OFFICE OF
Sustainability

Addressing Climate Change in Detroit

Detroit Climate Strategy

→ **The City of Detroit's Climate Strategy is a framework for residents, businesses, city departments, and industry to achieve the City's emission goals and increase resilience as climate change impacts our daily lives.** This document outlines 4 action strategies centered on reducing our greenhouse gas emissions, and adapting to the effects of climate change.

This strategy was developed collaboratively between the Office of Sustainability, City departments, consulting partners, input from community engagements and informed by the Climate Equity Advisory Council (CEAC). This work supports existing efforts, including the City's, and responds to the Sustainability Action Agenda which was published in 2019 and updated in 2021.

Priority action strategies:

1. **Transitioning to Clean Energy**
2. **Increasing Sustainable Mobility**
3. **Accelerating Energy Efficiency and Reducing Waste**
4. **Prioritizing Vunerable Residents and Adapting to Change**
   - a. **Reducing Flood Risks**
   - b. **Protecting from Extreme Heat**
   - c. **Improving Air Quality**

Check out the website!

2023

Letter from Mayor Mike Duggan

As the planet experienced yet another year of record-breaking heat, urgent action is needed to reduce greenhouse gas emissions and protect Detroiters.

Our most vulnerable residents, particularly communities of color, are especially at risk from the realities of climate change—including more frequent and intense heat waves and rainstorms.

In 2019, the City released Detroit's first citywide Sustainability Action Agenda (SAA). The agenda outlined 10 goals and a series of actions to create a city where all Detroiters thrive and prosper in an equitable, green city; have access to affordable, quality homes; live in clean, connected neighborhoods; and work together to responsibly manage resources.

Following the release of the SAA in 2019, the world was disrupted by COVID-19. As the City of Detroit came together to recover from this challenge, federal support for green jobs, clean energy, social equity, and infrastructure provided us the opportunity to accelerate our work to build back a better, more equitable and resilient city. Every neighborhood in Detroit has a future, and that future must include the realities of a changing climate and the opportunities that investments in clean energy, sustainable transportation, and green infrastructure offer. As Michigan's largest city, we can lead our state in taking care of today's communities while standing ready for the challenges of tomorrow.

Our long-term vision remains, but action is needed to put us on the pathway to meet our goals and address the urgent challenges residents and businesses are struggling with today. Detroiters face issues every day with high energy bills, limited transportation options, and unpredictable weather patterns driven by climate change.

Developed in partnership with community, technical partners and informed by the Climate Equity Advisory Council, this Detroit Climate Strategy outlines short-term actions we must collectively take to advance our climate work and provide benefits to Detroiters. This strategy calls for action to transition our energy supply to clean energy; increase access to sustainable transportation options; accelerate energy efficiency and reduce waste and air pollution; and help communities, with a focus on our most vulnerable residents, adapt to a changing climate. All this work will be grounded by the prioritization of our most vulnerable residents and historically disadvantaged communities.

Detroit has always been known for its determination, innovation, and resilience. These qualities have shaped our history and will continue to be assets as we confront the pressing challenges posed by climate change.

I want to thank the Office of Sustainability, the countless community partners, and the tireless efforts of the Climate Equity Advisory Council for developing the Detroit Climate Strategy. Finally, I would like to thank the Kresge Foundation for its financial support and commitment to this effort.

Mike Duggan

Mayor; City of Detroit, Michigan

Climate Strategy at a Glance

→ **Addressing climate change in Detroit is urgent and requires decisive and focused actions.** As the planet warms up, weather patterns are becoming more extreme and impacting our daily lives.

This strategy adds to the critical work already taking place throughout Detroit neighborhoods and it is meant to serve as guide to achieve emission reductions goals and increase resilience across the city. It is equally critical to understand that all Detroiters derserve to thrive.

We have a shared responsibility to ensure that Black, Indigenous, and People of Color (BIPOC) communities are not disproportionately impacted by extreme weather, and that new, emerging job opportunities become available to all Detroiters.

1 Setting the Table

The first section provides background information to understand why this strategy is important and describes sustainability efforts in Detroit to date.

PAGE

2 Taking Action

The second section focuses on how the strategy was developed and the actions needed to reduce climate impacts, increase resilience, and adapt to future changes.

PAGE

→ Key words to know...

Mitigation → Reducing our impact

Cutting greenhouse gas emissions by reducing energy use, sending less waste to landfills, and replacing fossil fuel energy sources with renewable energy, like solar and wind. This is critical to reduce the speed and scale of climate change.

Resilience → Adapting to change

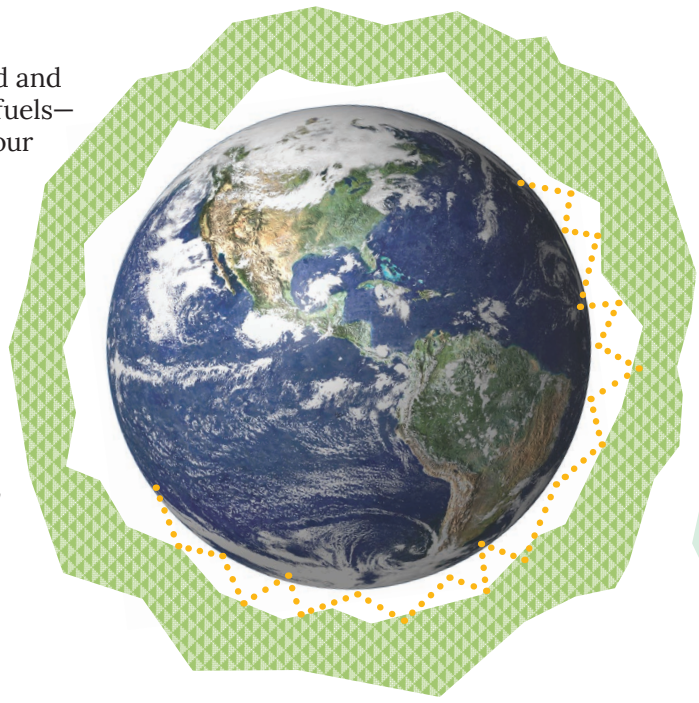
Strengthening infrastructure and equipping families and communities with the resources to protect themselves against the harmful effects of climate change and recover when climate impacts occur. This is also sometimes called adaptation.

Understanding Climate Change

→ Across the world...

Patterns of consumption have increased and as humans have relied heavily on fossil fuels—like oil, coal, and natural gas—to power our lives (think: driving, heating our homes, and fueling power plants). The use of fossil fuels releases greenhouse gases (GHGs), such as carbon dioxide (CO_2), into the atmosphere.

Similar to how a greenhouse works to keep plants warm, these GHGs trap the sun's energy as heat and act like a blanket around the Earth. As we burn more fossil fuels, this blanket gets thicker, driving higher global temperatures.



This is further amplified by the large-scale loss of trees and other vegetation that would otherwise help remove some of these GHGs from the atmosphere.

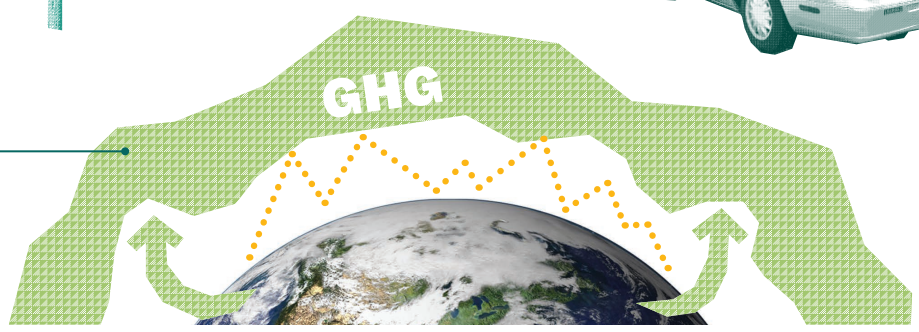
Changes to our climate are already evident and we must take action to adapt and reduce GHG emissions so we can slow down the impacts and begin to reverse this trend.

This Climate Strategy provides a framework so we can take collective action and empower our community to become more resilient.

1 Burning fossil fuels—oil, coal, and natural gas—to generate electricity releases GHGs (primarily carbon dioxide—CO_2).

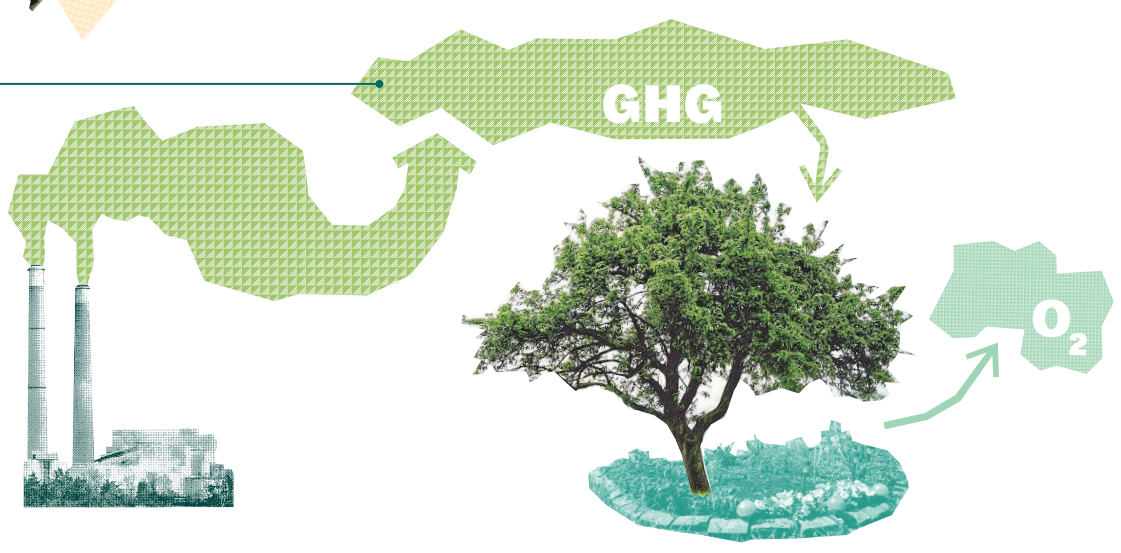
2 People consume more fossil fuels through everyday activities like heating homes with gas furnaces and driving gasoline- or diesel-powered vehicles.

