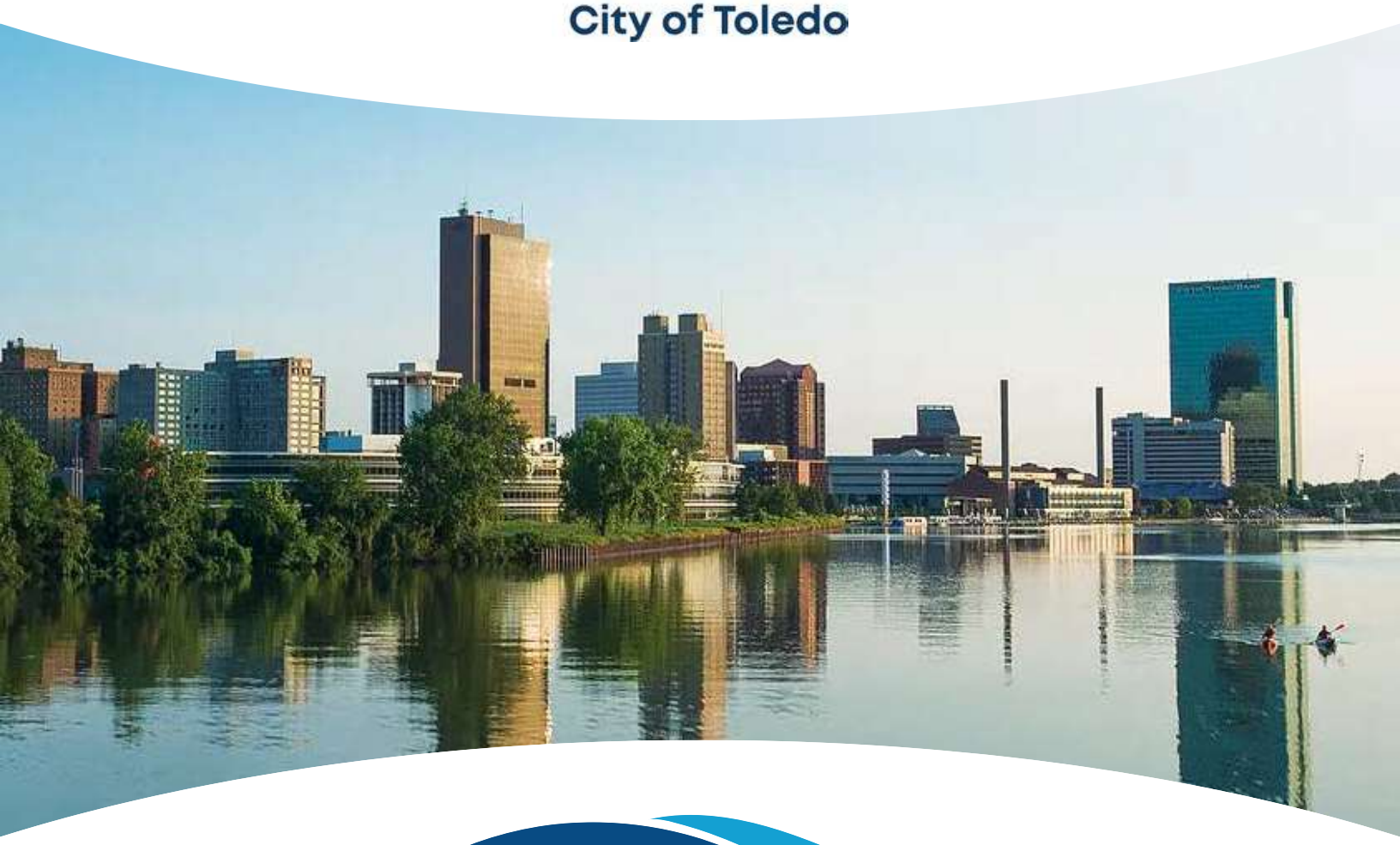
City of Toledo



CITY OF TOLEDO, OHIO

Municipal Climate Action Plan

June 2025

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This Plan reflects the values and priorities of our operations and builds on Toledo's commitment to environmental stewardship and collaborative planning. The insight and engagement of those who participated—whether by sharing feedback on the draft plan or attending stakeholder workshops —have been essential to shaping an ambitious, forward-thinking path toward a more sustainable and resilient future.

The Municipal Climate Action Plan was led by Dana Reising, Toledo's Sustainability Manager. Thank you to the authors, contributors and plan designers, Melanie Nutter, Katherine Lee, Benjamin Cavalier, and Jon-Paul d'Aversa, as well as to Nat Ziegler with Power A Clean Future Ohio (PCFO) for their support.

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We are grateful for the City-wide collaboration and shared vision that made this important milestone possible.

NUTTER CONSULTING

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Dear Community Members,

Our city stands at a pivotal moment where climate change is no longer a distant threat—it is here, affecting our environment, economy, and quality of life. The challenges are real–from rising temperatures and severe storms to flooding and threats to Lake Erie, As a city with a proud industrial heritage and a strong spirit of innovation, Toledo is ready to face those challenges and lead the way toward a more sustainable and resilient future.

I am honored to introduce Toledo's first Municipal Climate Action Plan. This plan is more than a planning exercise—it is a commitment to action. It outlines strategies to reduce our carbon footprint, strengthen our infrastructure, and create a healthier, more equitable Toledo for everyone.

Addressing climate change at the local level is not just a responsibility; it is an opportunity for leadership. Forward thinking cities like can make a real difference with the actions we take now and in the future. By improving energy efficiency in municipal buildings, expanding renewable energy use, enhancing our public transit system, and investing in green infrastructure, we recognize that leadership starts with greening our municipal footprint, and we are committed to further embedding sustainability into day-to-day operations.

This plan would not have been possible without the dedication and hard work of our city staff. Their expertise, vision, and commitment have been instrumental in developing a roadmap that reflects the needs and aspirations of our community. I want to extend my deepest gratitude to everyone who contributed to this effort. Your leadership and passion are driving positive change in Toledo, and I am proud to stand alongside you in this work.

Toledo is a city of resilience and progress. Together, we will build a future that is not only sustainable but thriving. I invite every resident, business, and organization to join us in this journey. The time for action is now, and Toledo is ready to lead.

Wade Kapszukiewicz

Wade Kapszukiewicz
Mayor, City of Toledo

Executive Summary

The City of Toledo's Municipal Climate Action Plan serves as a critical step toward building a more sustainable, resilient future for our community. This plan reflects Toledo's commitment to reducing municipal greenhouse gas emissions, enhancing environmental stewardship, and leading by example in the fight against climate change. Through data-driven analysis and cross-departmental collaboration, the City has identified key opportunities for improving operational sustainability while fostering long-term economic and social benefits for all.

Toledo, a city with a rich industrial history and a growing emphasis on sustainability, has already taken significant steps toward reducing its carbon footprint. In 2021, City Council adopted a goal to reduce greenhouse gas emissions by 30% from 2010 levels by 2030.

Reduce greenhouse gas emissions by 30% from 2010 levels by 2030

Efforts such as the Electric Lawn Mower Rebate Program and the RE-TREE Toledo initiative to plant over 10,000 trees exemplify the City's proactive approach. The Climate Action Plan builds on these initiatives by setting measurable goals and identifying strategies that align with Toledo's strategic priorities. The Council also created the One Percent for the Environment funding in 2022 to provide financial support for renewable energy, Lake Erie watershed conservation, and climate action.

A comprehensive greenhouse gas inventory was conducted as part of this plan to establish a baseline for municipal emissions and guide future reduction efforts. In 2023, Toledo's municipal operations emitted 93,815 metric tons of CO2e. Key sources of emissions included electricity (52%), solid waste (15%), and mobile combustion from city fleets (10%). The plan outlines actions to mitigate these emissions, including transitioning to renewable energy sources, enhancing waste management practices, and improving energy efficiency in City buildings.

Sources of emissions

52%
Electricity

15%
Solid Waste

10%
City Fleet

The Municipal Climate Action Plan identifies 72 strategic actions across these eight key sectors and strategies:

Overall Municipal Operations
Strategy 1: Establish the Toledo City government as a leader in sustainable operations

Buildings and Energy
Strategy 2: Increase renewable energy and reduce energy use in city-owned properties and assets

Transportation
Strategy 3: Enable the use of low carbon modes of transportation

Materials and Waste
Strategy 4: Reduce consumption and facilitate increased waste diversion

Water and Wastewater
Strategy 5: Conserve water resources and adapt land management practices for sustainable water use

Air Quality and Public Health
Strategy 6: Protect city employee health and well-being

Food Systems
Strategy 7: Prioritize and expand local food systems

Natural Areas and Land Use
Strategy 8: Maximize ecosystem services on city property

Each action is evaluated based on its potential impact, cost, and feasibility, ensuring that Toledo can achieve meaningful progress while maximizing available resources.

To ensure success, the plan establishes a structured implementation framework, including clear performance metrics, funding mechanisms, and timelines for action. This framework will allow the City to monitor progress, make data-informed adjustments, and remain accountable to its sustainability goals.

The Toledo Municipal Climate Action Plan represents a collective vision for a greener, more resilient future. Through continued collaboration and City leadership, Toledo is committed to making meaningful climate action a reality

Introduction

About Toledo

The City of Toledo was founded in 1837 along the western edge of Lake Erie, and is home to approximately 270,000 residents. In its early years, Toledo was built around manufacturing and industrial sectors due to its connection to the Great Lakes region as a port town with an exclusive canal network, as well as its location along the railway between Chicago and New York. A large automotive manufacturing sector contributed to its industrial identity, and Toledo earned the nickname of the Glass City, due to the abundance of glass manufacturers that once produced windows, bottles, glass art, and more.

Present-day Toledo continues to evolve as a hub for art, culture, and music, and is home to a number of theaters, performing arts institutions, and museums. The City also boasts its nationally-regarded Metroparks system, which has over 12,000 acres of public space spread across 23 metroparks and special use areas. Residents can enjoy more than 200 miles of trails, and the parks also provide space for an abundance of outdoor recreation activities including cycling, birding, camping, fishing, and much more.

Toledo has made previous efforts to improve sustainability around the community, and in 2021, the City Council passed a resolution to formally adopt a goal of reducing greenhouse gas emissions from their 2010 baseline by 30% by 2030. In support of this goal, the City spearheads a number of initiatives for the benefit of local residents.

RE-TREE TOLEDO

$6m
grant awarded

10,748
trees planted

56
public school students trained

In 2021, the City also conducted extensive urban heating mapping in partnership with the National Oceanic and Atmospheric Administration to better understand the effects of extreme heat on the local community. To help mitigate these local urban heat island effects, Toledo was awarded a $6 million grant in 2023 through the US Forest Service's Urban and Community Forestry Program for its "Restoring and Enhancing Tree Canopy for Resilience Equity and Engagement in Toledo" (RE-TREE Toledo) program, which will be used to plant 10,748 trees over a five year period while also providing career development opportunities to 56 public school students in the area through a paid summer training program. The City has also passed a resolution to begin working towards becoming a SolSmart designated community and is working to attain the Platinum level designation.

The One Percent for the Environment funding appropriation was created in 2022 by Council members Nick Komives, Theresa Gadus, and Sam Melden to provide financial support for renewable energy, Lake Erie watershed conservation, and climate action. It functions by capturing one percent of the annual General Fund and Capital Improvement Plan Budget and diverting it to a separate funding allocation specifically created to support climate and sustainability initiatives that may otherwise lack funding opportunities from the City or traditional financiers. This unique and innovative approach to funding climate action initiatives is one of the first of its kind, and it draws inspiration from "1% for the Arts" programs that have historically been used to fund public art installations. Toledo's adaptation of the funding mechanism is a testament to the City's bold commitment to advancing climate action and sustainability in creative manners. The development of this plan has identified key priorities and areas of opportunity that the City can begin to address with funding made possible through the One Percent funding allocation.[1]

City of Toledo Strategic Priorities and Values

This Municipal Climate Action Plan will serve as a guiding resource for the City of Toledo to identify key areas of opportunity, set measurable goals, and act on effective strategies for improving operational sustainability and reducing municipal emissions. By leading through example, the City can serve as a model for environmental stewardship and community resilience, while simultaneously fostering a sustainable and equitable future for all residents.

This plan will work to advance progress aligned with each of the City's strategic priorities. The advancement of sustainability and resilience initiatives that support climate action is cross functional and will also serve to improve operational efficiency and create a mission-driven culture where employees are able to contribute to meaningful efforts to uplift the surrounding community and build long term viability.

Core Values

- **Service Mindset:** Understanding the needs of our colleagues & community and responding with high-quality solutions
- **Belonging:** Feeling valued through positive connections with others
- **Sense of Purpose:** Committed to the outcome, knowing your direction and duty
- **Accountability:** Behaving the same way no matter who is present (or when no one is present)
- **Respect:** Recognition and appreciation of other people's values regardless of their status, views, or any other differences
- **Efficiency:** Prioritizing quality service while minimizing time, effort, and expense
- **Transparency:** Open and honest sharing of information and knowledge
- **Growth & Development:** Creating a growth-oriented atmosphere that empowers employees to develop knowledge and skills to advance in their careers

Strategic Priorities

- Improved Employee Culture
- Improved Operational Efficiency
- Improved Financial Stability
- Increased Business Investment
- Improved Neighborhood Safety
- Enhanced Neighborhood Quality
- Improved Residential Well-Being

Climate Change Impacts in Toledo

In 2024, Lucas County adopted an updated Hazard Mitigation Plan, providing a comprehensive assessment of the risks and vulnerabilities posed by natural and human-made hazards affecting the county and its municipalities. We conducted an in-depth review of climate-related hazards to evaluate potential risks to the Toledo community, analyzing sources including the 2024 Lucas County Hazard Mitigation Plan, the Midwest Chapter of the Fifth National Climate Assessment, and the 2021 Toledo Climate Change Vulnerability Assessment for Stormwater. This evaluation serves to inform targeted mitigation strategies and enhance the City's resilience to the anticipated effects of climate change. While the hazards below are ordered from high to low risk, it is important to address all risks that may impact our community, infrastructure, and environment.

