



AGENDA

Sustainability Commission Meeting

7:00 PM - Monday, August 10, 2020
Zoom Meeting

Page

1. CALL TO ORDER
2. ROLL CALL

Commissioner Heine
Commissioner Drennen
Commissioner Bayha
Commissioner Foley
Commissioner Greenwald
Commissioner Cannon
Commissioner Gibbons
Commissioner Collins
Commissioner Michalowski
Councilmember Wilcoxon
Director Akers
3. PUBLIC COMMENT (3 MINUTES)
4. AGENDA APPROVAL (5 MINUTES)
5. INTRODUCTIONS
6. PRESENTATIONS
 - 6.1. Michigan Municipal Association for Utility Issues (MI-MAUI) with Rich Bunch 3 - 4
[MI-MAUI overview 20190930](#)
 - 6.2. Resilience Hubs with Desmond Kirwin
[YSC Presentation](#)
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7. CONSENT AGENDA (2 MINUTES)
 - 7.1. Approval of minutes from July 13, 2020 7 - 13
[Sustainability 7-13-2020 Reg Minutes](#)
8. WORK SESSIONS
9. RESOLUTIONS/MOTIONS/DISCUSSIONS
 - 9.1. Sustainability Plan Adoption Resolution 15 - 74
[Draft Sustainability Plan -bw20200624 \(002\)](#)
[Prioritization Matrix - Sustainability Commission](#)
[Sustainability- powerpoint CED](#)

9.2. A2Zero discussion

75 - 212

[A2Zero-Climate-Action-Plan- 3.0](#)

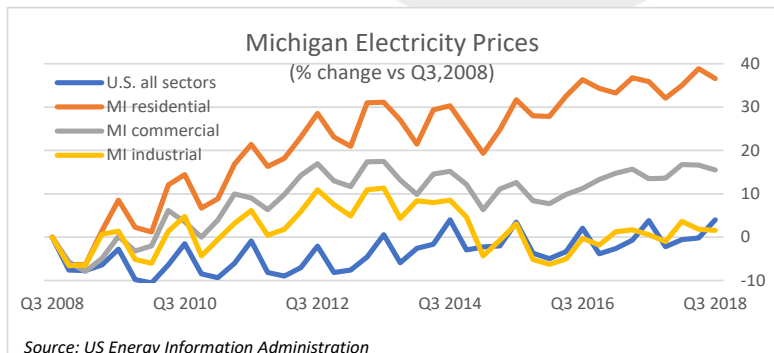
10. COMMISSIONER REPORTS (20 MINUTES)
11. PUBLIC COMMENT (3 MINUTES)
12. PROPOSED BUSINESS (5 MINUTES)
13. ADJOURNMENT



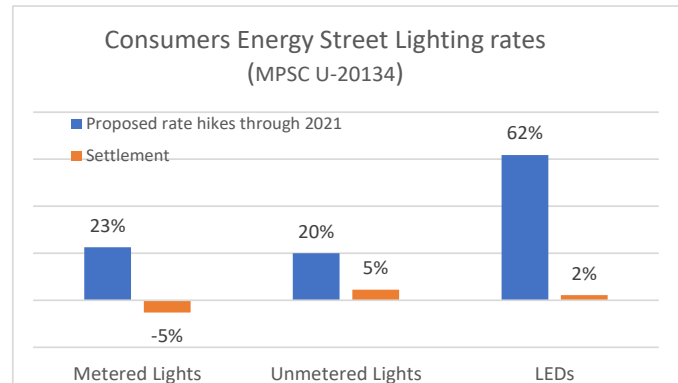
Local governments and public agencies are eager to reduce their energy costs and impacts, but have little influence over utility rates, regulations and business practices that determine what they can actually achieve. By joining together in the Michigan Municipal Association for Utility Issues (MI-MAUI), local governments and public agencies gain collective clout, focus and expertise to influence regulatory processes and utility practices. MI-MAUI connects key practitioners, aligns them along common interests, and produces innovative solutions to community challenges.

What's at stake?

Propelled by technological and regulatory changes, utility rates and tariffs are changing rapidly. Residential and commercial (including most municipal service) rates have gone up much faster than those for industries, who are very active in regulatory matters (see chart).



Working together, local governments gain a powerful, collective voice defending their fiscal, policy, climate and community development goals. In 2015-2016, for example, 25 southeast Michigan municipalities intervened in Michigan Public Service Commission (MPSC), ultimately securing street lighting rates that cost municipalities a collective \$3.6 million less per year than DTE had sought. Similarly, in 2018, MI-MAUI's municipal coalition negotiated a \$3 million reduction in Consumers Energy's proposed street lighting rates for 2019, and blocked additional, similar increases in 2020 and 2021 (see chart).



Models for MI-MAUI

The **Texas Coalition of Cities for Utility Issues (TCCFUI)** comprises more than 50 Texas municipalities dedicated to protecting and supporting the interests of the citizens and cities of Texas with regard to utility issues. TCCFUI monitors the activities of the US Congress, Texas Legislature, Texas Public Utility Commission, Texas Railroad Commission, and Federal Communications Commission on utility issues important to cities.

The **California City-County Street Lighting Association (CALS)** represents counties, cities and towns before the California Public Utilities Commission (CPUC). CALS advocates street light and traffic signal rates that are fair to local governments, and assists members with technical and engineering information, public and private funding information, acquisition strategies, legal review and support in negotiating service issues with utilities. CALS has saved cities over \$100 million since 1983 in avoided street light rate increases.



While local governments must monitor MPSC rate cases to serve their financial and policy interests, MI-MAUI's emphasis is on direct, proactive dialogue with utilities, which can be faster, cheaper and more cooperative while also addressing business policies and practices and not only MPSC-regulated rates and tariffs. MAUI's collective, expert and focused representation gives municipalities better-informed and unified representation with utilities, making it easier for utilities to respond to municipal needs.

MAUI's Scope and Role

MAUI represents local governments and other independent public agencies served by investor-owned utilities throughout Michigan, focusing on municipal operations including:

- municipal street lighting tariffs, technologies and maintenance practices;
- electric and gas tariffs and utility practices affecting municipal buildings, water treatment plants, etc.;
- tariffs and policies related to solar PV and microgrids serving municipal facilities;
- rates and rules for utility green-power programs; and more.

MAUI also addresses issues not directly related to municipal costs and operations, including right-of-way issues, energy facility siting policies and city-wide renewable energy, and climate and sustainability goals. MAUI primarily addresses energy issues, but may take on any utility service regulated by the MPSC. MAUI can also provide technical support to local governments in volatile or opaque markets such as recycling, waste hauling and energy hedging contracts.

MI-MAUI does not lobby for laws or policies, but provides research and analysis to other organizations that lobby on behalf of municipalities or their concerns.

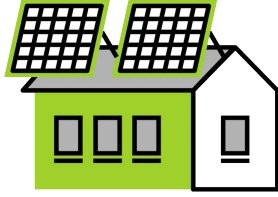
Benefits, Services, Costs

- Monitoring and analysis of MPSC rate cases of interest to local public governments/agencies; referral to legal and technical experts when municipalities wish to intervene formally in rate cases;
- Representation of member interests in MPSC policy proceedings;
- Coordination with and technical support for legislative advocacy partners;
- Monthly teleconference update on MI-MAUI activities and opportunities;
- Meetings, educational events, conferences, trainings and sharing of best practices among members;
- Convening of issue dialogues and collaborations with utilities.

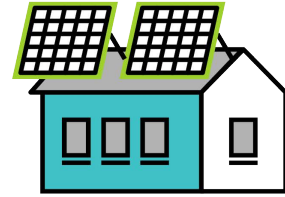
In most cases, membership or participation costs are figured as a small percentage of a government/agency's annual regulated-utility costs. MI-MAUI may take on special projects at the request of one or more members, with costs determined on a case-by-case basis.

Contact

Rick Bunch, Executive Director: 734-489-9633, rick@mi-maui.org



SOLARIZE YPSILANTI



A partnership with the City of Ann Arbor and other municipalities to make it easier and more affordable for Washtenaw County residents to get solar on their homes.

THE IDEA

- Neighbors and friends come together to learn about solar energy with a participating pre-vetted installer
- Participating residents benefit from group-buy discounts, agreed upon ahead-of-time with the installer
- Installers benefit from decreased costs associated with outreach and education, and discounts associated with buying in bulk
- All installers are approved by and work with Michigan Saves, which provides expedited low-interest financing for those interested

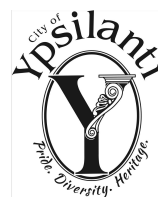
THE BENEFITS

 Save Thousands	 Increase Your Property's Value	 Low Payback Period	 Savings from Day 1	 Take Advantage of Incentives
 Solar is a Secure Investment	 Guaranteed Performance	 Save the Environment	 Create Energy Independence	 Simple and Easy

If you are interested in participating in a Solarize event or learning more about it, contact:

Julie Roth, Solarize Program Coordinator
juliekayeroth111@gmail.com 734-330-9585
Bonnie Wessler, City of Ypsilanti Program Contact
bwessler@cityofypsilanti.com 734-719-0266

A Program of A²Zero & the City of Ypsilanti





MINUTES

City of Ypsilanti SUSTAINABILITY COMMISSION MEETING Virtual Meeting

Monday, July 13, 2020
7:00 P.M.

I. CALL TO ORDER: 7:01 p.m.

II. ROLL CALL

Keith Michalowski	Present	Katy Greenwald	Present
Nancy Heine	Absent	Beth Gibbons	Present
Julia Bayha	Absent	Christian Cannon	Present
Bryan Foley	Present	Takunia Collins	Present

Also Present: Council Liaison Steve Wilcoxon
Michelle Bennett, Beckett & Rader City Planner
Commission Recording Secretary, Nancy Hare-Dickerson

Additional Staff Present: Bonnie Wessler, Public Services Project Manager (Zoom Meeting Host)
Joe Meyers, Economic Development Director
Jamaica Barry, Code Enforcement Officer
Chelsea Thomas, Treasury Technician

III. INTRODUCTIONS – none

IV. PUBLIC COMMENT

Kate Levin, 704 Hemphill Street, expressed support and thanks for the resolution for pollinator-friendly plants.

V. PRESENTATIONS- none

VI. AGENDA APPROVAL

Greenwald (Second: Foley) moved to approve the Agenda as submitted.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha
Motion: Carried

VII. CONSENT AGENDA

1. Approval of June 8, 2020 minutes

Cannon (Second: Greenwald) moved to approve the June 8, 2020 Minutes as submitted.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha

Motion: Carried

VIII. RESOLUTIONS/MOTIONS/DISCUSSIONS

1. Ypsilanti Sustainability Commission SJ-EJ Resolution

First Reading: Commissioner Gibbons read a draft of the Ypsilanti Sustainability Commission SJ-EJ Resolution into the record as follows:

A resolution of City of Ypsilanti's Sustainability Committee affirming its commitment to the principles of environmental and social justice in the wake of the combined disparate effects of COVID-19 on our community and the long history of police violence against African Americans.

Whereas, City of Ypsilanti condemns acts of brutality, racial profiling, and the use of excessive force by law enforcement officers.

Whereas, City of Ypsilanti supports strengthening efforts to promote accountability for individual law enforcement officers and police departments.

Whereas, the global pandemic COVID-19 has impacted the health, social and economic fabric of the City of Ypsilanti community;

Whereas, the disproportionate impact of the novel coronavirus has been on communities of color;

Whereas, City of Ypsilanti is committed to equity, fairness, justice, protecting its most vulnerable residents;

Whereas, the City of Ypsilanti is preparing to pass its first Sustainability Plan;

Now, therefore, be it resolved by the Sustainability Commission as follows:

The Sustainability Commission supports strengthening efforts to promote accountability for individual law enforcement officers and police departments.

The Sustainability Commission supports immediate steps to analyze police department structures, policies, and budgets and to reimagine how they can support local elected leaders' primary responsibility for ensuring the health and safety of their residents.

The Sustainability Commission is committed to centering the community's responses to the COVID-19 global pandemic in racial equity.

The Sustainability Commission supports the City of Ypsilanti dedicating resources, platforms, political will and authority to identifying and addressing the ways that the novel Coronavirus may exacerbate existing inequities in our communities and lifting up the medical and social needs of the most marginalized and demonstrate how centering their needs ensure the safety and health of all.

This resolution reconfirms our commission's commitment to social and environmental justice, and advancing the mission of this body to advocate, educate and promote the social, economic, and environmental health of the community now and into the future.

[At 7:12pm, a technical difficulty necessitated breaking from the meeting]

[At 7:18pm, meeting resumed]

Gibbons (Second: Cannon) moved to approve the Ypsilanti Sustainability Commission SJ-EJ Resolution as submitted.

[Discussion ensued as to the wide-range of topics included in the resolution and their relation to sustainability; as to additional items to possibly include in the resolution; as to ways to optimize the efficiency of the resolution in light of concerns of over-expansion in the resolution.]

Gibbons (Second: Cannon) moved to rescind the motion to approve the Ypsilanti Sustainability Commission SJ-EJ Resolution as submitted, in order to further review the resolution, to edit the language and to return it in revised form for approval at the next meeting.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha
Motion: Carried

2. Sustainability Plan

A. Action Plan Prioritization for Ypsilanti's Sustainability Plan

Commissioner Michalowski explained that this was brought to the Commission by Public Services Project Manager Bonnie Wessler to serve as a reference guide to help the Commission work their way through the Plan and to help with making decisions on what needs to be done.

B. Commissioner Feedback

Commissioner Michalowski indicated that he received email feedback from Commissioner Gibbons as to the Plan. Commissioner Gibbons shared her feedback and proposed amendments to the Plan.

[Discussion was had between commissioners and Michelle Bennett, Beckett & Raeder City Planner, as to proposed amendments]

Gibbons (Second: Cannon) moved to approve the proposed amendments to the Sustainability Plan as discussed.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha
Motion: Carried

C. Ypsilanti Resilience Hubs

Commissioner Foley shared updates as to a proposal he has in to the City of Ypsilanti DPW to install lights at the Parkridge Community Park Pavilion. Per query by Commissioner Foley, Public Services Project Manager Bonnie Wessler spoke as to the status of the playground equipment.

Foley (Second: Collins) moved to have Ypsilanti Resilience Hubs language added to the Sustainability Plan.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha
Motion: Carried

D. Support for Pollinator-Friendly Plants

Commissioner Michalowski referenced the following Resolution as a proposed add-on to the Sustainability Plan.

**Resolution No. 2020-002
2020-02-24**

RESOLVED BY THE SUSTAINABILITY COMMISSION:

WHEREAS, there is an ongoing global biodiversity crisis, with current rates of species' extinctions estimated at 1000 times the historical background rate across evolutionary time; and

WHEREAS, this biodiversity crisis is impacting animals responsible for pollinating the vast majority of food plants used for human consumption (hereafter "pollinators"); and

WHEREAS, monoculture turf grass (lawn grass) does not support biodiversity, requires unsustainable inputs of fertilizers, water, and fossil fuels for mowing and maintenance; and increases runoff and stream bank erosion; and

WHEREAS, native plants and other habitat- and food-providing plants (hereafter "pollinator-friendly plants") support pollinators and other wildlife; and

WHEREAS, pollinator-friendly plants can be well-adapted to local soils and climate, and insect- and disease-resistant, therefore requiring less water, chemical application, and maintenance; and

WHEREAS, the City of Ypsilanti has been designated as a "Bee City;" and

WHEREAS, perception of lawn, property, or garden aesthetics is a personal choice;

NOW, THEREFORE BE IT RESOLVED that the City of Ypsilanti shall make every reasonable effort to use pollinator-friendly plants on properties owned by the City, and

BE IT FURTHER RESOLVED that the City Council will instruct the Planning Commission to update the City Zoning Ordinances to (a) strike the plant height limitation; (b) prohibit only invasive and noxious weeds; and (c) reflect support of pollinator-friendly plants and plantings; and

BE IT FURTHER RESOLVED that the City Council will instruct the Administrative Hearings Bureau to disregard plant blight violations until the Zoning Ordinance is updated, and

BE IT FURTHER RESOLVED that the Sustainability Commission will make every effort to educate and empower residents with the goal of transitioning private properties to include pollinator-friendly plants.

Invasive and Noxious Weeds

(List adapted from the resources below, along with consultation with professional botanists and restoration biologists.)