3 The GHGs from burning fossil fuels remain in our atmosphere and act like a thicker blanket around the Earth, trapping more heat and warming the planet.



4 The warming of the Earth's climate drives an increase in the frequency and intensity of extreme local weather events, such as heavy rain, strong storms, and heatwaves.

5 Trees and plants remove carbon dioxide, a primary GHG, from the atmosphere through photosynthesis. However, the amount they remove can't keep up with the amount of carbon dioxide human activities are emitting.



Impacts of Climate Change in Detroit

Extreme Heat

Average temperatures in the Great Lakes region have already increased by 2.3°F between 1951 and 2021, and climate models predict we will see an **increase between 3-6°F by 2050 and 6-11°F by 2100.**

As average temperatures climb, the frequency and intensity of heatwaves will also increase. Between 1961 and 1990, Detroit averaged 10 days per year with a high temperature above 90°F.

Climate models predict we will see as many as 47 days by 2050 and 84 days by 2100

with 90°F temperatures

if the world continues on a high GHG emissions trajectory.

Power Outages

Wind storms, ice storms, and extreme heat can cause significant damage to our power grid infrastructure, resulting in power outages and disruptions as utilities work to restore services.

As climate change intensifies extreme weather, it is likely we will experience more frequent and longer power outages in the coming decades.

In just one month in 2021, storms caused nearly

1 million Michigan residents

to lose power.

Air Quality

While it is not the only factor influencing air quality, climate change is implicated through its causes and impacts. Burning fossil fuels emits air pollutants harmful to our health, and extreme heat is linked to decreased local air quality.

In Detroit, nearly

2,500 children

suffer asthma attacks linked to air pollution every year.

Flooding

Total precipitation in the Great Lakes region has increased 14% since 1951, and precipitation during heavy rainfall events has increased even more dramatically at 35%. These heavy storm events have severely impacted Detroit in recent years.

Recently heavy storms resulted in emergency declarations for flooding in 2019 and 2021, causing an estimated annual economic loss of $42-million in Wayne County. As climate change escalates extreme weather, this trend of rain storms becoming more severe will likely increase flooding risks for Detroit residents.

Climate models predict that by the end of the century there could be up to

50% more

major rain events in Wayne County that are considered to be extreme.

Climate Justice

Climate change's most tangible impacts—**costly flooding, poor air quality, and deadly extreme heat**— are too often concentrated in marginalized communities of color.

As a majority Black city where more than a third of residents live in poverty, Detroit cannot address climate change without tackling the problem through the lens of **climate justice.**

Climate justice is a principle that considers the inequities of climate impacts in relation to a community's contribution to the problem. We can find these inequities and understand them by looking at **"climate vulnerability,"** an approach which considers various physical and social signs to see how much communities will be affected by climate change.

For example, even if communities experience the same heatwave, low income neighborhoods with older homes will face dangerously high indoor temperatures while higher income neighborhoods, with better insulated homes and the ability to run efficient central air conditioning, will remain safe and comfortable.

Historically, people of color and low-income residents live in aging homes and dis-invested infrastructure. Too often, they are susceptible to lower air quality because they live closer to industry—making them more vulnerable to the impacts of climate change, while at the same time being underprepared to recover economically.

These marginalized communities bear the least responsibility for the emissions driving climate change, yet they feel the negative impacts of burning fossil fuels the most.

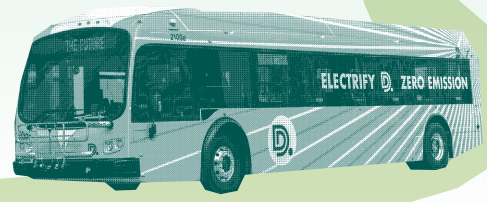
Acknowledging and addressing these injustices, while aligning action with community needs, is a fundamental priority of the Detroit Climate Strategy.

Taking Climate Action in Detroit

→ What a future Detroit could look like...

New and existing commercial **buildings are energy efficient and powered by clean energy,** enabling businesses to lower costs, use new technologies, and contribute to a sustainable future for employees and customers.

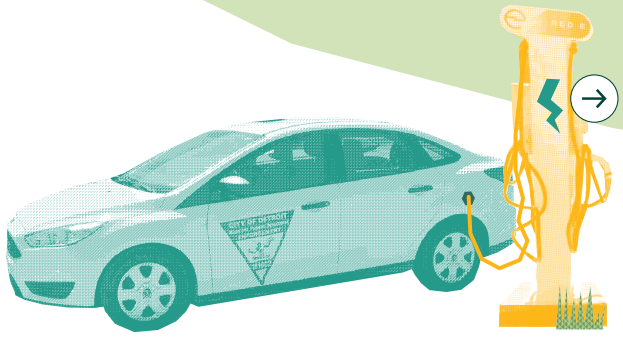
Lower utility bills and cleaner indoor air for residents as appliances are upgraded and homes are repaired and retrofitted to reduce energy use.



Community members are **knowledgeable on ways to fight climate change,** like conserving energy and reducing food and water waste.

Less flooding in our neighborhoods through better stormwater management—fewer lost possessions, less property damage, and more financial security.

Every district has a Resilience Hub: a community location with available solar energy, wifi, and streamlined social services ensure that everyone is cared for during power outages, extreme weather, and emergencies.



Detroiters breathe healthier with clean streets: no idling trucks, more pollution-free electric vehicles, and greater access to walking, biking and public transit across the city.

Detroiters are **protected on hot days** with energy efficient air conditioning and cooling strategies, quality green spaces with tree coverage, and accessible resources for residents with limited mobility.

Detroiters have access to family-sustaining wages in a clean energy economy: job training programs build a workforce that reflects the community, with employees benefiting from growth in green industries.

Building on Sustainability Efforts

Taking action to mitigate and adapt to climate change is just one piece of **building a more equitable, sustainable city.**

From food security to water quality and transportation, Detroiters have been organizing for their health and well-being for decades. This Detroit Climate Strategy builds on years of City and community planning to pave the way for a healthy, equitable, and sustainable future for all Detroiters.

2007

→ City of Detroit launches its vision for solid waste management

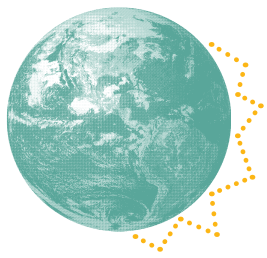
→ **Detroit City Council launches the Green Task Force** to advise on green policy and practices

2010

→ City of Detroit invests $9.5 million in energy efficiency and conservation upgrades into 19 of its buildings

2011

→ **Public Works launches a Curbside Recycling pilot program** for single family homes in response to Zero Waste Detroit's multi-year campaign



2013

→ **10 local nonprofits work together to create the Detroit Environmental Agenda** following the City of Detroit's 2011 Environmental Summit

2015

→ **Detroit's first Green House Gas (GHG) Inventory is published** by Detroiters Working for Environmental Justice and the University of Michigan School for Environment & Sustainability

2016

→ City of Detroit completes **citywide conversion to LED street lights**

→ Ground breaking on O'Shea Solar Park, **the city's first urban solar array**

2018

→ **City of Detroit launches Strategic Plan for Transportation**

→ City spends $3 million on **green stormwater infrastructure** and requires private properties to control stormwater on site

2017

→ **Mayor Mike Duggan creates the City's first Office of Sustainability** and commits to the Paris Climate Accord, bringing Detroit in alignment with 500 other U.S. cities

→ **Detroiters Working for Environmental Justice authored the Detroit Climate Action Plan**

→ MoGo bike share service launches

Detroit Office of Sustainability

How is this Climate Strategy related to the Sustainability Action Agenda?

The **2019 Sustainability Action Agenda** contains 43 actions across four sustainability outcome goals:

1. Healthy, thriving people
2. Affordable, quality homes
3. Clean, connected neighborhoods
4. Equitable, green city

Action #39 of the Sustainability Action Agenda calls for the development of a Climate Action Strategy — a strategy specifically outlining actions needed to reduce Detroit's GHG emissions — ***this is what you are reading now!***

While the Sustainability Action Agenda paints a broad **vision of a healthy, accessible, vibrant, green Detroit**, this Climate Strategy is focused more specifically on climate mitigation (reducing greenhouse gas emissions) and resilience (adapting to current and anticipated impacts of climate change).

The Sustainability Action Agenda and this Climate Strategy will work in tandem to guide climate and sustainability action in Detroit. The City will use these plans to guide funding decisions and position the City to leverage government grants with philanthropic and private capital to make measurable change.

2019

- → **City of Detroit publishes the Sustainability Action Agenda,** the first of its kind for the City of Detroit
- → **The Detroit Waste Incinerator closes**
- → **City Council approves an ordinance that sets goals** for reducing greenhouse gas emissions from municipal operations, measured by assessments conducted every 4 years:

  35% decrease by **2024**
  75% decrease by **2034**
  100% decrease by **2050**

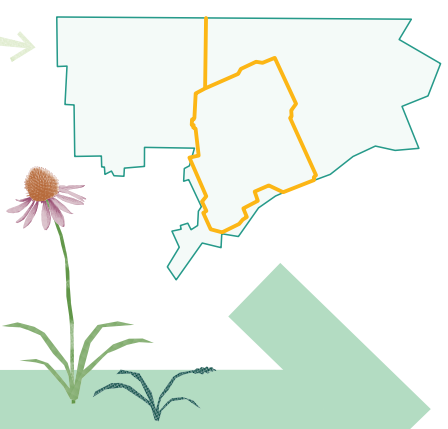
2021

- → The Office of Sustainability **releases a 2-Year Progress Update** on the actions and goals outlined in the Sustainability Action Agenda
- → The City of Detroit joins the United Nations **Race to Zero campaign, committing to net zero city-wide carbon emissions by 2050** (*with interim target: 50% reduction by 2034, from 2012 levels*)
- → More than **60 commercial buildings and 37 municipal buildings joined in the Detroit Energy Challenge** to reduce building emissions, in partnership with Detroit 2030 District

2022

- → **City of Detroit breaks ground on the Joe Louis Greenway,** a 27.5 mile recreational pathway that will unify Detroit's neighborhoods, people, and parks

JOE
LOUIS
GREENWAY



Greenhouse Gas Emissions in 2018

→ Understanding Where We Are

To cut our GHG emissions, we need to understand our starting point or baseline.