Each hazard has four factors to describe risk:

1. **Risk Ranking:** Overall risk of the hazard, accounting for frequency, response, onset, magnitude, and projected impacts on businesses, people, and property

2. **Vulnerability:** Susceptibility of businesses, people, and property to negative impacts of hazards

3. **Probability:** Likelihood of the hazard occurring
   - Excessive (Frequent): Will occur during a year
   - High (Probable): Likely to occur in a year
   - Medium (Occasional): May or may not occur in a year
   - Low (Remote): Unlikely to occur in a year

4. **Impact:** Scope of geographic area that would be affected
   - Catastrophic: More than 50% of land area affected
   - Critical: 25-50% of land area affected
   - Limited: 10-25% of land area affected
   - Localized: Less than 10% of land area affected

High Risk Impacts

Flooding	
Risk Ranking: High	**Vulnerability:** Medium
Probability: Excessive (Frequent)	**Impact:** Limited

Flooding occurs when water covers land that's usually dry, either because of rising water levels or heavy rain. Since 1996, Lucas County has experienced 42 floods, resulting in approximately $77.6 million in property damage. As climate change continues, Toledo is likely to see more intense rainstorms, which can lead to flash floods. These floods can cause serious damage to homes and buildings, especially for low-income residents who may not have the money or resources to make repairs. Flooding can also overwhelm the City's stormwater system, pollute drinking water, damage roads, and interrupt transit services.

Harmful Algal Blooms	
Risk Ranking: High	**Vulnerability:** High
Probability: Medium (Occasional)	**Impact:** Critical

Harmful Algal Blooms, or HABs, happen when algae growth is uncontrolled. They produce toxins that can be dangerous to people, animals, and the environment. While they can occur naturally, things like climate change, fertilizer use, and pollution from cities and farms can make these blooms happen more often and make them more severe. HABs can kill fish and other water life, make drinking water unsafe, and hurt local economies by affecting tourism and fishing. Lake Erie has seen an increase in these harmful blooms. In 2014, toxins from a major bloom were found in Toledo's drinking water supply, leaving about 400,000 people without safe water for more than two days.

Severe Thunderstorms	
Risk Ranking: High	**Vulnerability:** High
Probability: Excessive (Frequent)	**Impact:** Catastrophic

Severe thunderstorms are powerful local storms with lightning and thunder that can bring strong winds, hail, tornadoes, and flash flooding. A thunderstorm is considered “severe” if it produces a tornado, wind speeds of 58 miles per hour or more, or hail at least one inch in diameter. These storms can damage homes, buildings, and key infrastructure, leading to property damage, power outages, and sometimes fires caused by lightning. Severe storms also pose health and safety risks, especially for people living in mobile homes, individuals experiencing homelessness, and those who rely on electricity for medical equipment. Since 1956, Lucas County has experienced 311 severe thunderstorms, about 4.5 per year, causing more than $4 million in property damage.

Severe Winter Weather	
Risk Ranking: High	**Vulnerability:** High
Probability: Excessive (Frequent)	**Impact:** Catastrophic

Severe winter weather includes blizzards, heavy snow, strong winds, ice storms, and dangerously cold wind chills. These storms can cause significant damage, such as collapsing roofs, freezing water pipes, and widespread power outages. They can also be a threat to people's health and safety; extreme cold is especially dangerous for infants, older adults, and anyone without reliable heat. Power outages during winter storms can leave people in cold homes, which is especially risky for those living in older or poorly insulated housing. Since 1996, Lucas County has experienced 38 severe winter storms, causing more than $9 million in damages. While climate change is expected to bring warmer winters overall, it is also expected to increase the likelihood of freezing rain, ice, and wet snow in some areas, increasing the risk of dangerous winter weather.

Medium Risk Impacts

Tornado	
Risk Ranking: Medium	**Vulnerability:** Medium
Probability: Low (Remote)	**Impact:** Localized

A tornado is a rapidly spinning column of air that extends from a thunderstorm to the ground, often bringing extremely high winds. Some tornadoes can reach wind speeds over 250 miles per hour. Although tornadoes are usually short-lived, they can cause major destruction, damaging buildings, uprooting trees, overturning vehicles, and putting lives at risk. Tornadoes are typically formed during severe thunderstorms. Since 1954, Lucas County has experienced 12 tornadoes, resulting in 210 injuries, 16 fatalities, and more than $32 million in property damage.

There is ongoing research into how climate change may affect tornado patterns. While scientists have not reached a consensus on whether tornadoes will become more frequent or intense, many experts agree that climate change is likely to increase the number of severe weather events in the Midwest, which could contribute to tornado risk.

Wildfires	
Risk Ranking: Medium	**Vulnerability:** Medium
Probability: High (Probable)	**Impact:** Localized

Wildfires are uncontrolled fires that spread quickly through vegetation and natural landscapes. While they can happen any time of year, they are most common during long periods of hot, dry weather. In Ohio, wildfire season typically occurs in the spring, before plants have fully grown, and in the fall, after leaves have dropped and dried out. Wildfires can be extremely dangerous, moving quickly and destroying homes, buildings, and natural ecosystems in their path. Although Toledo is considered a low-risk area for wildfires compared to other parts of the state, Lucas County still experienced 31 wildfires between 2018 and 2022, burning a total of 53 acres.

Climate change is expected to increase the risk of wildfires in the region. Warmer temperatures and more frequent extreme heat events can dry out vegetation, creating fuel for fires. In addition, climate change is altering the timing of seasons, causing shorter winters and delayed falls that may extend the length of wildfire season.

Severe Wind	
Risk Ranking: Medium	**Vulnerability:** Medium
Probability: Excessive (Frequent)	**Impact:** Critical

Severe winds refer to strong, damaging wind events such as derechos, downbursts, microbursts, and gust fronts. These events can be highly localized or spread across large areas. Severe winds are capable of causing significant property damage, particularly to mobile homes and other less structurally secure buildings. In addition to property damage, severe winds can pose health risks. Flying debris can cause injuries, and high winds can stir up dust, pollen, and other airborne particles, potentially leading to respiratory issues, especially for individuals with asthma or other respiratory conditions.

Since 1996, Lucas County has experienced 44 severe wind events. While no fatalities have been recorded, these events have caused nearly $12 million in property damage. As climate change continues to drive more frequent and intense extreme weather, the risk of severe wind events is expected to increase in the coming years.

Low Risk Impacts

Coastal Erosion	
Risk Ranking: Low	**Vulnerability:** Medium
Probability: High (Probable)	**Impact:** Localized

Coastal erosion is the gradual loss of land along the shore, caused by waves, wind, weather, and water currents. In Ohio, about 95% of Lake Erie's shoreline is shrinking. As lake levels rise and flooding becomes more common, buildings, roads, parks, and natural areas near the shore are at greater risk of damage. Lucas County borders Lake Erie and has over 8.5 miles of public shoreline and 15 access points that are vulnerable to this erosion. Climate change is making the problem worse by bringing more rain that raises lake levels and stronger storms with high winds that speed up shoreline loss.

Drought	
Risk Ranking: Low	**Vulnerability:** Medium
Probability: Low (Remote)	**Impact:** Critical

Drought happens when an area gets much less rain or snow than usual for an extended period of time, leading to water shortages. This can affect people, agriculture, and the environment. Long-lasting droughts can limit the availability of clean drinking water and can impact industries that use a lot of water, like farming and energy production. Drought can also negatively affect natural bodies of water and local ecosystems, leading to poor water quality and creating conditions that increase the risk of waterborne illnesses and mosquito outbreaks.

Lake Surge	
Risk Ranking: Low	**Vulnerability:** Low
Probability: Low (Remote)	**Impact:** Localized

Lake surge is a sudden rise in lake water levels, usually caused by strong winds, changes in air pressure, or extreme weather. During a storm, winds and temperature shifts can push water to one side of the lake, creating a storm surge. When the storm passes, the water can slosh back to the other side, a movement known as a seiche. Lake Erie is especially prone to large seiches because it is both shallow and stretches from west to east, which lines up with typical storm winds. The part of Lake Erie along Toledo is particularly shallow, making the shoreline more at risk for damage from these events. Since 1997, Toledo has experienced four major lake surges, each causing about $100,000 in property damage on average. Climate change is expected to make lake surges more severe, as it brings more rainfall, higher lake levels, and stronger, more frequent storms.

Landslides	
Risk Ranking: Low	**Vulnerability:** Medium
Probability: High (Probable)	**Impact:** Localized

Landslides occur when soil, rocks, or debris move quickly down a slope, often after heavy rainfall. These sudden movements can be dangerous, damaging buildings, roads, and other infrastructure, and putting people at risk. While Toledo is not considered a high-risk area for landslides, the Ohio Department of Transportation has identified 40 landslide sites in Lucas County—all rated at the lowest risk level. Only two landslides have been recorded in Toledo since 1997. However, as climate change brings more frequent and intense rainstorms, the risk of landslides in the region could increase.

Temperature Extremes	
Risk Ranking: Low	**Vulnerability:** Medium
Probability: Medium (Occasional)	**Impact:** Catastrophic

Temperature extremes refer to periods of unusually high or low temperatures that significantly exceed historical norms and pose risks to public health and infrastructure. These conditions are generally defined as temperatures approximately 10 degrees above or below the average high or low for a given location and time of year.

Extreme cold can result in infrastructure damage—such as frozen or burst pipes—and negatively impact agriculture by damaging crops and livestock. It also presents serious health risks, particularly for vulnerable populations such as infants, older adults, and individuals lacking adequate shelter or heating, as exposure can lead to hypothermia and frostbite. Extreme heat poses similar public health concerns, including increased risk of heat exhaustion, heat stroke, and other heat-related illnesses. In urban areas, these effects are often intensified by the urban heat island effect, where built environments like roads and buildings absorb and retain heat, raising local temperatures.

Climate change is projected to reduce the frequency of extreme cold events while increasing the number and intensity of extreme heat days in Toledo.[2] Over the last three decades, the number of days exceeding 90°F has risen from an average of 19 days per year to 29 days currently. This figure is expected to increase to 38 days annually over the next 30 years.[3]

Proactively planning for the harmful effects of climate change is essential to safeguarding communities and creating long-term sustainability. This review of the climate-related hazards was used as a basis for prioritizing strategies and actions to address the most urgent risks, and position the City to drive impactful change. Through focused action that reduces greenhouse gas emissions, mitigates environmental damage, and fosters a sense of responsibility for shared spaces and resources, the City of Toledo can minimize risks posed by the changing climate and foster a community that is resilient for generations to come.

The Source of Local Municipal Greenhouse Gas Emissions

A greenhouse gas (GHG) inventory is an accounting of the emissions of greenhouse gases, such as CO_2, methane, nitrous oxide, and fluorinated gases, which result from the different processes that support everyday life within Toledo. An inventory itself does not interpret results, but simply provides data in an objective manner for further analysis, and contributes to a comprehensive understanding of the city's environmental footprint.

In examining the data, it becomes possible to prioritize interventions, allocate resources effectively, and set measurable goals for transitioning toward a low-carbon future. The GHG inventory informs the strategies included later in this plan by identifying which sectors that will make the biggest impact on GHG emissions in Toledo.

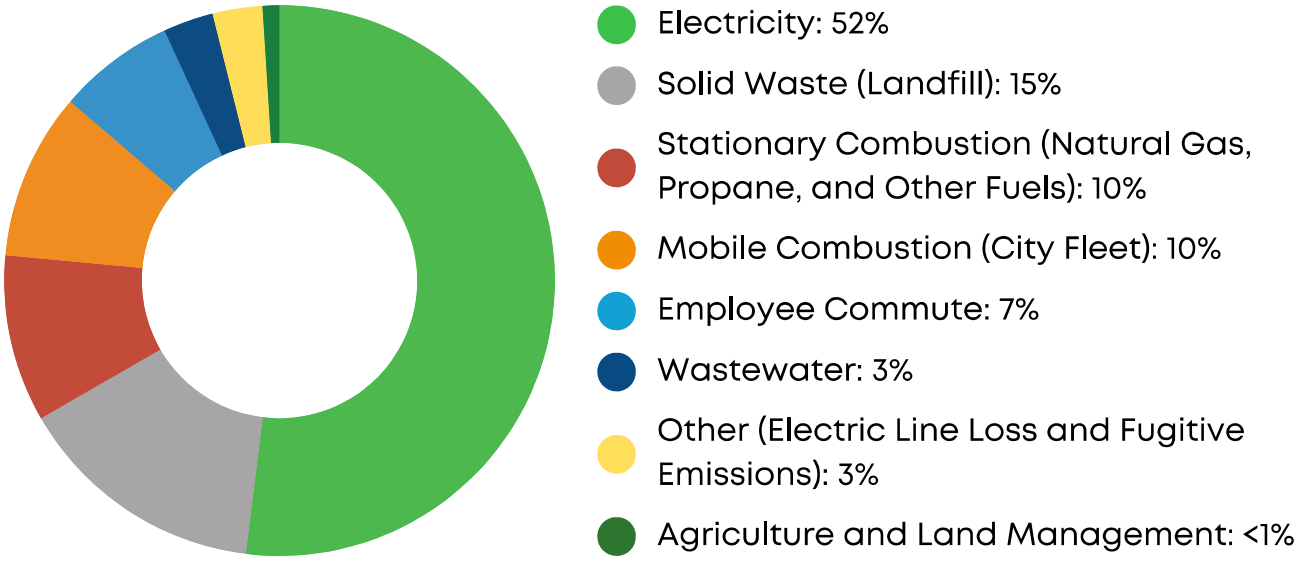
There are three different categorizations, or "scopes" of emissions that help to distinguish the relationship between the original emission sources and the resulting carbon footprint of a given entity.