Common Name	Scientific Name	Plant Type
Garlic Mustard	<i>Alliaria petiolata</i>	Forb
Ragweed	<i>Ambrosia artemisiifolia</i> L. var. <i>elator</i> (L.) Descourtils; <i>Ambrosia elatior</i>	Forb
Spotted Knapweed	<i>Centaurea maculosa</i>	Forb
Chicory	<i>Cichorium intybus</i>	Forb
Canada Thistle	<i>Cirsium arvense</i>	Forb

Bull Thistle	<i>Cirsium vulgare</i>	Forb
Queen Anne's Lace	<i>Daucus carota</i>	Forb
Teasel	<i>Dipsacus</i> sp.	Forb
Giant Hogweed	<i>Heracleum mantegazzianum</i>	Forb
Dame's Rocket	<i>Hesperis matronalis</i>	Forb
Purple Loosestrife	<i>Lythrum salicaria</i>	Forb
Sweet Clover	<i>Melilotus</i> sp.	Forb
Wild Sweet William (Bouncing Bet)	<i>Saponaria officinalis</i>	Forb
Bladder Campion	<i>Silene vulgaris</i>	Forb
Mullein	<i>Verbascum thapsus</i>	Forb
Orchard Grass	<i>Dactylis glomerata</i>	Grass
Japanese Stiltgrass	<i>Microstegium vimineum</i>	Grass
Common Reed	<i>Phragmites australis</i>	Grass
Japanese Barberry	<i>Berberis thunbergii</i>	Shrub
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub
Japanese Knotweed	<i>Fallopia japonica</i>	Shrub
Asian Honeysuckles	<i>Lonicera</i> sp.	Shrub
Giant Knotweed	<i>Polygonum sachalinensis</i> (<i>Fallopia sachalinensis</i>)	Shrub
Common Buckthorn	<i>Rhamnus cathartica</i>	Shrub
Glossy Buckthorn	<i>Rhamnus frangula</i> (<i>Frangula alnus</i>)	Shrub
Multiflora Rose	<i>Rosa multiflora</i>	Shrub
Poison Sumac	<i>Toxicodendron vernix</i>	Shrub
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Vine
Bindweed	<i>Convolvulus</i> sp.	Vine
Sweet Pea	<i>Lathyrus latifolius</i>	Vine
Poison Ivy	<i>Toxicodendron pubescens</i>	Vine/Shrub

Resources:

Michigan Department of Agriculture & Rural Development (MDARD) List of Prohibited and Restricted Weeds
https://www.michigan.gov/documents/mdard/Michigan_Prohibited_and_Restricted_Weeds_641413_7.pdf

State of Michigan Invasive Species Database
https://www.michigan.gov/invasives/0,5664,7-324-68002_71240---,00.html

U.S. Department of Agriculture – Michigan State-Listed Noxious Weeds
<https://plants.usda.gov/java/noxious?rptType=State&statefips=26>

Commissioner Michalowski also referred to a draft Native Landscaping Resolution/Ordinance Recommendation emailed by Public Services Project Manager Bonnie Wessler. Project Manager Wessler explained that she took a look at what other communities may be doing and provided it as assistance to the Commission in the development of their own resolution.

[Discussion ensued regarding Draft language]

Greenwald (Second: Michalowski) moved to approve Resolution No. 2020-002 Support for Pollinator-Friendly Plants.

[Discussion as to resolution language]

An alternative motion was made by Commissioner Collins to table the motion to approve Resolution No. 2020-002, in order to get more clarity on certain plants. No support was received; therefore, the motion was not acted upon.

[Clarifying procedural discussion was had]

Greenwald (Second: Michalowski) moved to approve Resolution No. 2020-002 Support for Pollinator-Friendly Plants as submitted.

[Further discussion continued as to language]

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon
Nays: Collins
Absent: Commissioners Heine, Bayha
Motion: Carried

Commissioner Greenwald and Council Liaison Wilcoxon will work together on bringing the Resolution before Council.

E. Temporary Hand-Washing Station for Parks

Commissioner Michalowski initiated discussion regarding temporary hand-washing stations being purchased and maintained in Ypsilanti City parks. *[Commissioner query and comments followed]*
Commissioner Michalowski asked for commissioners to email any feedback they may have to assist him in preparing a draft resolution for the next meeting.

F. Commissioner Feedback

- Commissioner Greenwald shared additional feedback as to Plan language related to conservation and biodiversity. Commissioner Collins shared feedback as to language supporting local food systems. *[Discussion was had]*

Greenwald (Second: Cannon) moved to add the biodiversity recommendations and supporting existing local food systems language to the Sustainability Plan, as discussed.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None
Absent: Commissioners Heine, Bayha
Motion: Carried

- Commissioner Gibbons provided additional comments as to correcting the Table of the Action Plan section that begins on page 45 -- action which is adaptation as well as mitigation.
- Commissioner Collins provided a comment to add “no-spray” language in the pollinator-bee section of the Plan. He also asked to add a “bee and butterfly-friendly zone” to the language of the Plan.

Collins (Second: Cannon) moved to add “bee and butterfly-friendly zone” language and to add “no-spray” language to the Sustainability Plan, as discussed.

Roll Call Vote – Ayes: Commissioners Michalowski, Foley, Greenwald, Gibbons, Cannon, Collins
Nays: None

Absent: Commissioners Heine, Bayha
Motion: Carried

Commissioner Michalowski addressed the lateness of the hour.

A motion was made by Commissioner Collins to extend the meeting time past 9pm. No support was received; therefore, the motion was not acted upon.

IX. WORK SESSION-none

X. COMMISSIONER REPORTS-none

XI. PUBLIC COMMENT

Kate Levin, 704 Hemphill Street, expressed her thanks for the approval of the pollinator-friendly plants resolution and her support of the SJ-EJ resolution.

XII. PROPOSED BUSINESS

Commissioner Michalowski asked commissioners to email any items for the August agenda within the new two weeks.

XIII. NEXT MEETING DATE

Monday, August 10, 2020

XIV. ADJOURNMENT: 9:13 p.m.

Gibbons (Second: Cannon) moved to adjourn the meeting of the Sustainability Commission.

Voice Vote: Unanimous

Motion: Carried

The City of Ypsilanti Sustainability Plan

*"It's real. It's us. It's bad. Scientists agree. There's hope."
Anthony Leiserowitz, Director Yale Project on Climate Change Communication*

Ypsilanti, in many ways, is a state leader in sustainability planning, yet these efforts had not been folded into the Master Plan until now. Inventories and strategies could be found in the City's Climate Action Plan, Energy Plan, or Alternative Fuel Policy. While these plans hold tremendous value, the recommendations within them carry considerably more enforceable weight when included in the City's primary policy document. The Master Plan is a community's most comprehensive planning document and serves as the policy basis for the Zoning Ordinance, which directly regulates land use. Zoning provisions have the legal force to protect natural resources, prioritize sustainable development, and improve the infrastructure that enables nonmotorized travel. The previous efforts were influential and integral to the City's "green" practices, and this next step officially codifies sustainability as a City priority through the compilation and advancement of sustainable strategies into a single cohesive document.

The Impetus

The Sustainability Commission was established in 2017 with a primary mission of addressing environmental issues and prioritizing sustainability policies. In this short time, the Commission has embarked upon and accomplished numerous initiatives, including:

This Sustainability Plan is intended to serve as a data resource, community reflection, and policy guide to the Commission's future actions.

Risk analysts, including the US Department of Defense, rank climate change as one of the most serious threats to ecosystems and people around the world.^{1 2} "Climate change" refers to a broad range of global phenomena resulting predominantly from the large-scale burning of fossil fuels, which add heat-trapping gases to Earth's atmosphere. The result is a variety of challenges: extreme heat and increased cooling days, more severe winter storms, changing coastal dynamics, rising water levels, disruptions to growing seasons, pest migrations, habitat loss, temperature volatility, increasing extreme weather events and associated stress on natural ecosystems, and risk of drought that will disturb of the characteristics and functions of natural processes.³

The Great Lakes Integrated Sciences and Assessments (GLISA) Center is one of the eleven regional centers funded by the National Oceanic Atmospheric Administration. It is a partnership between the University of Michigan and Michigan State University that seeks to provide usable and useful information on climate change impacts to decision makers across the Great Lakes Region. GLISA provides both *historic information*, derived from over 200 quality-controlled weather stations located in communities across the region, and *future climate information*, derived from regional and global climate models (RCMs and GCMs), as well as dynamically downscaled climate models. Historic climate information is useful for providing locally relevant information that communities can use to assess how well their physical

¹ Intergovernmental Panel on Climate Change (IPCC). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change <http://www.ipcc.ch/report/ar5/syr>

² U.S. Department of Defense. Quadrennial Defense Review. Washington, DC. 2014.

³ Planning for Community Resilience in Michigan. 2017. <http://mirisintide.org/wp-content/uploads/Resiliency-HandbookAPRIL-242017.pdf>

infrastructure and social systems are faring in the face of current climate change, whereas future climate information is useful for incorporating into capital improvement processes when decisions will affect infrastructure investments over 10, 20, or 50 years.

Some positive news is that this scientific awareness is reaching a critical mass of Americans (and Ypsilanti residents). Most Americans believe global warming is happening (71%) and that it will harm future generations (73%).⁴ Public opinion estimates generated by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication suggest that 78% of Washtenaw County residents believe climate change is happening, 76% believe climate change will harm future generations, and 83% support policies that bolster renewable energy or limit CO2 emissions.⁵

Historic Regional Climate Change

GLISA offers curated history climate information at two scales:

- Climate Division, which are multi-county, NOAA Designated regions,
- Quality-controlled weather stations.

Significant increases in precipitation across the entire region can be seen in data collected over the past 70 years (1950 to present). Increased seasonal precipitation is most notable in the spring and fall: fall precipitation has increased over 28%, and spring precipitation has increased over 21%. The region is experiencing this precipitation increase within storm events that are also increasing in severity, resulting in more rain falling in more concentrated bursts.

Precipitation Change 1950 – 2019 Southeast Michigan Climate Division

	in	cm	%
Annual	5.58	14.17	18.5
Winter	0.61	1.561	11.2
Spring	1.72	4.39	21.1
Summer	1.13	2.88	12.0
Fall	1.99	5.07	28.4

Source: GLISA

Over the same period, the average annual temperature has risen across Southeast Michigan by 2.4 degrees Fahrenheit (°F), and the gap between average high and low temperatures is closing and swinging upward towards warmer temperatures. Winter and spring are considerably warmer, with rising winter lows and earlier last frost dates leaving fewer days under 32°F in the spring season.

Included Counties	Watersheds
Genesee	Birch-Willow
Lapeer	Cass
Lenawee	Clinton
Livingston	Detroit
Macomb	Flint
Monroe	Huron
Oakland	Lake Erie
St. Clair	Lake Huron
Wayne	Lake St Clair
Washtenaw	Ottawa Stoney
	St. Clair
	Raisin
	Shiawassee
	Tiffin
	Upper Grand

⁴ Matthew T. Ballew, et al. 2019. Climate Change in the American Mind: Data, Tools, and Trends, Environment: Science and Policy for Sustainable Development. 61:3, 4-18, DOI: 10.1080/00139157.2019.1589300 <https://www.tandfonline.com/doi/full/10.1080/00139157.2019.1589300>

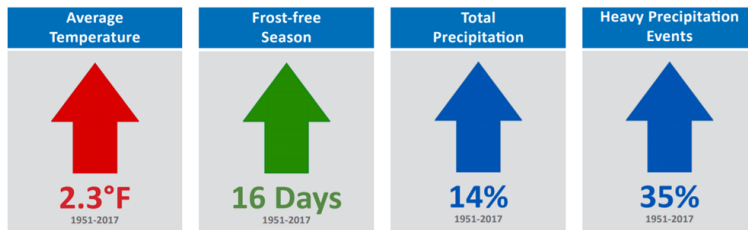
⁵ Marlon, J. Washtenaw County Michigan Public Opinion on Climate Change, 2019. https://factsheets.yccc.tools/Michigan:Washtenaw_County

Rise in Temperature from 1950 through 2019

Season	°F	°C
Annual	2.43	1.35
Winter	2.80	1.55
Spring	2.86	1.59
Summer	1.91	1.06
Fall	1.94	1.08

Source: GLISA

Other important changes, in addition to temperature and precipitation, are occurring locally. Increases in freeze/thaw cycles create stress on built infrastructure. Extensions of the growing season, which improve agriculture, can also increase risk of vector-borne illness. Extended heat events in the summer and ice storms throughout the winter lead to more stress on the electric grid, increase the likelihood of power outages, and further exacerbate existing vulnerabilities among Ypsilanti residents.

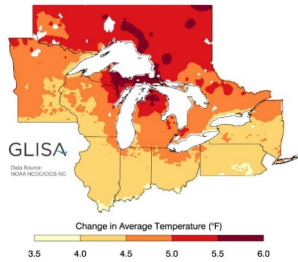


Source: GLISA

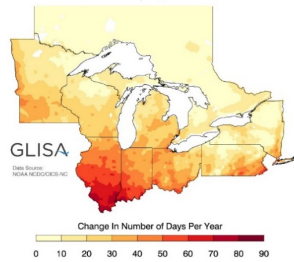
Future Climate Change

While future climate change can be more difficult to predict with the same precision historic information allows, GLISA can predict regional trends with high levels of certainty thanks to improved climate models and climate science translators. In terms of both temperature and precipitation, challenges are anticipated in the mid- to long-term. By the period of 2040-2070, southeast Michigan is expected to warm by 4.5°F annually. This average increase will be accompanied by more high heat days: in the same period, it is anticipated that there will be 30 to 40 more days over 95°F.

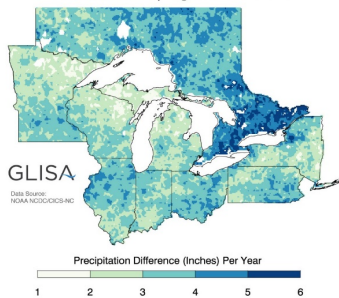
Projected Change in Average Temperature
Period: 2041-2070 | Higher Emissions: A2



Projected Change in Number of Days Over 90°F
Period: 2041-2070 | Higher Emissions: A2



Projected Change in Average Precipitation
Period: 2041-2070 | Higher Emissions: A2



Increases in overall precipitation and acute rain events are also expected for our region during the same period. Annual rainfall is expected to increase by three to four inches. By 2040-2070, the region is likely to experience up to two more days per year with heavy precipitation, defined as the 2% heaviest precipitation events in the area.⁶

It is important to remember that while understanding climate change is critical to the process of planning for Ypsilanti's future, these impacts may also open new opportunities for our community and region that set us apart from other areas. A temperate climate, an

extended growing season, an abundance of freshwater, and a legacy of innovation and production place southeast Michigan on the top of the list for "climate positive" regions of the world. To properly prepare ourselves and our community for the future, we must adequately address how climate impacts do and will exacerbate existing vulnerabilities in our community, but also be diligent to build a resilient future – one that that not only "bounces back," but "bounces forward."

Environmental Justice

In any crisis, the most vulnerable populations will bear a disproportionate level of the burden unless protective action is taken. Their lack of resources and influence means that they will suffer greater exposure to climate change threats, and be less able to adapt and react. Environmental justice (EJ) is the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with the respect to the development, implementation, and enforcements of environmental laws, regulations, and policies." This definition from the President's Executive Order in 1994 was designed to

⁶ GLISA. Great Lakes Regional Climate Change Maps. <http://glisa.umich.edu/resources/great-lakes-regional-climate-change-maps>

protect communities that had regularly been harmed by environmental contamination. Today, the definition applies to the effects that climate crisis will have on the disadvantaged. Nearly 25 years later, as climate change has inequitably descended upon us, the City of Ypsilanti understands that its populations of people of color and low-income households are more vulnerable to both the physical and social impacts of climate change; likewise, women and members of the LGBTQIA community are vulnerable to climate change's social effects. Where possible, this plan addresses what can be done on a local level to protect these people from the worst of these changes. As the structures that perpetuate structural inequity are brought to the attention of those in power, every attempt should be made to dismantle them or to minimize actual and potential harm.

Commented [BW1]: Throwing this in there b/c of the anecdotal coming out of covid- more often losing jobs/hours, having to move back in with abusive family/stay in abusive situations, etc.