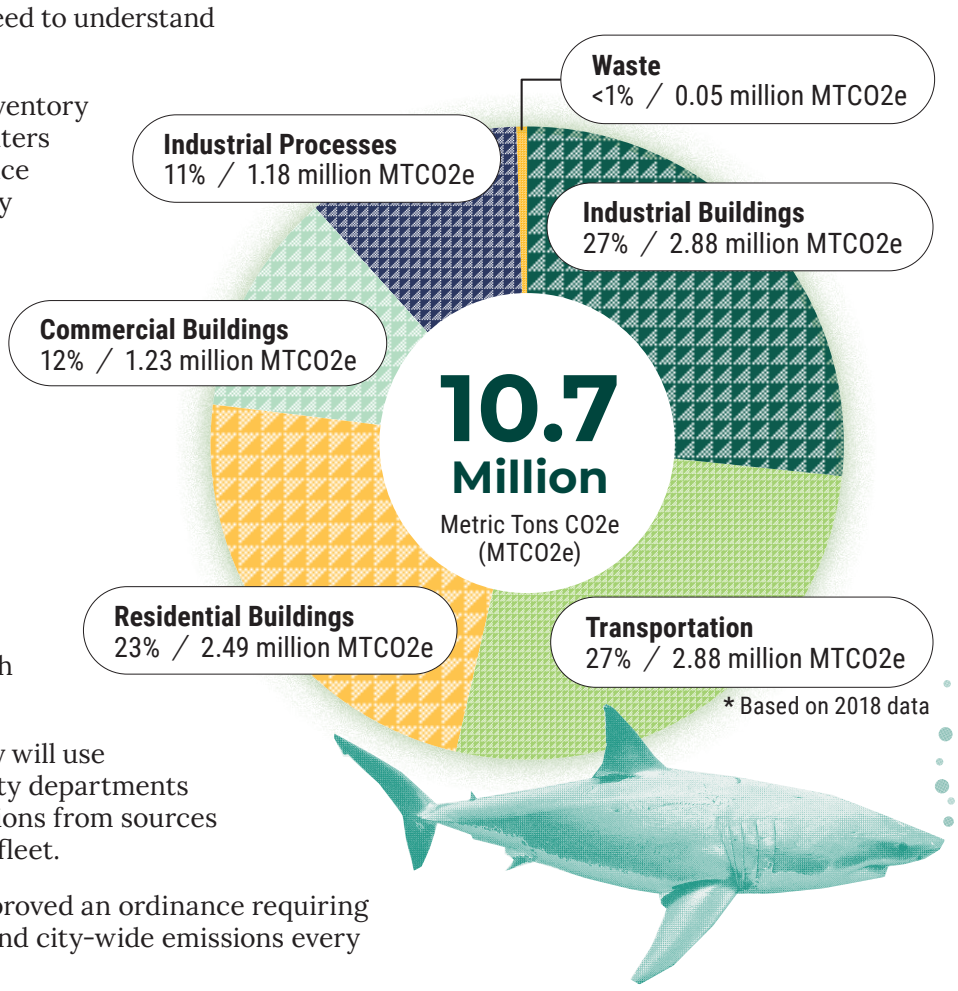
Detroit's first GHG emissions inventory was completed in 2015 by Detroiters Working for Environmental Justice in partnership with the University of Michigan, using 2012 data. **Detroit's GHG emissions in 2012 were 11.27 million MTCO2e.**

For the development of this Climate Strategy, the City partnered with the Center for Neighborhood Technology, Elevate, and EcoWorks to assess where we are today, with available data from 2018.

The result is a completed list for the City, plus a study of its municipal operations, which accounted for 168,309 MTCO2e.

The City's Office of Sustainability will use this information to work with City departments to reduce municipal GHG emissions from sources such as buildings and the City's fleet.

In 2019, Detroit City Council approved an ordinance requiring the City to measure municipal and city-wide emissions every four years.



What is MTCO2e?

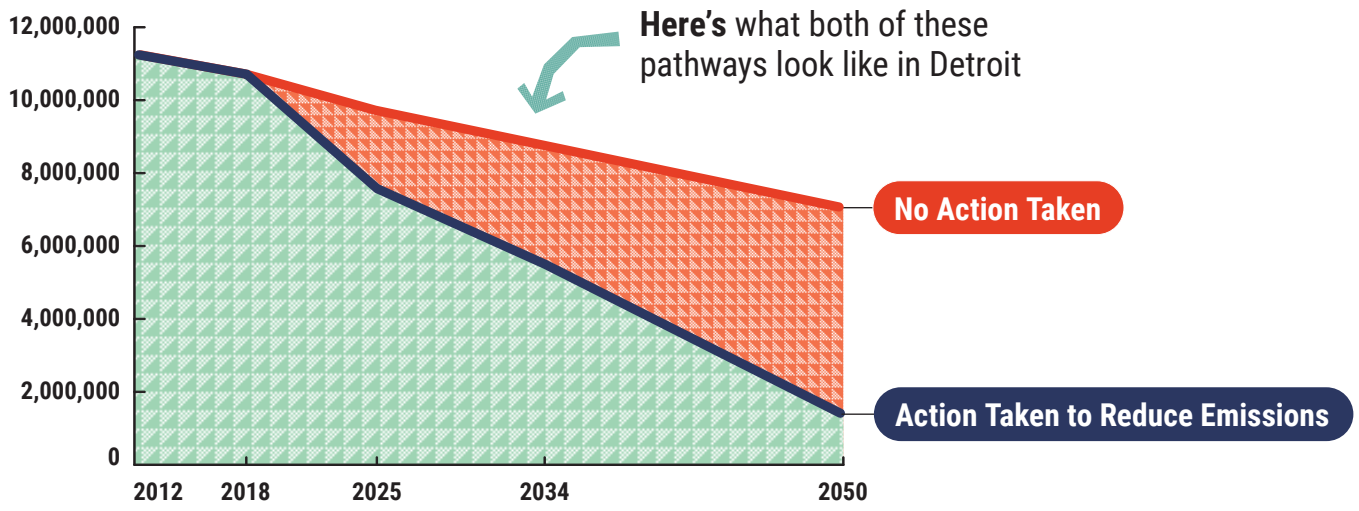
GHG emissions are measured in metric tons of carbon dioxide equivalent (MTCO2e). There are many GHGs that cause climate change, with CO_2 as the most widely recognized. To measure all emissions together, other GHGs can be converted into a single metric called "CO_2 equivalent" or "CO2e". CO2e is measured in metric tons (MT). While it is hard to imagine a gas weighing anything, **each metric ton weighs about the same as 440 bricks or a great white shark.**

10.7 million MTCO2e is a big number, but what does it mean? **To create this many emissions, you would have to charge a smartphone about 1.3 trillion times!** As a comparison, this is almost equal to the emissions of the entire state of Rhode Island, even though they have 60% of the population and 1/10th the land area. You can also imagine **10.7 million great white sharks.**

→ What Do We Need to Do?

As part of the 2018 GHG emissions inventory, an analysis was conducted to determine a pathway to reach our climate goals. We looked at a scenario with no climate actions, and a scenario mapping out how we can achieve the following goals for community-wide emissions:

30% decrease by **2024**
50% decrease by **2034**
80% decrease by **2050**

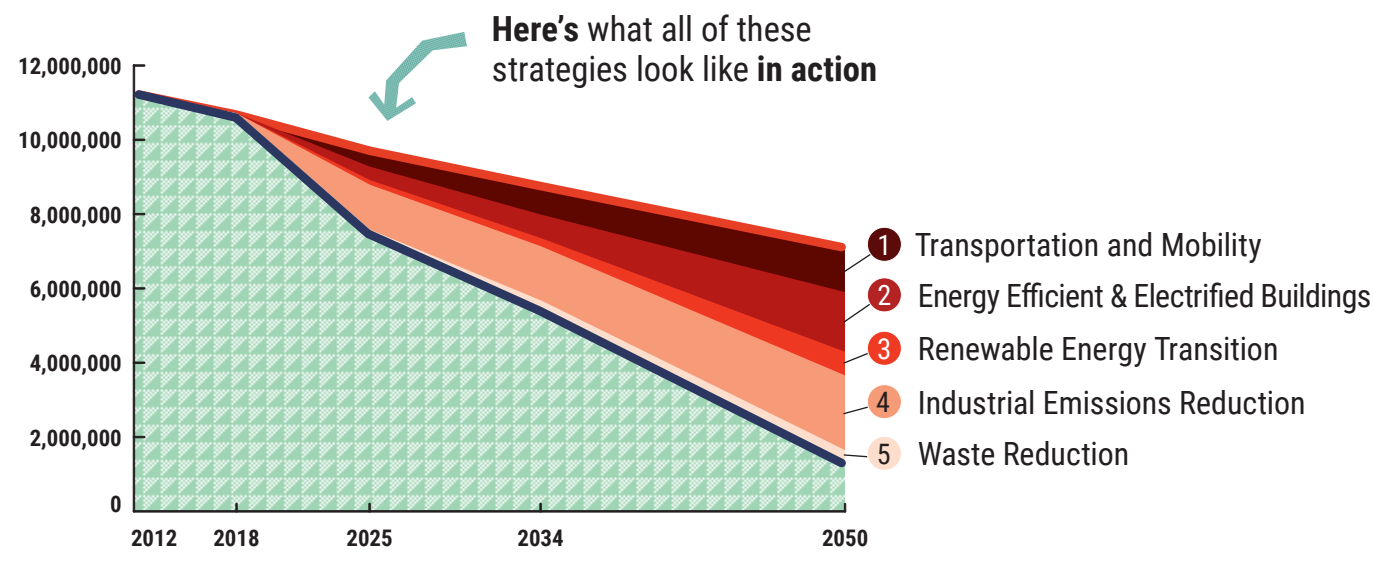


→ How Do We Do It?

It's great to know how much we need to reduce our emissions—**but how do we do it?**

To map this out, we did what's called a "wedge analysis." This analysis finds a pathway to reach our climate goals over time by breaking down the total emission reductions needed (the red part of the graph above) into smaller manageable categories, called "wedges." In this Climate Strategy, we identify five wedges, each with a set of defined actions and next steps.

By understanding these strategies, we can find a path to reach our GHG emission reduction goals.