Scopes of Emissions

- **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:** Generally emissions that happen outside of the city boundary and are indirect emissions, but are related to activities occurring within the City of Toledo's operations.Emissions from purchased goods and services and business travel are examples. (See Appendix A for more information).

A greenhouse gas inventory of City operations was completed as a part of this plan's development to highlight areas of highest concern and opportunity. By considering this inventory as a baseline from which to advance climate action, the strategic actions identified in this plan can be measured and tracked precisely.

Total emissions from City operations in 2023 were 93,815 MT CO2e. The GHG inventory broke down these emissions by activity and found the following percentages:



The inventory also found that 38% of the municipal operations were Scope 1, 55% were Scope 2, and 7% were Scope 3 (more details on Scope 3 emissions are included in Appendix A). This indicates that 55% of the total emissions associated with Toledo's municipal operations were actually produced indirectly and associated with the City due to high energy consumption rates. Waste, mobile fuel consumption, and employee commutes all also contributed significantly to the overall footprint.

Analyzed by type of greenhouse gas, the highest source of emissions is carbon dioxide, followed by methane and nitrous oxide respectively. The percentage of net greenhouse gas emission by type are:

- Carbon dioxide (CO2): 75.3%
- Methane (CH4): 20.5%
- Nitrous oxide (N2O): 4.2%

In 2023, the City offset approximately 22,512 MT CO2e through its Urban Forestry as well as RECS and PPAs. This brought the total net emissions to 71,303 MT CO2e for Municipal Operations.

Toledo will continue to expand its understanding of local emissions through partnering on a forthcoming County-wide greenhouse gas inventory. This inventory will create a more comprehensive picture of emissions across the Toledo community that includes additional components such as commercial, residential, and industrial sectors.

Developing the Municipal Climate Action Plan

The development of this Municipal Climate Action Plan took place through an iterative process involving comprehensive data analysis, cross-departmental collaboration, and extensive committee engagement to address climate change at the local level. A baseline analysis of Toledo's municipal greenhouse gas inventory was used to identify sectors of City operations, such as energy, transportation, and waste management, that have contributed significantly to the overall emissions footprint. This served as a foundation for setting clear and actionable emissions reduction targets.

Complementary to the municipal greenhouse gas inventory, we conducted a comprehensive plan and programming review of 13 existing City plans and policies, 14 data reports and assessments, as well as 8 regional plans and reports. Documents of note included the Forward Toledo Sustainability Strategies (2023), the Department of Utilities Sustainability Strategic Plan (2020), the Toledo-Lucas County Sustainability Plan (2014), and the Lucas County & Toledo EV Infrastructure Roadmap. The review of these documents helped to ensure that the finalized Municipal Climate Action Plan for the City of Toledo will align with existing priorities of both the City and the region, and leverage all existing climate action and sustainability progress to harness the power of collective action.

Plan and Programming Review

13	14	8
City plans and policies	**Data reports and assessments**	**Regional plans and reports**

To pair with the data-driven foundation and better inform the development of Toledo's climate action objectives, the City's Staff participated in a Visioning Workshop to establish priorities for improving the carbon footprint of City operations in a timely and equitable way. This input ensured that the plan reflects local priorities and effectively considers local challenges. The collaboration process was a critical component of fostering a shared sense of ownership, agency, and responsibility for the plan's successful deployment.

By synthesizing the takeaways from the greenhouse gas inventory and the feedback from the visioning workshop, the project team created strategies and specific actions to achieve city goals. To gather feedback on proposed actions, the City conducted a second Strategy Workshop with cross-departmental staff and partners from other local public agencies. In the workshop, staff voted on actions, providing insights on priorities for implementation. Additionally, staff proposed additional action ideas and suggested potential partners.

Informed by staff priorities, existing initiatives, and best practices, the project team created a comprehensive list of 72 actions across eight sectors. Each action included in the plan is contextualized with its potential GHG emissions, estimated cost, and expected timeline for implementation. This helps to distinguish between high- and low- impact actions as well as those with higher or lower capacity requirements for deployment.

Finally, the plan outlines a comprehensive implementation framework for the actions identified throughout the planning process. This framework considers timelines, funding mechanisms, the City's priorities, and more to chart a feasible path forward that balances long-term impact with speed of implementation. The implementation framework also identifies performance metrics that can be used to monitor and report progress. Through the holistic development of this plan, the City of Toledo has adopted a powerful tool for advancing climate action locally and creating a more sustainable and resilient community.

Taking Municipal Action:
Climate Strategies and Actions

The Municipal Climate Action Plan positions the City of Toledo to guide climate action for years to come. The plan outlines 72 recommended actions that span eight sectors: Overall Municipal Operations, Buildings and Energy, Transportation, Materials and Waste, Water and Wastewater, Air Quality and Public Health, Food Systems, and Natural Areas and Land Use. Each sector represents a core component of either the City's operational responsibilities, or areas of influence where the City can concentrate its programming to drive the most effective change. The sectors collectively establish a comprehensive approach to improving local sustainability and resilience.

To help contextualize the actions, we have identified their GHG emission reduction potential, projected costs, and anticipated timelines that summarize the important factors to consider for implementation.

One Goal: Make City Operations More Sustainable

While this Plan covers a range of sectors and identifies numerous actions to mitigate climate change in Toledo, the plan codifies one overarching goal: Make City operations more sustainable.

This goal encompasses initiatives and objectives that cover a wide range of municipal operations and activities, each of which contribute to the greater mission of reducing City-wide emissions. The plan identifies actions that have a mix of scale and implementation readiness to encourage both short- and long-term action and highlight the importance of action in the aggregate. Though some actions may have smaller impacts than others, the value of each action collectively will help the City achieve more sustainable operations.

The plan's 72 action recommendations are organized into tables with key implementation considerations:

1. **Greenhouse Gas (GHG) Reduction Potential:** Describes the greenhouse gas emission reduction potential through the implementation of the action. *High, medium, and low.*
2. **Cost:** Benchmarks the cost of implementation to the City government for the overall action. *Low (less than $100,000), medium ($100,000 - $500,000), and high (over $500,000).*
3. **Timeframe:** Offers an estimated timeframe for implementation. *Short (1-2 years), medium (3-5 years), and long (over 5 years).*

Overall Municipal Operations

The City of Toledo has demonstrated a continued resolve to advance climate action and build a sustainable community through previous and ongoing efforts. In 2021, the City Council adopted a goal of reducing emissions by 30% by 2030 which was supported through their hiring of Toledo's first Sustainability Manager, as well as a Sustainability Coordinator within the Department of Public Utilities. To build capacity, the City has also launched an Environmental Protection and Climate Resilience Commission, which is tasked with oversight duties encompassing a wide range of sustainability improvements, including sustainable growth management, water quality, solid waste disposal and energy and efficiency.

Toledo has not only demonstrated an eagerness to pursue aggressive climate action and increase sustainability, but they have embraced innovation. The City recently established a 1% for the Environment Fund, which is the first of its kind in the nation. The fund will divert 1% from the City's General Fund towards specific projects and funding allocations identified within this plan that foster climate resilience and environmental protection.[4] This official allocation of these resources streamlines the process through which climate action projects can be identified, planned, and implemented.

Toledo's focus on improving the sustainability of municipal operations demonstrates forward-thinking and leadership that will establish a strong foundation for continued climate action. By minimizing the City's carbon footprint, Toledo can preserve the local environment while protecting the health and wellbeing of both its employees and the broader community.

Our goal is to reduce greenhouse gas emissions by
30% from 2010 levels by 2030

Strategy 1: Establish the Toledo City government as a leader in sustainable operations

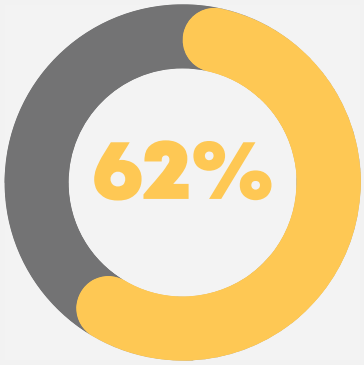
Municipal governments play a pivotal role in driving effective climate change due to their local authority and connection to the community. They have extensive roles and responsibilities related to the management of local resources, waste, and infrastructure, and as such can create a supportive foundation that fosters community-wide adoption of sustainable thinking. Through proactive and collaborative leadership, the City of Toledo can set an example for broader community-wide initiatives while growing community trust and participation. The City had previously approved a goal of reducing its emissions by 30% by 2030 from the 2010 baseline, but now plans to adopt goals and strategies that will pursue net-zero more aggressively. Advancing climate action in Toledo's municipal operations is a crucial component of fostering a healthier and more resilient community.

Toledo can achieve this by codifying updated emissions goals that set the pace for effective climate change mitigation. To accompany these goals, consistent and transparent data practices such as updated emissions inventories and climate action progress can be captured and communicated to both the City and its greater community to create a culture of both trust and accountability. By prioritizing initiatives, programs, and policies that center environmental health and long-term community sustainability, the City of Toledo can mitigate environmental externalities, effectively adapt to the changing climate, and achieve economic benefits associated with these actions, all while setting an example for the greater community through leadership.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 1.1: Set a GHG emission reduction target for municipal operations to be 50% by 2030 and net zero by 2050	High	Low	Short
Action 1.2: Update municipal GHG Emission Inventory every 5 years	Medium	Low	Short
Action 1.3: Dedicate One Percent for the Environment funds on community-facing initiatives that decrease GHG emissions, advance equity, and improve sustainability	Medium	Low	Long
Action 1.4: Launch a Climate Action Plan dashboard and report on progress to the city employees and the public	Low	Low	Short
Action 1.5: Establish sustainability criteria into planning and decision-making for capital improvement projects	High	Low	Medium
Action 1.6: Establish a green bank or revolving loan fund to recapitalize elective pay funds	Medium	Medium	Medium
Action 1.7: Join the Urban Sustainability Directors Network (USDN)	Low	Low	Short

Buildings and Energy

Buildings account for



of municipal GHG emissions

Nationwide, buildings and their energy use are consistently a major source of emissions, and in 2022, it was estimated that they accounted for 31% of the total US GHG emissions.[5] According to the municipal GHG inventory, stationary combustion and energy consumption from day to day operations contributed to 62% of the total municipal emissions. This includes emissions that come directly from fossil fuel combustion activities necessary for heating, cooking, and other on-site operations like air conditioning and waste disposal. Indirectly, emissions tied to the production of energy consumed by buildings are also associated with their overall footprint, so effective emissions reductions measures must address both usage efficiency and energy sourcing.

Existing Progress

As a regional population center with an industrial history, there are many opportunities to reduce emissions through initiatives focused on improving building and energy systems in Toledo, which the City has begun to capitalize on.

In 2024, the City applied for and achieved Solsmart Bronze status, designating Toledo as a municipality that holistically supports renewable solar energy through friendly policies and permitting processes. Through this program, the City will also receive technical assistance to help expand deployment of solar energy within its jurisdiction. Bronze is the first level of recognition, and the City can continue its progress of fostering a renewable energy friendly ecosystem by achieving Silver, Gold, or Platinum recognition.[6]

Within the codified municipal code, Toledo Public Power resolved in 2007 to utilize power derived from alternative or renewable sources “to the extent possible”. Though the code does not bind it to explicitly-outlined requirements, the early recognition that green power would be a necessary factor to prioritize in the coming years is demonstrative of Toledo's progressive approach to support sustainability initiatives early and often.[7]

27,000

streetlights converted to LED

$580k

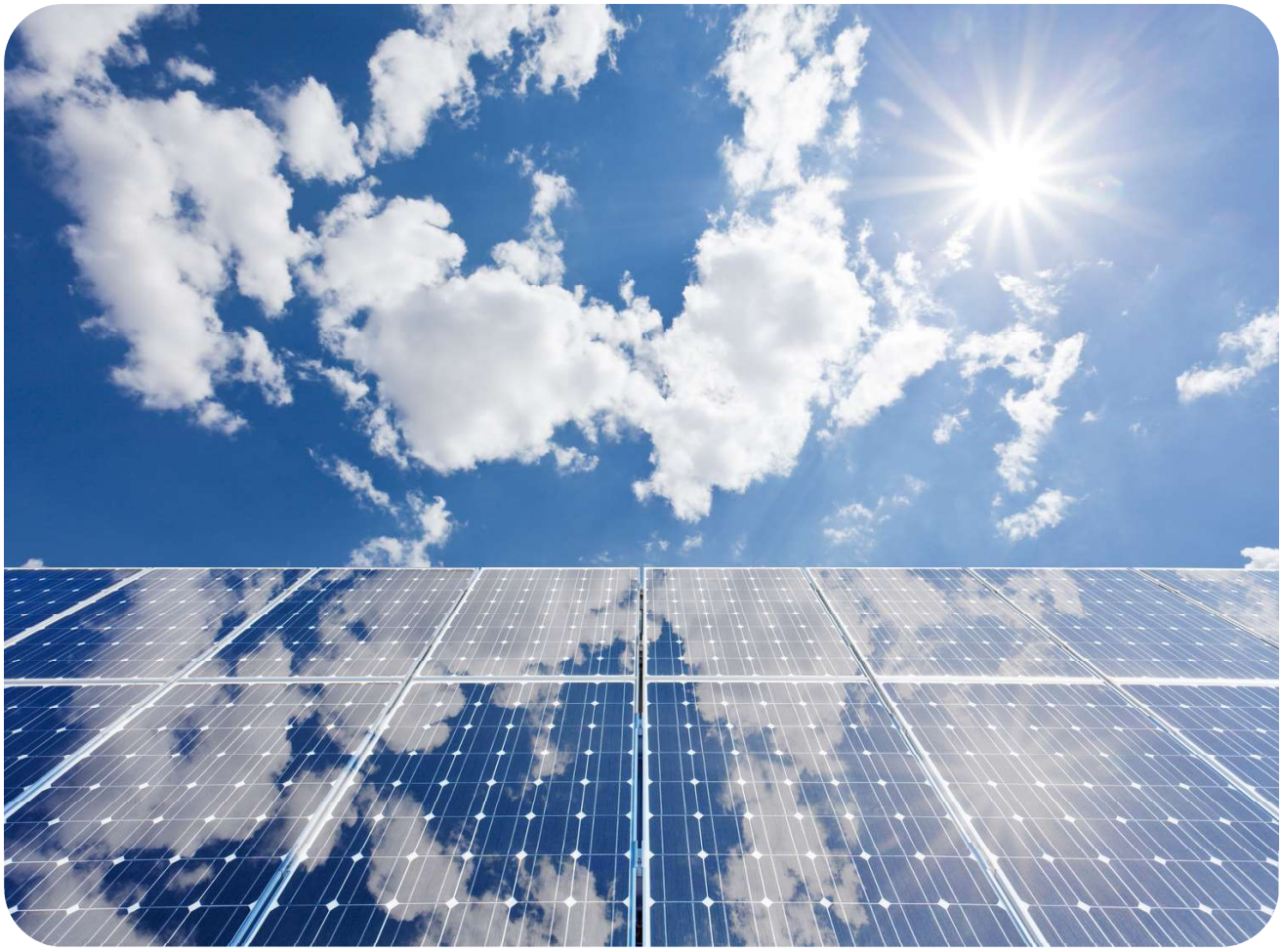
annual cost savings

The City partnered with Toledo-Edison in 2021 to replace nearly 27,000 conventional high-pressure gas streetlights with their LED counterparts. This project provided a number of significant and immediate improvements: the streetlight bulbs now have an expected lifespan of 15-20 years as opposed to 3-5 years, and owing to efficiency improvements of an estimated 50%, the City expects to save around $580,000 annually on energy costs. Additionally, most of the interior lighting in municipal facilities has been converted to utilize LED bulbs, and the City is working on reaching 100% conversion.[8]