Definition of Sustainability

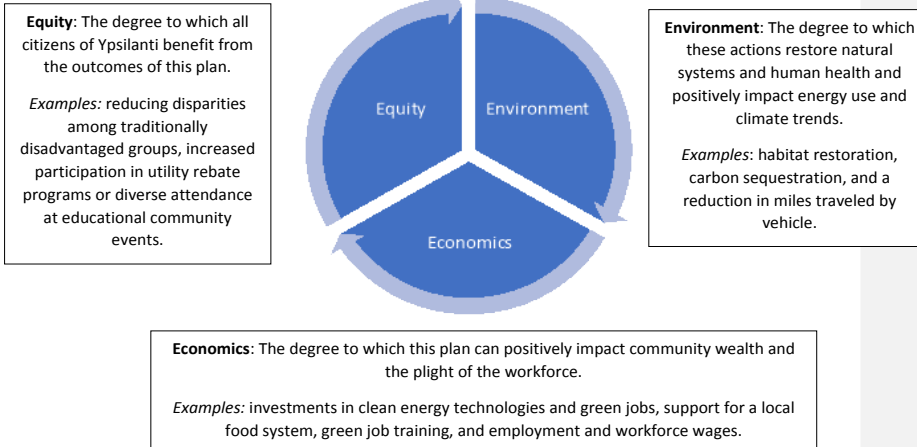
Sustainability is a tricky term to define. A commonly accepted definition of sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." This definition comes from *Our Common Future*, a report published in 1987 by the United Nations (UN) that suggested concrete and realistic proposals for dealing with environmental and development issues. In 2017, the Ypsilanti City Council passed Resolution No. 2017-238 approving a recommendation from the Sustainability Commission that defined sustainability with a nod to the UN definition:

"Achieving a balance of ecological, social, and economic considerations to provide for an equitable path for the growth and improvement of our community in the uses of our resources, remaining conscious of the historical context, while ensuring the availability and vitality of those resources for future generations."

As such, social equity, environmental health, and the economy become the three interrelated pillars of sustainable action. This Sustainability Plan will focus primarily on the environment; the social and economic sides of planning are discussed in greater detail in the City's Master Plan. However, recommended sustainability actions call out which of the three pillars it touches to expose the interconnected nature of sustainability planning.

When the residents were asked in the community-wide survey, "What does sustainability mean to you?" the answers were unsurprisingly varied. Most of them touched on at least one aspect of the three-pronged definition using phrases like "repairing our natural environment," "having a ...diverse community without pricing people out," and "clean water, healthy citizens, easier access to public transportation." The open responses were telling; Ypsilanti residents aptly identified that becoming a more sustainable city requires all-encompassing change.

Three Pillars of Sustainability



Public Input

In 2019, high priority themes from The City of Ypsilanti Energy Plan (2018), The City of Ypsilanti Climate Action Plan (2012), and the Shape Ypsilanti Master Plan (2013) were identified and coupled with a round of community input.

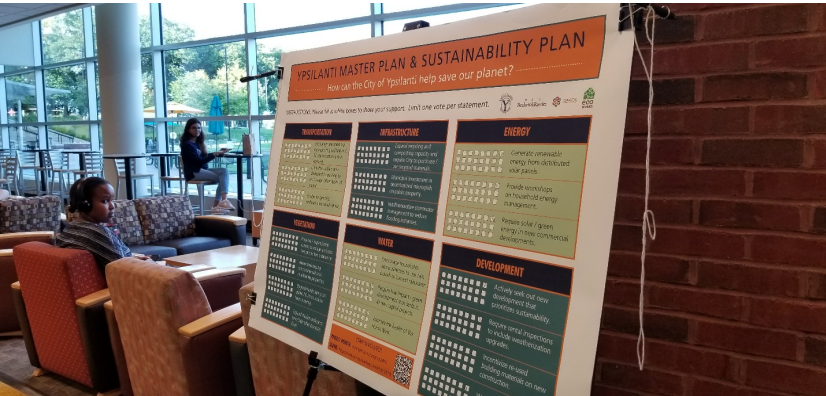
Residents were invited to attend an in-person meeting held on July 11, 2019 to participate in group exercises that prioritized sustainability actions. There was also an online survey (physical copies were provided), and in an attempt to “go to the people,” boards were placed on easels at different locations throughout the City (City Hall, EMU Student Center, Parkridge Community Center, and Cream & Crumb) in the spring and summer of 2019 that allowed residents to select their environmental priorities. The findings from each engagement were compiled, analyzed, and used as a basis for outlining the City’s ongoing path towards sustainability. The action plans represent public engagement findings, data collection, best practices, and staff capacity.

Community Engagement
Summary of Details

Survey respondents: 144

Board entries: 876 unique
responses

Attendees at in person
session: 25



Challenges, Goals, Objectives, and Strategies

This plan was developed in three phases: research, outreach, and confirmation. The existing physical setting of the City was inventoried, as was the community's current greenhouse gas emissions. Previous plans were reviewed, and progress towards those plans' goals were benchmarked. If there was a disconnect or gap between challenges noted during the inventory and plan review, this was noted for later review. Outreach was done in mid-2019, both specifically regarding sustainability and in tandem with the master plan scope, and the hopes and priorities of the community were incorporated into goal development. The challenges, goals, objectives, and strategies to reach those goals are presented below, loosely grouped into these categories: *earth*, including soil and contamination; *water*, including surface water, drinking water, and stormwater; *energy*, including production, consumption, and waste management; *biodiversity*, including urban forestry and outdoor lighting; *neighborhoods*, including land use and transportation; and *communication*.

PLANET

Earth

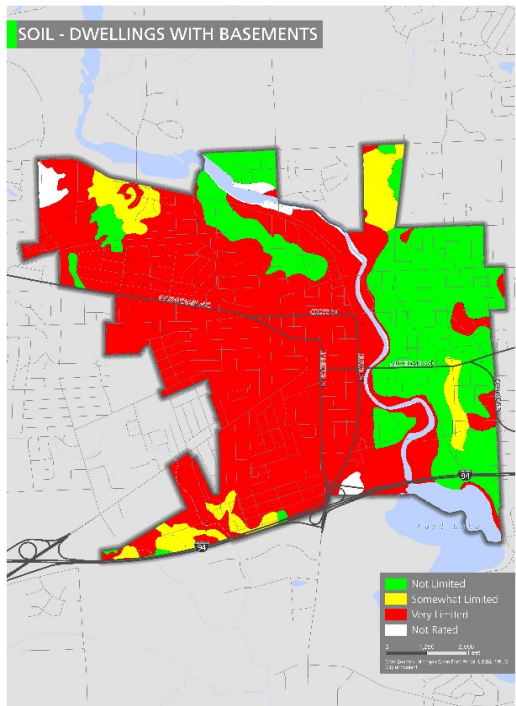
Soil Structure

Soil characteristics can impose limitations that affect the suitability of land for potential uses, such as dwelling units with basements and surface composting facilities. There are five types of soil in the City, and the table below shows the percentage of area within the City for each soil.⁷

Table X: Soil Types

Soil Type	Basic Characteristics	Percentage of Area in Ypsilanti
Fine	Soil particles not visible to the eye, poor load bearing capacity, fairly impermeable, susceptible to frost action	56.4%
Coarse Loamy	Larger grain loam soil, visible to the eye	18.8%
Sandy	Light soil, quick water drainage, poor water retaining qualities	12.8%
Fine Loamy	Smaller grain loam soil, not visible to the naked eye	11.8%
Loamy	Not predominantly sand, silt, or clay, suitable for growing plants due to the nutrient and water capacity	0.2%

Source: United States Department of Agriculture Soil Survey, current



As a foundational part of construction, soils impact development. The “Soils – Dwellings with Basements” map shows that most of the western side of the City is not conducive to basement construction based on the soil’s limited capacity to support a building without the soil shifting. As moisture content changes, the soils in the “very limited” category shrink and expand to a degree that could reduce their ability to support a basement.⁸ Given the predictions for greater concentrations of precipitation and instances of flooding, building basements in unsuitable soils is not a fruitful adaptation strategy. Basement construction is governed by the building code, which is not designed to take detailed soil considerations

usda.gov/App/HomePage.htm
usda.gov/App/HomePage.htm

into account for smaller residential parcels.

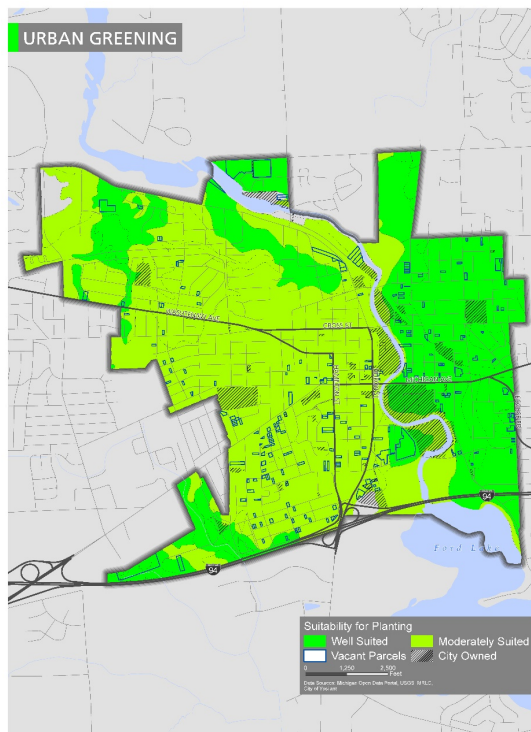
Sustainability Policy: Basements.

At a minimum, this information should be made available to all current and prospective property owners to discourage subterranean development that may have a high risk of failure. If continued construction, increased flooding events, or consistent property damage warrant a regulatory solution, an overlay zoning district could be applied to some or all of the “very limited” area that requires construction to meet floodplain standards, or that bans subterranean construction altogether.

Commented [BW2]: well, it kind of is- for commercial buildings, at least. The smaller/lower impact the building, the less the building code “cares,” generally speaking, because an individual failure is less impactful than a failure of a larger/commercial building. It’s when these failures happen en masse that it becomes an issue.

Green Infrastructure

Soil factors into planning for stormwater infrastructure, urban gardens, and tree planting. The “Urban Greening” map shows where the soil is best suited for plantings, along with streets and vacant and public



land within the City. Areas that are vacant or underutilized, held in the public trust, and have soils suitable for planting should be prioritized for green infrastructure as they will likely have the best outcomes. Alleys, culs-de-sac, and low-traffic residential streets are also good candidates for green infrastructure installation because they represent a significant land area distributed throughout the community, likely have excess capacity that could be repurposed, and may see low traffic volumes, meaning that the less-durable permeable pavement may be an option in some areas. Elements for urban greening shall be incorporated in the maintenance plan for public alleys and culs-de-sac.

Sustainability Policy: Green Infrastructure

The City of Ypsilanti does not have any city-specific regulations regarding soil or soil health but works with the County on soil erosion protections. Some cities

have addressed soil conditions through the adoption of sensitive features overlays which include soil and slope protection. In the City of Grand Haven, development in the sensitive feature zone is subject to more intensive site plan restrictions and review, including the prevention of soil erosion and disturbance.⁹ Any development in the sensitive feature overlay cannot move or disturb the soil at all without prior approval of the Planning Commission.

Ypsilanti participates in Washtenaw County's Soil Erosion and Sedimentation Control Program. The program is often triggered in the development process and "works to protect surface water and the

⁹ City of Grand Haven, Article IV Zoning Districts, Section 40-422 Sensitive Features Overlay district, https://library.municode.com/mi/grand_haven/codes/code_of_ordinances?nodeId=PTIICOOR_CH40ZO_ARTIVZODI_S40-422SASEAROVDI.

environment from the negative impacts of soil erosion pollution that are the result of earth changes.”¹⁰ Any projects that require substantial earth moving, defined as an area of 400 square feet, are required to obtain a Soil Erosion and Sediment Control (SESC) permit. Projects that require a permit include earth changes within 500 feet of a surface water’s edge, earth changes more than 1 acre, earth changes related to gravel pits and landfills, installation or alterations to ponds, transportation facilities, and directional drilling or boring for utilities and infrastructure.¹¹

Contamination

GOAL: Eliminate new instances of soil contamination and responsibly deal with the legacy of existing polluted sites

Ypsilanti’s industrial history has left behind environmental contamination that the City must still confront. Michigan’s Department of the Environment, Great Lakes, and Energy (EGLE) maintains a database of sites that have been affected by former development. This contamination can be found in many forms; from leaking storage tanks, from commercial activity, or from spills. The “Contamination Map” illustrates the location of all known brownfields that have been remediated or are in the process; sites of environmental contamination; and leaking underground storage tanks (LUSTs) in the City.

Brownfields have the broadest definition, covering most of the contamination spectrum and therefore applies to the widest range of sites. Brownfield sites could have experienced the threat of environmental contamination, are already contaminated, contain blighted structures, or have been deemed functionally obsolete. The map shows that most of these sites are primarily clustered along commercial corridors, the rail line, the river, and less frequently in neighborhoods.

EGLE tracks environmental contamination because of the significant impacts it can have on the drinking water supply and on residents living in proximity to these sites. This is a distinct database from LUSTs so that records are not duplicated. The main differences between the two systems are the source of the contamination, and which governmental division manages the sites. All other contamination releases, besides LUSTs, are covered under the Environmental Remediation Program (part 201). Twenty sites of environmental contamination were identified in the City.

The table “Contamination by Census Tract” shows the most up-to-date data available for underground storage tanks (found in the Appendix). These are tanks that have been buried underground to mitigate their risk of explosion, usually because they contain petroleum, and regulations regarding their decommissioning have evolved over time. Businesses have not consistently removed them before leaving the site, and after years of deterioration their contents leak into the soil. If left underground long enough, the contents could reach groundwater or other sources of drinking water. An estimated 47 leaking underground storage tanks (LUSTs) have been recorded in the City; all but 11 are closed, meaning

Brownfield Criteria

At least one of the following:

Environmental contamination

The threat of contamination

Blighted

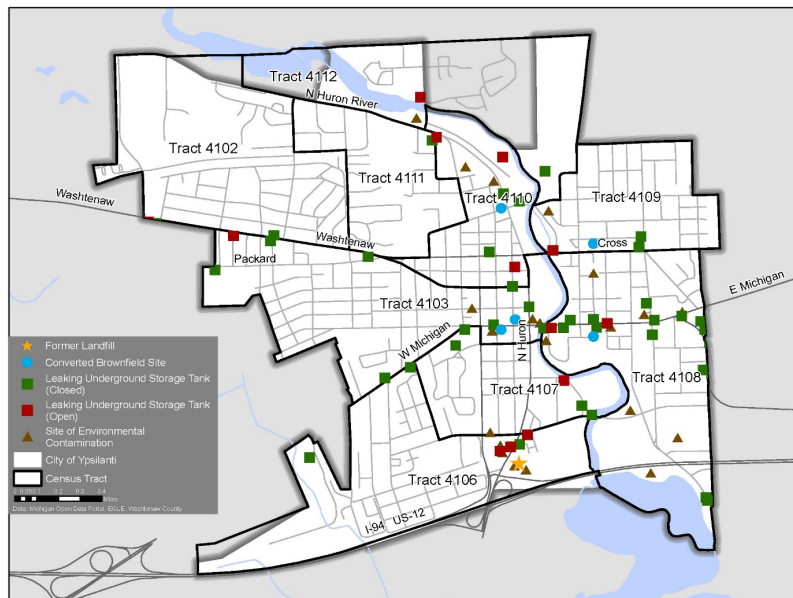
Functionally obsolete

¹⁰ Washtenaw County Water Resources Commissioner, Soil Erosion Control <https://www.washtenaw.org/DocumentCenter/View/758/Soil-Erosion---Sedimentation-Control-Ordinance---April-1-2016-PDF>.