Climate Vulnerability in Detroit

The impacts of flooding, extreme heat, and poor air quality are not felt equally across the city because some areas and populations are more **vulnerable to these climate risks.**

To direct resilience investments to where they will be most impactful and to increase awareness of climate vulnerability, a **Climate Vulnerability Assessment (CVA)** was developed. In this mapped analysis, developed in partnership with Data Driven Detroit and with input from the Climate Equity Advisory Council, **vulnerability was analyzed based on indicators in the following three categories:**

1 Exposure

Measures the risk of an area exposed to certain climate change hazards or dangers (e.g. extreme heat, poor air quality, and flooding)

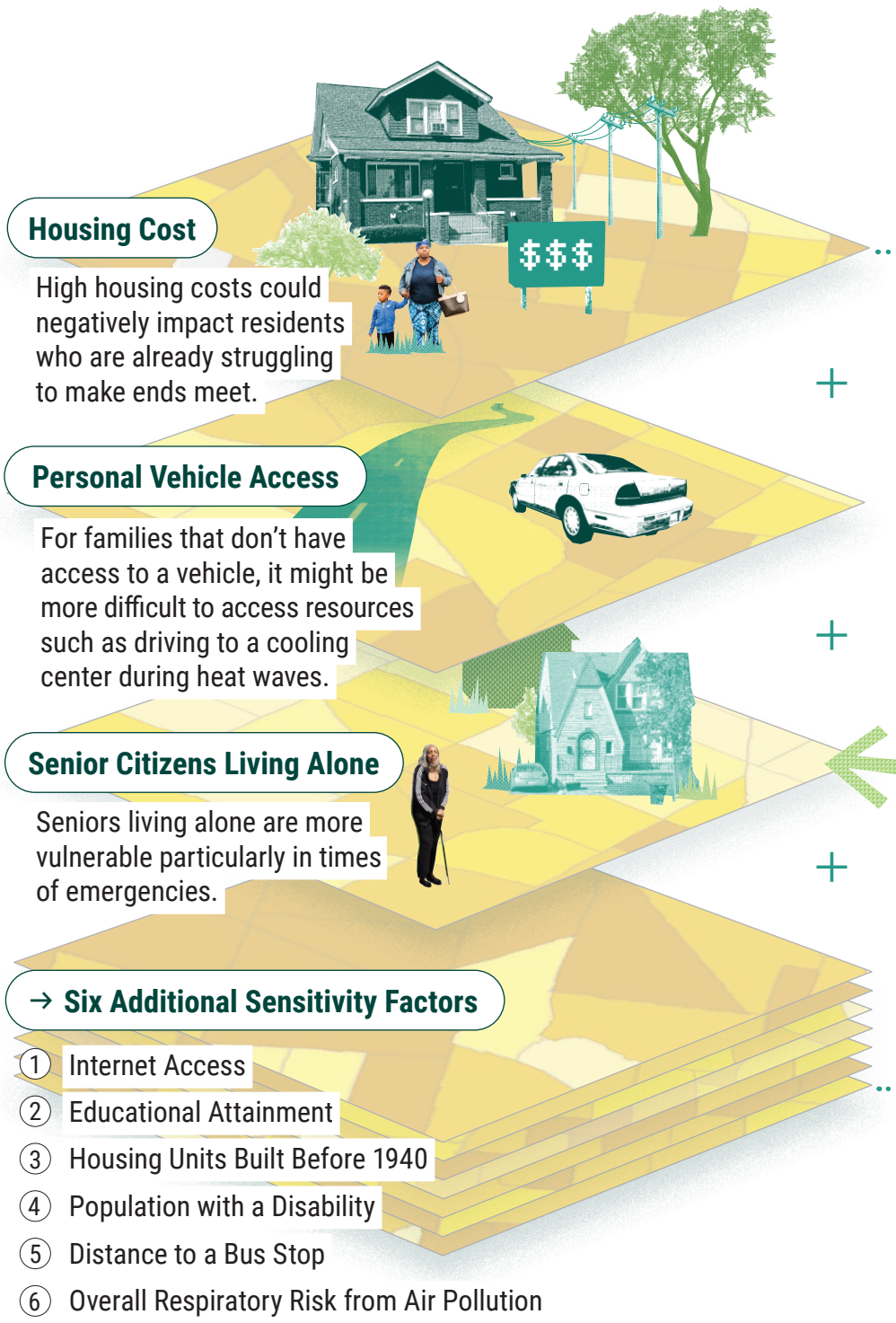
2 Sensitivity

Measures how sensitive people are to hazards or dangers caused by climate change (e.g., elderly folks and people with chronic health conditions are more likely to be harmed by extreme heat)

3 Adaptive Capacity

Measures the ability of people to access resources and support systems that can help them protect themselves against climate change hazards (e.g., walkability to cooling centers and other essential services)

→ Mapping Sensitivity in Detroit



Housing Cost

High housing costs could negatively impact residents who are already struggling to make ends meet.

Personal Vehicle Access

For families that don't have access to a vehicle, it might be more difficult to access resources such as driving to a cooling center during heat waves.

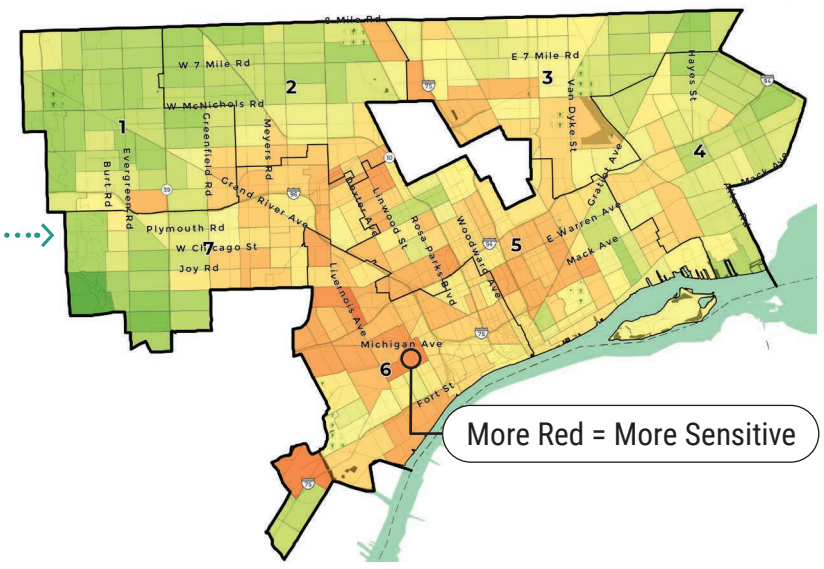
Senior Citizens Living Alone

Seniors living alone are more vulnerable particularly in times of emergencies.

→ Six Additional Sensitivity Factors

1. Internet Access
2. Educational Attainment
3. Housing Units Built Before 1940
4. Population with a Disability
5. Distance to a Bus Stop
6. Overall Respiratory Risk from Air Pollution

Overall Sensitivity by Census Tract



By combining and mapping all of the indicators together, we can see which survey regions are the most sensitive to climate hazards.

Currently, the City of Detroit is working to update and improve the indicators in order for this tool to support efforts in the most climate vulnerable areas of the City.

What is an Indicator?

An indicator is a data point that when analyzed and mapped, helps us understand an issue we care about. By combining indicators, we can get a more accurate measure of who and where is most impacted.

For example, the three data points listed on the right—**Housing Cost, Personal Vehicle Access, and Senior Citizens Living Alone**—are indicators.

We encourage all readers to explore the online interactive map, where you can visualize the exposure, sensitivity and adaptive capacity maps and their indicators.

Understanding the conditions of the most vulnerable will help guide investments and resources equitably to the neighborhoods that need them most.

Interactive Map

For a full list of the indicators used with the CVA, and descriptions of the methodology used to score indicators, *please visit the* ***Detroit Climate Strategy website***.

Developing the Detroit Climate Strategy

The DCS project team used their knowledge and skills to come up with a list of climate actions. They **talked with residents and listened to their input, making sure to include their feedback in the actions,** and also kept everyone informed along the way about any changes or progress.

Public Engagement

Stop → Collaborate → and Listen →

In 2021, the Office of Sustainability and Climate Strategy project team facilitated **six focus group sessions and three town hall meetings** to better understand resident perspectives and priorities for climate action.

Engagement events were hosted virtually as a COVID-19 precaution. Feedback from these events informed the development, selection, and refinement of actions in the Detroit Climate Strategy.

Cross-Dept. Coordination

Stop → Collaborate → and Listen →

During the making of the Detroit Climate Strategy, **city department directors and staff were involved to make sure that the actions and steps chosen matched the City's priorities, goals, and abilities.**

Over two years, they gathered feedback from various sources, such as group planning sessions, one-on-one meetings, surveys, and reviews to ensure everything was on track.

Detroit Climate Strategy

This collaborative document resulting from engagement and feedback from residents, City departments and the Climate Equity Advisory Council

Climate Equity Advisory Council

Stop → Collaborate → and Listen →

To incorporate community voice in the development of the Detroit Climate Strategy, a Climate Equity Advisory Council (CEAC) of city residents was formed in June 2021. **As an advisory council, they conducted 4 key activities:**

1. Informed selection of indicators used in the Community Vulnerability Assessment
2. Supported facilitation of public engagements in community townhalls and focus groups
3. Provided feedback on the equity implications of a select set of proposed climate actions
4. Created equity and justice centered Community Guidelines to support implementation of the Detroit Climate Strategy

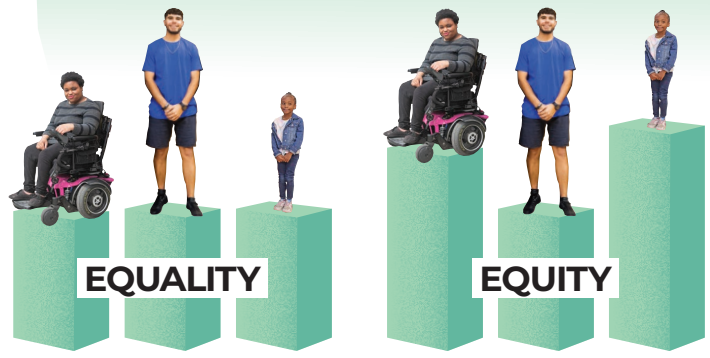
→ Community Guidelines Summary

The CEAC Community Guidelines define a community-centric and systems approach to implementing this Climate Strategy. This approach is centered in equity and justice, and is designed to guide implementation by prioritizing the people, places, and conditions most impacted by climate change. This approach will deepen community engagement and build capacity of community leaders, residents, and key stakeholders to take collective action.

