opportunities.	Medium	- Number of green infrastructure projects completed (#) - Green infrastructure projects implemented (sqft) - Reduction in surface temperature (degrees C)
Action 4.1.7: Encourage residents and commercial property owners to implement green roofs by providing educational resources and incentives	Communications and Public Engagement Department	Low	Low	The City of Chicago has adopted a city ordinance that incentivizes the installation of green roofs in one of its downtown mixed-used districts. Qualifying projects can receive a Floor Area Ratio bonus for the area of green roof that is incorporated.	Medium	- Number of residents reached (#) - Number of commercial property owners reached (#) - Number of green roofs implemented (#) - Incentives provided for green roofs (#)
Strategy 4.2: Encourage the adoption of water efficient appliances and best practices						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 4.2.1: Assess appliances in city-owned buildings and replace older, inefficient appliances with water efficient models	Building Department	Low	Low	The EPA operates a WaterSense Rebate Finder that helps with locating water conservation devices and appliances that are eligible for various rebates.	Medium	- Number of appliances replaced with water efficient alternatives (#) - Water saved (gallons) - Cost savings ($)
Action 4.2.2: Develop a rebate program for water efficient appliances to low-income households	Mayor	Low	Low	Apple Valley, Minnesota utilized grant funding from the Minnesota Metropolitan Council to establish a WaterSense rebate program for residents, to incentivize the adoption of water-conserving appliances.	Medium	- Number of rebates provided (#) - Water saved (gallons)
Action 4.2.3: Amend the code to require water-efficient fixtures in all new City and commercial construction projects	Building Department	Low	Low		Medium	- Building code changes passed
Action 4.2.4: Identify landscaped areas on municipal properties that can be replaced with low-water, native plants	Public Works	Low	Low	Cleveland Metroparks published an extensive report with scientifically-backed best practices for implementing native plants in landscaping.	Short	- Number of municipal properties assessed (#) - Area identified to replace with low-water, native plants (sq ft)
Action 4.2.5: Educate residents on water conservation techniques, including reducing lawn watering and fixing leaks	Communications and Public Engagement Department	Low	Low	The OH Department of Natural Resources maintains an information page with resources regarding water conservation education practices and programs. Cuyahoga County Soil and Water Conservation District is another helpful resource.	Short	- Number of residents engaged (#) - GHG reduction from water treatment (MT CO2e) - Reduction in water usage (gallons)
Action 4.2.6: Monitor and publish results of ordinances requiring on-site water management	Communications and Public Engagement Department	Low	Low	The City of San Jose, CA maintains a Citywide Water Use graph in their Climate Smart Data Dashboard that can serve as a model for Cleveland Heights to reference.	Short	- Frequency of result updates (months)
Strategy 4.3: Protect the regional watershed						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**

Action 4.3.1: Work with partners to identify opportunities for residents and businesses to engage in protecting the regional watershed	Communications and Public Engagement Department	Low	Low	Cuyahoga County's Soil and Water Conservation District supports opportunities for watershed protection involvement in the Cuyahoga River Area of Concern.	Short	- Number of organizations engaged (#) - Number of engagement opportunities (#) - Number of attendees (#)
Action 4.3.2: Daylight streams where previously culverted and covered	Planning and Development Department	High	Low	Through their Water Resource Restoration Sponsor Program, the OH Environmental Protection Agency helps to fund projects that counter the loss of ecological function through the protection and restoration of high-quality streams. The Clean Ohio Green Space Conservation Program provides grants to local governments for the acquisition of green space and the protection and enhancement of river and stream corridors.	Long	- Streams that have been daylighted (feet)
Action 4.3.3: Create incentives for residents to use native plants on lawns	City Council	Low	Low	The Native Plant Society of Northeast Ohio operates an annual grant program to provide financial assistance for promoting ethical landscaping that utilizes native species. The Northeast Ohio Regional Sewer District's stormwater fee credits are an alternative option that can fund native plants in the form of rain gardens.	Medium	- Financial incentives provided for native plants ($) - Number of residents utilizing native plants (#)
Action 4.3.4: Educate residents and businesses on the negative effects of synthetic fertilizer use to reduce runoff into local waterways	Communications and Public Engagement Department	Low	Low	The National Center for Appropriate Technology's ATTRA Sustainable Agriculture program has a toolkit for reducing synthetic fertilizer use at the commercial level.	Short	- Number of residents engaged (#) - Nitrate pollution in local waterways (ppm) - Phosphate pollution in local waterways (ppm)
Strategy 4.4: Improve the resilience of water infrastructure						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 4.4.1: Coordinate with Cleveland Water and NEORSD to increase climate resilience of water and sewer infrastructure, such as utilizing bigger pipes, investing in upgrades that reduce leakage, improving stormwater infrastructure, separating combined sewer overflows (CSOs), and installing home-to-utility connections	Mayor's Office	Low	Low	The OH Department of Development administers the Water and Wastewater Infrastructure Grant Program, which funds construction projects to improve or expand water and wastewater infrastructure elements.	Long	- Dollars invested in water and sewer infrastructure upgrades ($) - Number of sewer backups into homes (#)
Action 4.4.2: Provide incentives to support residents in installing sump pumps and backwater valves	Building Department	Low	Low	A similar program was offered by the City of Detroit to fund backwater valves and sump pumps to mitigate basement flooding in at-risk areas.	Medium	- Incentives provided to residents
Action 4.4.3: Install green infrastructure to help fulfill the City's EPA consent decree for reducing contaminated storm/sewer overflow in local waterways	Public Works	Medium	Low	The EPA maintains a webpage that includes information for currently available green infrastructure funding opportunities.	Medium	- Number of green infrastructure projects completed (#) - Green infrastructure projects implemented (sqft)

Air Quality and Public Health

Strategy 5.1: Expand local air quality monitoring

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 5.1.1: Expand PurpleAir air quality sensor program with a focus on disadvantaged neighborhoods and schools	Planning and Development Department	Low	Low	PurpleAir air quality sensors are available through the EPA's Air Sensor Loan Program, which could bolster the reach of the City's existing air sensor initiatives.	Short	- Number of PurpleAir sensors deployed (#) - PM2.5 and PM10 (μg/m³) - Nitrogen Dioxide (NO_2) (ppm or ppb) - Ozone (O_3) (ppm or ppb) - Carbon Monoxide (CO) (ppm)
Action 5.1.2: Integrate publicly gathered data from citizen-science projects for data analysis, public education, and decision-making	Ohio EPA	Low	Low	Citizenscience.gov has collaborated with federal agencies to conduct research projects pertaining to air quality improvements. They maintain various resource banks and toolkits to provide critical data foundations that can inform public decision making.	Short	- Number of residents engaged (#) - Number of citizen-science projects submitted (#) - PM2.5 and PM10 (μg/m³) - Nitrogen Dioxide (NO_2) (ppm or ppb) - Ozone (O_3) (ppm or ppb) - Carbon Monoxide (CO) (ppm)
Action 5.1.3: Promote the ability for the public to buy Purple Air sensors and join the monitoring	Communications and Public Engagement Department	Low	Low	PurpleAir air quality sensors are available through the EPA's Air Sensor Loan Program, which could bolster the reach of the City's existing air sensor initiatives.	Short	- Number of residents engaged (#) - Number of PurpleAir sensors deployed (#)

Strategy 5.2: Improve public engagement around air quality

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 5.2.1: Provide early warning alerts for poor air quality days to protect vulnerable residents	Communications and Public Engagement Department	Low	Low	The Mid-Ohio Regional Planning Commission currently provides air quality alerts and forecasts via email and text.	Short	- Number of residents engaged (#) - Number of alerts issued on poor air quality days (#)
Action 5.2.2: Display air quality data on the City's website or on a dashboard, with GIS maps or interactive charts, to engage residents	Information Technology/GIS Department	Low	Low	The EPA maintains a dashboard with numerous air quality data monitoring tools and models that can be referenced to inform how the City can establish their own data display. Airnow.gov, maintained by the EPA and partners, also provides current air quality information.	Short	- Number of website visitors (#) - Frequency of result updates (months)

Strategy 5.3: Reduce local sources of air pollution

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 5.3.1: Expand the electric lawnmower exchange program to include other lawn equipment, such as leaf blowers, and expand the number of participants	Mayor's Office	Low	Low	Shaker Heights has a rebate program for leaf blowers that could serve as a model for Cleveland Heights to expand their program.	Short	- Number of electric leaf blowers distributed (#) - Number of electric lawnmowers distributed (#)

Action 5.3.2: Catalog gas-powered city equipment, such as lawn equipment and generators, and develop a timeline to transition to electric	Sustainability and Resilience Coordinator	Low	Low	The U.S. Public Interest Research Group published a guide for cities and states to address lawncare equipment usage that includes policy recommendations.	Short	- Number of city-owned gas-powered lawn equipment (#) - Timeline for replacement completed - GHG reduction (MT CO2e)
Action 5.3.3: Curtail use of gas-powered lawn equipment for maintenance of city properties during poor air quality days or events	City Council, Mayor	Low	Low		Short	- Number of days with suspended lawn care due to poor air quality (#)
Action 5.3.4: Identify and implement green solutions to phase out gas generators to power traffic signals at major intersections during power outages	Public Works	Low	Low	Saratoga, California installed battery backups for 14 critical traffic lights around the city, to ensure continuity of operations in the case of a power outage.	Short	- Number of gas-powered generators (#) - Number of battery-powered generators (#) - GHG reduction (MT CO2e)
Action 5.3.5: Provide incentives and financial support to local landscaping businesses to switch to electric lawn equipment	City Council, Mayor	Low	Low	MassSave is a collaboration of Massachusetts energy providers that operates a lawn equipment electrification program where residents can qualify for a number of different rebate options for lawncare equipment.. It can be used as a model to inform program development.	Short	- Number of businesses engaged (#) - Number of lawn equipment electrified (#) - Incentives distributed ($) - GHG reduction (MT CO2e)
Action 5.3.6: Launch an anti-idling education campaign with emphasis on streets near schools, libraries and health facilities	Communications and Public Engagement Department	Low	Low	The EPA has best practices identified in their Idle-Free Schools Toolkit.	Short	- Number of residents engaged (#) - Number of educational materials distributed (#) - Air quality near schools: PM2.5 and PM10 ($\mu g/m^3$) - Air quality near schools: Nitrogen Dioxide (NO_2) (ppm or ppb) - Reduction in idling time (minutes)
Action 5.3.7: Review existing anti-idling policy for city vehicles and further develop a process for compliance	Planning and Development Department	Low	Low	The Department of Energy maintains an idle-reduction resource bank that can be used to inform policy development.	Short	- Number of city staff engaged in anti-idling education (#) - Percentage of city vehicles adhering to anti-idling policy (%) - Reduction in fuel usage (gallons) - Reduction in GHG emissions (MT CO2e)

Strategy 5.4: Protect public health during extreme weather events and other climate hazards						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 5.4.1: Designate public buildings such as the library and community center as Resilience Hubs that provide cooling and heating, clean, renewable backup power with battery storage, and air filtration systems	Sustainability and Resilience Coordinator	High	Low	Resilience hubs can take a number of different formats. The Urban Sustainability Directors Network's Resilience-hub.org resource tracks general best practices, opportunities, and partnerships. Through the IRA Community Change Grant program, funding is also available to develop community resilience hubs under Track One.	Long	- Number of Resilience Hubs (#) - Funds invested in resilience hubs ($) - Number of residents served annually (#) - Solar installed (kW) - Battery storage installed (kWh) - Energy savings (kWh)

Action 5.4.2: Establish a Resilience Hub Taskforce with other public agencies and community-based organizations to centralize public service delivery at hubs during extreme weather events	Sustainability and Resilience Coordinator	Low	Low	The Urban Sustainability Directors Network's Resilience-hub.org resource tracks general best practices, opportunities, and partnerships.	Long	- Number of organizations engaged through Resilience Hub Taskforce (#) - Number of service providers offering resources at resilience hubs (#)
Action 5.4.3: Loan free fans and/or air conditioners for low-income residents during extreme heat events	Community Services	Low	Low	Through the OH Department of Development's HEAP Summer Crisis Program, eligible low-income residents can receive financial assistance for utility bills, air-conditioning repair, and fan purchases.	Short	- Number of low-income residents served (#) - Number of fans distributed (#) - Number of air conditioners distributed (#)
Action 5.4.4: Offer a volunteer registration system for of vulnerable individuals in the community to be checked on by the City and community partners during extreme heat events	Community Services	Low	Low	The Atlantic Council's Climate Resilience Center developed a framework for implementing welfare-check programs during extreme heat events. Additionally, the OH Department of Aging provides a resource locator for aging and vulnerable members of the population.	Medium	- Number of residents on volunteer registry (#) - Number of heat-related fatalities (#) - Number of heat-related illnesses (#)
Action 5.4.5: Implement early warning systems that alert residents of severe thunderstorms and high winds, enabling better preparedness and response	Sustainability and Resilience Coordinator	Low	Low	FEMA's Next Generation Warning System Grant Program has previously provided funding for improvements to public broadcasting systems to bolster their reach and effectiveness.	Short	- Number of residents reached (#) - Number of early warning alerts sent (#)
Action 5.4.6: Create mutual-aid agreements with neighboring jurisdictions	Mayor's Office	Low	Low	Mutual-aid agreements can be powerful tools for emergency response management. The American Public Power Association published a playbook for mutual-aid agreements, as well as guidance on power-storm communications.	Medium	- Number of mutual-aid agreements established (#) - Reduction in response time (minutes) - Cost savings from resource sharing ($)