¹¹ Washtenaw County Soil Erosion and Sedimentation Control Ordinance 2016, <https://www.washtenaw.org/DocumentCenter/View/758/Soil-Erosion---Sedimentation-Control-Ordinance---April-1-2016-PDF>.

that corrective action has been taken to stop the spread of petroleum or other hazardous substances.¹²

Map X: Contamination Map



Sustainability Policy: Contamination

Contamination clean-up is often funded by higher levels of government, and specific projects are overseen by the state agency, EGLE. County-level Brownfield Redevelopment Agencies are an intermediary between these state and federal programs and the local municipalities with challenging redevelopment sites. The Washtenaw County Brownfield Redevelopment Agency (WCBRA) focuses on post-contamination efforts on a case-by-case basis as an economic and redevelopment tool, providing incentives in the form of grants, loans, and tax increment finance agreements that can be applied toward certain remediation costs in a proposed redevelopment project. The assistance is intended to make the cost to redevelop a brownfield site comparable to the cost of the same development in a “greenfield” (previously undeveloped) site on which remediation is not an issue. This helps to reduce sprawl and its associated vehicle emissions, makes use of established infrastructure, and prevents development damage

¹² Underground Storage Tanks, United States Environmental Protection Agency. <https://www.epa.gov/ust/learn-about-underground-storage-tanks-usts>

such as contamination and habitat loss on previously undisturbed sites. While environmental remediation is a primary goal of the brownfield program, its overarching mission is redevelopment, and its tools are flexible enough to help communities fund previously restricted and generally more expensive redevelopment projects regardless of contamination level.

The Environmental Protection Agency's Brownfields program, from which state and community programs are enabled, began in 1995; WCBRA was founded in 1999. Ypsilanti is one of the 23 municipalities that partners with the WCBRA to identify, assess, remediate, and redevelop brownfield properties. The WCBRA uses Tax Increment Financing, Community Revitalization Program, grants, and loans to advance projects through the various phases of redevelopment. Five sites in Ypsilanti have received assistance from WCBRA, only two of which had environmental contamination on site (the rest were deemed functionally obsolete), and all have been successfully converted into usable space except for the Water Street property. The small number of completed remediations underscores the reactive nature of the process, and highlights that on the local level, the most effective tools are preventative measures: upfront review, inquiry, and regular inspection of the design, storage, and uses in a zoning district. Ypsilanti has used its Zoning Ordinance to prevent automotive uses in certain zones because their practices and commonly used materials have a higher likelihood of contaminating soil.

The Bell Kramer neighborhood is an example of how environmental contamination, or even the threat of it, complicates land use planning. In 2014, the City of Ypsilanti rezoned the neighborhood to an industrial-commercial use in direct response to the findings of the 2012-2013 assessment, intending to prevent future homes from being built in a potentially hazardous area. However, after the rezoning, the existing homes became non-conforming structures, which are permitted to remain but no longer legally encouraged in any way. The financial implications of this designation made it more difficult to sell or upgrade the homes, effectively and sometimes dramatically reducing household wealth. The residents' discontent, coupled with the positive vapor testing results in the homes, provided support for the City to rezone the neighborhood back to residential uses. The history of this neighborhood points to the complexity of changing land uses and monitoring the effects of environmental contamination. Rezoning is one mechanism to prevent development on contaminated sites, but such use is inherently backward-looking and risks unintended consequences. When used, the process must be accompanied by frank conversations with current property owners before the public hearing.

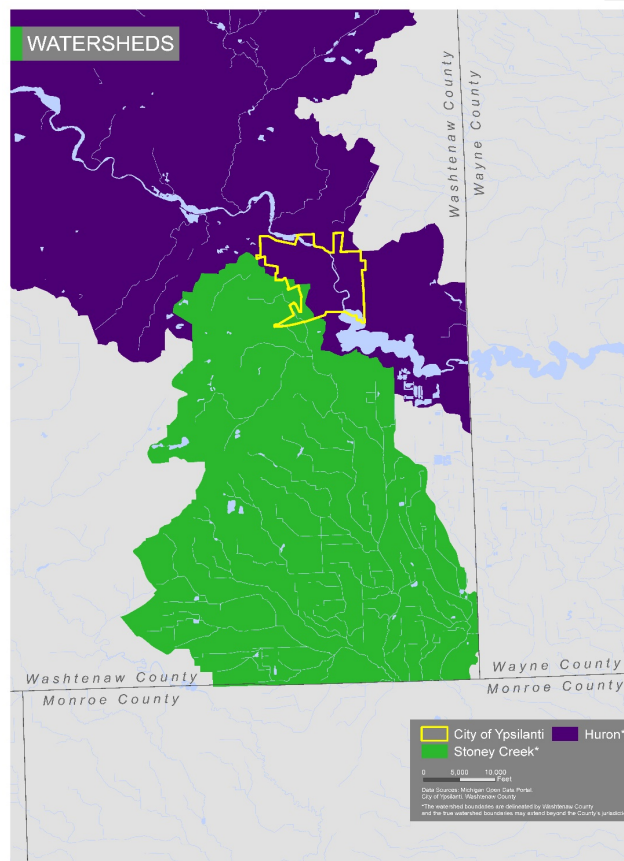
Water

GOAL: Protect the watershed from further contamination.

GOAL: Promote resources for water conservation and testing to ensure access efficiency upgrades and clean water

Surface Water Quality

Ypsilanti is a part of the Lake Erie Basin. Within the City's boundaries are two watersheds - Huron and Stoney Creek. The Huron Watershed, which covers most of the City, is divided into five sections. The section that encompasses Ypsilanti is known as the "Lower Middle Huron," enveloping about 27.7 miles of the river from North Maple Road (Barton Pond) downstream to Belleville Lake. It includes the City and Township of Ann Arbor, Superior Township, Ypsilanti Township, and Van Buren Township.¹³ Because a watershed crosses several jurisdictional boundaries, it is incumbent on these municipalities to cooperatively maintain high-quality drinking water while permitting access to the river. The health of the river depends on the quality of all its tributaries, which is often linked, at least in part, to land use policy. One way to coordinate across municipal jurisdictions is through a watershed



¹³ HRWC. "The Huron River: Lower Middle Huron." River Profile. <https://hrwc.maps.arcgis.com/apps/MapJournal/index.html?appid=67e1fd1bbc9a44cf853cd78dd6d8219f>

council: the Huron River Watershed Council (HRWC) was the first in the state and has been working to protect and restore the Huron River since 1965. In addition to writing a management plan for the entire watershed, the HRWC also authors management plans covering specific sections of the watershed. The HRWC is updating the section of the watershed that includes Ypsilanti in 2020-2021.

The HRWC identifies that the section of the Huron River that runs through Ypsilanti and Ann Arbor is heavily impounded: 77% of it is impounded by the seven dams that stretch across this area, making it more similar to a lake ecosystem than a river. Two sources afflicting the health of the watershed are runoff from impervious surfaces, and new development along the riverbank that clears vegetation vital to the absorbing runoff. In particular, phosphorous and E.coli are entering the river from Mill, Honey, and Boyden Creeks.

Table X: Watershed Report Card

Subject ¹⁴	Grade	Explanation
Watershed land use	D	High impervious surfaces along tributaries
Natural areas	D	12% of watershed has intact natural areas
River flow	F	Flashes following storms, erratic dam gate
River habitat	B	Where undammed, favorable features for river life
Aquatic Insect Community	C	Where undammed, good habitat for insects
Fish Community	B	Anglers enjoy good smallmouth bass
Phosphorous	C-	Concentrated of phosphorous exceed target; declining
E.Coli	C	After heavy rain, E.coli exceeds state standards
Total Suspended Solids	A	Low levels of TSS
Water Temperature	B	High maximum summer temperatures
Conductivity	B	Mostly measured at normal levels
Dams	F	High presence of dams and poorly controlled

Source: HRWC

Sustainability Policy: Water Quality

Some measures are in place to protect water quality. According to the City of Ypsilanti's code of ordinances, all development along any river frontage must show where a planned conservation and/or access easement of 50 to 100 feet would be located.¹⁵ A conservation easement allows river access for potential restoration or cleanup efforts. Without an easement, the City would have to receive permission from private property owners to pursue any river projects. The City has also adopted ordinances to limit phosphorus fertilizers and asphalt sealcoats; the success of this regulation is limited by enforcement and cooperation from property owners and has yet to be measured.

¹⁴ Huron River Watershed Council. Barton Pond to Belleville Lake Dam. <https://hrwc.maps.arcgis.com/apps/MapJournal/index.html?appid=67e1f1f1f1f1f1f1f1f1f1f1f1f1f1f1>

¹⁵ City of Ypsilanti Code of Ordinances, Article VI: Site Regulations, Section <https://cityofypsilanti.com/DocumentCenter/View/1396/ZOUUpdate-02-2021>

16

Stormwater Drainage Program

A case study in Detroit quantified the combined advantage of pervious pavement and a rain garden on a church's parking lot. Using the EPA's stormwater management model, they calculated that a 4,530 square foot rain garden and a 33,000 square foot patch of pervious pavement reduced stormwater runoff volume by 70%, even during the heaviest six-hour period of precipitation in Detroit's recent history (2016). In Detroit, there is an added incentive for property owners to use green infrastructure because they are charged a drainage fee based on the impervious surface area on the property. However, they may also earn a "green credit" for actions such as redirecting downspouts into areas where natural infiltration can take place.

To further ensure protections for the Huron River, an overlay district could be implemented. The regulations would limit new development, curtail uses involving toxic chemicals on site, and enforce low impact design standards that allow the site to retain water to mitigate contamination entering the river. Ypsilanti has adopted the stringent standards from Washtenaw County Water Resources Commissioner, a mighty step in safeguarding future development from polluting practices. However, these regulations are not a panacea because they only apply to new redeveloped sites, which are much fewer in number than established sites.

A retrofitting program would have wider scale effects, but its implementation is more controversial than policies pertaining only to new development. The adoption of stormwater fees based on the amount of impervious coverage on a property is an example of this type of effort and has been enacted in places like Detroit and Ann Arbor. In those communities, impervious surfaces incur drainage fees, thus incentivizing the implementation of pervious substitutes. Credits are offered for on-site stormwater management investments, such as the installation of a rain barrel, cistern, or rain garden to capture run-off from a rooftop. Rain barrels are a cost-effective method of storing water when used correctly. Best practices suggest rain barrels should stand upright, be screened to prevent mosquito breeding and debris accumulation, connect to overflow barrels, have a "do not drink" spigot, and belong to property owners who have been educated about its use and maintenance.

It takes the work of many groups to see positive change in our water systems. The Middle Huron Partners, a group that works with the HRWC, has invested over \$10 million over 11 years on projects that reduce and capture stormwater runoff. At a larger scale, the Middle Huron Partners successfully lobbied to restrict phosphorous fertilizers, and the state followed suit in 2012 with new legislation to reduce algae blooms. At the county level, Washtenaw County modified its focus from flood control to quality control. This change in philosophy is backed by a hierarchy of preferred management practices that prioritizes natural vegetation first for infiltration, then minimizing impervious surfaces, and finally detention and conveyance of excess stormwater.¹⁶ Vegetation is at the top of the hierarchy for its varied benefits: plants provide structural support, stabilize the soil through their root networks to reduce erosion, keep rivers healthier for aquatic life, and purify runoff before it enters the river.

As vegetation becomes the priority for protecting water quality, it is important to recognize the maintenance challenges that have hampered its progress. Landscaping

Rain Barrel Math

Roof catchment area = total square footage of your house plus the extension of the eaves

Ex. 40 ft x 50 ft = 2,000

1 inch of rain provides 600 gallons of water per 1,000 square foot of catchment area

Ex. 600 gallons x 2 = 1,200 gallons

The rain barrel system is only 80% effective at capturing the water

.80 x 1,200 gallons = 960 gallons

A rain barrel has the capacity to capture 960 gallons during a one-inch storm

Source: Ecology Action Center.
<https://ecologyactioncenter.org/clean-water/rain-barrels/>

¹⁶ Washtenaw County Water Resources Commissioner. Rules and Guidelines: Procedures and Design Criteria for Stormwater Management Systems. Revised October 2016. <https://www.washtenaw.org/DocumentCenter/View/302/Rules-and-Guidelines---Procedures-and-Design-Criteria-for-Stormwater-Management-Systems-PDF?bidid=>

is not a short-term proposition. Specifically, it takes about three years for a rain garden to take root and maximize its capacity as a water absorber and purifier. During that time, it must be regularly nurtured *and* must avoid its other unintended function as a “litter collector.” In cases where rain gardens have amassed trash and debris, they have been deemed “blight” and subsequently removed. A rain garden sign that includes its year of inception can insulate them from removal during their nascent stages and give them sufficient time to mature.

Dam Removal

The Peninsular Paper Dam, in its current state, is a cause of many troubling ecological indicators regarding the Huron River’s health, namely creating impoundments where algae forms and changing water temperatures that alter dissolved oxygen levels, harming fish habitats.¹⁷ Ypsilanti and the HRWC conducted a feasibility report on removing the dam. The dam was classified as a high potential hazard, due to the severity of impending damage it could cause if it failed, and its classification as obsolete because it no longer serves any purpose. Based on sediment quality and quantity, potential infrastructure and utility impacts, and riverfront land ownership, it was determined that removing the dam is feasible.¹⁸ In 2016, estimates for repairing the dam would exceed \$800,000 and removing it would cost closer to \$2.7 million. Its removal would help restore the Huron River to a flow that is better suited for the ecosystem that depends on it.

Sustainability Policy: Dam Removal

In May 2019, City Council voted to approve \$500,000 towards deconstructing the dam as opposed to continuing to pay for repairs so long as the City applies to grants to complete the project.¹⁹ ²⁰ Dismantling the dam will protect the environmental health of native species that rely on the Huron River, and protect the City’s budget in the long run.

Drinking Water Sources

There are 13 water wells within the City: four type 1 (community) wells, one type 2 (facility) well, four household wells, and four irrigation wells.²¹ All of the type 1 municipal wells in Ypsilanti have been closed, and the type 2 well is inactive according to EGLE. The remaining wells are personal wells that residents are responsible for testing. The City of Ypsilanti sources water from the Great Lakes Water Authority for its municipal water system.

Sustainability Policy: Water Sources

The City provides a municipal water system and requires households that can be serviced by municipal sewer shall be, according to ordinance 106-22. At the point of a sewer hookup, the City encourages households to use the municipal water system, and as most of the few remaining households convert, the installation of personal wells is no longer necessary nor advisable.

¹⁷ Huron River Watershed Council. The Huron River Data Report: Ann Arbor and Ypsilanti Vicinity. <https://www.hrwc.org/wp-content/uploads/LowerMiddleHuron-11x8.pdf>

¹⁸ Princeton Hydro. Peninsular Paper Dam: Dam Removal Assessment and Feasibility Report. September 2018. <https://cityofypsilanti.com/DocumentCenter/View/1789/2018-11-21-Peninsular-Dam-Removal-Study-Report>

¹⁹ WXYZ Detroit. Ypsilanti City Council Votes to Tear Down Peninsular Dam. May 2019. <https://www.wxyz.com/homepage-showcase/ypsilanti-city-council-votes-to-tear-down-peninsular-dam>

²⁰ Ypsilanti City Council. Resolution 2019-101. May 7 2019.

²¹ Michigan Open Data Portal, “Water Wells – South Central & Southeastern Michigan” <http://gis-michigan.opendata.arcgis.com/datasets/water-wells-south-central-southeastern-michigan?geometry=29.491%2C-17.893%2C-105.860%2C71.775>

The City created two well exclusion areas which are written into local ordinances and documented through property deeds. Well exclusion areas were instituted to protect property from water contamination; for example, in the downtown, a well was prohibited on a parcel where there was a leak from the former gas station. As wells become a less ubiquitous source of water in urban areas, this tool will be used even less frequently.

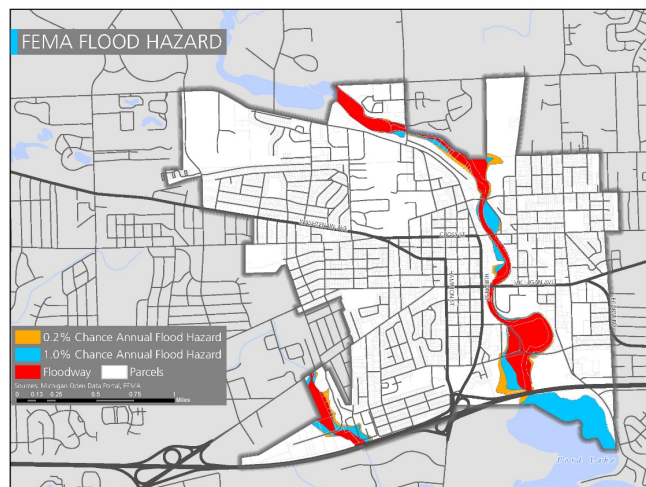
What the City can focus on is how to improve services through its water and wastewater provider Ypsilanti Community Utilities Authority (YCUA). Because wastewater treatment plants are energy-intensive, and provide an essential service to households, upgrades to this system are a win-win. Potential policies are two-fold. First, the City and YCUA can collaborate on home and business water efficiency financing programs to reduce total load and peak flow rates, saving energy at the plant and potentially lowering water bills for households. Secondly, advances to sensors and software can also improve its energy efficiency so that our water sources and treatment can contribute less to emissions.²²

Flooding and Stormwater Management

GOAL: Expand the City's capacity to deal with heavy rainfall to mitigate negative effects on people and property.