From its $180.9 million American Rescue Plan Act award from 2021, Toledo allocated $3 million towards capital improvements for the municipally-owned community and senior centers. Additional funding was sourced from the City’s Capital Improvement Plan ($1 million) and from Section 108 ($4.5 million). This project has been ongoing since 2023, and began with facility condition assessments and energy audits for each of the six centers to identify the most impactful improvements, which include but are not limited to HVAC systems, roofs, plumbing and electrical systems, and other site improvements. The project expects to provide more resilient public facilities that support community care and inclusion through shelter, food, childcare, mentoring, exercise, and recreational opportunities.[9]

Strategy 2: Increase renewable energy and reduce energy use in city-owned properties and assets

The City can improve energy efficiency in its portfolio of buildings with methods such as upgrades to insulation, window and door sealing, upgraded heating and cooling systems, and smart systems that monitor and control energy consumption, such as lighting and temperature control, more dynamically. There are a number of opportunities that the City can explore to increase accessibility of renewable energy such as municipal solar panels and community choice aggregation. Through programming designed to reduce these emissions, Toledo can get first hand experience working with energy efficiency improvement providers and renewable energy developers in a way that will inform the City of translatable tips and best practices that can be shared with the greater community in future larger-scale initiatives. City staff noted during the Visioning Workshop that the City has excess real estate square footage for City buildings which results in paying more energy bills than needed. By assessing and consolidating the City's real estate portfolio, the City can save money while reducing its greenhouse gas emissions as well.

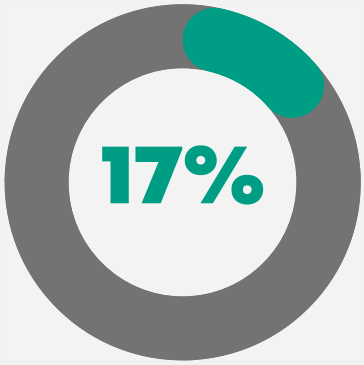


Actions	GHG Reduction Potential	Cost	Timeframe
Action 2.1: Apply to obtain SolSmart Platinum designation by 2030	Medium	Low	Long
Action 2.2: Pursue WindSmart Designation	Medium	Low	Long
Action 2.3: Determine the role of Toledo Public Power in increasing renewable energy supply for municipal facilities	Low	Low	Medium
Action 2.4: Conduct a Municipal Building Solar Feasibility Study, including rooftop solar and solar canopies at City properties	Low	Low	Medium
Action 2.5: Install renewable energy at municipal facilities	High	Medium	Medium
Action 2.6: Investigate opportunities to develop microgrids alongside solar arrays	Medium	Medium	Medium
Action 2.7: Complete conversion of City-owned outdoor lighting to LEDs	Medium	Medium	Medium
Action 2.8: Update energy efficiency assessments for municipal facilities, including an evaluation of HVAC and other heating equipment	Low	Low	Medium
Action 2.9: Implement ENERGY STAR Portfolio Manager to analyze building energy use	Medium	Low	Short
Action 2.10: Implement energy efficiency improvements through a revolving loan fund or Guaranteed Energy Savings Contract (GESC) in facilities with the highest energy usage	High	Medium	Medium

Actions	GHG Reduction Potential	Cost	Timeframe
Action 2.11: Design and launch a City employee outreach and education campaign on energy efficient habits	Low	Low	Short
Action 2.12: Require municipal facilities to consider energy efficient appliances for all replacements	Medium	Medium	Long
Action 2.13: Implement building automation systems in municipal buildings to reduce energy demand from heating, lighting, and other sources	Medium	Medium	Medium
Action 2.14: Adopt a Sustainable Building Policy which requires the use of green building practices and sustainable materials by following LEED standards (or an equivalent certification) for new construction, major renovations, and preventative maintenance of City facilities	Medium	Low	Medium
Action 2.15: Assess the City's real estate portfolio and "right size" city owned, rented and operated property	Low	Low	Medium
Action 2.16: Create and display educational materials on the sustainability features of the community centers and how the spaces can be used sustainably	Low	Low	Short
Action 2.17: Pilot the use of cool roof materials and examine policy options to require cool roofs for roof replacement on municipal buildings	Low	Medium	Medium

Transportation

City fleet and commuting account for



of municipal GHG emissions

Mobile combustion representing the City's fleet and employee commutes accounted for a combined 17% of the total municipal emissions inventory, presenting a significant opportunity for efficiency improvements and reduced emissions. Traditional modes of transportation depend heavily on personal vehicles which have high emissions per capita due to their inherent inefficiencies. Due to the space-intensive infrastructure necessary to support personal-vehicle based transit, this mode can contribute to inefficient, low-density development sprawl that can hamper the mobility of local community members. Supporting the advancement of zero-emissions vehicles, public transportation, active transportation, and associated infrastructure can increase equity of mobility within the community and provide transit options that are healthier, more community-centric, and offer reduced GHG emissions.

Existing Progress

Through Power A Clean Future Ohio's no-cost technical assistance program, a Fleet Electrification Analysis was conducted for Toledo's fleet in 2023. This assessment analyzed the current fleet to identify the different types of vehicles the City uses in its day-to-day operations, which in turn shed light on areas of high municipal transportation emissions. The report also provided cost-benefit analyses on a per-mile basis of factors like insurance cost, maintenance cost, fuel cost, depreciation, and charging infrastructure cost. By applying this framework to different components of the fleet, the assessment helped to identify vehicle types owned by the City that would be more cost effective to electrify soon and those that may be better to postpone. This report serves as a comprehensive snapshot in time of the existing fleet and provides ideas and recommendations for improving its emissions and overall cost effectiveness.[10]

In tandem with the fleet electrification assessment, Toledo also participated in the DOE's Charging Smart Program, which provides free technical assistance for local governments to shape and adopt policies, practices, and incentives that foster a supportive ecosystem for smooth and rapid EV charging infrastructure expansion. The City's participation resulted in an additional fleet assessment which identified the top 100 vehicles recommended for replacement, in addition to similar cost-per-mile analysis as conducted in the PCFO fleet analysis.[11] Additionally, a Lucas County and City of Toledo Electric Vehicle Infrastructure Roadmap was created to establish a framework to guide the governments through processes like effective siting, assessment of community demographics and identification of vulnerable populations, as well as overviews of state and federal funding opportunities. Following the completion of the fleet assessments and the EV Charging Infrastructure Roadmap, the City passed a resolution codifying its intent to replace old and least low efficiency vehicles with efficient and cost effective electric vehicles.[12]

On the active and low carbon transit side, Toledo has supported multiple projects that improve pedestrian and biking infrastructure, incentivizing healthier lifestyles and outdoor recreation. In addition to the Glass City Riverwalk project, which will expand walking and biking trails on both sides of the Maumee River, Toledo was also awarded a $28 million grant in 2024 for the Riverfront Infrastructure Vitality and Equity Restoration Project that reconnects residents of East Toledo to greenspace, economic opportunity by enhancing access across Front Street to downtown Toledo.[13] The project expanded mobility opportunities for pedestrians, cyclists, and people with disabilities, and contributes to the City's broader Trail Network that increases active transportation connectivity among different neighborhoods and downtown Toledo.

Strategy 3: Enable the use of low carbon modes of transportation

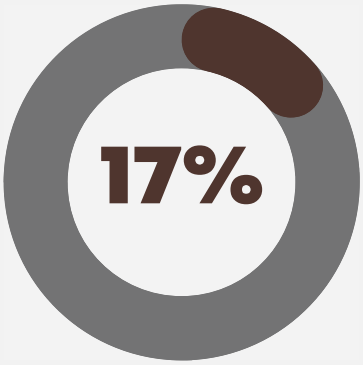
To support municipal operations, employees of the City of Toledo commute to and from work, and the City's fleet is used in and around the community. The City of Toledo can lead the way for transition to low carbon modes of transportation by identifying opportunities to electrify the municipal fleet, and increasing the amount of EV charging infrastructure to support this, in addition to the co-benefits of providing increased charging access to the community. To support the use of more active modes of transportation, Toledo can create policies that promote cycling and pedestrian infrastructure to support active transportation as a viable alternative to car commuting.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 3.1: Establish a goal for the transition of the City fleet to EVs	High	Low	Short
Action 3.2: Establish KPIs for the EV Procurement Resolution	Low	Low	Short
Action 3.3: Explore opportunities to purchase EVs through a bulk purchasing or group purchasing arrangements	Medium	Medium	Medium
Action 3.4: Require any new construction of a municipal facility to be EV ready with parking facilities	Medium	Low	Medium
Action 3.5: Assess existing charging infrastructure and install additional EV chargers on City-owned property	Medium	High	Medium
Action 3.6: Transition heavy-duty equipment and vehicles to electric models or low-carbon fuels	High	High	Long
Action 3.7: Develop and pass an anti-idling ordinance for all City vehicles	Medium	Low	Medium

Actions	GHG Reduction Potential	Cost	Timeframe
Action 3.8: Create and launch a training program for employees operating the City fleet to reduce idling and promote fuel efficient driving practices	Medium	Low	Short
Action 3.9: Conduct a City employee commuter survey	Low	Low	Short
Action 3.10: Provide incentives for City employees to transition from single-occupancy vehicles to other commuting modes, such as public transit, carpooling, biking, and walking	Medium	Low	Short
Action 3.11: Increase capacity of bike racks and storage on City property	Low	Low	Short
Action 3.12: Evaluate the City's remote working policy and invest in teleconferencing infrastructure to reduce employee commuting	Medium	Medium	Medium

Materials and Waste

Waste accounts for



of municipal GHG emissions

The emissions from waste generated through municipal operations in Toledo accounted for 15% of the total municipal GHG inventory. The production of materials and the management of waste are both resource and energy intensive processes that contribute significantly to greenhouse gas emissions and other environmental impacts. Organic materials in landfills decompose anaerobically (without oxygen) and create methane, one of the more detrimental greenhouse gases. Through responsible material procurement and waste management practices, the City can reduce overall demand for resources and curtail negative byproducts of waste management such as high transportation costs and fugitive methane emissions.

Existing Progress

Residents of Toledo are eligible for a number of waste diversion opportunities offered by the City. Primarily, there is a single stream residential curbside recycling program that allows residents to recycle paper, cardboard, metal, plastic containers, glass, and cartons. There are additional drop off centers located around the County for expanded recycling access, and the Lucas County Solid Waste Management District provides an “LC Recycles” app to keep residents informed on best practices, collection schedules, and other information pertaining to local recycling.[14]

Lucas County is working to construct a new Material Recovery Facility (MRF) online that will provide additional capacity for local recycling efforts. The facility is currently being constructed and is expected to be operational by the end of 2026. Through its development, the City of Toledo will lower both its recycling transportation costs as well as the emissions associated with its processing. As part of the development process, Lucas County was awarded a $7 million grant which will be used for an environmental remediation project on a portion of the MRF facility site.[15]

In 2023, Toledo launched a food waste composting pilot program in a partnership with Metroparks Toledo and Keep Toledo Lucas County Beautiful to manage three new food waste drop off locations at Swan Creek Metropark, Glass City Metropark, and the Toledo Botanical Gardens. This initiative aims to reduce the amount of organic material entering local landfills, which can often lead to unintended methane emissions as a result of anaerobic digestion.[16]

Other initiatives that address local material usage and waste management include the adoption of a paperless permitting system that cuts down on the City's resource consumption, as well as an annual leaf collection program, and frequent Clean Toledo Recycling Events that provide residents with opportunities to get rid of items that may hold reuse value or be harder to recycle.