Food Systems

Strategy 6.1: Improve community food security and access to fresh foods

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 6.1.1: Design and implement a food rescue program with partners to reduce food waste and serve residents in need	CESC	Low	Low	The Food Recovery Network, with an active chapter at Case Western University, is one example of a potential partner for a food rescue program.	Medium	- Food waste rescued (lbs.) - Number of residents served (#) - Number of meals distributed (#)
Action 6.1.2: Expand capacity and community awareness of the produce food co-op at City Hall	Communications and Public Engagement Department	Low	Low	The City can increase awareness of the co-op by partnering with local organizations and promoting through social media, city newsletters, and other local lines of communication.	Short	- Number of food vendors at co-op (#) - Number of residents participating in co-op (#)
Action 6.1.3: Integrate existing or future food distribution sites into Resilience Hub resource deployment	Sustainability and Resilience Coordinator	Low	Low	The Urban Sustainability Directors Network's Resilience-hub.org resource tracks general best practices, opportunities, and partnerships.	Long	- Number of resilience hubs with food distribution (#) - Number of meals distributed (#) - Number of residents served (#)

Action 6.1.4: Equip community resilience hubs with public refrigeration to preserve fresh food during power outages	Libraries, Community Centers	Low	Low	The Urban Sustainability Directors Network's Resilience-hub.org resource tracks general best practices, opportunities, and partnerships.	Long	- Number of resilience hubs with public refrigeration ($) - Food waste avoided (lbs) - Number of residents utilizing public refrigeration (#)
Action 6.1.5: Provide other public refrigeration options including dry ice during extreme heat to protect fresh foods	Libraries, Community Centers	Low	Low		Short	- Number of residents served (#)

Strategy 6.2: Expand community gardening and urban agriculture						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 6.2.1: Create and manage a city-run community garden program	Planning and Development Department	Low	Low	USDA has a People's Garden program that allows community gardens to register with USDA. They provide access to an Extension Foundation Connect platform where registered gardens can share best practices and provides opportunities to highlight garden projects. Five Star and Urban Waters Restoration Grant Program (due January 30, 2025) provides grants to develop community capacity to sustain local natural resources. Projects may include urban agriculture and community gardens, tree canopy enhancement, and green infrastructure.	Medium	- Number of community gardens (#) - Number of residents engaged (#)
Action 6.2.2: Plant fruit trees in the public right-of-way	Public Works	Low	Low	USDA's Urban and Community Forestry Grants program provided funding for projects to expand equitable access to trees and green spaces. The program was funded through the Inflation Reduction Act. Awarded projects included two Ohio cities (Akron and Port Clinton) that proposed planting fruit trees as a part of the project scope.	Short	- Number of fruit trees in the public right-of-way
Action 6.2.3: Provide incentives to increase fresh food markets in underserved neighborhoods	City Council	Medium	Low	"Best Practices and Challenges for Farmers Market Incentive Programs: A Guide for Policymakers and Practitioners": Report on best practices and challenges for Farmers Market Incentive Programs aimed to increase community access to fresh foods, especially for low-income households Municipal Strategies to Increase Food Access: Report details strategies and best practices to increase access to fresh foods, including multiple types of incentive programs	Medium	- Incentives provided ($) - Average resident proximity to fresh food markets (miles) - Number of fresh food markets in disadvantaged census tracts (#)
Action 6.2.4: Develop a program to provide small grants to community-run urban gardens for schools and underserved communities	Planning and Development Department	Low	Low	Cincinnati runs an Urban Agriculture mini-grant program, offering grants up to $1,000 fto support urban agriculture and community garden projects.	Medium	- Number of community-run gardens (#) - Number of grants given (#) - Grant funds disbursed ($)

Action 6.2.5: Restore and adapt underutilized spaces such as vacant lots for community gardens and urban agriculture	Planning and Development Department	High	Low	EPA provides several brownfields grant and technical assistance programs for assessment, cleanup, revolving loan funds, and job training. The Ohio Brownfield Remediation Program provides grants for the clean up and remediation of brownfield sites. The Ohio Targeted Brownfield Assessment (TBA) program provides property assessment services at no cost to eligible applicants. New York has a GreenThumb program, run by the Department of Parks and Recreation, that converts vacant lots into community gardens. To date, there are 553 community gardens registered with the program. Their model allows both publicly-owned and privately-owned sites to register, which reduces land acquisition costs.	Medium	- Number of rehabilitated underutilized spaces (#) - Number of community gardens (#) - Acreage of land converted to urban gardens (#)
Action 6.2.6: Encourage the use of heat-tolerant crop varieties in local urban agriculture and gardens	Communications and Public Engagement Department	Low	Low	USDA's Climate Hubs offer best practice resources for agricultural changes to adapt to climate change, including a resource titled "Manage crops to code with warmer and drier conditions" The City of Bloomington, IN offered a Climate Resilient Food Gardening workshop that was free for residents to attend.	Short	- Number of residents reached (#)

Natural Areas and Land Use

Strategy 7.1: Revitalize brownfields, vacant lots, and vacant buildings

Action	Authority	One-time Costs	Ongoing Costs	Funding and Implementation Resources	Timeline	Potential KPIs
Action 7.1.1: Conduct a community wide brownfields assessment to identify parcels for green spaces and renewable energy	Planning and Development Department	Medium	Low	EPA offers a Brownfield Assessment Grants program that provides funding for brownfield inventories, planning, environmental assessments and community outreach. The Ohio Targeted Brownfield Assessment (TBA) program provides property assessment services at no cost to eligible applicants.	Medium	- Brownfields assessment complete - Number of brownfields (#) - Number of brownfields identified for green space conversion (#) - Number of brownfields identified for renewable energy (#)
Action 7.1.2: Pursue state and federal grant funding for brownfield inventory, assessment, cleanup, and redevelopment	Sustainability and Resilience Coordinator	Low	Low	EPA provides several brownfields grant and technical assistance programs for assessment, cleanup, revolving loan funds, and job training. The Ohio Brownfield Remediation Program provides grants for the clean up and remediation of brownfield sites. The Ohio Targeted Brownfield Assessment (TBA) program provides property assessment services at no cost to eligible applicants.	Short	- Federal grants awarded ($)

Action 7.1.3: Invest in workforce development training for brownfield site remediation to benefit unemployed and underemployed community members and City employees	Economic Development	Low	Low	EPA provides a Brownfields Job Training Grants program that offers technical assistance and grants to build local workforces to perform assessment, cleanup, or preparation of contaminated sites (including brownfields) for reuse.	Medium	- Number of participants in brownfield job training (#) - Local brownfield workforce (#) - Financial assistance provided ($)
Action 7.1.4: Expand park space including mini parks, pocket parks and overall parkland	Public Works	Medium	Low	The Clean Ohio Green Space Conservation Program provides grants to local governments for the acquisition of green space and the protection and enhancement of river and stream corridors. Five Star and Urban Waters Restoration Grant Program (due January 30, 2025) provides grants to develop community capacity to sustain local natural resources. Projects may include urban agriculture and community gardens, tree canopy enhancement, and green infrastructure.	Medium	- Acres of parkland (acres) - Number of parks (#)
Action 7.1.5: Identify vacant property to use for compost sites and community garden sites	Planning and Development Department	Low	Low	New York has a GreenThumb program, run by the Department of Parks and Recreation, that converts vacant lots into community gardens. To date, there are 553 community gardens registered with the program. Five Star and Urban Waters Restoration Grant Program (due January 30, 2025) provides grants to develop community capacity to sustain local natural resources. Projects may include urban agriculture and community gardens, tree canopy enhancement, and green infrastructure.	Short	- Number of vacant properties assessed (#)

Strategy 7.2: Nurture a healthy tree canopy						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 7.2.1: Utilize native tree varietals on city-owned properties	Public Works	Low	Low	Cuyahoga County has a Healthy Urban Tree Canopy Grant program that provides funds to municipalities for tree planning, planting, and maintenance projects. Five Star and Urban Waters Restoration Grant Program (due January 30, 2025) provides grants to develop community capacity to sustain local natural resources. Projects may include urban agriculture and community gardens, tree canopy enhancement, and green infrastructure.	Short	- Percentage of trees that are native species on city-owned property (%) - Number of native trees planted (#)
Action 7.2.2: Conduct a new tree canopy assessment to determine the health and preservation of all viable trees in the near and long term while identifying trees most at risk to uprooting and damaging structures during severe weather	Planning and Development Department	Low	Low	The U.S. Forest Service published a report on best practices for developing urban tree canopy assessments.	Short	- Tree canopy assessment complete - Number of trees (#) - Tree canopy (%) - Number of trees identified as potential hazard (#)

Action 7.2.3: Regularly trim trees and maintain landscaping on city property to minimize tree damage and downed power lines during high winds and tornadoes	Public Works	Medium	Medium	Cuyahoga County has a Healthy Urban Tree Canopy Grant program that provides funds to municipalities for tree planning, planting, and maintenance projects.	Short	- Number of trees trimmed annually (#) - Number of tree hazards reported (#) - Reduction in costs from addressing tree hazards ($)
Action 7.2.4: Set a goal to increase tree canopy with a priority in areas of low tree canopy percentage	City Council	Low	Low	Cleveland set a goal of 30% tree canopy coverage by 2040 and published a 2020 Tree Canopy Progress Report.	Short	- Tree canopy goal passed
Action 7.2.5: Encourage public participation and stakeholder engagement to ensure that vibrant green space and watershed riparian corridors in Cleveland Heights are preserved and protected	Communications and Public Engagement Department	Low	Low	The University of Wisconsin's Organizational & Leadership Extension maintains a webpage with resources for community engagement during urban forestry projects.	Short	- Number of people engaged (#)

Strategy 7.3: Identify opportunities to expand green spaces in all neighborhoods						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 7.3.1: Prioritize greenspace investments in disadvantaged communities and communities most impacted by the urban heat island effect	Planning and Development Department	Low	Low	The Clean Ohio Green Space Conservation Program provides grants to local governments for the acquisition of green space and the protection and enhancement of river and stream corridors. Five Star and Urban Waters Restoration Grant Program (due January 30, 2025) provides grants to develop community capacity to sustain local natural resources. Projects may include urban agriculture and community gardens, tree canopy enhancement, and green infrastructure. EPA has a technical assistance resource page "Using Trees and Vegetation to Reduce Heat Islands."	Short	- Greenspace created (square yards) - Reduction in surface temperature (degrees C)
Action 7.3.2: Develop minimum requirements for greenspace in commercial developments through a code update	Planning and Development Department	Low	Low	In Chapter 1165.05 of the Zoning Code, large-scale residential developments are required to have a minimum of 30% of the net area dedicated to active or passive open space. This standard can be applied to or built upon for commercial developments.	Short	- Minimum requirement for greenspace changed in City Code
Action 7.3.3: Complete and implement the Cleveland Heights Parks, Recreation, and Open Space Master Plan	Planning and Development Department	High	Low	The National Recreation and Park Association has a best-practice resource for Equity-Based Master Plans.	Long	- Cleveland Heights Parks, Recreation, and Open Space Master Plan completed - Percentage of actions implemented (%)
Action 7.3.4: Expand landscape requirements in new parking lots	Planning and Development Department	Low	Low	The City of San Francisco adopted a green landscaping ordinance into their municipal code that can be used to inform potential requirements in Cleveland Heights.	Short	

Strategy 7.4: Support native species, biodiversity, and healthy habitats in city parklands						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**

Action 7.4.1: Collaborate with local partners to host educational events for residents on pollinator gardens, native species, and environmentally-friendly landscaping	Communications and Public Engagement Department	Low	Low	Friends of Heights Parks actively engages with the community to educate about the importance of native species, and are continually expanding their footprint.	Short	- Number of educational events hosted (#) - Number of event attendees (#)
Action 7.4.2: Generate local compost at City Hall to decrease the use of synthetic fertilizer	Public Works	Low	Low	Rust Belt Riders offers a commercial service for larger clients. Though governments are not listed, schools are on the list of clients served and they are open to consultations.	Short	- Organic waste diverted (lbs) - Synthetic fertilizer applied to landscape (lbs) - Compost applied to landscape (lbs)
Action 7.4.3: Eliminate synthetic fertilizer and pesticide use on city-owned property	Public Works	Low	Low	The Xerces Society, a wildlife conservation group, published a report on best practices for smart pest management with details about reducing traditional pesticide usage.	Medium	- Synthetic fertilizer applied to landscape (lbs) - Percent reduction in synthetic fertilizer use (%) - Pesticide applied to landscape (lbs) - Percent reduction in pesticide use (%)
Action 7.4.4: Create an annual recognition program for residential gardens and yards that exemplify environmentally-friendly landscaping practices and native plants	Communications and Public Engagement Department	Low	Low	Phipps Conservatory of Pittsburgh, PA has operated a similar recognition program that can be used as a model for Cleveland Heights.	Short	- Number of residents submitting applications for awards (#) - Number of residents recognized for award (#)
Action 7.4.5: Prioritize using vacant properties to plant native trees to increase canopy, and plant native shrubs and perennials to increase pollinator habitat	Planning and Development Department	Low	Low	The U.S. Forest Service has a basic instructions guide for native plant landscaping projects.	Medium	- Acres of vacant lots planted (acres)