Flooding has the potential to harm the drinking water supply, human life, property, and infrastructure. The Federal Emergency Management Agency (FEMA) has identified zones based on the anticipated frequency an area will flood in a 100-year interval. These predictions are based on historical data, which means that they

do not incorporate climate change considerations. Already, the FEMA-delineated floodplains have been shown in many cases to be outdated, as areas vulnerable to flooding have expanded outside of its boundaries. Part of the increase in instances of flooding is linked to increased precipitation falling in



²² Ypsilanti Climate Action Plan. 2012. Pg 30.

concentrated storm patterns. Fortunately, Ypsilanti has not yet experienced flooding that has overwhelmed its storm sewer infrastructure. The composition of Ypsilanti's soil helps in that regard, since only 7% of the soils in Ypsilanti are prone to "frequent flooding," and the other soils experience no flooding aside from extreme circumstances.²³ To gain more accurate depictions of how the City may flood in the future, Ypsilanti can invest in an updated study that incorporates recent data and includes forecasts of more intense and frequent storms. The study should also include how the river's altered channel (due to the removal of the dam and water treatment plant) will impact flooding.

Green Stormwater Infrastructure (GSI)

GSI is one way to reduce the impacts of excess stormwater. Green stormwater infrastructure is a broad term that includes several practices of water management that protect or mimic the natural water cycle. As opposed to conventional "gray" stormwater infrastructure, which uses hard surfaces and systems to channel excess water elsewhere, this approach protects and expands the natural environment so that water can be absorbed naturally at several scales: a home, a downtown, an entire city, a watershed. Common examples are rain gardens, green roofs, trees, planter boxes, rainwater harvesting systems, and bioswales, and better protection of wetlands and floodplains.

The utility of GSI should not be underestimated. For example, one acre of imperviously-surfaced roadway can generate between 0.5 and 1 million gallons of stormwater runoff annually. On Michigan Avenue in Lansing, there are 30 planter box bioretention areas that collect runoff from four acres of roadway and reduce the annual stormwater runoff by approximately 75%.²⁴

Sustainability Policy: Flooding and Stormwater Management

Landscaping requirements that beautify a site can also be used to capture stormwater runoff. Already embedded in the landscaping requirements in the Zoning Ordinance is a tree protection plan for site plan review. The applicant is awarded credit for preserving or incorporating existing trees and shrubs into the development, and if trees or shrubs intended to meet the minimum landscaping requirements are cut down or damaged, the applicant must replace them according to ordinance specifications. Moreover, trees proposed for credit cannot be invasive (122-632). The frontage of all public and private streets for a new or altered use that requires site plan review must be landscaped with street trees (122-636). Existing regulation stops short of a tree preservation ordinance, which would prevent the removal of trees determined meeting criteria for condition, size, and species.

In 2011, more space was allotted for urban agriculture in the form of community gardens in several zoning classifications including Park, Single-Family, Multiple-Family, Core Neighborhoods, and Health and Human Services zones. The Zoning Ordinance also permits accessory stormwater control features such as swales, pervious paving, rain gardens, rain cisterns, vegetated roofs, and other methods. Ypsilanti has one city-sponsored rain garden at the Freight House that is managed by volunteers. The rain garden in Depot Town is maintained by the DDA with volunteer assistance.

In partnership with Washtenaw County Conservation District (WCCD), the Sustainability Commission has offered support to promote WCCD workshops to residents, encourage tree planting on residential lots,

²³ Web Soil Survey, United States Department of Agriculture, <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

²⁴ SEMCOG. Green Infrastructure Vision for Southeast Michigan. 2014. Page 45.
<file:///C:/Users/Michelle%20Bennett/Downloads/GreenInfrastructureVisionForSoutheastMichiganMarch2014.pdf>

and identify a site and volunteers for an Earth day tree planting event. Washtenaw County has staff dedicated to teaching master rain gardener certification courses and provides technical advice for planting one on private property. The City of Ypsilanti also won bronze at the Michigan Sustainability Conference in 2019 for its work with the Washtenaw County Water Resources Commissioner to provide free consultations to households interested in developing or enhancing rain gardens.²⁵

During a site plan review process, an engineer calculates water displaced from a building and the rate that runoff will be absorbed by the different surfaces on site. Depending on the volume of run-off, mitigation recommendations are made, such as building retention ponds or installing storm trap tanks. However, landscaping standards are not typically based on the level of imperviousness onsite. A landscaping ordinance that ties in engineering standards, planning, and landscape architecture would combine each field's expertise to account for type, location, and design of landscaping that would optimize for water retention and appearance.

In addition to enhancing green stormwater infrastructure, some expansion to grey infrastructure may also be needed. In 2013, Ypsilanti was awarded a Stormwater, Asset Management, and Wastewater (SAW) grant. With the funds, the City mapped its storm sewers and plans to purchase a GIS license to continue monitoring and recording its conditions. With improved access to the interior of its infrastructure, Stormwater Management Plans can be tailored to specific areas for improvement and estimates for expansion are based on more accurate data. Using climate change predictions for precipitation and updated inventory on the storm sewer system, Ypsilanti can continue to use the Capital Improvement Plan to plan for greater stormwater capacity with greater precision.

Biodiversity

GOAL: Expand and protect natural habitats

Endangered Animals

The term "biodiversity" refers to the variety of living organisms within an ecosystem, and the plant and animal habitats of Ypsilanti and the broader region have been significantly impacted by urbanization and development. The Michigan Natural Features Inventory (MNFI) maintains a database of state and federally listed endangered and threatened species. This observational data is converted into the Biological Rarity Index. The Biological Rarity (Biorarity) Index model is based on the MNFI database of known sightings of threatened, endangered, or special concern species and high-quality natural communities. Each record is spatially joined to its habitat using land cover data, streamlines, and rail corridors. The records are then assigned three values based on the species' global status, state status, and occurrence quality rank. These values are multiplied by a likelihood of future sightings based on the age of the database record. Finally, the scores of all the records in a geographic unit are summed to determine the Biorarity Index for that geography.²⁶ The map "Biological Rarity Index" illustrates the areas in the City by that index. The higher the index, the more likely that area has threatened and endangered species. The areas with a higher index (darker colors) should be prioritized for conservation because of the importance of the habitat to threatened and endangered species. Overlaid on this map are three sites that have remained relatively untouched since the 1940s. Each of these areas fall into zoning districts with little

²⁵ Michigan Green Communities (MGC). 2019 MGC Challenge Participants and Awards. <https://migreengcommunities.com/blog/>

²⁶ Biological Rarity Index, Michigan Natural Features Inventory – MSU Extension, <https://mnfi.anr.msu.edu/resources/biological-rarity-index>

protection from development *and* correspond to priority conservation areas on the map, creating conflict from a preservation standpoint.

Table X: Potential Conservation Areas Current Zoning Districts

Area	Zone	Description of Zone
Mansfield (adjacent to cold water trout stream) & Highland	Production, Manufacturing, Distribution	Buildings can be on large plots of contiguous land, serviced by railroad lines or major thoroughfares; uses are expected to generate waste, noise, odor, and truck traffic; however, uses should produce minimal external impacts that are detrimental to other uses in the district or to properties in adjoining districts
Clark	Multi-family dwelling	Adjacent to high traffic generators and major thoroughfares and corridors; ensure sound development policies for concentrations of multifamily units; recreation, service, and retail uses are permissible as special land uses to allow residents to access everyday needs by foot, if they are not already within a quarter-mile walking distance

Due to the sensitive nature of threatened and endangered species, the MNFI does not release site specific data on threatened and endangered species, but in Washtenaw County there are 83 observed species that are listed as threatened or endangered, including the peregrine falcon, smallmouth salamander, and orange frilled orchid.²⁷

²⁷ Michigan State University. MSU Extension. Michigan Natural Features Inventory. Accessed March 3, 2020. <https://mnfi.anr.msu.edu/resources/county-element-data>

Native Plants

Native plants play an essential role in ecosystems: they are the primary producers that convert the sun's energy into biological material. Secondary producers, such as insects and herbivores, rely on plants to survive, and tertiary species such as carnivores rely on the entire chain. When this chain is interrupted, it impacts every organism involved in the ecosystem. Some of the largest threats to plants are human development and invasive species. Invasive species disrupt the proliferation of native plants and can therefore throw off the balance needed for the local ecosystem. Invasive species are species from another ecosystem, usually from another area of the globe, that outcompete the native species for essential resources. Invasive species outcompete native species because there are no natural predators or processes in the native ecosystem to curb their growth. When native species disappear from the landscape, other organisms whose survival depends on the native species also disappear.

As climate change continues to elevate global temperature averages, the composition of native species is subject to change. Species that were originally held south by a temperature barrier are now able to expand farther north because of rising overall temperatures. Meanwhile, native species that are not adaptive to warmer temperatures may disappear from the landscape.

Sustainability Policy: Biodiversity

Habitat Corridors

The best thing a community can do to preserve biodiversity is to concentrate development so that it does not sprawl onto and degrade natural habitat. The Mansfield and Clark sites are located on the periphery of the City, in land-use-intensive zones, making them vulnerable to larger footprints from commercial, industrial, or residential uses. Effective policy ensures that untouched land is ample and contiguous so that animal species can minimize their contact with the developed world. Because habitat corridors, like other corridor types, frequently cross municipal boundaries, they should be considered in a multijurisdictional context. Prior to the next sale of these lands, an inventory of habitat corridors and undisturbed sites should be conducted through a partnership with the City of Ypsilanti, Ypsilanti Township, Washtenaw County's Natural Areas Preservation Program (NAPP), and private property owners. NAPP can acquire natural areas once landowners have nominated their property for the program. The land is then owned and maintained by the Washtenaw County Parks and Recreation Commission with the purpose of preserving the land for plants and animals.²⁸ Building a relationship with property owners prior to the sale of their land, and maintaining an inventory database of the plant and animal species that in need of protection, could prevent the loss of more habitat.

Wildlife-friendly Gardens

In a more controlled environment than the untouched sites, the practice of "rewilding" lawns, or planting native grasses that are more wildlife-friendly than sod and are maintained without chemicals, can help spread pockets of biodiversity. Natural lawns are often perceived as unkempt, even a "threat to public health, safety, and welfare"²⁹ for attracting vermin, trash, and criminal activity. To an untrained eye, "weeds" are associated with blight; in fact, the Property Maintenance Code penalizes property owners for "weeds" over 10 inches in height. However, native grasses and shrubs on private property help to create microhabitats that allow the insect population, and the species that rely on them, thrive. Training

²⁸ Parks and Recreation Washtenaw County. Natural Areas Preservation Program. <https://www.washtenaw.org/939/Natural-Areas-Preservation-Program>

²⁹ Ypsilanti Property Maintenance Code. Section 110-81

property inspectors to spot wild grasses without penalizing them could normalize life-giving “messy” gardens a chance to boost biodiversity in the City.

The Sustainability Commission adopted a resolution (No. 2020-002) that acknowledges the value of native plants and resolves to update the City ordinance to support the planting of native species (disregarding native plant blight violations in the meantime), to make reasonable efforts to use them on City property, and to educate residents about native species suitable for planting on private property.

Educational Materials

The traditional “lawn” is perceived as a matter of neighborhood interest, both in terms of property value and the public health, safety, and welfare concerns above, and the concept of “rewilding” constitutes a substantial shift in this perception. The provision of educational resources would ease tension among inspectors, the City, and private households. A list of the City’s preferences for native species (keeping in mind native species are changing as the climate changes³⁰), prohibited species, and a basic factsheet for property owners explaining the reasons the City supports such species, the potential benefits of planting them, and how it helps to achieve sustainability goals could clarify the motivation. For example, newly produced materials describing “lawn alternatives” encouraging property owners to re-landscape their yards should include the overlapping positive effects: reduced emissions from lawn mowers, increased biodiversity, and better stormwater absorption. Microhabitats can be constructed as part of commercial and industrial development too, although they may require different guidance considering their scale. Green roofs, for instance, are an opportunity to plant native species that provide food sources or refuge for insects and birds on a larger but less visible surface than a home. Over an entire city, these microhabitats can become effective in supporting urban wildlife, once the parameters for property owners are disseminated.³¹



One area of the City that is an excellent candidate for focused native plantings is in the College Heights neighborhood. College Heights is situated at the headwaters of Owen Drain, an enclosed drain that runs

³⁰ “Climate Change Tree Atlas and Bird Atlas.” USDA, US Forest Service <https://www.fs.usda.gov/ccrc/index.php?q=tools/tree-and-bird-atlas>.

³¹ URBANhabitats “Green Roofs and Biodiversity” December 2006 <http://www.urbanhabitats.org/v04n01/introduction.html>

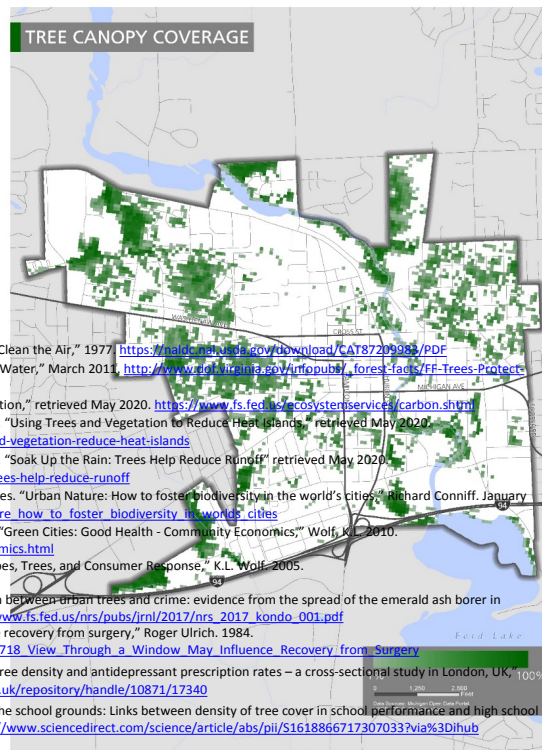
into the Huron River after passing through the EMU campus. The drain system has required several upgrades to expand its capacity; using the neighboring properties to exhibit best practices for stormwater management with native vegetation could relieve some of the pressure on the system.

Trees

GOAL: To preserve and expand a resilient tree canopy

Street Trees

Trees provide a suite of ecosystem services that are nearly incomparable: cleaner air,³² cleaner water,³³ sequestered carbon,³⁴ temperature moderation,³⁵ stormwater management,³⁶ urban wildlife habitat,³⁷ increased property values³⁸, increased commercial sales,³⁹ lower crime rates,⁴⁰ faster healing,⁴¹ lower prescription drug burden, lower rates of depression,⁴² and improved academic performance.⁴³ Despite these multifaceted benefits, there are practical day-to-day issues that stall planting and maintenance. Even though trees' ecosystem services pay off in the long-run, the shorter-term operational costs are resource-intensive. A tree's root system has the strength to push up sidewalks and, to a lesser extent, interfere with sewer infrastructure. When sidewalks heave from a growing tree root, it creates trip hazards that discredit another City goal: walkability. The tension lies in determining responsibility and corrective action over tree and sidewalk maintenance – by City code, residents are responsible for maintaining their sidewalks, but not for the trees that commonly disfigure them. When residents are cited for a heaved sidewalk, they push back on the City's lack of tree maintenance, which results from lack of funding. The tension has brought the conversation to a standstill for now; citations for sidewalk maintenance are rarely issued.



³² United States Forest Services. "How Trees Help Clean the Air," 1977. <https://nrs.fs.fed.us/dyn/Download/CAT87209001/PDF>

³³ Virginia Department of Forestry. "Trees Protect Water," March 2011. http://www.virginia.gov/forestry/infopub/forestry_facts/FF-Trees-Protect-Water_pub.pdf

³⁴ United States Forest Service. "Carbon sequestration," retrieved May 2020. <https://www.fs.fed.us/ecosystemservice/carbon.shtml>

³⁵ United States Environmental Protection Agency. "Using Trees and Vegetation to Reduce Heat Islands," retrieved May 2020.