1. Act in equitable and just ways
2. Build engagement through shared vision, goals, and practices
3. Put people first
4. Build community leadership and community action
5. Link and leverage actions to accelerate impacts
6. Strengthen policy and actions that directly reduce emissions

How Do We Define Equity?

The word 'equity' means being fair and just in both how things are done and their results. To understand and appreciate its importance, we must recognize how equity is different from equality. Equality means each individual or group of people is given the same resources or opportunities. However, equity recognizes that each person or group has different circumstances and provides the resources and opportunities needed to make sure that everyone has the ability to thrive.



Visit the ***Detroit Climate Strategy website*** to access the full community guidelines document, and a summary of the CEAC process, from the formation of the council to how it contributed to strategy development.

Let’s Dive Into the Climate Strategy!

→ Climate Actions at a Glance

The Detroit Climate Strategy (DCS) is a roadmap for Detroit to achieve important climate goals. It has four main actions that will help reduce emissions and prepare us for climate changes.

Mitigation
Reducing our impact

1. Transitioning to Clean Energy
2. Increasing Sustainable Mobility
3. Accelerating Energy Efficiency and Reducing Waste

Resilience
Adapting to change

4. Prioritizing Vulnerable Residents and Adapting to Change
   - a. Reducing Risk of Flooding
   - b. Protecting from Extreme Heat
   - c. Improving Air Quality

→ Action Details

There are multiple steps we will all need to take to reduce our climate impact and adapt to climate change. Each action includes 3-year milestones and contains the following information:

Action Impact Category

City Government
These actions are geared towards making municipal operations energy efficient and less wasteful.

Community-Wide
These actions will impact the whole city, increasing resilience and/or decreasing emissions.

Co-Benefits

Identifies environmental, economic, and equity related benefits the action step supports:

- Improve Public Health
- Increase Energy Efficiency & Affordability
- Improve Public Safety
- Quality Jobs & Opportunities
- Increase Government Efficiency & Transparency
- Improve Food System & Access
- Improve Air Quality
- Reduce Greenhouse Gases
- Improve Water Quality & Management

Taking individual & collective action!

Slowing down the impacts of climate change will require individual and collective action.

In addition to the actions outlined in this climate strategy, there are numerous efforts that will require engagement, partnerships and advocacy.

Advocacy priorities identified through the process of developing this strategy include:

1. Investments in Regional Transit
2. Energy Reliability
3. Environmental Justice

→ Guiding Principles

Community Advisory

Hearing from the community is key to making the Detroit Climate Strategy work. The City wants to involve all residents, especially those who might be more at risk, in its plans to fight climate change. This can happen through different types of meetings, both formal and casual, where residents can share their ideas and suggestions. As the actions are put into place, the city will ask residents to join in and work together to reach our shared goals and reduce emissions.

Workforce Development

As Detroit works to invest more in climate initiatives, there will be new chances for people in the city to find good jobs. **The City wants to team up with workforce development programs to create career opportunities in areas like energy efficiency, renewable energy, and electrification.** By training and keeping skilled workers in the area, Detroit can grow stronger with more stable jobs that support families and boost the City's economy.

Open Data & Government Transparency

Collecting and analyzing data is important to make smart decisions while working on climate actions. As part of this climate strategy, data on 2018 Greenhouse Gas Inventory and the Community Vulnerability Assessment will be available through the City of Detroit Open Data Portal. The City is always working to get better and promises to share data on the climate action progress. **We want Detroiters to know how we're working toward our goals.**

1 Transitioning to Clean Energy

Almost 70% of our citywide greenhouse gas (GHG) emissions in 2018 came from the city-wide generation of electricity to power our buildings and activities. Clean energy, like renewables generated from solar and wind, does not produce greenhouse gas emissions or pollution. Generating our electricity from clean sources is critical to meet our GHG reduction goals, improve air quality, and lower energy costs for residents and businesses. There are different ways to power buildings and operations with renewable energy, including having solar panels on buildings or buying renewable energy from the utility company. Although solar energy is becoming more common, there are barriers to making renewable energy accessible, affordable, and equitable. High upfront costs for installation and the need for home/property ownership make residential-scale renewable investments challenging for renters and low-income households.

> "There is much work to be done to lower our emissions and strengthen resilience in Detroit. Renewable, clean energy is a necessary and immediate solution. **The adoption of clean energy is the best approach and it will create a local workforce needed for a just transition.** Every one of these strategies offers a pipeline of opportunities. Preparing Detroiters to compete for the opportunities and careers that are needed makes the most sense"
>
> *— Donele Wilkins, Midtown resident, President and CEO of Green Door Initiative and member of the CEAC*

City Government Impact

1.1 Power 100% of municipal electricity usage with clean energy by 2034

Acquiring clean energy for municipal operations is a critical step to reducing the City's greenhouse gas emissions.

3-Year Target

- → Power 50% of municipal electricity with clean energy
- → Establish a pathway to 100% clean electricity

Co-Benefits

- Reduce Greenhouse Gases
- Increase Energy Efficiency & Affordability

City Government Impact

1.2 Launch a solar program to generate clean energy on City-owned sites and provide community benefits to residents

Using City-owned sites and facilities with large surface areas to deploy solar panels will enable the City to source clean energy directly and reduce emissions from municipal energy use.

3-Year Target

- → Issue a Request for Proposals for the deployment of solar energy on City-owned sites

Co-Benefits

- Reduce Greenhouse Gases
- Increase Energy Efficiency & Affordability
- Increase Government Efficiency & Transparency
- Quality Jobs & Opportunities

Community-Wide Impact

1.3 Work with utility provider and private property owners to source 50% of Detroit's electricity from clean energy

Creating a demand for clean energy is important to reach our GHG reduction targets. Coordinated efforts will be required across stakeholders to ensure equitable access to all residents and businesses.

3-Year Target

- → Coordinate bulk purchasing of clean energy with businesses and other large energy users
- → Support community solar efforts

Co-Benefits

- Reduce Greenhouse Gases
- Increase Energy Efficiency & Affordability
- Quality Jobs & Opportunities

2 Increasing Sustainable Mobility

Currently, most motorized transportation options, including personal vehicles and commercial trucks, use fossil fuels, emitting GHGs. In Detroit, most residents depend on cars to get them to jobs, grocery stores, medical centers, and childcare. Curbing emissions from transportation can be achieved by improving public transit, making it easier to take transit, bike, or walk, and increasing the use of electric vehicles.

Sustainable mobility plays a significant role in improving our environment by reducing GHG emissions and improving air quality. Increasing mobility options will help ensure that all Detroiters can access to clean, safe, affordable, and efficient ways to get around.

> "Expanding and improving public transit is not only critical to combat the climate crisis, it will hugely improve the daily lives of tens of thousands of Detroiters. **When done right, convenient reliable public transit will give Detroiters access to their choice of schools, jobs, doctors, and shopping—providing the freedom that we all deserve.** It's a real win-win, if we make the investments needed for quality public transit Detroiters can depend on."
>
> *— Megan Owens, Bagley Neighborhood Resident, Executive Director of Transit Riders United*

City Government Impact

2.1 Install 200+ public EV chargers at City facilities, garages, on-street and surface parking lots, covering every District

Providing EV infrastructure as part of capital improvements to municipal facilities ensures that charging will be available for the municipal city fleet and others as vehicles transition to EVs.

3-Year Target

- → Install EV chargers in 7 commercial corridor lots
- → Issue Executive Order requiring all municipal facilities with parking, including Recreation Centers, to have EV chargers installed by 2025
- → Leverage Federal funding to expand on-street charging

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases

Community-Wide Impact

2.2 Pilot EV carshare services in neighborhoods underserved by transit

Piloting mobility options in areas underserved by bus routes will provide increased mobility options to residents. Co-locating EV charging stations at community recreation centers builds on existing community resources.

3-Year Target

- → Ensure the presence of at least 2 publicly accessible EV car share vehicles at each Recreation Center

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases

Community-Wide Impact

2.3 Adopt ordinance requiring EV infrastructure for new developments

Investing in EV charging infrastructure as new buildings are developed will ensure that charging capability is available as fossil fuel-powered cars transition to electric vehicles.

3-Year Target

- → Adopt an ordinance requiring 20% of spaces in new developments be EV-capable

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases

City Government Impact

2.4 Transition City light-duty vehicle fleet to 100% zero emission by 2034

Transitioning vehicles that support City operations to electric power or clean fuels will improve air quality and reduce greenhouse gas emissions, noise, fuel and maintenance costs.

3-Year Target

- → Issue Executive Order requiring purchase of zero emission light-duty vehicles
- → Require that every Department have light duty Zero Emission Vehicles in their fleet

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases
- Increase Government Efficiency & Transparency

City Government Impact

2.5

Transition City heavy-duty vehicles to zero emission and clean fuel options

Transitioning heavy-duty vehicles to electric or clean fuel options will help achieve greenhouse gas emissions reduction targets and improve air quality.

3-Year Target

→ Complete City fleet conversion plan

→ Implement City fleet conversion plan

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases
- Increase Government Efficiency & Transparency

Community-Wide Impact

2.6

Transition City bus fleet to electric or clean fuel buses

Converting public buses to electric power or clean fuel will improve air quality, reduce greenhouse gas emissions, street noise, fuel, and maintenance costs.

3-Year Target

→ Procure zero emission buses as part of fleet transition

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Reduce Greenhouse Gases

Community-Wide Impact

2.7

Adopt a single pass for all forms of public transportation

Simplifying and streamlining the experience of using public transportation improves the experience of riders and reduces barriers for seamless modal switching.

3-Year Target

→ Integrate at least 2 mobility modes (i.e. DDOT, MoGo)

Co-Benefits

- Reduce Greenhouse Gases
- Quality Jobs & Opportunities

Community-Wide Impact

2.8

Make equitable investments in pedestrian and cyclist infrastructure

Investing in sidewalks, bike lanes, and greenways ensures that all residents can move safely in the city without a car.

3-Year Target

→ Complete 8 miles of the Joe Louis Greenway

→ Invest $31 million in intersection safety improvements

Co-Benefits

- Quality Jobs & Opportunities
- Improve Public Safety
- Improve Public Health

Community-Wide Impact

2.9

Invest in public transit infrastructure to increase ridership

Investing in public transit to improve bus reliability is critical to increasing ridership. Advocacy for these and overall regional transit funding is part of working toward an improved system.