Strategy 7.5: Encourage denser, mixed-use development to create walkable neighborhoods						
Action	**Authority**	**One-time Costs**	**Ongoing Costs**	**Funding and Implementation Resources**	**Timeline**	**Potential KPIs**
Action 7.5.1: Re-evaluate zoning code to identify areas where increased density or mixed-use buildings could be appropriate (in growing neighborhoods, areas near existing higher densities or near commercial areas)	Planning and Development Department	Low	Low	Cleveland is piloting a new Form-Based Code in four neighborhoods, aimed at facilitating community feedback, making zoning easier to understand for developers, and emphasizing sustainability and equity goals.	Medium	- Land area identified for dense or mixed-use rezoning (square miles)
Action 7.5.2: Reduce parking minimums to allow for denser, mixed-use development	Planning and Development Department	Low	Low	Cincinnati passed the "Connected Communities" policy, a new zoning code that allows additional housing and reduces parking minimums.	Medium	- Parking minimums changed in City Code - Percent of land area consisting of parking lots (%)
Action 7.5.3: Streamline permitting for mixed-use developments that incorporate sustainable design elements	Planning and Development Department	Low	Low	The Sustainable Development Code has research about the benefits of mixed-use zoning for development projects that can be used to inform permitting changes.	Medium	- Permitting reform passed

A Word from the Cleveland Heights Climate and Environmental Sustainability Committee (CESC)

On behalf of the Cleveland Heights Climate and Environmental Sustainability Committee, we would like to express our deepest gratitude to the City for investing in and prioritizing the development of the Climate Forward Plan. This bold step forward demonstrates our city's dedication to addressing the challenges of climate change, protecting our natural environment, and equitably improving the health and well-being of all Cleveland Heights residents. The creation of this plan shows that Cleveland Heights is not only ready to meet the challenges of the future but is prepared to be a leader in sustainability and resilience.

As we look toward the next phase of this initiative, the committee is eager to participate in the implementation of the plan's goals and strategies. Our members are fully committed to working alongside City leadership, staff, and the broader community to ensure the successful rollout of key projects, programs, and policies to reduce greenhouse gas emissions, support vulnerable community members and create resilient neighborhoods. We are confident that, through continued collaboration, Cleveland Heights will become a model for how communities can take meaningful climate action at the local level.

Cleveland Heights has a unique opportunity to lead the way in Ohio on sustainability, equity, and climate resilience, setting a standard for mid-size municipalities and peer cities that are also inner-ring suburbs of major cities. Since Cleveland Heights is one of the first mid-size communities in Ohio to develop its own climate action and resiliency plan, we are joining the early leaders in our state by setting ambitious goals and charting a sustainable and resilience course for the future. As we work together to implement this co-created, equitable and actionable plan, we can inspire other cities, towns, and villages to take bold steps and join us in addressing the climate crisis. We are excited to continue supporting the City's efforts and to help make Cleveland Heights a greener, stronger, and more resilient community for all.

Carly Beck, John Barber, Mohammad Irfan, Andy Boateng, William Hanavan, Catalina Maddox-Wagers, Tami Masuoka, and Sean Terry.

SECTION 6:

Conclusion

The Cleveland Heights Climate Forward Plan is both a roadmap and a call to action, aiming to build a resilient, equitable future through decisive climate action. Based on a commitment to carbon neutrality by 2050, the plan demonstrates the City's resolve to address climate change with meaningful, community-driven initiatives. This goal will be initially advanced through tackling six High Impact Pathways that, when implemented, are designed to achieve a 39.3% GHG emission reduction compared to the 2022 baseline, exceeding the City's 30% reduction by 2030 goal.

However, achieving these ambitious goals requires not only the dedication of city leadership but also the active engagement of residents, businesses, and organizations throughout Cleveland Heights. This collaborative approach underscores that sustainability and resilience are shared responsibilities, essential for safeguarding the health of the community and environment now and in the future.

The Climate Forward Plan highlights Cleveland Heights' readiness to adapt to evolving environmental challenges, from the recent hazardous air quality events to the increasing severity of storms and flooding. By advancing strategic priorities in seven key sectors, the city is positioning itself to tackle both immediate climate threats and long-term sustainability. The plan's actionable steps are grounded in the lived experiences of community members, whose voices have been instrumental in shaping the recommended strategies and actions and identifying vulnerable areas within the city. The alignment of goals, strategies and actions with community input ensures that the plan reflects both the aspirations and concerns of Cleveland Heights residents.

The Climate Forward Plan will serve as a guiding framework for a sustainable future. The City's Greenhouse Gas Inventory will be updated every two years to evaluate the mitigation results of the High Impact Pathways, along with the other strategies in this living document. The Climate Forward Plan is a living document that will be updated every 3-5 years. Annual progress reports regarding the monitoring and verification of the results of implemented policies and measures will also be conducted.

With the full commitment of city leadership and the active participation of its diverse community, Cleveland Heights is poised to meet the challenges of climate change head-on. Together, we are building a city that not only reduces its environmental impact but also ensures an equitable, thriving, and resilient future for all residents. This journey is just beginning, but with determination, collaboration, and collective action, Cleveland Heights will demonstrate its leadership as a model of climate-forward thinking and sustainability.

Appendix A: Climate Vulnerability and Risk Assessment

Hazard Assessment Methodology

As with any other kind of risk assessment, the Climate Forward Plan extensively relies on previous analyses. Being a small city in a relatively large metropolitan area, Cleveland Heights is fortunate to have several high-quality plans and assessments to draw on. In addition to the 2019 Cuyahoga County Climate Action Plan, these include:

- 2024 City of Cleveland Climate Risk and Vulnerability Assessment: As part of the City of Cleveland's update to its climate action plan, the 2024 CRVA aims to analyze the city's exposure to key hazards such as extreme heat, flooding, and severe storms, all worsened by climate change. By focusing on neighborhood-level data, the assessment evaluates how social, economic, and infrastructural factors contribute to the city's overall vulnerability, guiding targeted climate adaptation strategies for the most at-risk communities
- 2022 Cuyahoga County Multi-Jurisdictional Hazard Mitigation Plan and the Heights Region Annex to the MJHMP (including Cleveland Heights specifically). Introduced by the Disaster Management Act of 2000, hazard mitigation plans are approved by the Federal Emergency Management Agency (FEMA) and are required by FEMA for jurisdictions to access substantial sources of Federal funding. Hazard mitigation plans are centered around detailed natural hazard assessments and an analysis of localized jurisdictional vulnerability to those hazards as well as the development of actions to mitigate those hazards.
- 2022 Ohio State Hazard Mitigation Plan and 2023 Threat and Hazard Identification and Risk Assessment (THIRA). The state hazard mitigation plan takes a broader view of natural hazards, and its attendant 2023 THIRA update identifies a variety of natural, technological, and human-caused hazards, with climate adaptation recognized as a key emerging risk due to increased flooding, severe weather, and extreme heat. The assessment highlights Ohio's vulnerability to cascading impacts, such as disruptions to critical infrastructure, agriculture, and health systems, exacerbated by climate change.

Building upon existing data and plans is a best practice for developing a climate risk assessment. It should also be noted that Cleveland Heights is a part of a broader region, and climate change and hazards influenced by climate change do not stop at city limits.

Readers are encouraged to review:

- the full CRVA on City of Cleveland's web site at https://www.sustainablecleveland.org/crva
- the Cuyahoga County Multi-Jurisdictional Hazard Mitigation Plan at https://sites.google.com/view/cuyahoga-county-hmp-update/review-the-final-hmp, and the Heights Region Annex at https://drive.google.com/file/d/1GxeDDXrUJ1BglwP6WVw4zfUQoI3Llm4t/view.

In addition to existing plans, several publicly-available data sources provide more detailed views of vulnerability and impacts by census tract.

1) The U.S. Climate Vulnerability Index from the Environmental Defense Fund and Texas A&M University at https://www.map.climatevulnerabilityindex.org , provides overviews of climate and social vulnerability relative to other counties across the United States. As noted below, census tracts in Cleveland Heights differ significantly in their overall vulnerability. Interestingly, there is very little difference city-wide to physical climate impacts; the difference in overall vulnerability is a result of underlying social factors.

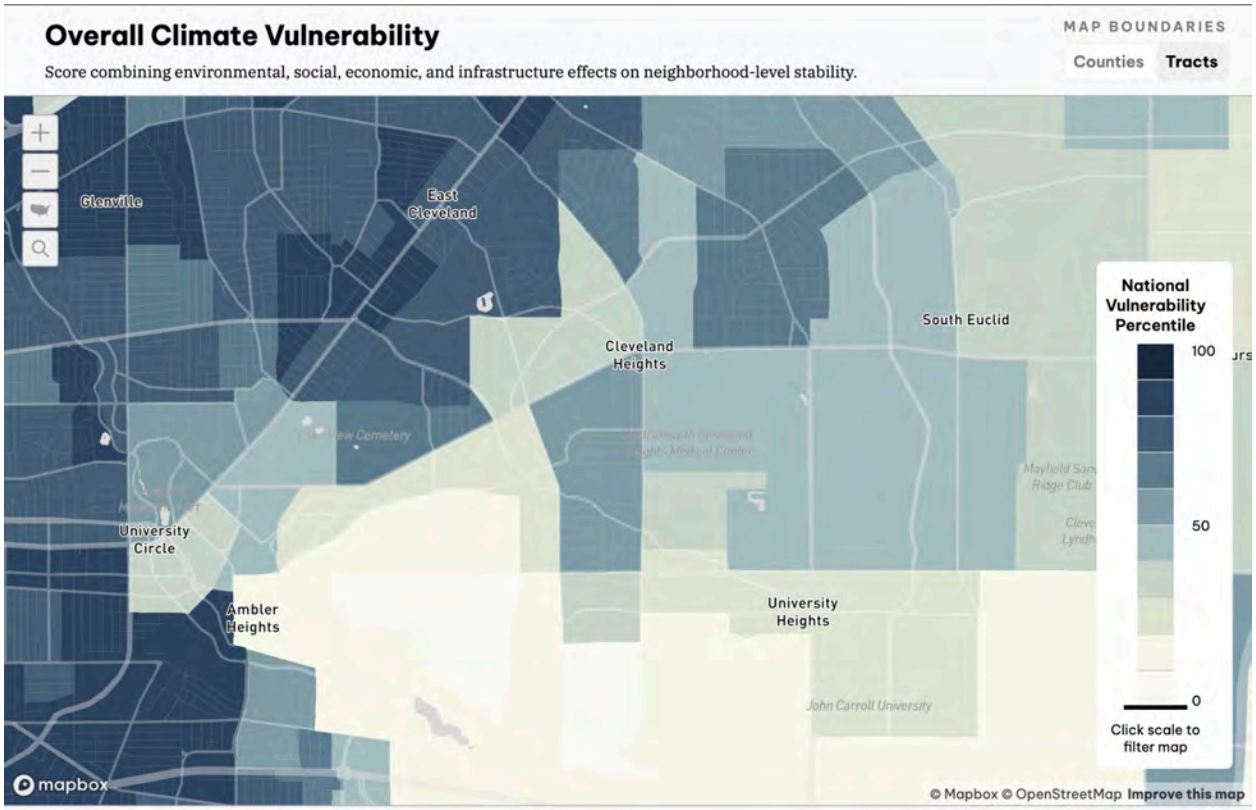


Figure 22: Overall Climate Vulnerability (source: U.S. Climate Vulnerability Index)