³⁶ United States Environmental Protection Agency. "Soak Up the Rain: Trees Help Reduce Runoff" retrieved May 2020.

³⁷ <https://www.epa.gov/soakuptherain/soak-rain-trees-help-reduce-runoff>

³⁸ Yale School of Forestry and Environmental Studies. "Urban Nature: How to foster biodiversity in the world's cities," Richard Conniff, January 2014. https://e360.yale.edu/features/urban_nature_how_to_foster_biodiversity_in_world_cities

³⁹ University of Washington/USDA Forest Service. "Green Cities: Good Health - Community Economics," Wolf, K.L. 2010.

⁴⁰ https://depts.washington.edu/hhwb/Print_Economics.html

⁴¹ Journal of Forestry. "Business District Streetscapes, Trees, and Consumer Response," K.L. Wolf. 2005.

⁴² <https://www.fs.usda.gov/treesearch/pubs/34952>

⁴³ Landscape and Urban Planning. "The association between urban trees and crime: evidence from the spread of the emerald ash borer in Cincinnati," M.C. Kondo et. al. July 2016. https://www.fs.fed.us/nrs/pubs/jrnl/2017/nrs_2017_kondo_001.pdf

⁴⁴ Science. "View through a window may influence recovery from surgery," Roger Ulrich. 1984.

⁴⁵ https://www.researchgate.net/publication/17043718_View_Through_a_Window_May_Influence_Recovery_from_Surgery

⁴⁶ Landscape and Urban Planning. "Urban street tree density and antidepressant prescription rates – a cross-sectional study in London, UK," 100%

M.S. Taylor et al. April 2015. <https://ore.exeter.ac.uk/repository/handle/10871/17340>

⁴⁷ Urban Forestry and Urban Greening. "Beyond the school grounds: Links between density of tree cover in school performance and high school academic performance," Dongying Li et. al. <https://www.sciencedirect.com/science/article/abs/pii/S1618866717307033?via%3Dihub>

Sustainability Policy: Street Trees

As the long and diverse list of ecosystem services identified above indicates, investment in trees pays back with dividends in the long run. In 2012, the City conducted an Urban Forestry Management Plan (UFMP) and is dedicated to fighting climate change, it is a reasonable next step to bolster the tree maintenance budget to alleviate tension with neighbors and provide better care for its stock.

To reduce sidewalk heaving, the size of the sidewalk cut out should be based on the tree species' need for water and area to grow. A uniform "one size fits all" ordinance for tree planting is easier to administer but may not yield desirable outcomes. An emphasis on species with a tap root system could alleviate infrastructure damage. Porous pavers or more malleable materials to surround trees may reduce instances of cracked surfaces. With porous surfaces, trees have greater access to water and may not have to push upward for hydration. In the meantime, citations for damage caused by public trees should continue to be sparsely issued.

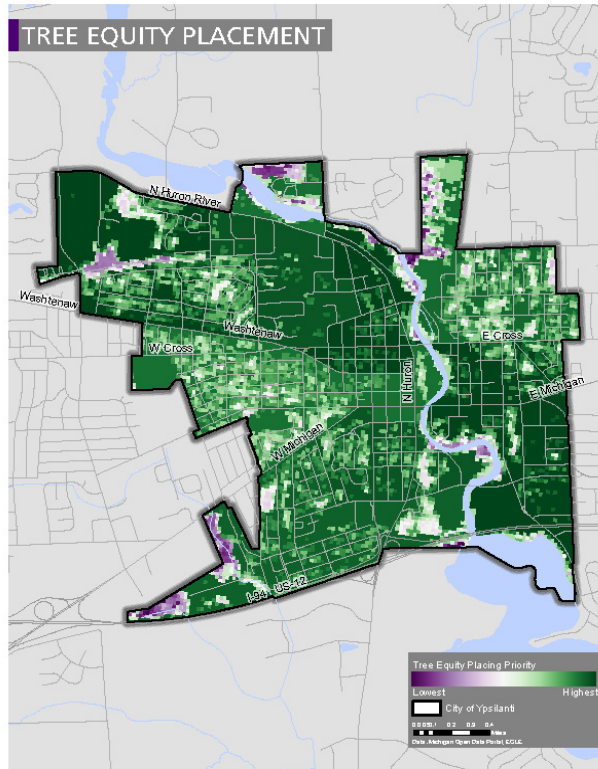
Tree Species and Placement

The "Tree Canopy Coverage" map shows that trees are more prominent within peripheral neighborhoods and along the river. Large white swaths on the map represent zero coverage.

In 2012, an Urban Forestry Management Plan found that Ypsilanti had 8,835 public trees, stumps, and planting sites for a total appraised value of about \$10.7 million. There are 105 distinct species, but maples account for 55% of the tree population. This represents a tree diversity shortage, leaving the City vulnerable to a disease that could wipe out half of its tree population as has happened in communities with Dutch Elm Disease and, more recently and locally, Emerald Ash Borer. Public trees skew older and the majority are in fair condition; they would ideally be replaced with younger trees at a higher replacement rate.⁴⁴

⁴⁴ City of Ypsilanti Urban Forestry Management Plan. February 2012.

Separate from the UMFP, a tree placement model was run for the entire City to determine what areas are most in need of trees based on four factors. The four factors were weighted accordingly: existing tree canopy (55%), land use (25%), and low-income population and heat vulnerability index were both weighted at 10%. The results of the tree placement model are shown in the “Tree Equity Placement Map.” The darker green areas represent highest-need areas and the purple areas have adequate tree canopy coverage.



The challenge in tree planting is the initial funding and ongoing maintenance; the environmental challenges that result from a lacking tree canopy coverage come with high opportunity costs to human health, water quality, and aesthetics. When the City of Ann Arbor quantified the benefits that public trees provide, each tree was found to contribute \$97 in ecosystem services annually. Each tree provides annual energy savings of \$48 by shading buildings and slowing winds, which reduce the heating and cooling requirements in buildings. The aesthetic value and quality of life benefits each tree provides is estimated at \$29. Reducing runoff and other water quality benefits is valued at \$11 per tree, and the air benefits that tree provide is quantified at \$9 per tree.⁴⁵

Communities that manage and expand their urban trees can achieve status as a “Tree City,” awarded by the Arbor Day Foundation based on four standards: a tree board or department, a tree care ordinance, a community forestry program with a budget of at least \$2 per capita, and observance of the Arbor Day holiday. As of June 2019, Ypsilanti no longer qualified for Tree City designation, and could resolve to restore it. The primary benefit of Tree City status is the improved tree canopy, but the standards also

⁴⁵ City of Ann Arbor Urban & Community Forest Management Plan, City of Ann Arbor, June 2, 2014.

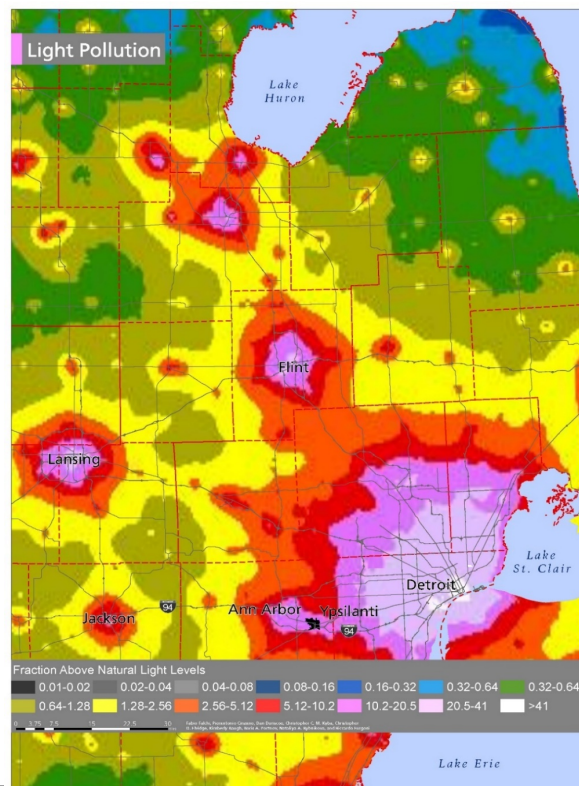
provide a framework for action, and the status helps gain the necessary awareness and support to continue investing in it.

Sustainability Policy: Tree Species and Placement

The 2012 Urban Forest Management Plan (URMP) details suitable locations, necessary budget, recommended species to plant, and maintenance practices. This document should serve as the guidebook for tree purchasing and placement decisions. The map "Tree Planting Priority" adds an equity-focused dimension to tree placement and planning and should be considered as an additional resource.

Light Pollution

The inappropriate use of artificial light is referred to as "light pollution," and includes excessive brightness, the brightening of the night sky, light where it is not needed, and the clustering of light sources.⁴⁶ Light pollution alters the perception of many nocturnal animals by turning the night into day, inhibiting their ability to forage, hunt, and breed. Migratory birds that use the moon and stars to navigate can be pulled towards urban areas and collide with lit buildings.⁴⁷ Outdoor lighting also impact insects that are attracted to the cooler white lights and less attracted to the warmer yellow lights.⁴⁸ Consequently, warmer lights have less influence on insects' lifecycles and on the greater chain of its predators. Regulating and



⁴⁶ Light Pollution, International Dark Sky Association, <https://www.darksky.org/about/>

⁴⁷ Wildlife and Ecosystems, International Dark Sky Association, <https://www.darksky.org/light-pollution/wildlife/>

⁴⁸ Servick, Kelly "Which Light Bulb Attracts the Fewest Bugs? Study Reveals Surprises." Science, Feb. 14, 2016. <https://www.sciencemag.org/news/2016/02/which-light-bulb-attracts-fewest-bugs-study-reveals-surprises>

reconfiguring lighting can help alleviate disruptive migratory bird patterns.

The City of Ypsilanti has an artificial-to-natural light ratio that ranges from 10.2 to 20.5, indicating that the amount of night light is 10-20 times above natural levels.⁴⁹ The United States Department of Energy estimated that 35% of lighting is wasted, costing roughly \$3 billion dollars annually. With some changes, buildings can reduce lighting to solve problems of waste.

The challenges to making lighting upgrades are varied. To start, the DTE streetlights in Ypsilanti use white light that is not dark sky compliant, meaning the City could not adhere to new regulations that it would enforce on others. Another barrier is the cost of a photometric study needed to ensure that even the current standards are met, which can be prohibitive for investors. Continuous compliance with lighting standards is also an issue, as property owners may change fixtures without seeking a City permit or even verifying that the new fixture meets the code. Ypsilanti's Historic District Commission, which oversees development in one of the state's largest historic districts, only approves warmer lights that are friendlier to insects and night vision, but finds the modern fixtures that accommodate dark sky lights are not compatible with the historic aesthetic.

Sustainability Policy: Light Pollution

The policy and practice of lighting are not perfectly aligned, which often signals that changes to the ordinance are warranted. While Article VI Section 122-609 of Ypsilanti's Zoning Ordinance states that "parking and loading facilities, building entrances, and building exits used during night-time shall be artificially illuminated," some developments have been allowed to turn lights off for periods of the night. The parameters around lighting standards are based on the effect on adjacent property owners, the overall height of a lighting fixture, and the intensity of the light, but the complexity of measuring these criteria on varying properties is time-intensive. To reduce light pollution, the International Dark Sky Association created a Model Lighting Ordinance that recommends creating lighting zones permitting different intensities, applying "curfews" that turn off lighting after a given time, minimizing uplighting, and instituting performance standards indicating a maximum light measurement based on site conditions.⁵⁰ Motion detectors can help achieve many of these suggestions, along with an added bonus of reducing energy waste, and could be required by ordinance. Consideration of new guidelines should be rectified with Ypsilanti's existing conditions. If a lighting curfew seems less realistic, for example, minimizing uplighting could be emphasized so that practice follows policy more closely with an emphasis on reducing energy consumption.

⁴⁹ Cooperative Institute for Research in Environmental Sciences at the University of Colorado Boulder, <https://cires.colorado.edu/artificial-sky>

⁵⁰ International Dark-Sky Association. "Model Lighting Ordinance." June 2011. https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF

PROFIT

Energy

In November 2019, the City of Ypsilanti committed to carbon neutrality by 2035 in partnership with the City of Ann Arbor as a response to a “climate emergency.” The resolution calls for City Council to budget staff and resources to become carbon neutral. Achieving this goal will require the City to first measure, and then reduce, “greenhouse gas” (GHG) emissions that trap heat in the atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases.⁵¹

The City of Ypsilanti has focused on measuring local emissions for a decade or more. In coordination with the 2012 Climate Action Plan, 2005/2008 community and government greenhouse gas emissions were evaluated. An updated Greenhouse Gas (GHG) Study was conducted alongside this Sustainability Plan to determine if their actions were achieving reductions in carbon emissions. The 2020 City of Ypsilanti Community and Government Greenhouse Gas Inventories present 2018 emissions from the City of Ypsilanti community as a whole and emissions from the City of Ypsilanti government operations. The inventory follows the approach and methods provided by the ICLEI US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (US Community Emissions Protocol). ICLEI is a global network of local and regional government committed to sustainable urban development. Because this protocol differs from the 2012 methodology, the results are not directly comparable, but do show movement in emissions.

Community Inventory

GOAL: Decrease the community’s emissions by 171,310 metric tons of CO2e by 2030.

The City of Ypsilanti looked at community emissions through multiple frames, including “community-wide activities” and “government significant influence.” The community-wide activities frame shows the extent to which community members’ use of energy, materials, and services contribute to GHG emissions within or outside of the City boundary, regardless of whether the City has significant influence over those emissions. The findings show that the City of Ypsilanti’s total 2018 community emissions were 269,180 metric tons of CO2e, comprised primarily of commercial energy, residential energy, and transportation sectors.⁵²

Community Inventory: Significant Influence Frame

Despite its lack of direct control over major GHG contributors, the City included sources or activities in which it can exert significant influence

Units of Measurement

CO2 – carbon dioxide

CO2e – carbon dioxide equivalent, a standard unit for measuring carbon footprints that conveys the impact of different greenhouse gases in terms of the functionally equivalent amount of CO2

Transportation

I-94 passes through the City of Ypsilanti and represents a significant source of transportation related emissions which are not directly attributable to the community. The Southeast Michigan Council of Governments (SEMCOG) estimates that travel on I-94 represents 53% of all total on-road vehicle miles traveled within the City annually while non-highway vehicle miles represent 47%.

Within the residential sector, electricity use accounted for 60% of emissions, while natural gas use in stationary combustion accounted for 40%.

⁵¹ Environmental Protection Agency. “Greenhouse Gas Emissions.” <https://www.epa.gov/ghgemissions>

⁵² City of Ypsilanti 2020 Inventories of Community and Government Greenhouse Emissions. Figure 2. Pa

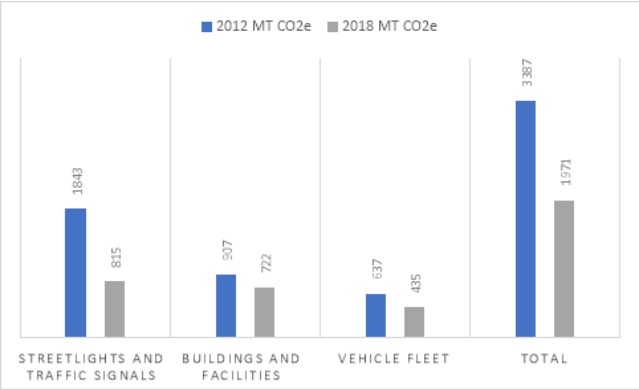
over energy consumption. Already measured as the largest greenhouse gas contributors, the categories “residential” and “commercial-industrial” saw an increase in emissions between 2008 and 2018, making households and businesses starting points for new mitigation policy. It is possible that the uptick in commercial and residential emission is related to the legalization of marijuana for personal and commercial use, given that the time period coincides with the implementation of these notoriously high energy operations. It was estimated that through policy, Ypsilanti can influence 64% of community emissions (171,310 MT CO₂e).⁵³ This figure will become the baseline for setting an emissions reduction target, against which future emissions in the “significant influence frame” will be measured.