3-Year Target

→ Improve reliability and timing of buses per the DDOT Reimagined Plan

Co-Benefits

- Quality Jobs & Opportunities
- Improve Public Health
- Reduce Greenhouse Gases

Community-Wide Impact

2.10

Reduce miles traveled to goods and services

Identifying needs within neighborhood commercial corridors and investing to create environments where businesses can thrive is part of revitalizing neighborhoods and encourage walkability.

3-Year Target

→ Launch master planning process citywide—increase policies for mixed use development and Transit Oriented Development (TOD)

Co-Benefits

- Quality Jobs & Opportunities
- Improve Food Systems & Access
- Improve Public Health

Community-Wide Impact

2.11

Support mobility innovation and investment

Retaining Detroit's competitive advantage in mobility innovation and the auto industry is part of transitioning into a cleaner future and ensuring economic growth and regional vitality.

3-Year Target

→ Pilot inductive charging and associated activations on city roadways

→ Expand the Transportation Innovation Zone

→ Launch a program to prepare youth for future mobility and innovation jobs

Co-Benefits

- Quality Jobs & Opportunities

3 Accelerating Energy Efficiency and Reducing Waste

Reducing electricity and gas in homes and buildings will help reduce our GHG emissions, lower energy bills, and improve indoor and outdoor air quality. Energy efficiency improvements like weatherization, roof and window repairs help conserve energy and keep buildings warm in winter and cool in summer.

In 2020, 16% of Detroit families spent more than 10% of their income on utility bills. High utility costs hurt lower-income families more; it puts them at risk of having utilities shut off. It also forces families to choose between heating their home or other important needs.

> "Opportunities exists for City and residents to work together to offset energy usage with renewables. Buildings can be retrofitted to be more energy efficient which would magnify the benefits. **Most importantly we can all enjoy improved health as we move towards a more sustainable energy future that serves all residents of Detroit."**
>
> *— Gibran Washington, 8 Mile and Rosemont Resident*

Community-Wide Impact

3.1 Adopt energy benchmarking ordinance

Benchmarking refers to measuring the energy performance of a building to determine if that building uses (consumes) more or less energy than similar facilities. Understanding consumption is the first step to curbing usage.

3-Year Target

→ Collect annual energy and track water data for City buildings greater than 10,000 sq. ft.

→ Adopt an ordinance requiring benchmarking for targeted public and private buildings

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases
- Increase Government Efficiency & Transparency

City Government Impact

3.2 Retrofit municipal facilities to reduce their use of energy and fossil fuels

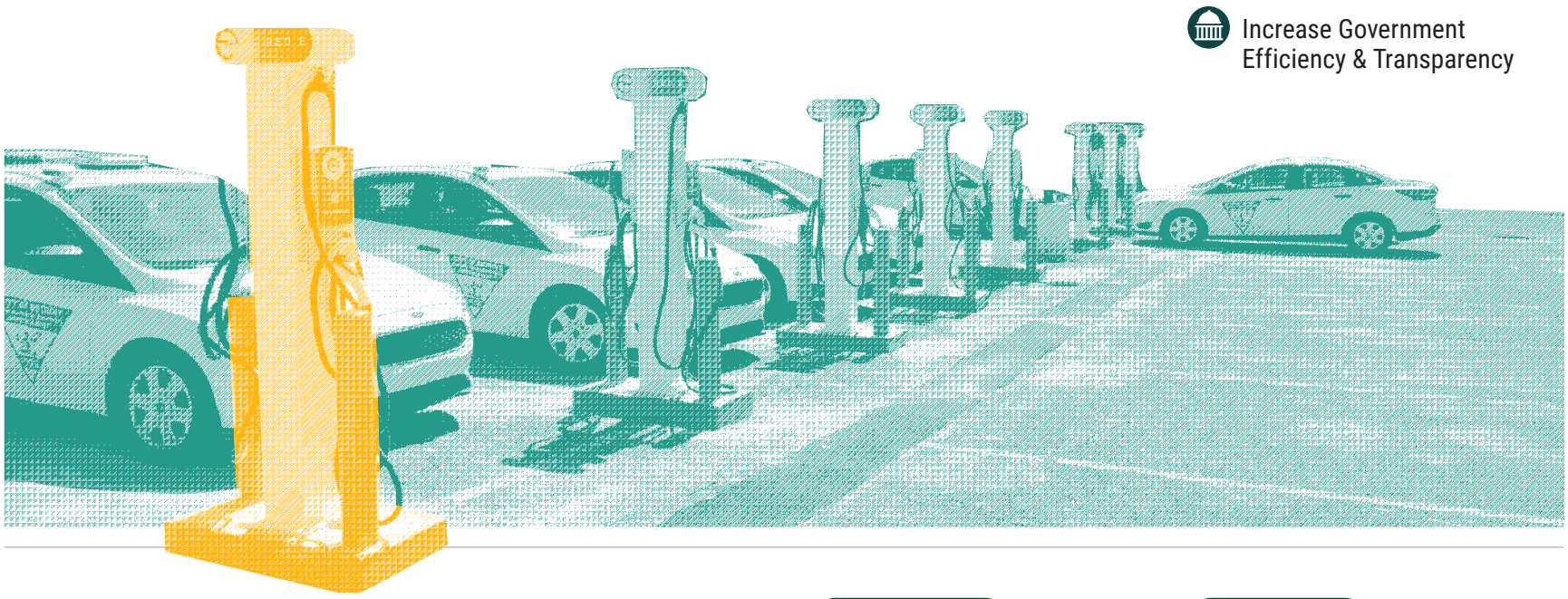
Lowering energy consumption is key to reducing GHG emissions. Improving buildings efficiency through weatherization and system upgrades will result in savings in energy and costs.

3-Year Target

→ Upgrade 25% of the largest energy using critical facilities, achieving at least 25% energy reduction

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases
- Quality Jobs & Opportunities
- Increase Government Efficiency & Transparency



City Government Impact

3.3 Require all new municipal buildings to be all-electric or all-electric ready

Switching building systems to electric is part of the overall goal to power buildings with clean energy and zero emissions.

3-Year Target

→ Issue Executive Order requiring new municipal buildings to be all-electric or all-electric ready

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases
- Quality Jobs & Opportunities
- Increase Government Efficiency & Transparency

Community-Wide Impact

3.4

Expand access to energy efficiency programs and electrification upgrades by leveraging existing home repair programs

Coordinating with existing programs that provide home repairs ensures that residents who need help the most have access to improvements that can reduce their utility costs.

3-Year Target

→ Complete roof replacements for senior, low-income, and disabled Detroiters via the Renew Detroit Program

→ Weatherize Detroiters' homes through the Low Income Home Energy Assistance Program and other programs.

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases
- Quality Jobs & Opportunities

Community-Wide Impact

3.5

Support development of financing programs for energy efficiency and electrification projects

Providing financing options to pay for energy efficiency improvements, such as a revolving loan fund, will enable owners to complete retrofits now and pay back the costs over time with the savings from the improvements.

3-Year Target

→ Launch pilot financing program for commercial or multi-family buildings

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases

Community-Wide Impact

3.6

Accelerate energy reductions in buildings of all scales through increased participation in education, incentives, and recognition programs

Connecting property owners, developers of industrial, commercial and multifamily buildings to programs that reduce energy (and costs) is a critical step to achieve our GHG goals.

3-Year Target

→ Work with partners to identify opportunities for broader buildings decarbonization

Co-Benefits

- Increase Energy Efficiency & Affordability
- Reduce Greenhouse Gases

→ Reducing Waste

Everything we create, use, grow, and eat needs a place to go when we're done with it. Some materials, like plastic, can take generations to break down, while others, like food, release harmful GHGs into the air when they do. But if we find other ways to deal with waste—like recycling, composting, and reducing how much we make—we can have a positive impact, release less greenhouse gases, save natural resources, and create more jobs and economic opportunities.

Large industrial facilities use a lot of energy, which produces significant pollution and GHG emissions that harm the environment. Cutting down on waste, including energy waste, in all sizes of buildings, from homes to industrial facilities, is important for our impact on the planet.

Community-Wide Impact

3.7

Increase participation in waste reduction and recycling

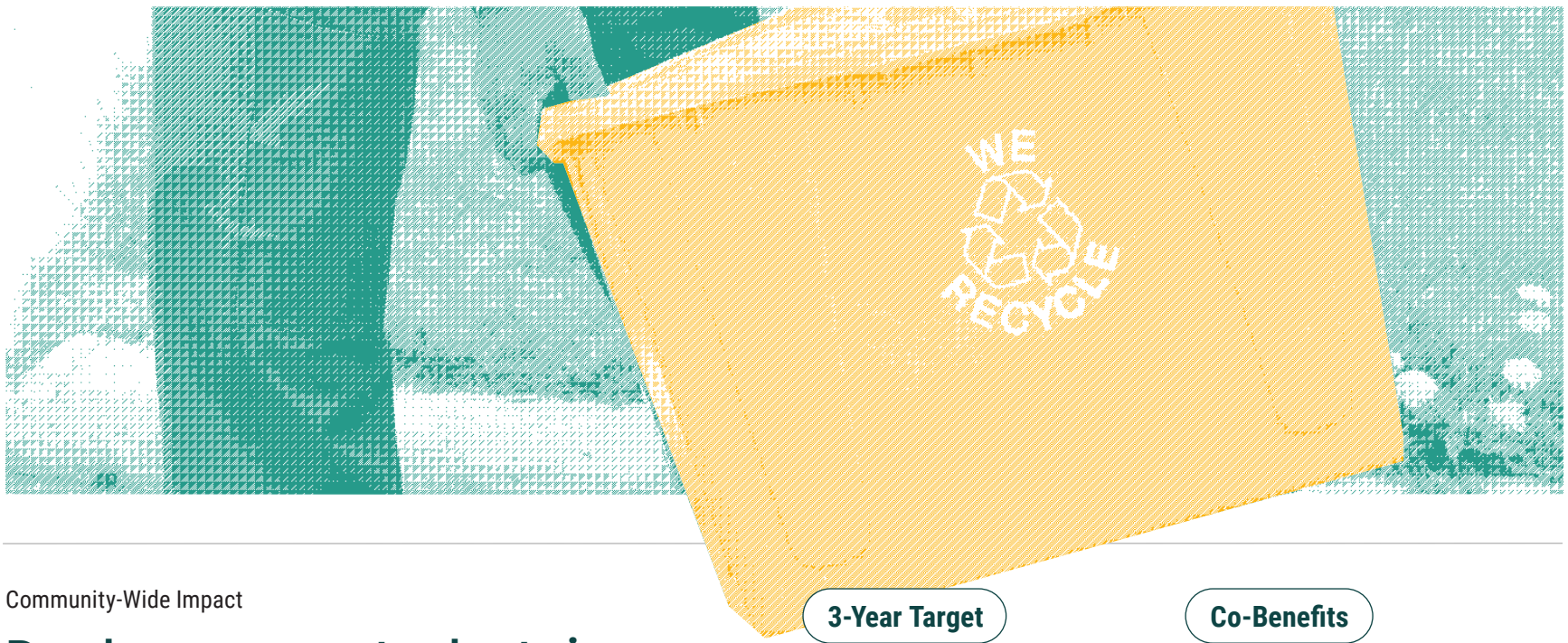
Investing in recycling infrastructure and partnering with community organizations to increase recycling, reduce food waste, and salvage excess food to redistribute it to those in need.