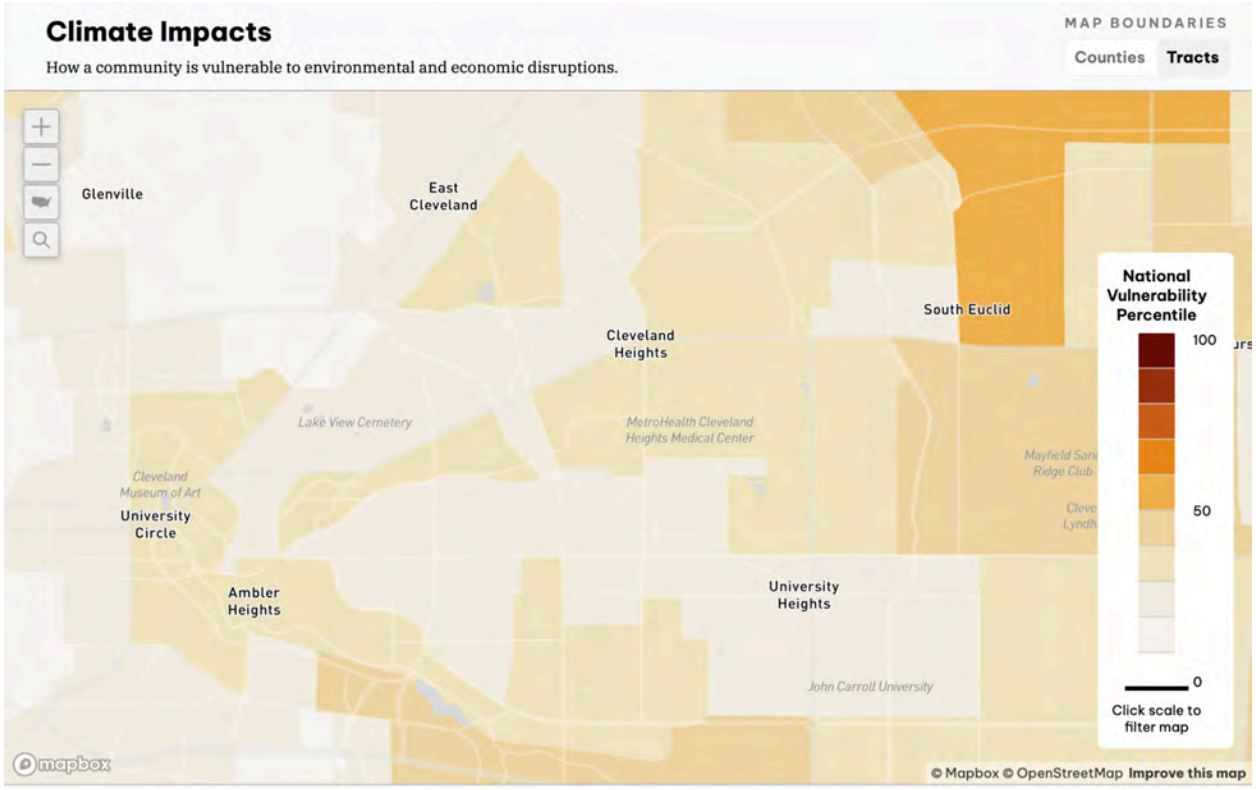


Figure 23: Climate Impacts (source: U.S. Climate Vulnerability Index)

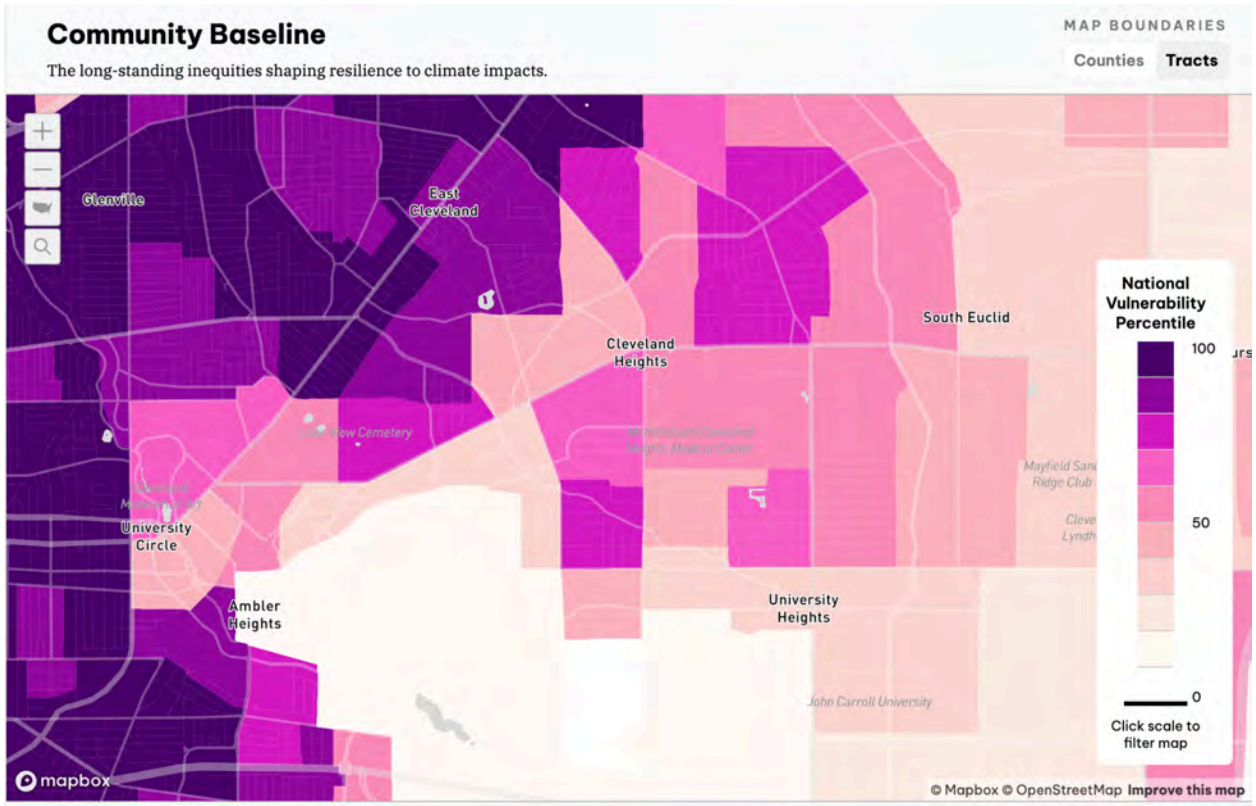


Figure 24: Community Baseline (source: U.S. Climate Vulnerability Index)

2) Climate Mapping for Resilience and Adaptation (CMRA) at https://livingatlas.arcgis.com/assessment-tool/explore/details hosted at resilience.climate.gov displays a range of data by community or census tract.

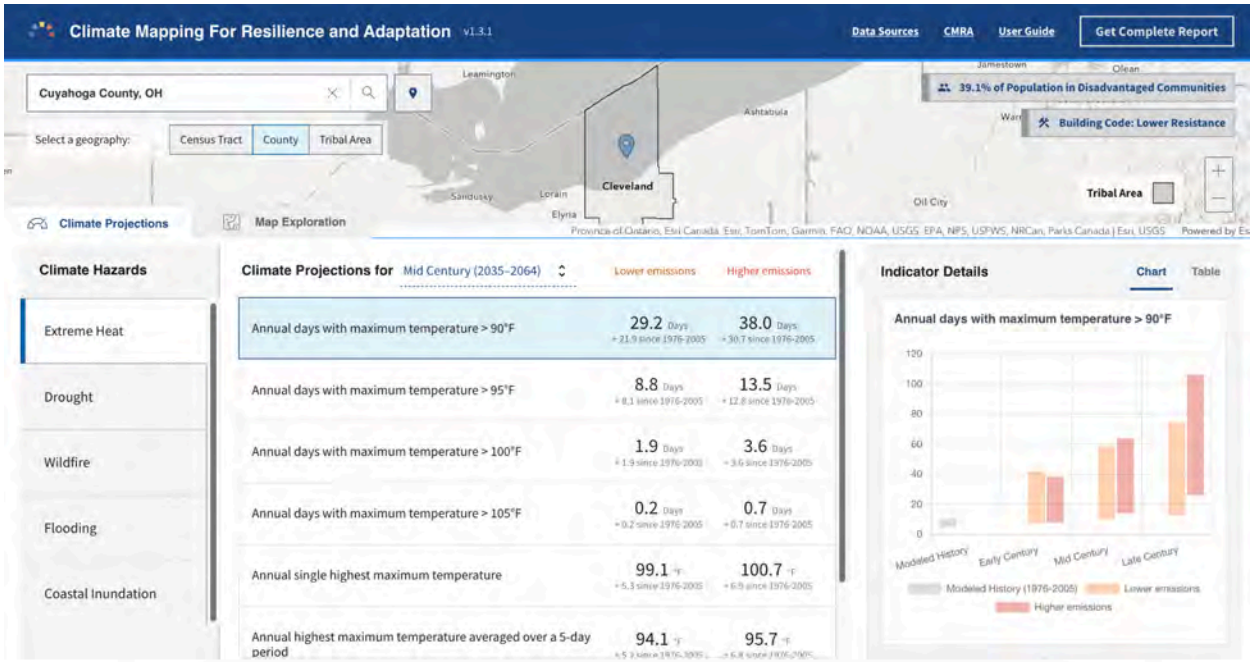


Figure 25: Extreme Heat Climate Projections for Cuyahoga County (source: CMRA)

The Steps to Resilience Framework

The Steps to Resilience is a five-step process featured in the U.S. Climate Resilience Toolkit to guide communities through the stages of understanding and responding to climate risks. Resilience, in this context, refers to the ability to anticipate, prepare for, and recover from the impacts of climate change while maintaining essential functions.

The five steps are as follows:

1.) **Explore Hazards:** In this initial step, we identify the climate-related hazards that could impact the community. This involves analyzing historical climate data, consulting climate projections, and engaging with stakeholders to identify both current and future hazards. The goal is to understand the nature of these hazards—such as heatwaves, flooding and drought - and how they might evolve due to climate change. The specific hazards identified for Cleveland Heights are included in Section 3.4 below.

2.) **Assess Vulnerability and Risks:** This step involves evaluating how vulnerable our community is to the identified hazards. A climate risk assessment within this context looks at factors such as exposure (how much of the community or infrastructure is at risk), sensitivity (how severely they are affected), and adaptive capacity (how well they can cope with the impacts).

- Exposure and sensitivity were determined through literature review of both existing relevant plans applicable through the planning area as well as studies of anticipated climate impacts. For the Cleveland Heights Climate Forward Plan, this was done through review of existing plans as well as where possible City and community input. Adaptive capacity was informed by the literature review, but this category is necessarily more subjective, and addressed in more detail when adaptation options are discussed. Specific factors include:
  - i.) Exposure
    - (1) Residences, businesses and the natural environment: Proximity to hazards and reliance on infrastructure at risk (like roads or power),
    - (2) Critical Facilities: Proximity to hazard and their importance during emergencies.
  - ii.) Sensitivity
    - (1) Residences: Age and condition of housing, presence of vulnerable populations, and access to utilities
    - (2) Businesses: Dependence on infrastructure that could be damaged, sensitivity of operations to climate disruptions, and vulnerability of key assets.
    - (3) Critical Facilities: The degree to which these facilities depend on vulnerable infrastructure, the critical nature of the service they provide, and potential service disruptions during climate events.
    - (4) Natural Environment: Species that are sensitive to changes in temperature, precipitation, or water availability, and the presence of endangered species or ecosystems that are already stressed.

iii.) Adaptive capacity
   (1) Residences: Access to financial resources, access to information and early warning systems, and community networks for support and recovery.
   (2) Businesses: Financial capacity to invest in adaptation, flexibility to change business models, and access to recovery resources
   (3) Critical Facilities: Backup power supplies, redundancy in services, resilience of their infrastructure, and staff training for disaster response.
   (4) Natural Environment: Ecosystem diversity, presence of natural buffers), and the ability of ecosystems to regenerate after disturbances.

We then use the Modified Calculated Probability Risk Index (CPRI), which considers present and future impacts. The results are displayed in an overall Climate Risk Matrix as well as an Exposure Matrix.

3.) **Investigate Options:** After identifying and assessing risks, we focus on exploring adaptation and mitigation options. We are evaluating different strategies to reduce vulnerabilities and manage risks. This includes infrastructure improvements, policy changes, or nature-based solutions.
4.) **Prioritize and Plan:** We are now in the process of prioritizing the most significant risks and developing detailed plans to address them. This step is informed by the risk assessment, ensuring that resources are allocated to the areas of greatest need
5.) **Take Action:** The final step involves implementing the strategies developed in the previous step which will be codified in the Climate Forward Plan.

Overview of the Modified CPRI Methodology

The Modified Calculated Probability Risk Index (CPRI) methodology, a modification of a commonly-used FEMA methodology for hazard mitigation planning, which until recently focused on current risks informed by past data, aims to quantify risk by considering both present and future climate scenarios. The Modified CPRI has been used to address recent FEMA requirements (as of 2023) to significantly enhance consideration of “future conditions” (climate impacts that may differ from past trends).

The Modified CPRI is designed to address the limitations of traditional natural hazards-related risk calculation methodologies, which often underweight the risks posed by climate change. The Modified CPRI incorporates both current and future projections of climate-related hazards by assigning weighted scores to the overall exposure to risk severity and probability of risk and assigns an overall score to aid in risk communication and decision-making in both temporal frames. The scores are informed, as noted above, by a literature review of existing plans as well as up-to-date climate assessments. The calculation is:

((Exposure(Severity (Present)*0.3)+(Probability (Present)*0.45)+(ExposureSeverity (Future)*0.3)+(Probability (Future)*0.45))

This formula ensures that future risks, particularly those exacerbated by climate change, are given significant consideration in the overall risk assessment.

Score Values:

- 1 – Negligible
- 2 – Minor
- 3 – Moderate
- 4 – Major
- 5 – Extreme

Integration into the Steps to Resilience Framework

The US Climate Resilience Toolkit's Steps to Resilience framework provides Cleveland Heights a structured approach to assess and respond to climate-related risks. Integrating the Modified CPRI within this framework grounds the analysis by tying together proven risk assessment methodologies while centering the reality that past occurrences no longer fully predict future conditions.