Government Operations GHG Emissions Inventory

GOAL: Decrease government operation emission in support of attaining citywide net zero by 2030

The government operations inventory is a separate greenhouse gas emissions inventory that takes a deeper dive into emissions derived from municipal operations. The largest emitters are streetlights and traffic signals, accounting for 32% of emissions, followed by vehicle fleet emissions that comprises 17% of the total.⁵⁴ Actions to reduce emissions in both sectors are substantially underway in the City and will continue to play a key part of a carbon neutrality strategy. Ypsilanti has already transitioned many of its light fixtures to LED and begun introducing hybrid and electric vehicles to its fleet. Emissions are expected to continue dropping as the City continues to address harder-to-replace streetlights and continues fleet modifications. Not including emissions from employee commutes and solid waste, government operations emissions have dropped by 42% over a decade!

Figure X: Comparative Government Emissions by Sector 2012-2018 (MT CO₂e)

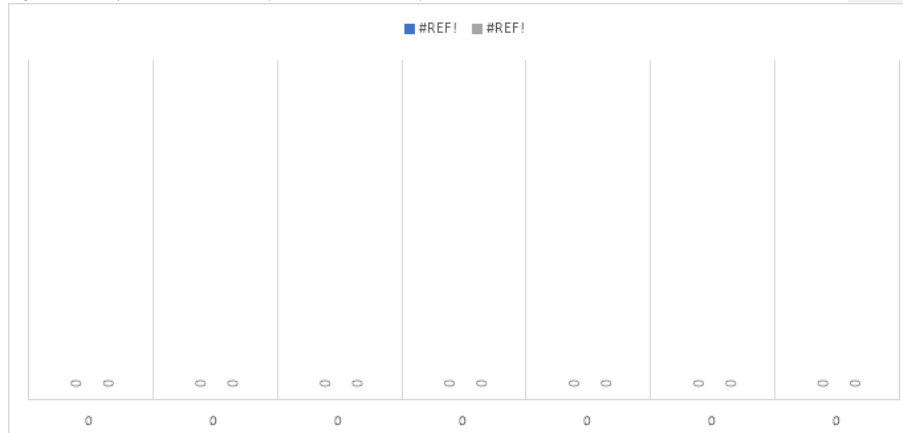


Source: EcoWorks

⁵³ City of Ypsilanti 2020 Inventories of Community and Government Greenhouse Emissions. Figure 15. Pg 37.

⁵⁴ City of Ypsilanti 2020 Inventories of Community and Government Greenhouse Emissions. Pgs 42 and 43.

Figure X: Comparative Community CO2e Emissions by Section 2012 & 2020* GHG Inventories



Source: EcoWorks

Sustainability Policy: Energy

The City has made successful strides in increasing its renewable energy portfolio. Ypsilanti continues to lead by example in its actions and in streamlining the solar permitting process to enable property owners to follow suit. The City has enabled solar installation as far as its authority permits, stopping just short of mandating them on new construction.

Ypsilanti worked with DTE and Solar Currents to install a solar farm by Highland Cemetery. The City has also installed solar panels on most of its municipal buildings and converted most of its lighting – both building and streetlighting – to LED. It has also allotted \$250,000 from budget surpluses to be used as a revolving loan funding to make energy efficiency improvement to municipal buildings. These efforts have translated into noticeable reductions in emissions since the last inventory was conducted. Moreover, the City has pursued other best practices that include low-flow water fixtures, programmable thermostats, air sealing, staff behavior changes, and increased awareness about conservation and efficiency. Another City policy that may have contributed to emissions reduction is an increased financial contribution to expand bus service, potentially taking cars off the road. Energy efficiency measures for municipally operated facilities have resulted in significant savings.

It has only fallen short on its most ambitious goal related to energy and light pollution: Resolution 2013-175 sought to place solar roofs on 1,000 properties and

Commercial

In 2017, EMU replaced an aging cogeneration unit with a new high efficiency unit projected to reduce annual emissions of CO2 by 21,305 tons/year and reduce NOx emissions by 112 tons annually. Emissions from Eastern Michigan University represent 46% of total commercial emissions in the City of Ypsilanti.

Source: Ecoworks

generate five megawatts of electricity from distributed solar by 2020.⁵⁵ Ypsi Solar has calculated that 55 sites have solar panels totaling about 1.26 megawatts of capacity. Based on those calculations, the City has realized 5.5% of the solar roof target and 24.8% of the megawatt target. The City should continue to address major projects at the most energy-intensive facilities and implement no- or low-cost efficiency opportunities at all facilities. Larger projects, which require more planning and money, are integrated into capital improvement plans.

Next Steps

A next step in emission reduction for Ypsilanti could be the purchase of renewable energy certificates (RECs) to expand consumers' service options and support renewable electricity development. An REC is a tradeable market-based instrument used in electricity markets. It allows organizations that purchase RECs to account for nonrenewable electricity use. REC purchasers diversify their consumption by expanding its use of low- to zero-emission energy sources and tracking its growing reliance on renewables. RECs are a flexible tool because they can be purchased separately from electricity, meaning the purchasing organization does not need to alter its existing power contract to use greener power. The two can be matched and use the same infrastructure.⁵⁶

Making headway on properties that are not municipally owned is also an issue of equity and education. Increasing energy efficiency for residents and business owners means reducing the percentage of income spent on housing utility costs in addition to reducing the amount of energy consumed. Education programs for residents could help lower residential usage; this awareness and access may be especially promising in Ypsilanti given that residents are supportive of increased energy efficiency standards and the use of renewable energy. Promoting higher standards for new development, namely commercial and industrial, could be encouraged through incentives for developers to pursue energy-efficient standards (Energy Star, LEED, Living Building Challenge), applications for tax abatements, and promoting existing financial tools to help developers meet these standards during and prior to the site plan review process. For small businesses, Retired Engineer Technical Assistance Program (RETAP) provides pollution prevention, water conservation, and energy efficiency programs free of charge. RETAP teams review a site's operations and recommend strategies for reducing waste at a significant cost savings. Eligible businesses must be independently owned and operated, have fewer than 500 employees, and be primarily engaged in manufacturing.⁵⁷

Another issue to tackle in Ypsilanti is residential energy consumption. Renter-occupied units are a large

Energy Competitions

In Traverse City, the month-long "kWh Challenge" was organized. Over 50 staff members from city departments participated in weekly challenges of unplugging unused electronics, using efficient computer settings, and using daylight as opposed to artificial light. These represent simple behavior changes that have significant savings, while creating a friendly competition to train staff on energy efficiency.

Source: SEEDS

⁵⁵ City of Ypsilanti, "Resolution for 1,000 Solar Roofs Initiative", No. 2013-175, September 3, 2013.

http://www.solarypsi.org/repository/documents/cityhall/Resolution_2013-175_1000_Roofs_by_2020.pdf

⁵⁶ EPA Green Power Partnership. "Offsets and RECs: What's the Difference?" https://www.epa.gov/sites/production/files/2018-03/documents/gpp_guide_recs_offsets.pdf

⁵⁷ EGLE. Pollution Prevention and Energy Efficiency Assessments. <https://www.michigan.gov/egle/0,9429,7-135-3304-11899--,00.html>.

portion of housing stock, so energy efficiency and safety of rental properties could lead to substantial reductions in use. The up-front costs of major efficiency improvements have so far exceeded their profit potential in the estimation of the local landlord community, and so the City will be in a stronger position to implement required standards as the market strengthens. In the meantime, there are intermediary steps to take. As outlined in the 2012 Climate Action Plan, a requirement to provide information regarding utility charges allows potential tenants to choose a unit based on its energy performance. During rental inspections, a certification process that verifies which units have met energy standards would enable tenants to more easily shop and compare units. Certification criteria can be based on existing programs such as the “Energy Star Homes” program. For eligible low-income homeowners, Washtenaw County has a weatherization program that reduces monthly energy bills by improving a home’s insulation.

The coordination of reducing municipal and community emissions is the job for a dedicated staff position. Having an Energy Manager position that is integrated into City Hall could be responsible for making enduring progress on these goals. Many of the energy action plans items derived from the 2018 Energy Plan could fall under the Energy Manager’s purview. An Energy Manager could improve data collection processes, spread knowledge of energy management among city staff, analyze trends in energy use, and develop communications with the residents and property owners. This person would lead a team to research and update available energy-saving equipment, determine how to incorporate more renewable energy in the City’s portfolio, promote policies and incentives for reducing energy use, seek grants and other funding mechanisms to implement clean energy projects, liaise with the Sustainability Commission, expand outreach to commercial and industrial uses, and manage capital improvement projects related to energy efficiency. In recognition of the substantial financial commitment that a newly-created staff position represents for the City, a reasonable starting place could be to fund the position for one year and expect an early outcome of its efforts to result in savings sufficient to cover continued funding.

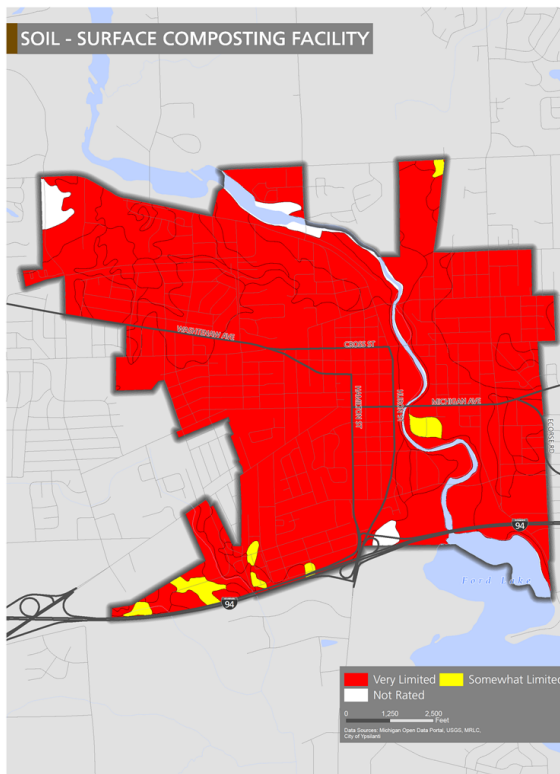
Importantly, development of this system will build institutional knowledge that outlasts the employment of any one dedicated staff member. A system that regularly schedules a GHG inventory update every five years using the same methods and program that forecasts reductions and benchmarks municipal utility bills to an annual goal would be a valuable organization change. The system should include internal reporting from the Sustainability Commission so positive results can be shared and celebrated with the community.

Ypsilanti has joined Ann Arbor in the carbon neutral goal by 2035. Recently, Ann Arbor has published a draft Net Zero plan with seven strategies for getting there. The strategy “Power our Electrical Grid with 100% Renewable Energy” set forth in the plan is ambitious but necessary. Estimated to cost \$4.1 million and reduce greenhouse gases by 41%, the goal is supported by four actions. Community choice aggregation, which gives cities control over procuring power for its community, is the chosen route that has one major road block. This step is not enabled by the state. Ann Arbor is working on recommendations for legislators to allow cities to bulk buy power on behalf of their residents and businesses. Through economies of scale and the right to integrate as much renewable energy as the community can manage, Ann Arbor has committed to buy 100% renewable energy by 2027 and provide it for the entire community through community choice aggregation. As a partner in this effort, Ypsilanti should support and lobby the state with Ann Arbor for legislation that has the power to convert widescale energy use into clean consumption.

Through the Net Zero community engagement sessions, microgrids were mentioned as a way to produce, convey, and store energy. Microgrids are decentralized nodes that transmit energy with the capacity to

disconnect from the traditional grid. In times of crisis, for example storms that cause major power outages, an entire section of a city can lose energy if the traditional centralized grid is hit. Because microgrids can disconnect from the traditional grid, they mitigate the effects of storm on households and businesses. They can be powered by generators, batteries, or renewable sources which plugs them into renewable energy goals and adaptation goals. Still, there is little discussion of deployment as further research is needed into how they should be operated and where they should be placed to have the largest impact.

On a larger scale, the City's support for sustainability is reinforced when it participates in regional, national, and international commitments to energy, climate, and sustainability causes. Ypsilanti has formed pivotal partnerships locally with the Michigan's Suburbs Alliance, EGLE, DTE, Ann Arbor, among others but its work can be hoisted to higher heights if it were to sign on to the Paris Climate Agreement, The Sierra Club's "Ready for 100" pledge, and the Global Covenant of Mayors for Climate and Energy. Where the goals embedded in each of these organizations' core mission may seem difficult to attain, the connection to case studies, methodologies, policies, and expertise will regenerate interest and action in the pursuit of low-energy consumption.



Waste Management GOAL: Reduce the amount of waste generated in Ypsilanti that enters landfills

The City of Ypsilanti's waste disposal is contracted to Stevens Disposal, which serves Southeast Michigan. Stevens Disposal provides waste services to 5,337 households, roughly 70% of households in the City.^{58 59} The solid waste generated in the City is transported to two landfills in southeast Michigan: Carleton Farms located in Sumpter Township and the City of Riverview's municipal landfill, Riverview Land Preserve.⁶⁰ Carleton Farms accepts 2.25 million tons of waste annually, the third highest volume in Michigan, and has a total capacity of 101 million tons, the largest in the state. The landfill is estimated to produce 15.8 million cubic feet of gas per day, 40.1% of which is captured. Methane that cannot be captured is flared. Flaring gas is the

process of lighting gas wells on fire to convert the more harmful methane to carbon dioxide as it enters the atmosphere. Carleton Farms flares 0.65 million cubic feet of landfill gas daily, roughly two-thirds the size of an Olympic size swimming pool. In 2018, Carleton Farms emitted 195,105 metric tons of carbon dioxide equivalents to the atmosphere.⁶¹ Based on current capacity, Carleton Farms is anticipated to close in 2052. River Land Preserve accepts 780,000 tons of waste annually and has a capacity of 39 million tons. Riverview Land Preserve is expected to close in 2031.⁶² In 2018, Riverview Land Preserve emitted 288,394

⁵⁸ Stevens Disposal Services Contract. Retrieved from email with Bonnie Wessler. February 27, 2020.

⁵⁹ United States Census "Quick Facts: Ypsilanti city, Michigan"

⁶⁰ Stevens Disposal Customer Service. Phone call on January 20, 2020.

⁶¹ FLIGHT, United States Environmental Protection Agency. <https://ghgdata.epa.gov/ghgp/main.do>

⁶² Landfill Methane Outreach Program (LMOP) United States Environmental Protection Agency. <https://www.epa.gov/lmop/project-and-landfill-data-state>

metric tons of carbon dioxide equivalents into the atmosphere. While the waste generated by Ypsilanti is only a fraction of the waste sent to these two facilities, it is undeniably contributing to a highly emissions-generating system.

The closure of the two landfills that Ypsilanti relies on in the relatively near future provides an opportunity to pursue strategies for diverting as much of the waste stream as possible. In 2016, Kent County published a landfill reduction plan called “Strategy to Reimagine Trash,” calling for a 20% reduction in landfill contribution by 2020 and a 90% reduction by 2030. The study found that up to 75% of the waste stream in the County has the potential to be converted or reused and explores a variety of targeted means to address specific waste categories. Recognizing that this represents a resource, a centerpiece of the plan is the development of a “Sustainable Business Park” comprised of businesses dedicated to the recovery and re-application of common elements found in the waste stream.

Recycling and composting are two household-level actions that can be supported by City actions. The City of Ypsilanti provides recycling hauling services, and as of 2020 serves 5,186 properties.⁶³ The City also has a composting site that can treat yard waste but not kitchen waste. Due to the soil composition of the City, a composting facility would likely have to locate outside of City boundaries as the “Soil – Surface Compositing Facility” shows that most of the City’s soil is not conducive to a surface composting facility. These ratings are based on factors that might lead to the contamination of groundwater from composting byproducts.⁶⁴ Due to its location in the floodplain, its services should not be expanded to other organic waste at this site. However, kitchen waste can be composted by individual households using common aboveground systems and applied at the household level, and the City could support these efforts through education, perhaps in conjunction with education about natural lawn alternatives.

The public expressed the need for recycling and composting options in all three forms of engagement. Residents prioritized expanded recycling and composting services in the “infrastructure” category of the survey, and 61% believe that improved curbside access would realistically help their households divert waste from landfills. The Zero Waste Hierarchy describes a series of steps and considerations that will help communities, organizations, and individuals make smarter choices about materials purchases in order to reduce environmental impact.