3-Year Target

- → Divert 15% of municipal solid waste from landfills
- → Increase participation in curbside recycling to 60%
- → Increase the amount of food rescued and reduce food waste

Co-Benefits

- Reduce Greenhouse Gases
- Improve Food Systems & Access
- Quality Jobs & Opportunities



Community-Wide Impact

3.8

Develop a zero waste plan to increase waste diversion

Meeting the waste diversion goal will require the development of a zero waste plan to guide the City's waste management efforts.

3-Year Target

- → Publish a Zero Waste Strategy identifying long term targets for waste diversion and materials management

Co-Benefits

- Reduce Greenhouse Gases
- Improve Food Systems & Access
- Increase Government Efficiency & Transparency

Community-Wide Impact

3.9

Pilot community and commercial-scale composting initiatives

Reducing food waste at scale requires collaboration with local and community stakeholders to build capacity with the goal of rescuing edible food and composting food waste.

3-Year Target

- → Pilot community food scrap and yard waste drop-off sites in partnership with local compost processors
- → Pilot commercial composting in municipal buildings
- → Train health inspectors on food donation and rescue, and provide resources to Detroit businesses

Co-Benefits

- Reduce Greenhouse Gases
- Improve Food Systems & Access

Community-Wide Impact

3.10

Work with other municipalities in the region to drive down industrial emissions

Reducing industrial emissions from sectors like manufacturing, will require engagement, collaboration and creative solutions. Partnering will allow sharing of best practices to increase energy efficiency and reduce emissions.

3-Year Target

- → Create task force with relevant regional stakeholders to address industrial emissions

Co-Benefits

- Reduce Greenhouse Gases
- Improve Air Quality

4 Prioritizing Vulnerable Residents and Adapting to Change

In Detroit, residents are already experiencing increased flooding, extreme summer heat, and poor air quality as a result of climate change. As extreme weather events impact our lives, it is important to strengthen the overall resilience of the city and put vulnerable residents first.

Resiliency means strengthening infrastructure and giving communities the resources to protect themselves against the harmful effects of climate change, and recover when climate events occur. In action, it means improving city infrastructure so it can sustain extreme weather events and supporting residents and businesses with adaptation measures and recovery efforts.

> "The recovery from flooding has been long and tedious with many residents still recovering, with many rebuilding their lives piece by piece. Climate change's severe weather patterns have created the need for urgency and **prioritization of emergency preparedness plans, that begin with the most marginalized residents** to make sure the recovery foundation is solid and can handle the weight of **our most prized asset—our residents.**"
>
> *— Sandra Turner-Handy, East Outer Drive Resident, former Engagement Director for the MI Environmental Council*

Community-Wide Impact

4.1 Develop a network of Resilience Hubs that serve as a resource in times of extreme weather events

Developing trusted spaces where residents can go to get resources will help before, during, and after extreme weather events or climate emergencies.

3-Year Target

→ Launch two additional Resilience Hubs in Detroit

Co-Benefits

- Improve Public Safety
- Improve Public Health
- Increase Energy Efficiency & Affordability

Community-Wide Impact

4.2 Increase resident participation in Detroit's emergency management notification system—Detroit 365

Leveraging the existing city-wide resident notification system ensures that residents are informed prior, during, and after extreme weather events.

3-Year Target

→ Increase participation in Detroit 365 by 10%

Co-Benefits

- Improve Public Safety
- Improve Public Health

Community-Wide Impact

4.3 Support neighborhood-level action on climate resilience and emergency preparedness

Adapting to climate risks requires equiping communities with knowledge and resources to take action to protect themselves before extreme weather events (flooding, extreme heat and poor air quality).

3-Year Target

→ Launch 3 community engagements to support local communities on climate resilience

Co-Benefits

- Improve Public Safety
- Improve Public Health

Community-Wide Impact

4.4

Expand access to resources for recovery after extreme weather events at the household level

Providing resources and support to residents to recover is critical to the health and safety of communities.

3-Year Target

→ Develop a disaster recovery guide for residents and coordinate distribution via Resilience Hubs

Co-Benefits

- Improve Public Safety
- Improve Public Health

Community-Wide Impact

4.5

Coordinate with DTE on energy reliability improvements and support prioritization of power restoration to vulnerable communities

Ensuring energy reliability in Detroit through targeted investments to improve the grid is critical. When outages do occur, work to ensure that vulnerable residents such as seniors and people dependent on medical devices are prioritized.

3-Year Target

→ Work with DTE on pilot to bury electrical assets underground

→ Upgrade at least three recreation centers with back up power

Co-Benefits

- Improve Public Safety
- Increase Energy Efficiency & Affordability

Community-Wide Impact

4.6

Advocate for electric service continuity during extreme weather events

Preventing electricity shut-offs is important to reduce health and safety risks during extreme heat and cold weather events.

3-Year Target

→ Work with partners to support the continuity of electric service during extreme weather events

Co-Benefits

- Improve Public Safety
- Increase Energy Efficiency & Affordability

Reducing the Risk of Flooding

Flooding can have a significant economic impact for our communities. FEMA estimates that there could be $42 million in economic losses a year in Wayne County from flooding without further action. As climate change makes heavy rain events more likely and intense, the City will increase its resiliency across various scales, from large infrastructure upgrades that will better manage wastewater to resources and programs designed to support and protect households when flooding does occur.

Community-Wide Impact

4.7

Implement large scale green stormwater infrastructure projects and conduct sewer system improvements and maintenance on a regular basis

Building green stormwater infrastructure projects relieves the overall sewer system from excess stormwater and prevents potential sewer overflows.

3-Year Target

- → Invest $30 million in infrastructure in Rouge Park
- → Invest $42 million in infrastructure in Brightmoor

Co-Benefits

- Improve Water Quality & Management
- Increase Government Efficiency & Transparency

Community-Wide Impact

4.8

Expand sewer protection program resources in flood-prone areas of the City

Improving sewer systems and water service lines for vulnerable residents is part of ensuring health, safety, and resilience.

3-Year Target

- → Complete 10,000 lead service line replacements by 2025
- → Protect 1,000 homes with basement back up retrofits

Co-Benefits

- Improve Water Quality & Management

City Government Impact

4.9

Incorporate small-scale green stormwater infrastructure into City-funded capital projects

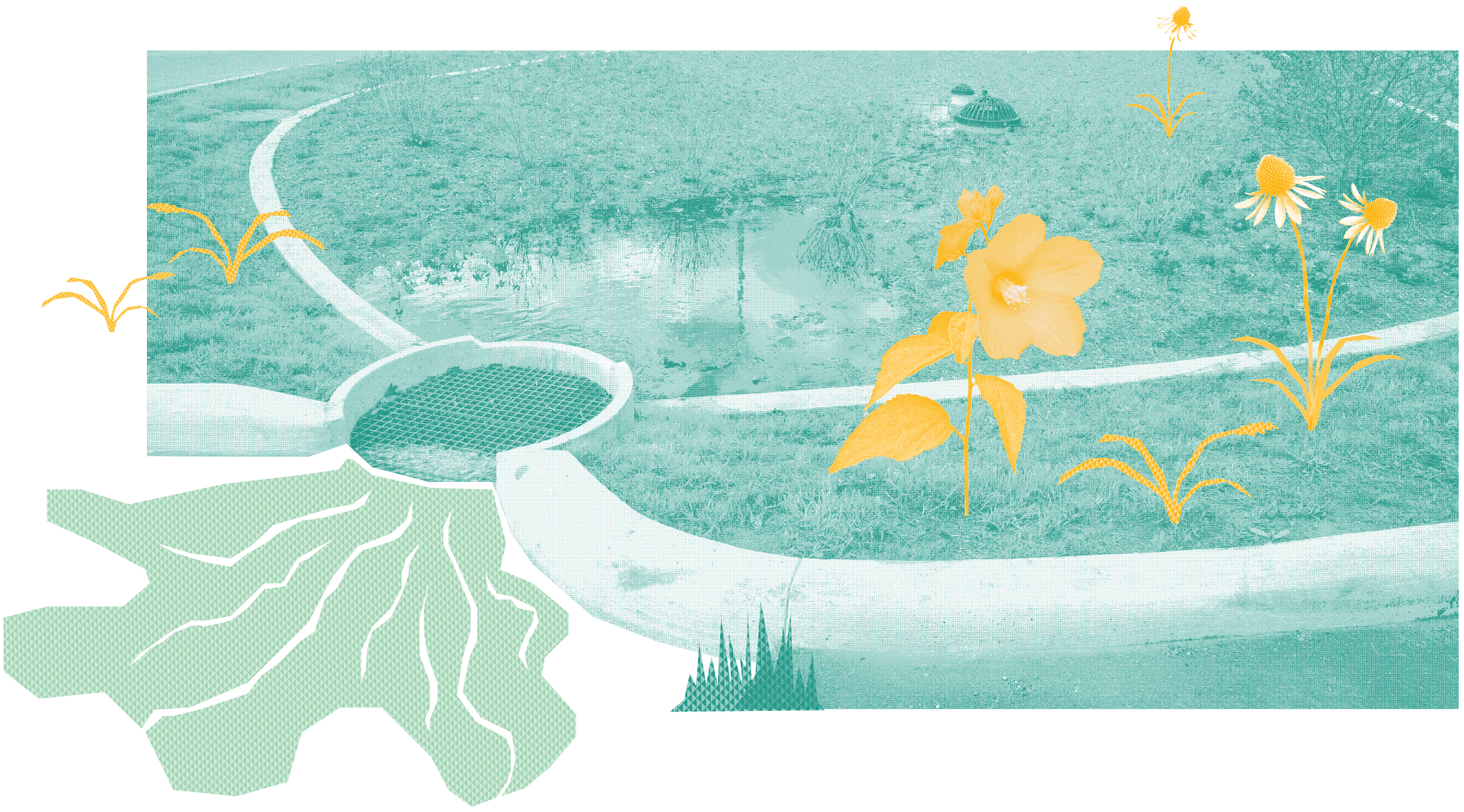
When carrying out capital improvements, such as surface parking renovations, is important to include stormwater management strategies to slow down water entering the sewer system.