The Modified CPRI is used in the first two parts of the Steps to Resilience:

1. Explore Hazards
    - Objective: Identify climate-related hazards that could impact the community.
    - Application: Use historical data and climate projections to identify hazards. The Modified CPRI starts by evaluating the present severity and probability of these hazards while concurrently projecting how these factors might evolve due to climate change.
    - Example: A region may assess the severity of tornadoes as *moderate* based on the past damage to homes, trees, and infrastructure, and the probability as *unlikely*, given the rare occurrence of tornadoes in the region. However, with climate change potentially increasing the instability of weather patterns, some projections suggest that while tornado frequency may remain low, the intensity could increase. Therefore, the CPRI is updated to reflect that while the probability remains *unlikely*, the severity might escalate too high if more intense tornadoes were to occur in the future, prompting the need for improved building codes and public safety measures.

2. Assess Vulnerability & Risks
    - Objective: Determine the vulnerability of systems and populations to identify hazards and evaluate associated risks.
    - Application: Apply the Modified CPRI to quantify the risks by evaluating the severity and probability of each hazard. for both current and future scenarios. This dual approach allows for a more comprehensive understanding of how vulnerabilities may change over time.
    - Example: A city's water supply system might currently be moderately vulnerable to drought (Severity = 3, Probability = 3). Future climate models might predict increased

drought frequency, elevating the future Severity and Probability to 4 each, which the Modified CPRI will reflect.

Cleveland Heights Climate Hazards Analysis

Severe Weather (Thunderstorms)

Hazard Description

Severe thunderstorms are characterized by heavy rain, strong winds, lightning, and occasional hail, leading to flash flooding, downed trees, and power outages. These events can cause significant structural damage and disrupt daily activities.

According to the American Meteorological Society's Monthly Weather Review, Cleveland Heights currently experiences an average of 36 to 45 thunderstorm days per year.The Heights Regional Annex to the Cuyahoga County Multi-Jurisdictional Hazard Mitigation calculates that historically on average 2 severe thunderstorm events per year impact the City. During severe thunderstorms, wind speeds can exceed 60 mph, and rainfall rates can surpass 2 inches per hour, contributing to rapid surface runoff and localized flooding.

Probability of Future Events and Impact of Climate Change

The likelihood of severe thunderstorms is expected to increase with climate change, which projects a warmer and wetter climate for the Midwest. Impacts will include:

- Increased Frequency: According to the Great Lakes Integrated Science Assessment (GLISA):

  "*The frequency of severe thunderstorm environments is also projected to rise across the United States by mid to late century. The greatest projected increases occur during spring over the Midwest and northern Great Plains regions, with increases of up to 2.4 days of such environments per season.*"
- Greater Intensity: Storms may produce more intense rainfall, exceeding 2 inches per hour in some cases with stronger wind gusts.

Overall Vulnerability

Cleveland Heights' vulnerability to severe thunderstorms is heightened by several factors:

- **Aging Infrastructure:** Stormwater systems in areas such as Monticello Boulevard and Cedar-Lee are inadequate for handling increased rainfall, leading to recurrent flooding.
- **Mature Tree Canopy:** While providing ecological benefits, the large number of mature trees increases the risk of downed branches and power lines, particularly in older areas, during storm events.
- **Above-Ground Power Lines:** Many parts of the City rely on above-ground power lines, which are highly susceptible to damage from falling trees and debris, causing extended outages.

Impacts by Asset Category
Frequent severe thunderstorms cause damage to homes and businesses, particularly in:

- **Residential Areas:** Homes constructed before 1960 throughout the city are vulnerable to flooding and water damage due to aging drainage systems.
- **Business Districts:** Businesses throughout the city face operational disruptions from flooding and power outages, leading to loss of income and increased repair costs.
- **Critical Facilities:**
    - **Schools and Community Center:** Vulnerable to disruptions from power outages and localized flooding, affecting their roles as an emergency shelter.
    - **Municipal Facilities:** Power loss and road closures can hinder emergency response capabilities.
    - **Major Roadways:** Prone to flooding and blocked by downed trees, delaying emergency services and disrupting traffic flow.
    - **Healthcare Facilities:** Potential power outages and obstruction from road closures.
    - **Grocery Stores and Gas Stations:** Potential impacts from power outages.

Natural Environment: Frequent flooding especially in the Dugway Brook Watershed can disrupt habitats and alter ecosystem dynamics, threatening local biodiversity.

Severe Weather (Tornado and High Winds)

Hazard Description

Tornadoes are defined by their violently rotating columns of air, with wind speeds potentially exceeding 200 mph. High wind events, often accompanying storms, can reach 60-80 mph, resulting in downed trees, power outages, and property damage. The dense tree canopy and aging above-ground power infrastructure exacerbate the impact of these events.

While it is difficult to completely separate high wind events from other hazards, high winds do impact Cleveland Heights regularly through other hazards such as thunderstorms. Individual events such as derechos (widespread wind storms associated with a thunderstorm) have directly impacted the City in the past, and tornadoes, while infrequent, do touch down in Cuyahoga County. The 2022 Cuyahoga County Multi-Jurisdictional Hazard Mitigation Plan lists three tornadoes between EF0 and EF2 between 2001 and 2021 and indicates that the entire county is at risk.

Probability of Future Events and Impact of Climate Change

Under all credible scenarios, severe wind events, including tornadoes and straight-line winds, are expected to become more frequent and intense:

- Increased Frequency: As mentioned above, according to GLISA, the frequency of severe thunderstorm events with associated high winds is expected to increase by up to 2.4 days per season, with increases highest in the spring.

- Changing Storm Patterns: According to NOAA's Midwest Regional Climate Center, the warming climate may also result in more unstable atmospheric conditions, conducive to severe thunderstorms capable of generating high winds and occasional tornadoes. While currently the number of days tornadoes occur is decreasing, the intensity of tornadoes, frequency of broader outbreaks, and expansion throughout the year of tornadoes is increasing, from 3.5 days per year with multiple tornados before 1980 doubling to more than 7 days per year since 2000.

Overall Vulnerability

Cleveland Heights is highly vulnerable to high wind and tornado events due to several factors:

- **Aging Infrastructure:** Many older homes and buildings, particularly in historic areas, are not built to withstand high wind pressures, making them more susceptible to damage.
- **Mature Tree Canopy:** The city's dense tree cover increases the risk of downed trees and branches, leading to property damage and power outages.
- **Above-Ground Power Lines:** Most portions of the city rely on above-ground power lines, which are highly susceptible to damage from falling trees and debris, causing extended outages.

Impacts by Asset Category

- **Residential Areas:** Older homes, such as the many homes built in the community before 1939, are particularly vulnerable to roof and window damage from high winds and falling debris. Prolonged outages due to downed power lines can leave residents without electricity for days, impacting those who rely on medical devices or cooling during hot weather.
- **Business Districts:** Businesses are vulnerable to structural damage and operational disruptions from power outages.
- **Critical Facilities:**
    - **Schools and Community Center**: Potential damage from high winds; older structures may be more vulnerable.
    - **Municipal Facilities**: Power outages and road blockages can impede emergency services.
    - **Major Roadways**: Potential obstruction from fallen trees.
    - **Healthcare Facilities:** MetroHealth Medical Center Cleveland Heights is at risk from power outages and road access issues, potentially disrupting healthcare services during emergencies.
    - **Grocery Stores and Gas Stations:** Damage from high winds and power outages could impair operations of gas stations.
- **Natural Environment:** High winds can cause significant damage to the city's urban forest. Damage to natural areas can disrupt wildlife habitats and increase soil erosion, affecting local water quality and ecosystem health.

Severe Weather (Extreme Precipitation)

3.4.3.1 Hazard Description

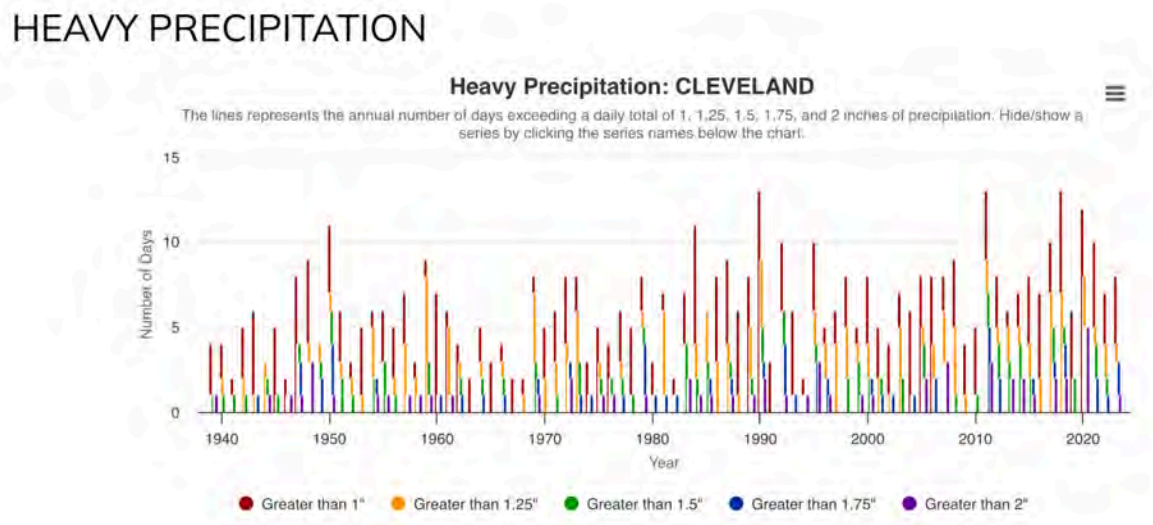


Figure 26: Heavy Precipitation Trends for Cleveland (source: GLISA)

Cleveland Heights' hilly terrain, aging stormwater infrastructure, and proximity to waterways like Doan Brook and Dugway Brook heighten the risk of flooding. According to the Great Lakes Integrated Science Assessment, the Cleveland area has experienced an annual total precipitation increase of 29.6% between 1951 and 2023, with a measurable increase in the frequency of days with rainfall over 2 inches in a day over the past two decades, in line with national and global trends. Cleveland Heights currently experiences an average of 3-5 days per year with rainfall exceeding 2 inches annually, with an increasing number of those days including high rates of rainfall in short periods of time.

During heavy rain events, combined sewer systems such as those common in older areas of Cleveland Heights can become overloaded, causing sewer backups and basement flooding. (The City is currently under a consent decree with the U.S. Environmental Protection Agency to separate the City's current combined system). These events pose serious challenges for property owners and the city's infrastructure, particularly as climate change will increase both the frequency and intensity of extreme precipitation.

Probability of Future Events and Impact of Climate Change

Under the RCP8.5 scenario, the frequency and intensity of extreme precipitation events in Cleveland Heights are expected to increase significantly:

- Increased Frequency: According to GLISA:

  "Climate models project the Great Lakes region to experience a greater increase in total precipitation than most other regions of North America. The amount of precipitation falling in the most intense 1% of precipitation events has increased significantly in the Midwest (42%) and Northeast (55%) from 1958 to 2016. These numbers are projected to increase by another 40% or more by the late century (2070-2099), relative to 1986-2015 amounts.... The number of days per

year exceeding one inch of precipitation is projected to increase by 15 to 23% on average in the Midwest and Northeast regions of the United States through mid-century. The number of days exceeding 2 inches of precipitation is projected to increase at a faster rate, by 37 to 46%, on average."

- Greater Intensity: As temperatures rise, the atmosphere can hold more moisture, resulting in heavier downpours. At 2 degrees Celsius of warming, rainfall intensity on the heaviest 1% of rainy days is projected to increase by 14.58% in Cuyahoga County, indicating frequent occurrences of intense, short-duration rainfall that can quickly overwhelm the city's stormwater infrastructure.

Overall Vulnerability

Cleveland Heights' vulnerability to extreme precipitation is significant due to several factors:

- **Aging Infrastructure:** Many areas, particularly those with combined sewer systems, are not equipped to handle the increased volume of water during extreme events.
- **Topography:** The city's steep slopes channel runoff rapidly into low-lying areas, overwhelming drainage systems and causing flash floods.
- **Proximity to Waterways:** Areas near Doan Brook and Dugway Brook are especially vulnerable to riverine flooding during heavy rains, exacerbating flood risks for nearby properties.

Impacts by Asset Category

- **Residential Areas:** Basement flooding is a frequent issue in older homes, particularly in areas. Flash floods can quickly inundate homes, causing significant property damage. Standing water and sewer backups can lead to mold growth and contamination, posing health risks to residents.
- **Business Districts:** Businesses can be vulnerable to flooding due to age and elevation, among other factors. Repeated flooding can lead to significant financial losses for small businesses, especially those without flood insurance.
- **Critical Facilities:**
    - **Schools and Community Center:** Basements and lower floors could be impacted by flooding.
    - **Municipal Facilities:** Leaking older roofs could cause damage on adjacent floors.
    - **Major Roadways:** Flooding can make these major thoroughfares impassable, delaying emergency response and isolating parts of the city.
    - **Healthcare Facilities:** Flooding and power outages can disrupt medical services.
    - **Grocery Stores and Gas Stations:** Extreme precipitation could cause flash flooding, and impact ground floors of grocery stores.
- **Natural Environment:** Heavy rains can erode river banks, increasing sedimentation and degrading water quality. Flooding can disrupt habitats in parks and natural areas. Increased runoff can carry pollutants, such as oils and chemicals, into local water bodies, further harming other wildlife.