Strategy 4: Reduce consumption and facilitate increased waste diversion

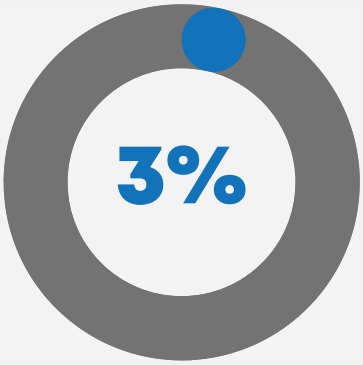
Comprehensively addressing climate change requires attention to both the beginning and end of a material or resources life cycle. The City can support improvements in this sector through efforts such as waste diversion, recycling programs, and other material reuse initiatives that promote responsible sourcing and continued material management processes. Collectively, these actions can help to lower emissions and operational costs, while promoting a more circular environment.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 4.1: Set a recycling rate goal for waste generated at City facilities	Low	Low	Short
Action 4.2: Conduct an assessment of how much waste is currently recycled at City facilities	Low	Low	Short
Action 4.3: Assess the Hoffman Road office recycling pilot and use learnings to implement full recycling at all City facilities	Medium	Low	Medium
Action 4.4: Design and launch a recycling and composting training program for all City employees	Low	Low	Short
Action 4.5: Mandate that all City hosted and sponsored events work toward zero waste with recycling, composting and no disposables	Low	Low	Medium
Action 4.6: Expand composting drop-off sites to service all City facilities	Medium	Medium	Medium
Action 4.7: Set up a pilot program to utilize compost for end use on City property	Medium	Low	Medium

Actions	GHG Reduction Potential	Cost	Timeframe
Action 4.8: Train City landscapers on best practices composting yard waste and other compostable materials	Low	Low	Short
Action 4.9: Conduct periodic waste audits of the municipal waste stream and provide education to City staff	Low	Low	Medium
Action 4.10: Adopt a Sustainable Purchasing Policy to prioritize local, sustainable, and recycled materials	Medium	Low	Medium
Action 4.11: Implement a City-wide paperless initiative to identify ways to reduce paper usage and increase efficiency	Medium	Low	Medium
Action 4.12: Implement an employee incentive program to highlight ways to reduce waste from City operations	Low	Low	Medium
Action 4.13: Explore opportunities for methane capture at the Hoffman Road Landfill and the Bay View Wastewater Treatment Facility	Medium	High	Long

Water and Wastewater

Wastewater accounts for



of municipal GHG emissions

While wastewater only accounted for 3% of the municipal operations carbon footprint, wastewater treatment plants also likely contribute to a significant portion of the municipal electricity consumption, which accounts for 52% of the overall inventory. Access to clean and reliable water sources is a critical component of a resilient community, and the changing climate will continue to bring more extreme temperatures, precipitation events, and extended periods of drought, all of which can increase the risk factor for local water supplies. Improper overuse of water reserves can quickly create community allocation risks, and the effects of flooding and sewage overflow can damage or destroy existing water treatment and distribution infrastructure.

Existing Progress

Toledo has made significant strides towards improving its water usage and wastewater management practices. In 2020, the Department of Public Utilities adopted a Sustainability Plan which guides the Department in establishing priorities and understanding strengths and weaknesses. The plan also identifies a path forward to improve the sustainability of the operations. The adopted Plan codified goals such as increasing natural stormwater management infrastructure by 50% by 2040, and reducing current energy use by 50% by 2040.[17] It has guided the Department of Public Utilities towards integrating sustainability as a foundational component of its operational philosophy.

Department of Public Utilities 2040 Goals

Increase natural stormwater management infrastructure by 50%

Reduce energy use by 50%

In November 2023, residents of Toledo voted in favor of allocating approximately $627 million of City funding over the course of 10-15 years for major upgrades to the Bay View Wastewater Treatment Plant. Bayview was originally constructed in 1926 and has not had a major overhaul in close to 40 years. The City's investments will occur in stages. The first five years are expected to see $329 million allocated towards systems and process improvements that include the use of gravity thickeners, building and dewatering processes, and digesters with accompanying gas systems. The improved plant will more reliably provide safe drinking water to the community, in addition to providing benefits such as biogas recovery that can be used as an alternative fuel source.

The Department of Public Utilities received a Silver Peak Performance Award in 2019 from the National Association of Clean Water Agencies for its excellence in providing clean water and promoting responsible water use.[18] The Water section of the Department of Public Utilities has also spearheaded an Advanced Metering Infrastructure project that replaced nearly 116,000 water meters with smart counterparts, enabling live performance metrics and reporting that helps in identifying leaks and errant usage earlier to reduce waste.[19]

In 2020, the City of Toledo completed work on Phase One of a Delaware Creek restoration project that focused on minimizing erosion and reducing stormwater runoff while improving water quality and local habitats. This phase included the installation of three rain gardens to improve stormwater management capacity, and was funded through grants from the Ohio Lake Erie Commission and the EPA Great Lakes Restoration Initiative. Phase Two, which is scheduled to be completed in 2025, will focus on reducing high volume and velocity runoff that erodes the creek banks and is expected to support better benthic and aquatic habitats.[20]

The City of Toledo Parks Department is investing over $20 million in conducting water quality projects Jermain Park, Collins Park, Detwiler Park, Bandore Park, the Maumee River Island restoration as well as at the City's newest addition to the Park system - the Penn 7 project. This 59 acres project was transformed from a disposal site filled with invasive plants and sediment dredge to a healthy wetland with a thriving wildlife habitat. It will open as a public park, on the Maumee River, by the fall of 2025.

At the community level, the City of Toledo engages residents in initiatives to increase water conservation and reduce stormwater runoff. Through the Toledo Metropolitan Area Council of Governments (TMACOG), the City supports the Lake Erie Starts Here public education campaign, engaging residents in stormwater management best practices to protect water quality in Lake Erie. In addition, the Toledo-Lucas County Rain Garden Initiative is helping to promote more widespread natural stormwater management practices that also contribute to improved city aesthetics. This partnership, which consists of government agencies, businesses, educational institutions, environmental organizations, and private citizens helps to educate the community about the issues pertaining to stormwater pollution, and how rain gardens can be an effective mitigation technique. They provide technical assistance and training to help expand access and capability for the community to install more rain gardens.[21] The Toledo-Lucas County Rain Garden Initiative also leads local implementation of the Sacred Grounds pilot, a national program of the National Wildlife Federation that supports faith-based institutions in installing native gardens for stormwater management.[22]

Strategy 5: Conserve water resources and adapt land management practices for sustainable water use

Sustainable water management ensures that communities have access to clean and sufficient water supplies, even as populations grow and climate change intensifies water-related challenges. To preserve this access, exceptional attention must be paid to both the operational usage of water, as well as any ways in which existing facilities, land use policies, or other day to day activities within Toledo may damage the local water supplies. Conservation efforts like reducing waste, implementing reduced watering schedules, and protecting natural watersheds help mitigate risks such as droughts and pollution.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 5.1: Continue to invest in energy efficiency improvements at the water treatment and water reclamation facilities	High	High	Long
Action 5.2: Explore opportunities to implement sewer thermal energy recovery in wastewater treatment	Medium	High	Long
Action 5.3: Require municipal facilities to consider water efficient appliances for all replacements	Medium	Medium	Long
Action 5.4: Design and launch an education campaign for City employees about water conservation	Low	Low	Short
Action 5.5: Implement smart irrigation systems at properties with high irrigation water use	Medium	Medium	Medium
Action 5.6: Increase the amount of permeable surfaces that exist on City-owned property	Medium	Medium	Long
Action 5.7: Launch a Green Infrastructure Pilot program on City properties that are prone to flooding	Low	Low	Medium
Action 5.8: Install rainwater capture infrastructure for facilities with high non-potable water demand and adequate rooftop area	Low	Low	Medium
Action 5.9: Evaluate opportunities to implement projects that utilize recycled water	Low	Low	Medium

Air Quality and Public Health

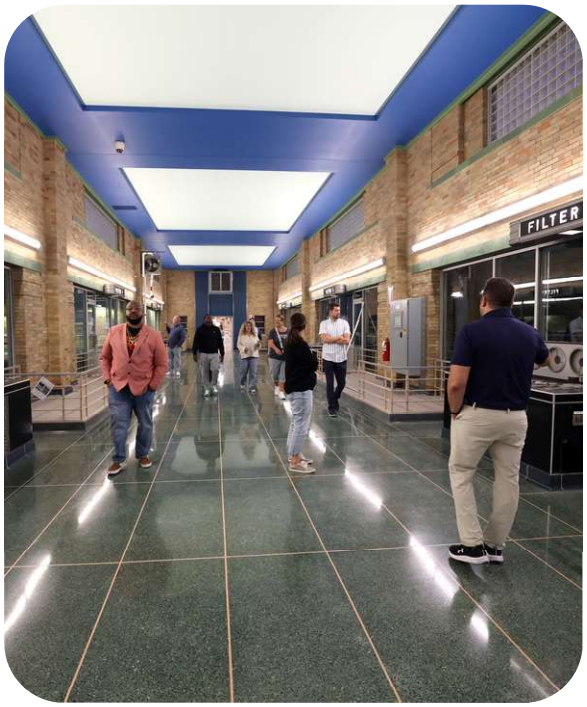
Improving air quality helps to mitigate greenhouse gas emissions and other pollutants while reducing the public health risks faced by City employees and the broader Toledo community. In work environments, poor air quality can increase fatigue, headaches, and create difficulties concentrating.[23] Extended exposure to high levels of air pollution such as particulate matter (PM2.5) and greenhouse gases is also known to increase the risk of respiratory and cardiovascular illnesses. Through initiatives to improve air quality, such as improved ventilation and fresh air circulation, the City can enhance employee well-being while demonstrating care and support for its workforce.

Existing Progress

Improving air quality, and by extension public health, has been a focal point for the City of Toledo and other local government agencies. The Environmental Services Division of the Toledo Department of Public Utilities operates an air section which focuses on monitoring and improving local and regional air quality.[24] The Toledo Metropolitan Area Council of Governments (TMACOG) also works within the region to provide weekly air quality reports and ozone forecasts, as well as educational materials and resources for residents to better understand what contributes to poor air quality, and why it is an important risk factor to mitigate.[25]

The City of Toledo also leads an awareness campaign called the "Ozone Action Season". The campaign provides general information through a frequently asked questions section that addresses things like what ozone is, where it comes from, and how it contributes to health issues. It outlines five feasible methods for individual contribution to reducing ground-level ozone formation, and provides resources for residents to stay up to date with ozone forecasts through the months of April to September.[26] Additionally, through a partnership with TMACOG, community members can have a compression test conducted on their vehicles gas cap to reduce instances of fuel vapors escaping through leaking or faulty caps. This helps to reduce unnecessary emissions and money lost through evaporating gas.

Strategy 6: Protect city employee health and well-being



The City's employees are its backbone, so making demonstrated efforts to create a healthy and sustainable work environment shows commitment to fostering a more resilient community from the ground up. Protecting the health and wellbeing of City employees through attention to local air quality can reduce short- and long-term illnesses, build a culture of mutual care and respect, and set an example to the greater community that investing in and caring for employees is a positive method of creating a healthy community. Air quality initiatives can help to reduce emissions and particulate matter, and create clean and healthy environments that support the City's employees.

Actions	**GHG Reduction Potential**	**Cost**	**Timeframe**
Action 6.1: Educate and incentivize improving indoor air quality in municipal buildings	Low	Low	Short
Action 6.2: Encourage City employees to balance using outdoor air circulation in buildings with traditional HVAC sources for comfort and air quality as the weather permits	Low	Low	Short
Action 6.3: Perform indoor air quality assessments to evaluate building health	Low	Low	Short
Action 6.4: Conduct regular cleaning and maintenance of HVAC systems to ensure healthy indoor air quality	Low	Low	Short

Food Systems

Creating robust local food systems can help to reduce dependencies on national supply chains, and generate a variety of localized benefits. Sourcing locally helps to boost the local economy and support small businesses and farmers, and can also improve food security, as the shorter travel distances reduce likelihood of major supply disruptions during natural disasters or major national crises. Expansive local food systems are also less emissions-intensive due to their shortened transportation distances, and may be better suited to incorporate local or regional sustainability goals or initiatives into their operations. The provision of local food can provide residents with more nutritionally-complete diets and helps to build connections among community members, farmers, community supported agriculture, and more.

Existing Progress

Strong and comprehensive food systems that provide equitable access to affordable and nutritious fresh foods are important components of a sustainable and resilient municipality. Toledo has made a number of efforts that support more expansive and equitable local food systems.

In 2024, the City adopted its Forward Toledo Plan which included the codification of food access as a City priority, and identified community barriers such as local food insecurity and areas that have limited access to grocery store options due to zoning and the evolution of big-box grocery stores that consolidated resources into fewer locations.[27] Historical discriminatory practices such as redlining have also impacted access from the legacy of disinvestment in some neighborhoods. To complement the recognition of food systems as a major priority, the City has created its first Food Policy Manager position, which will be charged with identifying local gaps and barriers for residents to access fresh and healthy foods, and exploring opportunities for improvement. The City is also conducting a study to explore the design of a Healthy Food Overlay for zoning and regulations on small-box discount stores to improve access to healthy, fresh foods.