3-Year Target

- → Incorporate green stormwater infrastructure in the design checklist for City capital projects

Co-Benefits

- Improve Water Quality & Management
- Increase Government Efficiency & Transparency



b Protecting from Extreme Heat

Extreme heat poses a significant risk to public health and it is felt more severely by the most vulnerable. The increasing frequency, length, and severity of heatwaves is attributable to climate change and climate scientists predict these trends will continue, with heatwaves becoming even more common and dangerous in the coming years. Protecting from extreme heat includes ensuring the availability of cooling sites as well as increasing the city's tree canopy to provide increased shade in the summer.

"Currently our systems of cooling centers and an unreliable energy grid make the city more vulnerable to deaths from extreme heat events. **We need to improve our energy resilience and access to community centers** that can serve as cooling hubs in instances of extreme temperatures while working to improve household resiliency to heat through air conditioner provision, energy efficiency improvements, and solar & storage systems."

— CEAC Member, Islandview Resident

Community-Wide Impact

4.10

Reduce the urban heat island effect and mitigate the impacts of extreme heat on public health

Reducing the impacts of heat on residents will require short- and long-term resources. In the short-term, developing a Heat Action Plan will ensure that residents have cooling sites available. In the long-term, investing in increasing tree canopy in high heat vulnerability areas will help cool neighborhoods.

3-Year Target

- → Plant 30,000 trees, starting with most blighted properties and areas
- → Create an Extreme Heat Action Plan

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Increase Energy Efficiency & Affordability

C Improving Air Quality

Exposure to air pollution has negative effects on our health including increased prevalence and severity of asthma, respiratory infections, heart disease, and cancer. Poor air quality has a disproportionate impact on BIPOC communities. Advocating for improved air quality in Detroit is not new for many residents, as activists organized and fought for years to shut down the Detroit incinerator (closed in 2019) and reduce pollution from heavy industry.

"While the City of Detroit and local organizations are working to stop these injustices and create a healthier living environment for the community, more support is needed. **There is much work to be done within the realm of climate justice and social equity.** However, the work currently being done is only the first step in a series of needed changes throughout Detroit."

— Dolores Perales, resident of District 6

Community-Wide Impact

4.11

Work with partners to reduce truck pollution in areas with low air quality

Tackling truck pollution will require enforcing anti idling policies and partnering with industry to incentivize the use of cleaner freight.

3-Year Target

- → Launch program for clean freight
- → Complete two green buffers (phytoremediation) along truck corridors and expand to other locations
- → Strengthen air quality mitigation at new industrial developments

Co-Benefits

- Improve Air Quality
- Improve Public Health
- Increase Energy Efficiency & Affordability

Glossary

A

Adaptation

Adjusting to the inevitable effects of climate change that will occur despite mitigation efforts.

Adaptive capacity

Measures the ability of people to access resources and support systems that can help them protect themselves against climate change hazards (e.g., walkability to cooling centers and other essential services).

B

Benchmarking

When applied to building energy use, benchmarking serves as a mechanism to measure energy performance of a single building over time, relative to other similar buildings, or to modeled simulations of a reference building built to a specific standard (such as an energy code).

BIPOC

An umbrella term which stands for Black, Indigenous, and People of Color. The use of this term is significant in recognizing that Black, Indigenous, and People of Color are severely impacted by systemic racial injustices.

C

Climate change

Long-term changes in temperatures and weather patterns. These changes can be natural, from changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil, and gas.

Climate justice

A term and movement that considers the inequities of climate impacts in relation to a community's contribution to the problem. Climate change can have differing social, economic, public health, and other adverse impacts on underprivileged populations. Advocates for climate justice are striving to have these inequities addressed head-on through long-term mitigation and adaptation strategies.

Climate vulnerability

The combination of a community's exposure, sensitivity, and adaptive capacity to climate change related events.

Climate Vulnerability Assessment (CVA)

An analysis in which the three vulnerability factors (exposure, sensitivity, and adaptive capacity) are broken down into measurable indicators and mapped by geographic area (e.g., census tract).

Co-benefit

A specific direct or indirect community benefit that happens when a given action is taken.

Composting

The natural process of recycling organic matter, such as leaves and food scraps, into a rich fertilizer that helps soil and plants thrive.

Carbon dioxide (CO_2)

The most common greenhouse gas contributing to climate change, often created as a by-product of fossil fuel combustion, such as burning coal at a power plant or burning gasoline to power a car.

Carbon dioxide equivalence (CO2e)

A single metric for converting the warming potential of many greenhouse gases into a comparable unit (CO2).

D

Detroit Climate Strategy

A series of 35 actions and community-informed policy guidance developed by The City of Detroit, nonprofits, EcoWorks, Elevate, Next Energy, and the Center of Neighborhood Technology, and a 13-member Community Equity Advisory Council.

E

Electrification

The process of powering by electricity and, in many contexts, the introduction of such power by changing over from an earlier power source.

Energy burden

The percentage of annual household income spent on annual energy bills. As a metric, energy burden helps us understand energy affordability, identify which groups carry disproportionally higher burdens than others, and recognize which groups most need targeted energy affordability- and energy justice-related policies and investments to reduce high energy burdens.

Energy efficiency

Technology using less energy to perform a specific function, such as lighting and appliances like refrigerators and washing machines.

Equity

A term that refers to processes and outcomes that are fair and just.

While equality gives everyone the same resources regardless of their needs, equity gives resources with the goal of putting everyone on fair and just equal footing with respect to their individual needs.

Extreme weather events

Occurrences of unusually severe weather or climate conditions (e.g., heatwaves, flooding) that can cause devastating economic, social, and health impacts on communities.

Exposure

Measures the risk of an area being exposed to particular climate change hazards or dangers (e.g., extreme heat, poor air quality, and flooding).

F

Family Sustaining Wages

A wage that provides enough income to cover all of a family's basic needs—like: food, child care, health care, housing, and transportation.

Fleet (vehicles)

A collection of vehicles owned and/or operated by a government agency, business, or other organization.

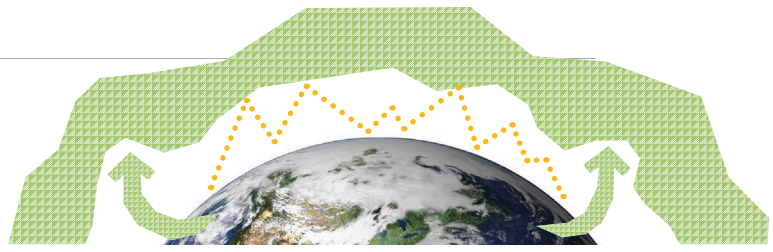
Fossil fuels

Combustible non-renewable fuels such as coal, oil, and gas formed in the geological past from the remains of living organisms.

Frontline communities

Groups of people that disproportionately carry the burden of harm from climate change hazards, pollution, economic disinvestment, under-investment, and or social and political disenfranchisement.

G



Greenhouse gases (GHGs)

Gases that absorb infrared radiation in the atmosphere. GHGs include: carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride.

GHG emissions inventory

A report that counts up how much of the gases that cause climate change are being released during a certain timeframe.

M

Mitigation

Reducing the causes of climate change (i.e., reducing the emission of greenhouse gases).

Mobility hub

Destination where users can switch modes of mobility.

Mode shifting

Switching from one mode of transportation to another mode.

N

Net-zero

Cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance.

P

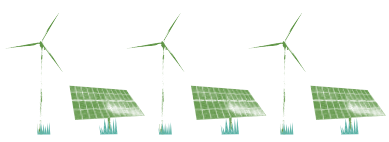
Paris Climate Accord

A landmark international agreement in 2015 to address climate change and its negative impacts. It aims to reduce global greenhouse gas emissions at a scale to limit the global temperature increase to 2 degrees Celsius above preindustrial levels, with a stretch goal of 1.5 degrees. The agreement includes commitments from major emitting countries to cut climate pollution and strengthen those commitments over time.

R

Recycling

The collection and reprocessing of waste materials for reuse, rather than sending to a landfill.



Renewable energy

Energy from sources that restore themselves over short periods of time and do not diminish over time such as the sun, wind, moving water, and heat from the Earth's core.

Resilience

Giving families and communities the resources to protect themselves against the harmful effects of climate change and recover when climate impacts occur.

Resilience Hub

A local community location where solar energy storage, broadband, and streamlined social services ensure that everyone is cared for during power outages, extreme weather, and other emergencies.

Retrofits

Renovations to a building to increase energy efficiency.

S

Sensitivity

Measures how sensitive people are to climate change-driven hazards or dangers (e.g., elderly folks and people with chronic health conditions are more likely to be harmed by extreme heat).

Sustainability Action Agenda

Detroit's first action plan focused on sustainability, published by the Office of Sustainability in 2019.

T

Transit

Publicly or privately owned services that help people move from one place to another (e.g., buses, rideshare, public scooters/bikes).

U

Urban heat island effect (UHI)

Higher temperatures in urban areas due to dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality.

V

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extreme weather.

W

Waste management

The process of collecting, treating, and disposing of solid waste. This includes recycling, composting, and sending waste to landfills.

Weatherization

The practice of protecting a building and its interior from the elements, (i.e. sunlight, rain, wind) and of modifying a building to reduce energy consumption and optimize energy efficiency.

Wedge analysis

A type of analysis which identifies and charts a greenhouse gas emissions reduction pathway over time.

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