Severe Weather (Winter Weather)

Figure 27: Days with Minimum Temperature Below 32 degrees Fahrenheit (source: NEMAC Explorer)

Hazard Description

Winter weather hazards in Cleveland Heights include heavy snowfall, ice storms, freezing rain, and extreme cold temperatures. The City experiences these events between November and March, with an average annual snowfall of approximately 68 inches. As experienced historically and detailed in the Cuyahoga County Multi-Jurisdictional Hazard Mitigation Plan, significant winter storms can drop more than 12 inches of snow in a single event. Ice storms and freezing rain pose additional risks by creating hazardous road conditions, downing power lines, and causing tree damage.

Probability of Future Events and Impact of Climate Change

Somewhat counterintuitively, while climate change may reduce certain impacts from winter weather, it may increase others:

- **Increased Variability:** Climate change may lead to increased variability with potential for both milder winters and more intense snowstorms. The 2023 U.S. Fifth National Climate Assessment projects that while overall snowfall may decrease slightly, the frequency of heavy snow events may actually increase. While we may have fewer snow days, greater ice storms which result from heavy snow events are that much more problematic.
- **Warmer Winters:** The average winter temperature in Northeast Ohio will increase, leading to more frequent freeze-thaw cycles, which can exacerbate road deterioration and increase the likelihood of ice storms.

- **Extreme Events:** Despite a general trend toward milder winters, extreme cold events are still expected to occur due to polar vortex disruptions, with temperatures potentially falling below -10°F.

Overall Vulnerability
Cleveland Heights is vulnerable to winter weather due to several factors:

- **Aging Infrastructure:** Older water mains and roads are susceptible to damage from freeze-thaw cycles.
- **Mature Tree Canopy:** The city's dense tree cover poses a risk during ice storms, leading to frequent power outages as branches give ice a much greater surface area to accumulate upon.
- **Above-Ground Power Lines:** Many areas rely on above-ground power lines, which are vulnerable to damage from falling branches and ice accumulation.

Impacts by Asset Category

- **Residential Areas:** Heavy snow can cause roof collapses and ice dams, leading to water damage. Ice storms can down power lines, leaving residents without heat or electricity.
- **Business Districts:** Prolonged closures and reduced customer traffic due to hazardous conditions result in lost revenue. Blocked parking from snow and ice storms that make use of sidewalks can also have significant impacts.
- **Critical Facilities:** Snow and ice can impede emergency response times. Power outages and blocked access routes can disrupt emergency services as well.
    - **Schools and Community Center:** Power outages after extreme weather events could result in disruptions to normal school activities.
    - **Municipal Facilities:** Power outages due to ice storms could occur.
    - **Major Roadways:** Ice storms particularly have major negative impacts on mobility for the elderly, those with limited mobility, and others such as transit-dependent populations. Increased freeze-thaw cycles have cumulative impacts on roads and sidewalks requiring more frequent maintenance.
    - **Healthcare Facilities:** Power outages due to ice storms could negatively impact patient care.
    - **Grocery Stores and Gas Stations:** More frequent ice storms could impact mobility to grocery stores and gas stations.
- **Natural Environment:** Ice storms can cause significant damage to the city's urban forest, leading to a loss of tree cover and increased risk of invasive species. Road salt and chemical deicers used during winter storms can contaminate local waterways, affecting water quality in local waterways.

Flooding

Hazard Description

Flooding is a significant hazard in Cleveland Heights, particularly due to its topography, aging stormwater infrastructure, and proximity to waterways such as Doan Brook and the Dugway Brook Watershed. While the City does not have significant portions in FEMA Special Flood Hazard Areas, it is at risk from other kinds of flooding due to its topography, building construction and increased precipitation.

Cleveland Heights receives an average of 41.03 inches of rainfall annually. According to the NOAA National Centers for Environmental Information, Ohio has experienced a significant increase in the number of 2-inch extreme precipitation events since the mid-1990s, a trend which is expected to increase due to increased water vapor in the atmosphere as a result of global warming. An example of the kinds of events that are expected to increase in frequency was the August 2023 event, overwhelming stormwater systems and causing widespread basement flooding on the west side of Cleveland, especially in low-lying areas and neighborhoods with combined sewer systems.

Probability of Future Events and Impact of Climate Change

Under all credible scenarios, the frequency and intensity of flooding in Cleveland Heights are expected to increase due to climate change:

- **Increased Frequency:** The frequency of heavy rainfall events is projected to increase by 20-30% by mid-century. Cleveland Heights could experience 5-10 additional days of intense rainfall per year.
- **Greater Intensity:** Extreme precipitation events, with rainfall exceeding 2 inches per hour, will become more common. This increase will put additional strain on the city's already burdened stormwater infrastructure.
- **Warmer Temperatures:** Warmer temperatures will result in more precipitation falling as rain rather than snow during winter months, leading to increased runoff and the risk of winter and spring flooding. Projections suggest a 10-20% increase in winter rainfall by 2050.

Overall Vulnerability

Cleveland Heights is vulnerable to flooding due to several factors:

- **Aging Infrastructure:** Many areas, particularly those with combined sewer systems in older neighborhoods, are not equipped to handle increased volumes of water during extreme events.
- **Topography and Urbanization:** The city's hilly terrain channels runoff into low-lying areas, while extensive impervious surfaces limit natural absorption of rainwater, increasing surface runoff and flood risks.
- **Proximity to Waterways:** Areas near waterways are especially susceptible to riverine flooding during heavy rains, exacerbating risks for nearby properties.

Impacts by Asset Category

- **Residential Areas:** Flash flooding can cause significant damage to foundations, electrical systems, and personal property. Floodwaters can carry contaminants, leading to health risks such as mold and bacterial infections.
- **Business Districts:** Frequent flooding increases insurance premiums and repair costs, putting additional financial strain on small businesses.
- **Critical Facilities:**
    - **Schools and Community Center:** Flooding may disrupt educational activities and damage buildings, affecting access to essential community services. This applies to private schools such as the Hebrew Academy of Cleveland as well.
    - **Municipal Facilities:** Potential structural damage and operational shutdowns, hampering emergency response and essential municipal services.
    - **Major Roadways:** Flooding can make major roads impassable.
    - **Healthcare Facilities:** Could make transportation difficult as well as damage below-grade facilities.
    - **Grocery Stores and Gas Stations:** May experience difficulties in access as well as damage.
- **Natural Environment:** Heavy rains can erode the banks of Doan Brook and Dugway Brook, leading to sedimentation and habitat loss. Flooding can increase runoff, carrying pollutants and debris into local waterways.

Extreme Heat

Hazard Description

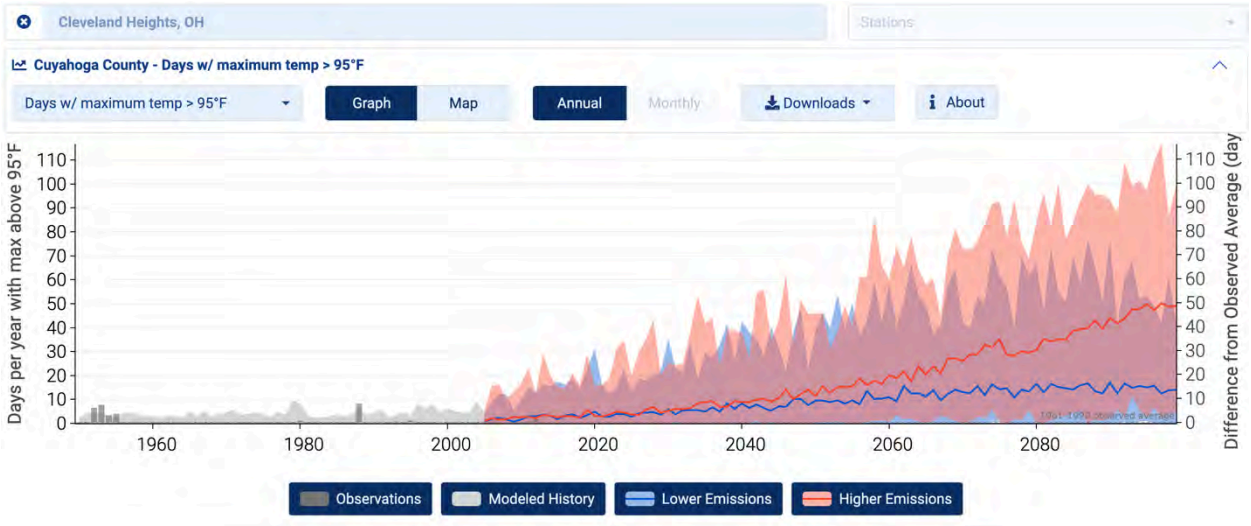


Figure 28: Days with Minimum Temperature Above 95 degrees Fahrenheit (source: NEMAC Explorer)

Cleveland Heights typically experiences around 10 days per year with temperatures above 95°F, but this number will increase due to climate change. Extreme heat exacerbates the urban heat

island effect, where urban areas experience higher temperatures than rural areas due to heat retention by buildings and roads.

In Cleveland Heights, neighborhoods with less tree cover, such as the Cedar-Lee, Severance Town Center and Coventry Village areas, are particularly affected, experiencing temperatures up to 5°F higher than surrounding areas. Prolonged heat events can also degrade air quality, leading to higher concentrations of ground-level ozone and particulate matter, which can aggravate respiratory conditions such as asthma.

Probability of Future Events and Impact of Climate Change

Under all credible scenarios, the frequency and intensity of extreme heat events in Cleveland Heights are expected to increase significantly:

- **Increased Frequency:** The number of days exceeding 90°F is projected to rise from an average of 10 days per year to 25-30 days by mid-century. Heatwaves lasting three or more days could become more common, with some years experiencing multiple prolonged heat events.
- **Greater Intensity:** Extreme heat days with temperatures above 95°F could increase from 2-3 days per year to 10-15 days by 2050. This poses severe health risks, particularly for vulnerable populations.
- **Heatwaves in Spring and Fall:** Overall temperature increases are likely to result in extreme heat events moving both earlier and later in the year.

Overall Vulnerability

Cleveland Heights is increasingly vulnerable to extreme heat due to several factors:

- **Aging Infrastructure:** Older buildings, especially those without air conditioning, are less equipped to keep indoor temperatures cool.
- **Limited Tree Cover in Urban Areas:** Areas with low tree canopy experience higher temperatures, increasing residents' exposure to extreme heat.
- **Energy Demand and Grid Reliability:** Prolonged heat waves increase demand for electricity, straining the power grid and risking outages.

Impacts by Asset Category

- **Residential Areas:** Prolonged exposure to extreme heat can lead to heat exhaustion and heatstroke, particularly for elderly residents and those with pre-existing conditions. Increased use of air conditioning during heat waves can lead to higher energy bills, disproportionately affecting low-income households.
- **Business Districts:** Excessive heat can impact outdoor workers and businesses with inadequate cooling, leading to reduced productivity.
- **Critical Facilities:**
    - **Schools and Community Center:** Facilities without adequate cooling infrastructure may need to close during extreme heat events.

    - **Municipal Facilities:** Elderly populations needing city services at City Hall during those events are impacted and there is a higher risk from the physical conditions at Severance**.**
    - **Major Roadways:** No specific impacts.
    - **Healthcare Facilities:** Vulnerable populations including the elderly are more susceptible to extreme heat events, possibly increasing demands on hospital services.
    - **Grocery Stores and Gas Stations:** No specific impacts.
- **Natural Environment:** Extreme heat can damage trees and reduce their ability to provide shade and cooling. High temperatures increase the formation of ground-level ozone, exacerbating respiratory conditions.

Drought

Hazard Description

Drought is characterized by prolonged periods of low precipitation, leading to water shortages, soil moisture deficits, and stress on local water resources. While Cleveland Heights has not historically been prone to severe droughts, changing climate patterns have increased the likelihood and potential severity of drought conditions.

Drought can affect water availability for residential, commercial, and environmental needs, particularly during the summer months when demand is highest. The city's reliance on Lake Erie and local aquifers for water supply mitigates some risks, but prolonged dry periods can still lead to significant impacts on water-dependent activities, landscaping, and ecosystem health.

Probability of Future Events and Impact of Climate Change

Under the RCP8.5 scenario, the likelihood of drought events in Cleveland Heights is expected to increase due to rising temperatures and changing precipitation patterns:

- **Increased Frequency:** Prolonged dry periods, particularly in the summer, are projected to become more frequent by mid-century. Cleveland Heights could experience up to 20 more dry days annually, with precipitation deficits occurring more regularly.
- **Higher Temperatures:** Higher Temperatures: As stated in the 2024 City of Cleveland Climate Risk and Vulnerability Assessment, average summer temperatures for Cuyahoga County are projected to rise between 5.3-6.7°F by 2050, increasing evaporation rates and reducing soil moisture levels, thus exacerbating drought conditions. Higher temperatures will also lead to increased water demand for irrigation and cooling.
- **Variable Precipitation:** While overall annual precipitation may increase, it is expected to occur in fewer, more intense events, leading to periods of drought between heavy rainfalls. This pattern can disrupt water recharge and increase stress on the water supply during dry periods.