The Community Garden Water Program is another initiative designed to incentivize local food systems through the support of community gardens, which can provide fresh produce in addition to hands-on opportunities for residents to learn more about growing healthy food and pay closer attention to why local food matters. The Community Garden Water Program provides funding to install water systems including taps, meters, backflow preventers and more at community garden locations around the City, with the overarching goal of supporting urban agriculture, economic development, and helping to build strong community relationships.[28]

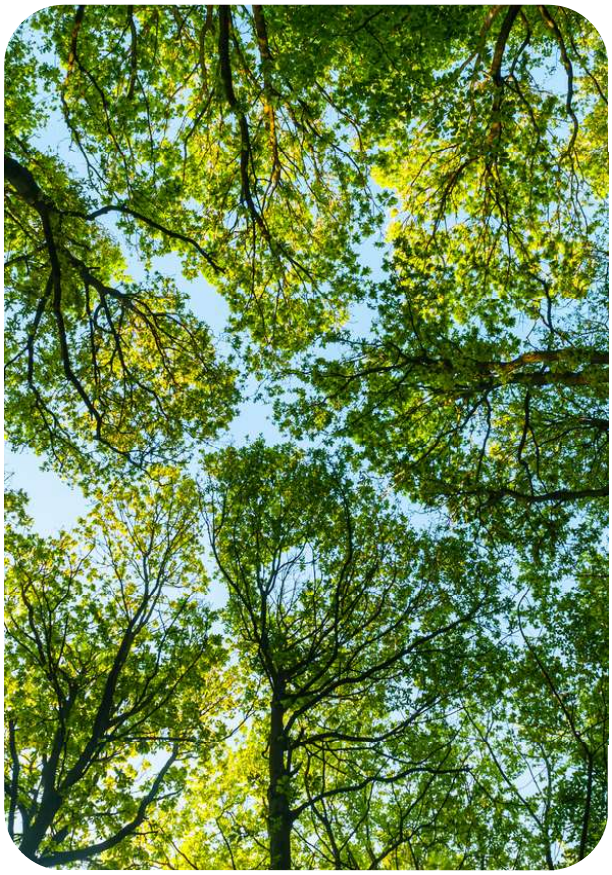
The Toledo-Lucas County Health Department (TLCHD) in partnership with the City of Toledo has also launched a Healthy Food Small Market Pilot Program which is intended to explicitly address food deserts by providing financial assistance to small stores for infrastructure items such as refrigerators and freezers, as well as technical assistance and training intended to increase profitability of healthy food options. Funded by ARPA, the program will support increased healthy food access, as well as create potential opportunities for local partnerships between store owners and local food producers.[29]

Strategy 7: Prioritize and expand local food systems

The City of Toledo can support food access by developing policies that support local food procurement, reducing the use of pesticides and other pollutants, and identifying opportunities for community gardens, agrivoltaics (combining agricultural production with photovoltaic (PV) solar energy production on the same land), and other sustainable food production practices.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 7.1: Assess the viability of agrivoltaics on City property	Medium	Low	Medium
Action 7.2: Develop a "local food first" procurement policy for City operations	Low	Low	Medium
Action 7.3: Reduce City operations use of harmful chemical pesticides and fertilizers	Low	Low	Short
Action 7.4: Assess the City's food shed logistics and identify improvements to reduce greenhouse gas emissions	Medium	Low	Medium

Natural Areas and Land Use



Municipalities can utilize sustainable practices for natural area and land use management that prioritize emission reduction and community resilience benefits. While agriculture and land management account for the smallest share of the City operations greenhouse gas inventory, the City of Toledo can utilize best practices for low emission lawn care and maintenance, modeling sustainable options for residents and reducing costs. Additionally, healthy green spaces and tree canopy can provide a multitude of community benefits. Access to green spaces is shown to improve mental and physical health; trees and plants also help to filter air pollutants. In addition, a robust tree canopy can also support community resilience, providing shade for temperature regulation and decreasing stormwater runoff.

Existing Progress

Already, Toledo has taken a number of steps to improve natural areas and land use around the City in a variety of ways. It is currently leading a Brownfield Assessment Grant program, which supports the proactive identification of abandoned and polluted brownfield sites. Upon identification and qualification, the City also operates a Brownfield Revolving Loan Fund (RLF) program that was established through a grant from the US EPA. This RLF provides loans and grants to nonprofits and for-profits in the Toledo area to remediate environmental damage and pollution from previous industrial applications and redevelop the properties to provide them with a new and more sustainable purpose that benefits the greater community.[30]

10,000

trees planted through RE-Tree Toledo

13,000

acres of parks operated by Metroparks Toledo

300

acres of riverfront being revitalized for community green space

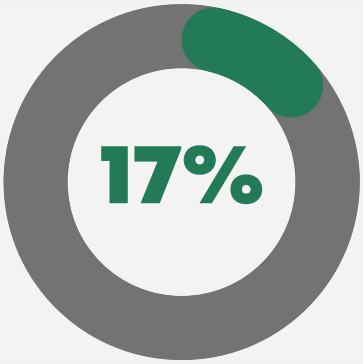
In 2023, the National Oceanic and Atmospheric Administration in partnership with the City conducted a comprehensive mapping of the urban tree canopy to better understand how urban heat island effects existed throughout the community. The study found that Toledo's tree canopy was significantly lower than the average recommended percentage of coverage, prompting the City to apply for a grant through the USDA's Urban and Community Forestry Program urban forest restoration grant. The City was awarded the grant in the amount of $6,098,294 and has used it to begin implementing their RE-Tree Toledo initiative which will significantly bolster the urban tree canopy through the introduction of more than 10,000 additional trees.[31]

Toledo also boasts an impressive park system with more than 13,000 acres of space, operated by Metroparks Toledo, a public agency. The Metroparks Toledo Foundation, a separate non-profit entity that helps consolidate additional private funding to support the parks, completed its Glass City Metropark project in 2023, part of a larger and ongoing $200 million initiative to revitalize approximately 300 acres along the City's riverfront that had previously been used for industrial purposes. The revitalization incorporates stormwater infrastructure and natural systems into a large and centralized community green space that provides a fresh start for a prime section of land within Downtown Toledo.[32]

Strategy 8: Maximize ecosystem services on city property

Ecosystem services are the direct and indirect benefits that ecosystems impart on humans.[33] These benefits are wide-ranging but generally consist of provisioning services that create material outputs (food, water, etc), regulating services such as erosion control, supporting services that foster biodiversity, and cultural services that contribute to the local identity.

2023 Urban Heat Mapping



tree canopy coverage

As part of the 2023 Urban Heat Mapping Campaign, it was determined that the City had a tree canopy providing only 17% coverage, which fell significantly below the average recommended target of 35-40%.[34] This mapping suggests that Toledo has room to gain greater ecosystem services through attention to its natural areas. Through considerate planning of natural areas and the municipal properties, the City can create healthy spaces that provide the most ecosystem benefits to employees and community members who interact with them. This can include initiatives that increase the number of trees within Toledo, supporting greater biodiversity through the use of native plants in local landscaping, and supporting sustainable landscaping techniques like reduced mowing schedules and electrified lawn care equipment.

Actions	GHG Reduction Potential	Cost	Timeframe
Action 8.1: Increase tree canopy on City property	High	Low	Long
Action 8.2: Assess the mowing schedule on non park spaces, vacant land and City right of way land and reduce mowing footprint by 40% by 2030	Medium	Low	Short
Action 8.3: Plant more native plants and pollinator plants on City property	Medium	Low	Medium
Action 8.4: Pilot electric mowers and push mowers in City parks and on City property	Medium	Low	Short
Action 8.5: Remediate vacant lots for repurposing by addressing environmental concerns, removing debris, and installing native, low-maintenance plants	Low	Medium	Long
Action 8.6: Adopt policies to protect a healthy, mature tree canopy, prioritizing preservation of the largest existing trees	Medium	Low	Short

Implementation Plan

With the Municipal Climate Action Plan completed, the City of Toledo is prepared to establish itself as a climate action leader through focused and intentional initiatives and programming designed to reduce emissions, lower costs, and improve sustainability throughout the City's operations.

Priority Projects

The MCAP identifies ten priority projects with high greenhouse gas emission reduction potential to support implementation action and budget allocation.

To support implementation, each priority project includes:

- Description of the action, its benefits, and implementation steps
- Estimated costs
- Suggested budget
- Implementation resources, including funding and best practice resources
- Key performance indicators (KPIs)

Priority Projects

Buildings and Energy

- **Action 2.5:** Install renewable energy on municipal facilities
- **Action 2.6:** Investigate opportunities to develop microgrids alongside solar arrays
- **Action 2.8:** Update energy efficiency assessments for municipal facilities, including an evaluation of HVAC and other heating equipment
- **Action 2.10:** Implement energy efficiency improvements through a revolving loan fund or Guaranteed Energy Savings Contract (GESC) in facilities with the highest energy usage

Transportation

- **Action 3.5:** Assess existing charging infrastructure and install additional EV chargers on city-owned property
- **Action 3.11:** Increase capacity of bike racks and storage on city property

Materials and Waste

- **Action 4.3:** Assess the Hoffman Road office recycling pilot and use learnings to implement full recycling at all city facilities
- **Action 4.6:** Expand composting drop-off sites to service all city facilities

Water and Wastewater

- **Action 5.8:** Install rainwater capture infrastructure for facilities with high non-potable water demand and adequate rooftop area

Natural Areas and Land Use

- **Action 8.5:** Remediate vacant lots for repurposing by addressing environmental concerns, removing debris, and installing native, low-maintenance plants

Action 2.5: Install renewable energy on municipal facilities

By installing renewable energy systems on municipal facilities, the City of Toledo can generate local, clean electricity, reducing operational costs and greenhouse gas emissions. This also demonstrates municipal leadership in climate action and offers an opportunity to engage and educate the community on renewable energy benefits. Implementation starts with assessing suitable sites for solar (rooftop and ground-mounted) or wind installations, which is currently underway through no-cost technical assistance from Power A Clean Future Ohio. Priority sites are identified based on energy demand and generation potential, followed by detailed design and feasibility studies with contractors.

Estimated Costs

Renewable Energy Feasibility Assessment	As a member of PCFO, Toledo is currently receiving a no-cost renewable energy feasibility assessment for city-owned properties. This assessment will provide general costs, return on investment, and emissions reductions associated with each system. The results should provide enough clarity to determine a go/no-go for each project. Prior to installation, an engineering assessment will be needed to determine any additional considerations which could impact the final cost.
Solar Panel Installation	Small-scale (rooftop, e.g., fire station, library): Costs can range from $50,000 to $500,000+, depending on the system size (e.g., 50 kW to 250 kW). Small scale systems, as of 2025, have an average per watt cost in Ohio between $1.50 (commercial-scale low-end) and $3.10 (residential-scale high end) depending on characteristics of the site. Large-scale (ground-mounted, e.g., wastewater treatment plant, landfill): Can range from $1 million to $10 million+ for multi-megawatt installations (e.g., 1 MW to 5 MW). Large-scale systems are currently around $1 per watt.
Wind Turbine Installation	Typically a more substantial investment, often ranging from $1 million to over $5 million per turbine, depending on size and generating capacity. This is less common for individual municipal facilities but could be considered for larger land parcels.

Suggested Budget

Investigation/Planning (Assessment, Feasibility Studies, Site Selection): $50,000 - $250,000

This budget would cover initial site assessments, energy audits to determine demand, engineering studies for system sizing, preliminary design, and financial modeling to evaluate incentives and financing options (e.g., PPA vs. direct ownership). As mentioned above, PCFO is currently conducting a feasibility assessment for multiple sites. This may be sufficient for smaller projects, however large-scale systems will require an engineering-grade assessment (cost noted above).

Implementation (Construction and Installation): $50,000 - $10,000,000+ per project (highly variable)

This budget would cover the procurement of solar panels, inverters, racking, or wind turbines; electrical infrastructure upgrades; installation labor; permitting; and commissioning. The range is broad due to the vast difference in project scale. Tax incentives have not been factored into the suggested cost.

Implementation Resources

- Clean Electricity Investment Credit: Through elective pay, cities can capture a 30% tax credit for qualifying projects that generate or store clean energy, along with 20% in additional bonus credits for projects that meet domestic content requirements and are located in energy communities.
- Clean Electricity Production Credit: Through elective pay, cities can receive up to 1.5 cents per kilowatt hour of clean electricity produced at a qualified facility, with 20% in additional bonus credits for projects that meet domestic content requirements and are located in energy communities.
- Power Purchase Agreement (PPA): Under a PPA, a third-party developer will install, own and operate an energy system on a city property, offering the city clean electricity at a low, fixed rate.
- Green Bond: A green bond is a type of fixed-income debt financing through which the bond-issuer (municipality) borrows money from private investors to fund sustainability projects, including renewable energy.
- Energy Loan Fund: This Ohio Department of Development loan program provides low-interest financing to install energy efficiency measures. Renewable energy can be included, but it must be tied to a larger efficiency project.
- Title 17 Clean Energy Financing: DOE's Loan Program Office provides loans and debt guarantees for clean energy technology projects.

Key Performance Indicators

- Installed renewable energy capacity (kW)
- Annual energy generated from renewable systems (kWh)
- Annual energy cost savings ($)
- Reduction in municipal greenhouse gas emissions ($MTCO_2e$)

Action 2.6: Investigate opportunities to develop microgrids alongside solar arrays

By installing renewable energy systems on municipal facilities, the City of Toledo can generate local, clean electricity, reducing operational costs and greenhouse gas emissions. This also demonstrates municipal leadership in climate action and offers an opportunity to engage and educate the community on renewable energy benefits. Implementation starts with assessing suitable sites for solar (rooftop and ground-mounted) or wind installations, which is currently underway through no-cost technical assistance from Power A Clean Future Ohio. Priority sites are identified based on energy demand and generation potential, followed by detailed design and feasibility studies with contractors.

Estimated Costs

Feasibility Studies and Design	Initial studies can range from $75,000 to $500,000, depending on the complexity, number of critical facilities considered, and detailed engineering required.
Microgrid Infrastructure (including solar and battery storage)	Costs can range from $1 million to $15 million+ per microgrid, depending on the size of the solar array (e.g., 500 kW to 5 MW), battery storage capacity (e.g., 1 MWh to 10 MWh), and the resilience requirements of the critical facilities served.

Suggested Budget

Investigation/Planning (Feasibility Studies, System Design, Collaboration with Experts/Utilities): $100,000 - $750,000

This budget would cover engaging energy consultants, conducting detailed engineering studies, assessing interconnection requirements, developing control strategies, and engaging with utility partners and potential PPA providers.

Implementation (Construction, Equipment Procurement, Integration): $2,000,000 - $20,000,000+ per project (highly variable)

This budget would cover the purchase of solar arrays, battery energy storage systems, microgrid controllers, switchgear, installation, and commissioning. The cost will heavily depend on the scale of the critical facilities being supported.