Overall Vulnerability

Cleveland Heights' vulnerability to drought is influenced by several factors:

- **Water Demand:** Typical usage of water for residential lawns and public green spaces increases water stress during d droughts.
- **Aging Infrastructure:** Older water systems may not be equipped to handle fluctuations in demand and supply, leading to inefficiencies and increased maintenance needs during drought conditions.
- **Tree Canopy and Green Spaces:** The city's extensive tree canopy and numerous parks require significant water to maintain, making them highly vulnerable to drought stress.

Impacts by Asset Category

- **Residential Areas:** Higher water usage during droughts can lead to increased utility bills for residents. Lawns and gardens may suffer during prolonged dry periods, reducing property values and increasing maintenance costs.
- **Business Districts:** Businesses may incur additional costs for water during drought periods, impacting profitability.
- **Critical Facilities:**
    - **Schools and Community Center:** No specific impacts.
    - **Municipal Facilities:** Drought conditions can lower water pressure and availability, complicating firefighting efforts.
    - **Major Roadways:** No specific impacts.
    - **Healthcare Facilities:** No specific impacts.
    - **Grocery Stores and Gas Stations:** No specific impacts.
- **Natural Environment:** Prolonged drought can lead to tree mortality and increased vulnerability to pests and diseases. Public parks may experience reduced usability of green spaces and increased maintenance costs due to the need for additional watering and potential replacement of vegetation. Low water levels in streams during droughts can concentrate pollutants, reducing water quality and harming aquatic life, as well as increased sedimentation and erosion.

Air Quality

Hazard Description

Air quality in Cleveland Heights is affected by pollutants such as ground-level ozone, particulate matter (PM2.5 and PM10)[66], and emissions from transportation and industrial activities outside of city limits. Poor air quality can have significant health impacts, particularly for individuals with respiratory conditions, the elderly, and children. Cuyahoga County experiences several days each year when the Air Quality Index (AQI) reaches "Unhealthy for Sensitive Groups" (AQI 101-150) or beyond, especially during the summer months. According to the US EPA's Air Quality Index Report, in 2023, Cuyahoga County had 13 of those days, including 3 days classified as "Unhealthy" for all populations and 1 day as "Very Unhealthy".

Emissions from local traffic, particularly along major roads like Mayfield Road, Cedar Road, and Lee Road, contribute to elevated levels of nitrogen oxides (NOx) and carbon monoxide (CO), compounding air quality issues. Additionally, temperature inversions during the winter months can trap pollutants close to the ground, further degrading air quality and exacerbating health risks.

Probability of Future Events and Impact of Climate Change
Climate change is expected to impact air quality in Cleveland Heights in several ways:

- **Increased Ozone Levels:** Higher temperatures promote the formation of ground-level ozone. By mid-century, the city could see a 20-30% increase in high-ozone days, with temperatures exceeding 90°F more frequently, leading to more days with unhealthy air quality.
- **More Frequent Wildfires:** Increased wildfire activity in western and northern North America can lead to elevated PM2.5 levels in Cleveland Heights due to long-range transport of smoke. In September 2020, Cleveland Heights experienced several hazy days with PM2.5 levels exceeding 35 $\mu g/m^3$ due to wildfire smoke, leading to public health warnings.
- **Increased Heat Waves:** Higher temperatures and more frequent heat waves can exacerbate air pollution, leading to more frequent "Unhealthy" AQI days.

Overall Vulnerability
Cleveland Heights is vulnerable to air quality issues due to several factors:

- **High Vehicle Usage:** The city's reliance on automobiles contributes significantly to local air pollution, particularly along high-traffic roads.
- **Older Housing Stock:** Many older homes in Cleveland Heights lack adequate insulation and air filtration, making indoor air quality more susceptible to outdoor pollution.

Impacts by Asset Category

- **Residential Areas:** Poor air quality can exacerbate asthma, chronic obstructive pulmonary disease, and other respiratory conditions. Many older homes lack proper ventilation systems, making it difficult to maintain good indoor air quality during high pollution days. This is a significant concern for the elderly and those with pre-existing health conditions.
- **Business Districts:** Outdoor activities, such as farmers' markets and outdoor dining, can be negatively impacted during high pollution days. Businesses may face increased costs for air filtration systems or may need to modify operations to protect employees from poor air quality.
- **Critical Facilities:** Hospitals and clinics such as MetroHealth Medical Center Cleveland Heights experience increased patient loads during high pollution events.
    - **Schools and Community Center:** Poor air quality can lead to the cancellation of outdoor activities and affect student health and attendance.
    - **Municipal Facilities:** No specific impacts.
    - **Major Roadways:** No specific impacts.

    - **Healthcare Facilities:** Hospitals and clinics experience increased patient loads during high pollution events.
    - **Grocery Stores and Gas Stations:** No specific impacts.
- **Natural Environment:** High ozone levels can damage sensitive plant species, reducing growth and biodiversity. Deposition of airborne pollutants can contribute to the eutrophication of local waterways like Doan Brook, leading to algal blooms and degraded water quality.

Appendix B: Greenhouse Gas Emission Inventory Methodology and Inputs

Analysis inputs, such as energy consumption, were estimated by PCFO based on local-, regional-, and state-level data. Whenever possible, data collected by Cleveland Heights were used in place of estimates. ClearPath, developed by ICLEI USA, was used to then estimate emissions. A preliminary report underwent ICLEI's quality assurance testing to ensure accurate reporting according to GHG Protocol standards.

Results are presented in terms of metric tons of carbon dioxide-equivalents (MT CO2e) in order to compare different greenhouse gasses on an apples-to-apples basis regarding their global warming potential.

City Operations Inventory: Inputs

Input Values				
Sector	**Category**	**Fuel**	**Unit**	**Quantity**
All	Population			44,652
City Operations	Stationary Energy	Natural Gas	MCF	16,078
City Operations	Electricity	Electricity	KWh	4,221,834
City Operations	Passenger Vehicles	Gasoline	Gallons	59,711
City Operations	Light Trucks	Gasoline	Gallons	43,338
City Operations	Light Trucks	Diesel	Gallons	25,247
City Operations	Heavy-Duty Vehicle	Diesel	Gallons	70,682
City Operations	Passenger Vehicles	Gasoline	VMT	1,313,646
City Operations	Light Trucks	Gasoline	VMT	780,098
City Operations	Light Trucks	Diesel	VMT	454,460
City Operations	Heavy-Duty Vehicle	Diesel	VMT	424,093
City Operations	Waste		Short Tons	652
City Operations	Water		Gallons	3,793,856
City Operations	Employee Commute		Employees	376
City Operations	Tree Canopy		Acres	390
City Operations	Electric Line Losses	Electricity	Percent	4.5%
City Operations	Fugitive Emissions	Natural Gas	Percent	0.5%

Table 15: Inputs to City Operations Inventory

Community-Wide Inventory: Inputs

These records were compiled from the ClearPath tool that Cleveland Heights utilized to develop the community-wide inventory. Additional detailed data can be accessed on ClearPath using the

Activity Data Report. The inventory was developed in alignment with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC).

Residential Energy Sector			
Inventory Record	**GPC Scope**	**GPC Ref #**	**MMBTU**
Residential Electricity Consumption	Scope 2	I.1.2	658435.3345
Residential Electric Aggregation Participants	Scope 2	I.1.2	265536.6382
Residential Fuel Oil Consumption	Scope 1	I.1.1	3297.589726
Residential Kerosene Consumption	Scope 1	I.1.1	123.9016101
Residential Natural Gas Consumption	Scope 1	I.1.1	1526727.885
Residential Propane Consumption	Scope 1	I.1.1	30295.44409

Table 16: Community-wide greenhouse gas inventory inputs for the residential energy sector

Commercial Energy Sector			
Inventory Record	**GPC Scope**	**GPC Ref #**	**MMBTU**
Commercial Electricity Consumption	Scope 2	I.2.2	203885.6553
Commercial Electric Aggregation Participants	Scope 2	I.2.2	33988.1843
Commercial Distillate (No. 2) Consumption	Scope 1	I.2.1	18253.94454
Commercial Gasoline Consumption	Scope 1	I.2.1	21000
Commercial Natural Gas Consumption	Scope 1	I.2.1	264000
Commercial Propane Consumption	Scope 1	I.2.1	8000

Table 17: Community-wide greenhouse gas inventory inputs for the commercial energy sector

Industrial Energy Sector			
Inventory Record	**GPC Scope**	**GPC Ref #**	**MMBTU**
Industrial Electricity Consumption	Scope 2	I.3.2	144
Industrial Natural Gas Consumption	Scope 1	I.3.1	79000
Industrial Distillate (No. 2) Consumption	Scope 1	I.3.1	40000
Industrial Gasoline Consumption	Scope 1	I.3.1	5000
Industrial Propane Consumption	Scope 1	I.3.1	4000
Industrial Residual (No. 6) Consumption	Scope 1	I.3.1	1000

Table 18: Community-wide greenhouse gas inventory inputs for the industrial energy sector

Transportation & Mobile Sources Sector					
Inventory Record	**GPC Scope**	**GPC Ref #**	**On Road VMT**	**Fossil Fuel Energy Equivalent (MMBtu)**	**Biofuel Energy (MMBtu)**

Scope 3 Aviation Emissions			Not Estimated		
Gasoline Consumption	Scope 1	II.1.1	107309026.8	569004.1172	
Diesel Consumption	Scope 1	II.1.1	5323741.573	94081.53042	
Biodiesel Consumption	Scope 1	II.1.1	74073	452.5843989	104.9527615
Fuel Ethanol Consumption	Scope 1	II.1.1	10193243.06	8037.346421	30623.56563
Onroad Natural Gas Consumption	Scope 1	II.1.1	1853367		
Onroad Propane Consumption	Scope 1	II.1.1	19413		
Scope 3 Rail Emissions			0		
Scope 3 Water Travel Emissions			0		

Table 19: Community-wide greenhouse gas inventory inputs for the transportation and mobile sources sector

Solid Waste			
Inventory Record	**GPC Scope**	**GPC Ref #**	**Tons Waste Exported**
Exported Waste (All Sectors)	Scope 3	III.1.2	137100

Table 20: Community-wide greenhouse gas inventory inputs for the solid waste sector

Process and Fugitive Emissions			
Inventory Record	**GPC Scope**	**GPC Ref #**	**Leakage Rate**
Fugitive Emissions from Natural Gas Distribution	Scope 1	I.8.1	0.30%

Table 21: Community-wide greenhouse gas inventory inputs for the process and fugitive emissions sector

Agriculture, Forestry, and Other Land Uses (AFOLU)			
Inventory Record	**GPC Scope**	**GPC Ref #**	**Canopy Area of Trees Outside Forest (hectares)**
Urban Tree Canopy	Scope 1	V.2	930.575457

Table 22: Community-wide greenhouse gas inventory inputs for the agriculture, forestry, and other land uses (AFOLU) sector

Water and Wastewater			
Inventory Record	**GPC Scope**	**GPC Ref #**	**Population Served**
Wastewater Treatment (Out of boundary)	Scope 3	III.4.2	45002

Wastewater Treatment (effluent discharge)	Scope 3	III.4.2	45002

Table 23: Community-wide greenhouse gas inventory inputs for the water and wastewater sector

Appendix C: List of Plans, Policies, and Reports Reviewed

City Plans and Programs

- City of Cleveland Heights Master Plan (2017)
- Community Reinvestment Area (CRA) Program
- Complete and Green Streets Policy
- Compton Road Greenway Study
- EV Smart Letter
- EV Smart Report
- Fleet Electrification Analysis
- Grow Tax Savings Program
- Mayfield Road Corridor Multimodal Plan
- Shared Spaces Program
- Stormwater Management Plan
- Taylor Road Corridor Study
- Vision Zero Policy

Codes and Ordinances

- Building, Fire, and Housing Codes
- Lead Safe Ordinances
- Zoning Code

Regional and State Documents

- Cuyahoga County Climate Change Action Plan (2019)
- Cuyahoga County Multi-Jurisdictional Hazard Mitigation Plan (2022)
- Cuyahoga County Regional Shared Micro-Mobility Program
- Cuyahoga County Tree Canopy Assessment
- Cuyahoga County Vulnerability Assessment
- Greater Cleveland Regional Transit Authority Transit-Oriented Development Plan
- Ohio State Hazard Mitigation Plan (2022)
- Ohio Threat and Hazard Identification and Risk Assessment (THIRA) (2023)
- City of Cleveland Climate Risk and Vulnerability Assessment (2024)

Climate Action Plans

- City of Ann Arbor Living Carbon Neutrality Plan (2020)
- City of Cincinnati Green Cincinnati Plan (2023)
- City of Cleveland Climate Action Plan (2018)
- City of Columbus Climate Action Plan (2021)
- City of Detroit Climate Action Plan (2017)
- City of Lakewood Climate Action Plan (2021)
- City of Oberlin Climate Action Plan (2019)
- Cuyahoga County Climate Change Action Plan (2019)

Appendix D: List of Tables and Figures

Appendix E: References

1. United States Census Bureau. “Population of Cleveland Heights by Race.” *U.S. Census Bureau*. https://data.census.gov/table/ACSDP5Y2022.DP05?q=population%20of%20Cleveland%20Heights%20by%20race&g=160XX00US3916014
2. United States Census Bureau. “Language Spoken at Home, Cleveland Heights, Ohio.” *U.S. Census Bureau*. https://data.census.gov/table/ACSST5Y2022.S1601?q=Cleveland%20Heights%20languages&g=160XX00US3916014
3. United States Census Bureau. “Income in the Past 12 Months (In 2022 Inflation-Adjusted Dollars), Cleveland Heights, Ohio.” *U.S. Census Bureau*. https://data.census.gov/table/ACSST5Y2022.S1901?q=Cleveland%20Heights%20income&g=160XX00US3916014
4. U.S. Department of Energy. “U.S. Energy and Employment Report 2021, State Reports.” *U.S. Department of Energy*. https://www.energy.gov/sites/default/files/2021-07/USEER%202021%20State%20Reports.pdf
5. “Cuyahoga County Urban Tree Canopy Viewer.” Cuyahoga County Planning Commission. http://arcg.is/1qqOCH
6. University of California Center for Climate Justice. “What Is Climate Justice?” *University of California*. https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/#:~:text=Climate%20justice%20connects%20the%20climate,least%20responsible%20for%20the%20problem.
7. U.S. Environmental Protection Agency. “Learn About Environmental Justice.” *U.S. Environmental Protection Agency*. https://www.epa.gov/environmentaljustice/learn-about-environmental-justice
8. U.S. Environmental Protection Agency. “Overview of Environmental Indicators in EJSCREEN.” *U.S. Environmental Protection Agency*. https://www.epa.gov/ejscreen/overview-environmental-indicators-ejscreen
9. U.S. Energy Information Administration. “Ohio State Energy Profile.” *U.S. Department of Energy*. https://www.eia.gov/state/analysis.php?sid=OH
10. Internal Revenue Service. “Residential Clean Energy Credit.” *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/residential-clean-energy-credit
11. Council of the City of Cleveland Heights. “Resolution 48-2022: Second Reading.” *City of Cleveland Heights*. https://www.clevelandheights.gov/DocumentCenter/View/10911/Resolution-48-2022-Second-Reading?bidId=
12. Unpredictable City. “Ohio Residential Solar Access Dashboard.” *Unpredictable City*. https://unpredictable.city/ohio-residential-solar-access-dashboard
13. Jewell, Thomas. “Going green, again: Cleveland Heights introduces solar power agreement for three city buildings”. *Cleveland.com*. https://www.cleveland.com/community/2020/04/going-green-cleveland-heights-introduces-solar-power-agreement-for-three-city-buildings.html
14. Department of Planning and Development. “Sustainability Initiatives.” *City of Cleveland Heights*. https://www.clevelandheights.gov/329/Sustainability
15. City of Cleveland Heights. "Municipal Services & Environmental Sustainability Committee Meeting 8.26.2024." *City of Cleveland Heights*. https://clevelandheightsoh.portal.civicclerk.com/event/141/files/attachment/1638

16. Cleveland Heights-University Heights City School District. "Staff Spotlight: CH-UH Employees Committed to Success." *Cleveland Heights-University Heights City School District*. https://www.chuh.org/protected/ArticleView.aspx?iid=6G3PB0I&dasi=3Y22
17. Office of State and Community Energy Programs. "Low-Income Energy Affordability Data (LEAD) Tool." *U.S. Department of Energy*. https://www.energy.gov/scep/low-income-energy-affordability-data-lead-tool
18. Internal Revenue Service. "Energy Efficient Home Improvement Credit." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/energy-efficient-home-improvement-credit
19. Internal Revenue Service. "Energy Efficient Commercial Buildings Deduction." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/energy-efficient-commercial-buildings-deduction
20. Department of Development. "Energy Efficiency and Utility Assistance." *Cuyahoga County*. https://cuyahogacounty.gov/development/residents/energy-efficiency-and-utility-assistance
21. Ohio Department of Development. "Energy Savings Programs for Individuals." *State of Ohio*. https://development.ohio.gov/individual/energy-assistance/energy-savings
22. Ohio Association of Community Action Agencies. "City of Columbus Launches Clean Energy Workforce Development Program Through Partnership With IMPACT." *Ohio Association of Community Action Agencies*. https://oacaa.org/city-of-columbus-launches-clean-energy-workforce-development-program-through-partnership-with-impact/
23. Department of Development. "Home Repair and Remodeling: Heritage Home Loan." *Cuyahoga County*. https://cuyahogacounty.gov/development/residents/home-repair-and-remodeling/heritage-home-loan
24. Department of Sustainability. "Cuyahoga Green Energy." *Cuyahoga County*. https://cuyahogacounty.gov/sustainability/initiatives/microgrid
25. City Utilities. "Go Time for the Microgrid: City Utilities' Ingenuity Builds Resilience and Sustainability." *City of Fort Wayne*. https://utilities.cityoffortwayne.org/go-time-for-the-microgrid-city-utilities-ingenuity-builds-resilience-and-sustainability/
26. Internal Revenue Service. "Commercial Clean Vehicle Credit." *U.S. Department of the Treasury*. .https://www.irs.gov/credits-deductions/commercial-clean-vehicle-credit; Internal Revenue Service. "Alternative Fuel Vehicle Refueling Property Credit." *U.S. Department of the Treasury*. .https://www.irs.gov/credits-deductions/alternative-fuel-vehicle-refueling-property-credit#:~:text=For%20consumers%20who%20purchase%20and,per%20item%20
27. Town of Belmont. "Policy to Transition Belmont's Municipal Vehicle Fleet to Electric Vehicles." *Town of Belmont*. https://www.belmont-ma.gov/sites/g/files/vyhlif12826/f/uploads/belmont_fleet_-_electric_vehicle_policy_final_no_markeup.pdf
28. Internal Revenue Service. "Credits for New Clean Vehicles Purchased in 2023 or After." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/credits-for-new-clean-vehicles-purchased-in-2023-or-after; Internal Revenue Service. "Used Clean Vehicle Credit." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/used-clean-vehicle-credit
29. Internal Revenue Service. "Commercial Clean Vehicle Credit." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/commercial-clean-vehicle-credit
30. Internal Revenue Service. "Alternative Fuel Vehicle Refueling Property Credit." *U.S. Department of the Treasury*. https://www.irs.gov/credits-deductions/alternative-fuel-vehicle-refueling-property-credit
31. Power a Clean Future Ohio. "Cleveland Heights Fleet Electrification Analysis." *Power A Clean Future Ohio*.

32. Electrification Coalition. "EV Readiness Ordinance Case Study." *Electrification Coalition*. https://electrificationcoalition.org/resource/ev-readiness-ordinance-case-study/
33. Council of the City of Cleveland Heights. "Complete Streets Policy (Resolution 37-2018)." *City of Cleveland Heights*. https://www.clevelandheights.gov/DocumentCenter/View/5394/37-2018-Complete-Streets-APPROVED-VERSION?bidId=#:~:text=%22Complete%20and%20Green%20Streets%22%20are,reduce%2C%20accommodate%20and%20slow%20stormwater
34. City of Cleveland Heights. "Section 1121.12: Accessory Use Regulations." *City of Cleveland Heights*.https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-13374#JD_1121.12
35. Cuyahoga County Solid Waste District. "Registered Compost Facilities." *Cuyahoga County Solid Waste District*. https://cuyahogarecycles.org/compost_facilities/
36. Department of Sustainability. "Sustainable Stores Program." *Cuyahoga County*. https://cuyahogacounty.gov/sustainability/initiatives/byobag/sustainable-stores-program
37. City of Cleveland Heights. "Section 1165.06: Sustainability Guidelines." *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-14980
38. Department of Finance and Management. "Sustainable Purchasing." *City of Columbus*. https://www.columbus.gov/Government/Departments/Finance-and-Management/Sustainable-Purchasing#:~:text=The%20city%20recognizes%20that%20the,the%20city's%20commitment%20to%20sustainability
39. U.S. Department of Transportation. "US DOT Equitable Transportation Community Explorer - State Results." *U.S. Department of Transportation*. https://experience.arcgis.com/experience/0920984aa80a4362b8778d779b090723/page/ETC-Explorer---State-Results/
40. City of Cleveland Heights. "Section 1165.06: Sustainability Guidelines." *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-14980
41. City of Cleveland Heights. "Section 1121.12: Accessory Use Regulations." *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-13374
42. City of Cleveland Heights. "Section 1351.25: Maintenance of Roofs, Gutters, Downspouts, and Chimneys." *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-17646
43. Northeast Ohio Regional Sewer District. “Stormwater Fee Credit Policy Manual.” *Northeast Ohio Regional Sewer District*. https://www.neorsd.org/I_Library.php?SOURCE=library/CreditManual_ALL_12182012.pdf&a=download_file&LIBRARY_RECORD_ID=4699
44. City of Cleveland Heights. "Section 1166.01: Landscape Requirements Purpose." *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-15023
45. Minnesota Metropolitan Council. “Council Meeting Agenda, May 22, 2024.” *Minnesota Metropolitan Council*. https://metrocouncil.org/Council-Meetings/Committees/Metropolitan-Council/2024/05-22-2024/0522_2024_121.aspx
46. City of Cleveland Heights. “Watersheds.” *City of Cleveland Heights*. https://www.clevelandheights.gov/350/Watersheds
47. Biohabitats, Inc. “Nine Mile Creek Watershed Improvement Project.” Biohabitats, Inc. https://www.biohabitats.com/wp-content/uploads/NineMileCreek_07602.pdf
48. Village of Bratenahl. “Nine Mile Creek Watershed Project.” Village of Bratenahl. https://www.bratenahl.org/410/Nine-Mile-Creek-Watershed-Project

49. Ohio Environmental Protection Agency. “Doan Brook Watershed Action Plan.” *Ohio Environmental Protection Agency*.
https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/35/nps/WAPs/DoanBr.pdf
50. Northeast Ohio Regional Sewer District. “About the Project Clean Lake Program.” *Northeast Ohio Regional Sewer District*. https://www.neorsd.org/community/about-the-project-clean-lake-program /
51. City of Detroit. “Basement Backup Protection Program Flyer.” *City of Detroit*.
https://detroitmi.gov/sites/detroitmi.localhost/files/2022-09/Basement%20Backup%20Protection%20Program%20Flyer.pdf
52. Department of Public Health. “Air Permitting Program.” *City of Cleveland*.
https://clevelandhealth.org/programs/air/permitting/#:~:text=The%20Cleveland%20area%20does%20not,result%20of%20continued%20ozone%20levels
53. City of St. Louis Park. “St. Louis Park launches idling reduction public health campaign.” *City of St. Louis Park*. https://www.stlouisparkmn.gov/Home/Components/News/News/1122/
54. Cuyahoga County. “Ready Notify.” *Cuyahoga County*.
https://cuyahogacounty.gov/ready/readynotify/readynotify
55. City of Ann Arbor. “Ann Arbor Awarded $1 Million USEPA Government-to-Government Grant to Expand Resilience Work.” *City of Ann Arbor*. https://www.a2gov.org/news/Pages/article.aspx?i=1008
56. City of Cleveland Heights. “Urban Garden Project.” *City of Cleveland Heights*.
https://www.clevelandheights.gov/1694/Urban-Garden-Project
57. Office of the Governor, Ohio. “Governor DeWine Announces $67 Million in Demolition Awards to Create Redevelopment Opportunities.” *Office of the Governor, Ohio*.
https://governor.ohio.gov/media/news-and-media/governor-dewine-announces-67-million-in-demolition-awards-to-create-redevelopment-opportunities
58. Office of the Governor, Ohio. “Round 6 Brownfield Descriptions.” *Office of the Governor, Ohio*.
https://content.govdelivery.com/attachments/OHIOGOVERNOR/2024/10/11/file_attachments/3029975/2024%201011%20Round%206%20Brownfield%20Descriptions.pdf
59. Puente, Kelly. “Sun-catching solar farm to power key Cleveland site.” *Cleveland.com*.
https://www.cleveland.com/metro/2013/01/sun-catching_solar_farm_to_pow.html
60. Cuyahoga County Planning Commission. “Cuyahoga County Greenprint.” *Cuyahoga County Planning Commission*. https://www.countyplanning.us/projects/cuyahoga-county-greenprint/.
61. Cuyahoga County Planning Commission. “Cuyahoga County Greenprint.” *Cuyahoga County Planning Commission*. https://www.countyplanning.us/projects/cuyahoga-county-greenprint/.
62. City of Cleveland Heights. “Section 1165.05: Sustainable Regulations for Large Scale Residential Developments.” *City of Cleveland Heights*.
https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-14948
63. City of Cleveland Heights. “Section 1335.10: Performance Standards.” *City of Cleveland Heights*.
https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-16542
64. City of Cleveland Heights. “Chapter 1141: Planned Development Objectives.” *City of Cleveland Heights*. https://codelibrary.amlegal.com/codes/clevelandhts/latest/clevelandhts_oh/0-0-0-13763
65. City of Cleveland Heights. “Cedar-Lee-Meadowbrook Project Updates.” *City of Cleveland Heights*.
https://www.clevelandheights.gov/CLM-Project-Updates.
66. Particulate Matter (PM) is tiny solid particles and liquid droplets suspended in the air. These particles come from various sources, such as vehicle emissions, industrial processes, construction sites, wildfires, and even natural sources like dust or pollen. Particulate matter is categorized based on the size of the particles, which affects how deeply they can penetrate into the respiratory system.