Implementation Resources

- Clean Electricity Investment Credit: Through elective pay, the City can access a 30%-50% tax credit on the solar and battery storage components of microgrid projects.
- Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) Program: FEMA has previously funded microgrid projects through both of these grant programs. While both programs are currently paused, they may become available in the future.
- Power Purchase Agreement (PPA): Under a PPA, a third-party developer can install, own and operate a microgrid on a city property, offering the city clean electricity at a low, fixed rate and with minimal risk associated with the project development.
- Cuyahoga Green Energy: The county's municipal energy utility is developing a series of district microgrids, which could serve as a potential implementation model.

Key Performance Indicators

- Number of feasibility studies completed for microgrid projects (#)
- Renewable energy capacity integrated into microgrids (kW)
- Energy storage capacity integrated into microgrids (kWh)

Action 2.8: Update energy efficiency assessments for municipal facilities, including an evaluation of HVAC and other heating equipment

Electricity use accounts for 52% of the greenhouse gas emissions from municipal operations, driven by building energy use and heating systems. Updated energy efficiency assessments will help the City identify targeted, high-impact strategies to reduce energy use, cut greenhouse gas emissions, and lower utility costs. These assessments will analyze HVAC systems, boilers, and other energy-intensive equipment to ensure they meet current energy standards and operate efficiently. Implementation involves identifying priority municipal facilities, reviewing past audit findings and utility data, and selecting qualified energy auditors. Results will guide a phased approach to retrofits and equipment upgrades that maximize energy and cost savings.

Estimated Costs

Individual Facility Assessments	**Small facilities** (e.g., small police station, community center): $5,000 - $15,000 per facility for a detailed audit. **Medium facilities** (e.g., larger office building, recreation center): $15,000 - $50,000 per facility. **Large/Complex facilities** (e.g., city hall, wastewater treatment plant): $50,000 - $150,000+ per facility.
Comprehensive Portfolio Assessment (multiple sites)	If assessing many facilities simultaneously under a single contract, total costs could range from $100,000 to $500,000+, depending on the number and size of buildings.

Suggested Budget

Investigation/Planning (Hiring Auditors, Initial Data Review, Prioritization): $75,000 - $300,000

This budget would cover contracting with qualified energy auditors, initial data collection and analysis, and developing a prioritized list of facilities for assessment based on energy consumption and potential savings.

Implementation: $0

Not applicable for this action, as it's an assessment phase; implementation of upgrades is covered in Action 2.10.

Implementation Resources

- Ohio Energy Efficiency Program - Audit Support: The Ohio Department of Development operates a program to support energy planning and audits for local governments, among other eligible entities.
- Energy Loan Fund: This Ohio Department of Development loan program provides low-interest financing to install energy efficiency measures, including HVAC upgrades. ODOD also offers technical assistance to facilitate the required energy audit for potential applicants.
- Dynegy: Dynegy offers energy efficiency rebates and energy audits to large commercial customers, which may be accessible for the City of Toledo.

Key Performance Indicators

- Number of municipal facilities with energy efficiency assessments (#)
- Assessed potential energy savings (kWh)
- Assessed potential energy cost savings ($)

Action 2.10: Implement energy efficiency improvements through a revolving loan fund or Guaranteed Energy Savings Contract (GESC) in facilities with the highest energy usage

Revolving loan funds and Guaranteed Energy Savings Contracts are effective financing mechanisms to implement energy efficiency improvements through realized energy savings. A revolving loan fund allows reinvestment of energy cost savings into future projects, creating a self-sustaining cycle. Alternatively, a GESC allows the City to partner with an energy services company (ESCO) that designs, installs, and maintains upgrades, with guaranteed energy savings used to pay back the investment over time. Implementation begins with identifying high-energy-use facilities, assessing potential efficiency measures, and selecting the most appropriate financing mechanism based on project needs, return on investment, and available funding.

Many Ohio school districts and municipalities have successfully used GESCs (often called Energy Performance Contracts) to fund significant energy efficiency upgrades without upfront capital. For instance, several Ohio public universities have implemented large-scale efficiency projects through ESCOs, upgrading lighting, HVAC, and building controls, with the savings guaranteeing the project's repayment.

Estimated Costs

The actual costs for implementing energy efficiency improvements can vary dramatically based on the scope and depth of the retrofits.

Individual Facility Upgrades (e.g., lighting retrofits, building controls)	$50,000 - $500,000 per facility.
Major HVAC System Replacements or Building Envelope Improvements	$500,000 - $5,000,000+ per facility, especially for larger or older buildings.
Portfolio-wide Upgrades (multiple facilities under a GESC)	Can easily reach $5 million to $20 million+ for comprehensive projects across a municipal portfolio

Suggested Budget

Investigation/Planning (Detailed Project Scope, Financial Modeling, ESCO Selection/Loan Application): $75,000 - $200,000

This budget would cover developing detailed project specifications, financial modeling to determine the viability of a revolving loan fund or GESC, legal review of GESC contracts, and the procurement process for selecting an ESCO or applying for relevant loans.

Implementation (Capital Investment in Energy Efficiency Measures): $1,000,000 - $20,000,000+ (variable based on scale and number of projects)

This budget represents the actual investment in energy efficiency upgrades, which would be financed through the chosen mechanism (revolving loan fund or GESC). The amount will depend on the total estimated costs from the energy audits and the City's investment appetite.

Implementation Resources

- Energy Loan Fund: Ohio Department of Development loan program that provides low-interest financing to install energy efficiency measures. Renewable energy is an eligible cost, but must be tied to a larger efficiency project.
- Advanced Energy Fund Grant: The Ohio Department of Development operates a grant program for energy efficiency and advanced energy projects. Applications are currently closed.
- Ohio Energy Efficiency Program: The Ohio Department of Development operates the State Energy Program which provides resources and grant funding for energy efficiency assessments and improvements.

Key Performance Indicators

- Funds invested in energy efficiency improvements ($)
- Energy reduction (kWh)
- Energy cost savings ($)
- Reduction in GHG emissions (MTCO2e)

Action 3.5: Assess existing charging infrastructure and install additional EV chargers on city-owned property

Creating a robust network of public electric vehicle (EV) charging infrastructure can help accelerate local EV adoption by reducing range anxiety and addressing key logistical barriers. Publicly accessible chargers also promote greater equity by supporting residents who may lack access to home charging, such as renters or those living in multi-family buildings. To advance this action, the City can explore partnerships with EV charging providers to assess the capacity, condition, and utilization of existing chargers, and identify strategic locations for expansion on city-owned property. Priority will be given to sites that serve both municipal fleet needs and community members, ensuring convenient, reliable access to charging across a wider geographic area.

Ohio is actively expanding its EV charging infrastructure, particularly along major corridors through DriveOhio initiatives. Many municipalities in Ohio, such as Columbus and Cleveland, have installed public EV chargers in downtown areas, parking garages, and public facilities to support both fleet electrification and public access.

Estimated Costs

Assessment of Existing Infrastructure	$10,000 - $50,000, depending on the number of city-owned properties and existing chargers.
Level 2 Chargers (240V AC)	**Equipment Cost**: $500 - $2,000 per charger. **Installation Cost**: $1,500 - $5,000 per charger (can be higher for complex electrical upgrades or trenching). **Total per Level 2 Charger**: $2,000 - $7,000.
Level 3 / DC Fast Chargers (480V DC)	**Equipment Cost**: $25,000 - $80,000+ per charger. **Installation Cost**: $25,000 - $100,000+ per charger (due to significant electrical service upgrades, transformers, and potential new utility connections). **Total per Level 3 Charger**: $50,000 - $180,000+.
Network Fees & Software (if applicable)	Annual fees ranging from $500 - $1,500 per charger for smart charging features, billing, and data.

Suggested Budget

Investigation/Planning (Assessment, Site Identification, Needs Analysis): $25,000 - $100,000

This budget would cover detailed site assessments, electrical load analysis, identifying priority locations based on fleet needs and public access, and developing a comprehensive deployment plan.

Implementation (Charger Procurement and Installation): $100,000 - $1,000,000+ (highly variable depending on number and type of chargers)

This budget would cover the purchase of EV charging equipment, installation labor, electrical upgrades, trenching, permitting, and potentially initial network activation fees. A smaller scale project for municipal fleet use might be at the lower end, while a significant public charging network would be at the higher end.

Implementation Resources

- Power A Clean Future Ohio conducted a Fleet Electrification Assessment in 2023 that identified targets for Level 2 and Level 3 chargers, as well as estimated cost, to meet municipal EV fleet charging needs.
- Alternative Fuel Vehicle Refueling Property Credit: This property credit provides a 30% credit, up to $100,000, for each electric vehicle charger or fueling property for clean-burning fuels.
- DriveOhio EV Infrastructure Partner Directory: This directory consolidates equipment vendors, electricians, contractors, and consultants in the state of Ohio that are seeking or open to partnerships for EV infrastructure projects.
- DriveOhio Alternative Fuel Vehicle Registration Dashboard: This resource provides a variety of visualized data on alternative fuel vehicle registration and charging equipment. Users can view the make, model, and location of existing vehicle registration, public EV charger locations, and new vehicle registrations by month to understand live consumer patterns.

Key Performance Indicators

- Number of EV chargers at municipal facilities (#)
- Monthly charger use (# of sessions)
- Reduction in GHG emissions (#)

Action 3.11: Increase capacity of bike racks and storage on city property

Providing accessible bike racks and storage on city property supports active transportation options for City staff and visitors, helping to reduce reliance on single-occupancy vehicles. This shift not only lowers transportation-related greenhouse gas emissions, but also decreases individual commuting costs and supports healthier, more sustainable mobility choices. By expanding bike parking capacity at municipal facilities, the City can make cycling a more viable and attractive commuting option, particularly for employees. Implementation will involve assessing current bike rack availability, identifying high-demand or underserved locations, and installing new or upgraded bike storage solutions that are secure, weather-resistant, and aligned with best practices in design and accessibility.

Estimated Costs

Bike Racks (Individual Units)	**Basic U-Rack** (galvanized steel): $150 - $400 per unit. **Designer/Architectural Racks**: $500 - $1,500+ per unit. **Bike Lockers** (single user): $1,000 - $3,000 per unit. **Covered Bike Shelters** (multi-bike): $5,000 - $20,000+, depending on size and materials.
Installation Costs	$50 - $300 per rack, depending on surface (e.g., concrete vs. asphalt) and labor.
Site Preparation	Minor costs for concrete pads or landscaping, if needed.

Suggested Budget

Investigation/Planning (Assessment, Site Identification, Design Selection): $5,000 - $20,000

This budget would cover assessing current bike rack availability, identifying high-demand areas through staff and visitor surveys, researching different bike rack and storage options, and developing a prioritized installation plan.

Implementation (Procurement and Installation): $20,000 - $100,000+ (variable depending on scale)

This budget would cover purchasing the chosen bike racks, lockers, or shelters, as well as the labor and materials for installation. A small-scale project might be on the lower end, while comprehensive upgrades across many facilities would be on the higher end.

Implementation Resources

- Transportation Alternatives Program: The Ohio Department of Transportation operates the Transportation Alternatives Program that provides grants for a variety of pedestrian and bicycle infrastructure projects that serve as alternative transit options to single-occupancy vehicles.
- Community Spark Grant:The League of American Bicyclists has an annual funding opportunity that provides $2,000 mini-grants for educational opportunities, subsidies for bicycle equipment, events, and other bike related infrastructure.
- OH Department of Transportation Multi-Modal Design Guide: This resource provides in-depth guidance for the planning, design, and implementation of pedestrian and bicycle facilities.
- Essentials of Bike Parking: This guide by the Association of Pedestrian and Bicycle Professionals contains technical best practices and tips for short- and long-term bike parking considerations, as well as installation and bike rack information.

Key Performance Indicators

- Number of bike racks on city property (#)
- Percentage of city properties with bike racks (%)

Action 4.3: Assess the Hoffman Road office recycling pilot and use learnings to implement full recycling at all city facilities

The Hoffman Road office currently operates a full recycling program, serving as a pilot for broader implementation across City facilities. To expand this program, the City will evaluate the pilot to understand what has worked well, where improvements are needed, and how the approach can be scaled effectively. Insights from the Hoffman Road pilot, such as best practices for signage, bin placement, staff participation, and contamination reduction, will inform the design of a standardized recycling program for all municipal buildings. By expanding recycling across City facilities, the City can significantly reduce waste sent to landfills and lead by example in promoting sustainable practices. Implementation will include evaluating current waste streams, developing consistent recycling protocols, and providing staff education to ensure program success.

Estimated Costs

Pilot Program Evaluation	$10,000 - $30,000 (for an external consultant or dedicated staff time to analyze data, conduct interviews, and prepare recommendations).
Recycling Bins/Containers	**Indoor Office Bins**: $50 - $200 per bin (e.g., desk-side or common area bins for mixed recyclables). **Larger Outdoor Collection Bins/Dumpsters**: $500 - $2,000+ per unit, depending on size and features.
Signage and Educational Materials	$1,000 - $10,000 (for design, printing, and distribution of consistent, clear signage and educational flyers/posters).
Staff Training	In-house staff time for training sessions; potentially $1,000 - $5,000 for external training resources or specialized workshops.
Contamination Reduction Measures	Potentially minor costs for specific tools or processes if contamination is identified as a major issue.

Suggested Budget

Investigation/Planning (Pilot Evaluation, Waste Audits, Program Design): $25,000 - $75,000

This budget would cover the formal evaluation of the Hoffman Road pilot, conducting waste audits at other facilities to understand current waste streams, designing standardized recycling protocols, and developing a comprehensive staff education plan.

Implementation (Bin Procurement, Signage, Initial Training, Ongoing Services): $50,000 - $250,000+ (variable depending on number of facilities and scale)

This budget would cover the purchase of new recycling bins, development and installation of consistent signage, initial staff training sessions, and potential ongoing costs for waste hauling contracts or program monitoring.

Implementation Resources

- Recycle Ohio Grant: The Ohio EPA offers the Recycle Ohio Grant annually to provide funds to establish and implement waste source reduction, recycling and litter prevention programs, recycling market development for manufacturers, expansion of recycling equipment and processing facilities and recycling infrastructure improvements.
- How to Set Up a Recycling Program: This archived resource from the US EPA outlines critical considerations when creating a recycling program such as preliminary waste prevention techniques, waste stream identification, and coordination of the overall program.

Key Performance Indicators

- Percentage of municipal waste recycled (%)
- Municipal recycling collected (tons)
- Percentage of city facilities with recycling infrastructure (%)

Action 4.6: Expand composting drop-off sites to service all city facilities

Organic waste contributes to landfill methane emissions, a potent greenhouse gas released during decomposition in oxygen-poor environments. By expanding composting efforts, the City can reduce these emissions and divert organic waste from landfills. To broaden the impact of its composting program, the City will establish composting drop-off sites at all municipal facilities, increasing accessibility for both staff and residents. Implementation can include collaboration with the Lucas County Solid Waste Management District and other local composting providers to design an efficient system for collecting, consolidating, and distributing the compost. Through this expansion, the City will promote waste diversion, support sustainable practices, and reduce its environmental footprint.

Estimated Costs

Composting Bins/Containers	**Indoor Collection Bins** (kitchen/break room): $100 - $300 per bin (for appropriate odor control and design). **Outdoor Drop-off Bins/Collection Carts**: $300 - $1,000+ per unit, depending on size and durability.
Collection Services (ongoing operational cost)	**Third-Party Composting Hauler**: Costs can range from $50 - $200+ per pick-up, depending on volume and frequency. Annual costs could be thousands to tens of thousands of dollars for multiple facilities. **In-house Collection/Transport**: Costs would include staff time, vehicle fuel, and maintenance.
Educational Materials	$10,000 - $50,000 (for developing clear signage, educational flyers, and online resources).
Potential Site Preparation	Minor costs for designated drop-off areas, if needed.

Suggested Budget

Investigation/Planning (Needs Assessment, Partner Engagement, Program Design): $15,000 - $50,000

This budget would cover assessing the organic waste generation at facilities, engaging with the Lucas County Solid Waste Management District and other local composting providers, and designing the collection system and public education strategy.

Implementation (Bin Procurement, Initial Collection Services, Outreach): $30,000 - $150,000+ annually (variable, with ongoing collection costs)

This budget would cover the purchase of composting bins, initial costs for collection services (if contracting), and the development and distribution of educational materials. The ongoing collection fees will be a significant operational expense.

Implementation Resources

- Composting and Food Waste Reduction Cooperative Agreements: The USDA grant program supports composting projects that provide alternative waste streams while increasing access to compost for local farms.
- Approaches to Composting: This informational webpage by the US EPA provides a breakdown of the composting process, as well as different models and methods of composting.
- Composting Scraps in Your Community: This toolkit assembled by the US EPA offers a number of resources and case studies to assist with messaging for composting programs that can increase buy-in and utilization rates.
- How Diversion Can Help Achieve Zero Waste Goals: This resource is a broad blueprint for creating and scaling composting programs. While it covers more than just municipal composting, it has a wealth of information on policy, collection and program structure, collaboration, and communications and engagement components of developing a composting program.

Key Performance Indicators

- Number of city facilities with composting drop-off sites (#)
- Organic waste diverted from landfill (tons)
- Reduction in GHG emissions (MTCO2e)

Action 5.8: Install rainwater capture infrastructure for facilities with high non-potable water demand and adequate rooftop area

Facilities with high water demand, but not requiring potable water, present a significant opportunity for rainwater capture, helping to reduce reliance on the City's treated water supply. By installing rooftop rainwater capture systems, these facilities can collect and store rainwater for non-potable uses such as irrigation, cooling, and industrial processes. This approach not only conserves potable water but also reduces stormwater runoff, decreasing water pollution and strain on the sewer system. To begin implementation, the City will assess its facilities to identify sites with both high water demand and sufficient rooftop capacity for rainwater capture systems. This analysis will guide the installation of systems that maximize water conservation, reduce operational costs, and enhance sustainability across municipal operations.

Rainwater harvesting systems are increasingly used in Ohio for various non-potable applications. For example, some botanical gardens or public parks in Ohio use captured rainwater for irrigation. Large commercial buildings or industrial facilities may use it for cooling towers or for delivering water.

Estimated Costs

Assessment and Feasibility Studies	$10,000 - $50,000 per facility, depending on complexity and the depth of the analysis.
System Components (Tanks, Pumps, Filtration, Plumbing)	**Small-scale** (e.g., for irrigation at a park facility): $5,000 - $20,000. **Medium-scale** (e.g., for toilet flushing in a municipal building): $20,000 - $100,000. **Large-scale** (e.g., for cooling towers or industrial processes): $100,000 - $500,000+.
Installation Costs	Can vary significantly based on site access, existing plumbing, and labor rates. Typically 30-50% of component costs.

Suggested Budget

Investigation/Planning (Assessment, Site Analysis, System Design): $30,000 - $100,000

This budget would cover conducting detailed facility assessments to identify suitable sites, analyzing water demand and rooftop characteristics, engaging engineers for system design and sizing, and evaluating potential potable water savings.

Implementation (System Procurement and Installation): $50,000 - $500,000+ per project (highly variable)

This budget would cover the purchase of storage tanks, pumps, filters, distribution plumbing, and installation labor. The cost will depend heavily on the size of the system and the complexity of integration into existing facility infrastructure.

Implementation Resources

- Rainwater Harvesting Systems Technology Review: This EPA resource provides details pertaining to system design considerations when planning a rainwater harvesting project. It includes a diagram and further breakdown of an exemplary rainwater collection system.
- Rainwater Harvesting Calculator: Utilizing historical precipitation data, this calculator allows users to calculate estimates for monthly rainfall that can be collected from a given roof size.

Key Performance Indicators

- Number of municipal facilities with rainwater capture systems installed (#)
- Total volume of rainwater captured annually (gallons/year)
- Reduction in potable water use (gallons)

Action 8.5: Remediate vacant lots for repurposing by addressing environmental concerns, removing debris, and installing native, low-maintenance plants

Vacant lots can be underutilized and can present environmental challenges, including debris accumulation, unaddressed contamination, and unmanaged vegetation. Remediating these sites is an opportunity to transform them into valuable community assets and prepare sites for reuse, while addressing environmental concerns. This action focuses on clearing debris, remediating any environmental hazards, and installing native, low-maintenance plants that require minimal upkeep and watering. By repurposing vacant lots in this way, the City can enhance green space, promote biodiversity, and improve aesthetic and environmental quality in underdeveloped areas. Implementation will involve assessing vacant lots for environmental risks, conducting cleanup activities, and designing landscape plans that incorporate native plant species to foster long-term sustainability and resilience.

Estimated Costs

Costs for vacant lot remediation are extremely variable and depend heavily on the specific conditions of each lot.

Environmental Assessments (Phase I & II ESAs)	**Phase I** (historical review): $2,000 - $5,000 per lot. **Phase II** (sampling and analysis): $10,000 - $50,000+ per lot, depending on the extent and type of contamination.
Debris Removal	$500 - $5,000+ per lot (depending on volume and type of debris, e.g., construction waste vs. household trash).
Contamination Remediation	This is the most unpredictable cost. **Minor Contamination** (e.g., lead in soil): $10,000 - $50,000. **Moderate Contamination** (e.g., petroleum hydrocarbons): $50,000 - $250,000. **Severe Contamination** (e.g., heavy metals, industrial chemicals requiring extensive excavation/treatment): $250,000 - $1,000,000+ per lot.

Site Preparation (grading, soil amendments)	$1,000 - $5,000 per lot.
Native Plant Procurement and Installation	$1,000 - $10,000+ per lot (depending on size of lot, density of planting, and type of plants).
Fencing/Security (if needed during remediation)	Variable.

Suggested Budget

Investigation/Planning (Lot Inventory, Environmental Assessments, Landscape Design): $50,000 - $250,000

This budget would cover initial vacant lot inventories, Phase I and potentially Phase II Environmental Site Assessments for prioritized lots, and developing landscape plans incorporating native species. This would also include engaging with the Ohio EPA's Site Assessment Program.

Implementation (Debris Removal, Remediation, Planting): $100,000 - $5,000,000+ (highly variable, heavily dependent on contamination levels)

This budget would cover the actual costs of debris removal, environmental remediation (if necessary), site preparation, and the procurement and installation of native, low-maintenance plants. The range is extremely broad due to the potential for significant remediation expenses on contaminated sites.

Implementation Resources

- Ohio EPA Site Assessment Program: The Ohio EPA offers a Site Assessment Program to assist local government entities in assessing ground water, surface water, sediment, soil, and soil gas.
- Ohio EPA Grant-Funded Brownfield Assistance Programs: The Ohio EPA administers the Targeted Brownfield Assessment Program, as well as the Technical Assistance for the Voluntary Action Program, which both provide support for different components of brownfield revitalization.
- Pennsylvania Horticultural Society: PHS partners with local businesses and community groups to transform vacant lots into vibrant green spaces, addressing over 12,000 vacant lots across the city.
- Native Plant Finder: This tool maintained by the National Wildlife Federation allows users to identify native plant species according to zipcodes.

Key Performance Indicators

- Number of vacant lots assessed for environmental concerns (#)
- Number of vacant lots remediated and repurposed annually (#)
- Number of native and pollinator plant species planted annually (#)

Conclusion

The City of Toledo recognizes the critical role that municipal operations play in addressing climate change and reducing the community's total greenhouse gas emissions. By outlining strategic priorities, establishing achievable goals, and defining specific short- and long-term actions, Toledo is committed to leading by example and demonstrating its dedication to continued sustainability.

Appendix A: Scope 3 Emissions in the Greenhouse Gas Inventory

Scope 3 emissions for a city are **all other indirect emissions** that occur **outside the city's geographic boundaries** but are a consequence of activities by the city's residents, businesses, and institutions. These are the "ripple effects" of the city's consumption and activities.

What Would It Look Like to Start Including More Scope 3 Emissions?
Moving beyond a basic inventory to include more Scope 3 emissions involves several key steps:

1

Identify Relevant Scope 3 Categories: The GPC (Global Protocol for Community-Scale Greenhouse Gas Emission Inventories) outlines 15 categories of Scope 3 emissions for cities. The first step is to determine which of these categories are most significant and relevant to your city. These might include:

- **Embodied emissions in goods and services consumed within the city:** This is often the largest category, encompassing emissions from the production, transportation, and disposal of everything from food and clothing to electronics and construction materials used by residents and businesses.
- **Fuel and energy-related activities (not included in Scope 1 or 2):** This includes emissions from the extraction, production, and transportation of fuels used within the city.
- **Waste generated outside the city boundary:** Emissions from the disposal of waste generated within the city but sent to facilities elsewhere.
- **Water supply and wastewater treatment (if not fully captured in Scope 1 & 2):** Emissions associated with the energy and chemicals used to supply water to the city and treat wastewater outside the city.
- **Transportation of imported goods:** Emissions from transporting goods into the city.
- **Business travel by residents:** Emissions from air and other travel for work purposes.
- **Employee commuting (for businesses within the city):** Emissions from residents commuting to jobs within the city.
- **Investments:** Emissions associated with the city's and its residents' investments.

2

Determine Data Availability and Collection Methods: This is often the most challenging part. Unlike Scope 1 and 2, where data is often more readily available (e.g., utility bills, fuel consumption records), Scope 3 data can be dispersed and require different approaches:

- **Top-down approaches:** Using national or regional averages and multiplying by city-specific consumption data (e.g., per capita spending on goods).
- **Hybrid approaches:** Combining national/regional data with some local data where available.
- **Life Cycle Assessment (LCA) data:** Utilizing data from LCA studies for specific products and services consumed in the city.
- **Input-output models:** Using economic models to estimate the indirect emissions associated with various sectors of the city's economy.
- **Surveys and studies:** Conducting surveys of residents and businesses to gather data on consumption patterns, travel behavior, etc.
- **Partnerships:** Collaborating with regional or national organizations that may have relevant datasets.

3

Select Calculation Methodologies and Tools: Based on the available data, appropriate calculation methodologies need to be chosen. Various tools and guidance documents exist to assist with this, often provided by organizations like the GHG Protocol and academic institutions.

4

Establish Reporting Framework: Decide how the Scope 3 emissions will be reported. Will they be included in the main inventory totals, or reported separately? Transparency about the methodologies and data limitations is crucial.

5

Iterative Improvement: Including Scope 3 emissions is often an iterative process. Cities typically start with the most significant and feasible categories and gradually expand as data availability and expertise improve.

How Much of a Process Is It?
Including comprehensive Scope 3 emissions is **significantly more complex and resource-intensive** than a basic Scope 1 and 2 inventory.

- **Time Commitment:** It can take several months to a year (or even longer) to build the capacity, identify data sources, develop methodologies, and perform the calculations for a robust Scope 3 inventory.
- **Expertise Required:** It often requires individuals with expertise in data analysis, environmental science, economics, and potentially specific sectors like waste management or transportation. Cities may need to dedicate existing staff or hire consultants.
- **Data Availability Challenges:** Gathering reliable and city-specific data for many Scope 3 categories can be a major hurdle.
- **Methodological Choices:** There isn't always one "right" way to calculate Scope 3 emissions, and different methodologies can yield different results. This requires careful consideration and documentation of assumptions.
- **Ongoing Effort:** Scope 3 inventories need to be updated regularly to reflect changes in consumption patterns and data availability, making it an ongoing process.

How Greatly Would Emissions Increase?
In most cases, including comprehensive Scope 3 emissions will **substantially increase** a city's reported greenhouse gas footprint. It's not uncommon for Scope 3 emissions to represent **50% to 80% or even more** of a city's total emissions when a full life-cycle perspective is considered.

The exact increase will depend on the specific characteristics of the city's economy and consumption patterns. Cities with high levels of consumption of imported goods and services, or with significant air travel by residents, are likely to see a larger increase.

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