Sustainability Policy: Waste Management

A comprehensive waste strategy starts with source reduction or diversion of waste from landfills. Every ton of mixed paper recycled can save the energy equivalent of 166 gallons of gasoline. Not purchasing that paper to begin with makes an even bigger impact because no raw materials or energy are used to produce it, to transport it, or haul it at the end of its life. Diverting organic waste from landfills includes

survey.sc.egov.usda.gov/App/HomePage.htm

separate collection requirements, education campaigns, financial incentives for food redistribution, and disincentives for generating food waste.⁶⁵ Nearly half of the solid waste produced globally is organic or biodegradable.

The City of Ypsilanti provides finite curbside recycling and composting pickup, and households and property owners must rely on assorted groups for full service. The curbside recycling program does not collect glass and Styrofoam because they disrupt the recycling stream. The curbside recycling service is limited to properties with fewer than four units, which excludes roughly 88 residential properties. Ypsilanti's partnership with Simple Recycling grants households curbside recycling of textiles and small electronics, and the City relies on Washtenaw County for annual drop-offs and hazardous materials disposal. Items with Freon can be disposed of curbside with advanced planning and a fee. Residents are also eligible to use Ann Arbor's drop-off recycling station for safe disposal of items that Ypsilanti does not collect. This inventory shows that options for recycling do exist, but the decentralization of the services and locations is inconvenient and discourages full participation.

In 2018, the Sustainability Commission resolved (No. 2018-08-002) to increase recycling rates based on the Climate Action Plan findings. The resolution aims for increased education about the City's recycling program and the placement of artistic recycling bins throughout the City. The expansion of the recycling program would have to be accompanied by an extensive outreach and education program to ensure that best recycling practices are followed. The following summer, the Sustainability Commission defined 2019-2020 goals, one of which was to facilitate a Zero Waste event (No. 219-07-002).

The curbside composting program operates from April through December, but this service is only for yard waste and not for household waste.⁶⁶ Because the City's soil conditions inhibit the likelihood of expanding its composting infrastructure, and the current compost yard is in a floodplain, Ypsilanti should cooperate with an organization that offers composting services and encourage residents to use it. Another possibility is a biodigester that use microorganisms to decompose waste. The decomposing waste produces methane, which can be captured for energy, and digestate, which can be used as fertilizer.⁶⁷ Biodigesters are more expensive to build than traditional composting facilities but produce two valuable resources, methane and digestate, which can be sold.⁶⁸ In 2017, the City of Ann Arbor conducted a feasibility study for a biodigester and concluded that the project would not yet be profitable – the startup costs are too high for the revenue stream it would provide. The study cited challenges such as low landfill fees, modest energy costs, and minimal financial reimbursement as the reasons for the improbable feasibility of the biodigester.⁶⁹ At a minimum, the City can offer educational resources to households interested in composting their own household waste.

PEOPLE

Complete Neighborhoods

⁶⁵ Corvidae, J. et al. The Carbon-Free Region Handbook. RMI. (2018) Retrieved from https://rmi.org/category/global-energy-transitions/cities-and-communities/carbon-free-regions-handbook/?post_type=insight

⁶⁶ The City of Ypsilanti, Meeting with Bonnie Wessler, March 4, 2020.

⁶⁷ Nyifa, W. "Remember the Biodigester." Saskatchewan Research Council <https://www.src.sk.ca/blog/remember-biodigester>

⁶⁸ Dawson, L. "How Cities are Turning Food into Fuel." Politico, Nov. 11 2019.

⁶⁹ City of Ann Arbor. "Ann Arbor Biodigester Feasibility Study." June 2017. <https://www.a2gov.org/departments/systems-planning/planning-areas/climate-sustainability/SiteAssets/Pages/Sustainability/Ann%20Arbor%20Biodigester%20Fs.PDF>

The Bell Kramer Neighborhood

Home to about a dozen households, this neighborhood is immediately adjacent to a former city landfill that has not been used since 1967. The first phase of an environmental assessment was conducted in 2012-2013. Volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), metals, benzo(a)pyrene, and methane gas were detected at higher levels than the state permits. These substances produce substantial health and environmental risks. Property owners were notified because contaminations could have been migrating through the neighborhood. In 2017 and 2018, indoor air was tested in some of the Bell Kramer homes, and concentrations of contaminants were within acceptable ranges for the residents to stay.

Land use planning is a critical component of mitigating and adapting to climate change. Density, walkability, and access to urban gardens and greenery are just some ways a city can curtail dependence of fossil fuels. Ypsilanti residents want to live in neighborhoods that are green, connected, and complete. Over two-thirds of respondents recorded that “completeness” is deciding factor when choosing where to live. The features of a “complete neighborhood” were decided by survey-takers, and most important to them was the presence of “parks, recreation, and/or open space (96%),” and the fourth highest priority is trees and/or community gardens (77%).

GOAL: Maintain and expand transportation options including the development of bicycle, pedestrian, and sharing networks.

Residents also see complete neighborhoods as physically connected so that streets safely accommodate bicyclists, pedestrians, public transportation passengers, and users of all ages and abilities. This was expressed in high response rates rating “sidewalks” (87%) and “public transportation options” (84%) as factors describing completeness of a neighborhood. Even though 64% of Ypsilanti residents commute to work alone in a personal vehicle,⁷⁰ improved

nonmotorized transportation infrastructure can make a difference in how people choose to arrive to other destinations. Residents generally support alternative modes of transit, even those who report that they do not use the service themselves. Residents are proponents of expanded bicycle and pedestrian networks and public transit service including the development of an Amtrak stop. When residents were asked what them from walking or riding a bicycle to destinations, they cited incomplete sidewalks or bicycle lanes, the condition of the nonmotorized infrastructure, and the difficulty in crossing some streets safely. Ypsilanti has shown its commitment to connectivity by coordinating with the Township and County on the Border to Border trail and the AATA to expand bus coverage and frequency.

GOAL: To incentivize energy efficient and socially responsible development

Motivated neighborhoods can establish “Eco districts” to concentrate focus on sustainability goals in a geographic area. This was proposed in the 2013 Master Plan, and the Zoning Ordinance has been updated to permit more components of an Eco district: community gardens, rain collection systems, and renewable energy projects. The City has enabled such developments, and while they cannot take on the lead on implementation, these changes support neighbors’ eco-friendly demonstrations. The next step would be for a group of neighbors to develop and agree to a set of performance standards, and, with the help of a Sustainability Commissioner liaison, look for funding and/or initiate smaller scale projects that meet their performance goals. Eco district performance goals could be tailored to the neighborhood but

⁷⁰ American Community Survey. 2017 5-Year Estimates. Table DP03.

aligned with City sustainability goals, for example, expanding tree canopy coverage or developing green houses in open space.

Sustainability Policy: Complete Neighborhoods

Transportation

City Ordinance No. 1156 provides for the planning, design, and construction of streets that offer appropriate access to all legal users and provide safe, accessible, comfortable, and efficient transportation options for people and goods in order to support the City's quality of life, economic vitality, and environmental sustainability. This is an important step in cutting vehicle miles traveled (VMT), as is coupling transportation routes with building density as the AAATA has done.

There is still much to be done in terms of reducing vehicle miles traveled. Undoubtedly, EMU is a primary traffic generator. A partnership between the university and the City to manage a bike-share and car-share program might limit how many trips students make by car. While it is hard to predict to what extent this will change behavior, an easy-to-use sharing system provides another option to close that "last mile" problem. The Ride also makes a good partner to encourage commuting by bus. The City and the DDA could partner with the Ride and local businesses to offer discounted transit passes to employees who bus to work to not only reduce VMT but also to reduce demand for parking in compact areas. A parking cash-out alternative is another possibility for employees that would otherwise drive and take a parking space for patrons. Strategic development of electric vehicle charging infrastructure will allow greener power alternatives for those cars which remain on the road.

Nonmotorized path enhancements also have the potential to change travel behavior. The City has identified intersections in the Master Plan that would slow down vehicular traffic and include pedestrian and bicycle improvements to create safer, multi-modal streets. Ypsilanti's commitment to safety as a guiding principle applies to the continuation of bicycle lanes on major thoroughfare and trunklines to protect bicyclists from sharing the road with fast moving vehicles. The timing and location are crucial to a connectivity strategy. When roads undergo repair is opportune to layer on topical improvement such as bicycle lanes or sidewalks. In terms of location, nonmotorized features should be installed where they connect to an expanding an existing network or build links between neighborhoods and job centers. Lastly, to protect their right to use the roads safely, police enforcement of bicycle and pedestrian safety would, over time, help build a reputation of balanced road use.

Land Use and Mobility

Land use and mobility planning go hand in hand. Reliable transportation, mixed-uses, and density are cornerstones of mobility. In that regard, Ypsilanti have a favorable combination. Permitting neighborhood-friendly stores that provide goods serving daily needs (convenience store, market) and personal services (hair salon, medical offices) in proximity to households makes destinations convenient by foot or bicycle. In Ypsilanti, 93% of residential parcels are within ¼ mile walk (and 100% are within ½ mile) from a small convenience retailer or service provider, based on 2015 SEMCOG land codes. This land use configuration has a huge impact, assuming that people walk to these locations when they can. The Urban Land Institute reviewed studies that show that compact suburban development reduces VMT by 12-18% compared to low-density suburban development.⁷¹ With that in mind, Ypsilanti should continue to prioritize infill development, converting central lots that bolster mobility for residents before

⁷¹ Urban Land Institute. "Land Use and Driving: The Role Compact Development Can Play in Reducing Greenhouse Gas Emissions." <https://uli.org/wp-content/uploads/ULI-Documents/Land-Use-and-Driving-Low-Res.pdf>

tending to the City's periphery. Along major corridors where the Ride traverses and the vehicular capacity permits, density bonuses for a mix of uses could strengthen nonmotorized access to goods and services.

Development

Ypsilanti residents' preference for green, connected, and complete neighborhoods are reflected in the US Green Building Council's LEED for Neighborhood Development standard as well as in Detroit's vision for "20 minute neighborhoods" and Kalamazoo's Imagine 2025 Master Plan, demonstrating an emerging trend in Michigan. The US Green Building Council's LEED for Neighborhood Development standard recognizes that neighborhoods can be designed to respond to the local impacts of global climate change and make significant advances toward a sustainable planet. The standards focus on achieving sustainability goals at a neighborhood scale, and align with Ypsilanti's broader sustainability goals:

- Lower operating costs and increased asset value
- Reduce waste sent to landfills
- Reduces VMT
- Increase energy and water conservation
- Provide more healthful and productive environments for occupants
- Reduce greenhouse gas emissions
- Promotes rebates, zoning allowances, and other incentives

Equity development in a complete neighborhood also includes housing choice. Ypsilanti has a considerable segment of the population with low earnings who need of affordable housing. The current stock of affordable units has waiting lists, leaving those in need in a financially precarious situation. The process for securing affordable housing is long and involves many parties. The City in conjunction with the Housing Commission can seek affordable housing development opportunities and identify parcels where they could locate in a neighborhood with access to services. Coupling subsidized housing and green development would be an exemplary sustainability project that unquestionably embraces the pillars of equity, environment, and economy. Because the City is largely built-out with no room for an entire new neighborhood, these standards could be applied to infill sites or on sites that have room to expand on their parcel.

Communication

Disaster Preparedness and Adaptive Responses to Climate Change

GOAL: Develop the datasets necessary to determine where disaster relief should be targeted

Extreme heat and cold events, heavy rainfall, flooding, and other extreme weather events are expected to increase over time as a result of climate change, and each will require a coordinated response among county, state, and federal levels of government amid a catastrophe. While sustainability-related actions will help mitigate these risks in the future, the City must help residents adapt to these increasing risks by expanding emergency preparedness and communication tools.

Extreme Heat and Cold

As GHG emission rates continue to rise, Michigan is expected to see up to a 5°F increase in average air temperature between 2041 and 2070. An additional 30 to 70 days per year, depending on the region, are expected to exceed 90°F. The amount of energy needed to cool buildings will also rise. There were 474 cooling "degree days" in 1990, 679 cooling degree days in 2000, and 1205 cooling degree days in

2019. Degree days can be a confusing and counterintuitive measurement. There can be more than 365 heating or cooling degree days in one year because degree days are measured relative to a base of 65°F (18°C) and reflect the *amount* of heating or cooling necessary at a facility. Above 65°F (18°C), it is assumed that a facility will need to be cooled, and below 65°F (18°C), it is assumed that a facility will need to be heated. Heating Degree Days (HDD) are the equivalent number of days a facility would need to be heated by 1 degree to accommodate the heating requirement. For example, one day where the temperature measures 80°F would be 15 Cooling Degree Days because it is 15 degrees above 65°F.

Extreme heat events are among the most harmful weather phenomena. They amplify ground-level ozone levels, which are associated with higher hospitalization rates for asthma, more severe allergic reactions, and premature deaths for people with heart and lung disease. Healthcare costs increase as a result of these negative health impacts. Heat events also put pressure on electrical distribution as people rely more on air conditioning and reduce grid reliability as a result of increased demand, and decrease energy efficiency and increase costs for rate payers. More generally, many types of seasonal businesses are impacted, from wineries to ski resorts.

Michigan will continue to experience extreme cold events as well, which disproportionately affect homeless people who are vulnerable to cold temperatures. The risk of illness increases for low-income individuals, the elderly, and those with chronic ailments who may be vulnerable to colder temperatures.

Heavy Rain and Flooding

Precipitation is projected to increase on average and to concentrate in more intense precipitation events, likely resulting in greater periods of both extreme flooding and extreme drought. An additional 2 to 3 inches of annual precipitation is expected for Michigan, and the number of days each year experiencing heavy rainfall is expected to increase by at least one day per year. These extreme weather events will impact the economy, disrupt the environment, and disproportionately impact vulnerable populations. Flooding puts residents and emergency response personnel in direct physical danger; increases pollution and waterborne illnesses; incurs expensive property damage; displaces households and businesses; creates damp conditions that spur the development of mold and reduce indoor air quality; stresses the capacity of aging sewer infrastructure and increases the risk it may be overwhelmed, forcing the release of untreated water into nearby water sources including those used for drinking; erodes banks and shorelines that support buildings and infrastructure; damages power lines, infrastructure, and vegetation; and disrupts power and transportation systems resulting in reduced productivity and profitability.

Sustainability Policy: Disaster Preparedness

The City has a dedicated page on its website to emergency preparedness that has a list of links and contact information for essential services. The City nor the County has a local hazard mitigation plan that includes what to do in case of extreme weather. In 2004, Washtenaw County worked with all local units of government to adopt resolutions that would support a Hazard Mitigation Plan to become eligible for FEMA grant funding for high-risk hazards. However, that year, FEMA grants focused on flooding mitigation instead and the Hazard Mitigation Plan was discontinued.⁷² Since then, the County conducted a risk assessment that put convective weather (severe winds, lightning, tornadoes, hailstorms) as the top threat.⁷³ The County also has an Emergency Operations Center which becomes the centralized coordinating point for large-scale emergencies. It is recommended that Ypsilanti participates in this

⁷² Email with David Halteman, Emergency Services Director. April 2020.

⁷³ Washtenaw County. Washtenaw County's Risk Assessment. <https://www.washtenaw.org/1760/Risk-Assessment-Hazard-Ranking>

process when the County updates the plan to a multilingual and universally accessible plan for emergencies that include climate change predictions.

Heat

Because not everyone has access to air conditioning, this is an equity issue. While cooling centers have been identified at the county-level, it is worth preparing now for increasing locations and hours for air-conditioned rooms. To start, conducting a heat island assessment will show the hottest areas of the City and provide guidance on where to locate cooling centers. Secondly, monitoring where ozone levels peak on hot days can indicate where “outbreaks” for respiratory problems may stem from and supplementary services to cooling centers could be targeted there.

Cool

Cold days also come with response improvements. When heating a household is too expensive for vulnerable populations to maintain, heating centers shall be distributed for households to get through the winters comfortably. Similar to cooling centers, there should be an expectation that established heating centers need to be revisited and likely expanded. On a municipal level, many processes are set in motion during rain and snow events. The shift in focus will be in capacity building and less so in wholesale change to established processes. For example, an apt overlap with goals of walkability is to improve snow removal from sidewalks and bicycle lanes so that weather doesn’t have to stop residents from nonmotorized travel. With the expectation of colder and hotter weather, infrastructure made of the same materials will not last as long. The abrupt and prolonged changes cause roads and sidewalks to crack more frequently. An investment in materials that withstand such swings should be investigated and incorporated in the CIP with a priority on longevity.

Outreach about Sustainability Goals and Practices

GOAL: The city of Ypsilanti plays a leading role in educating its residents on sustainability topics

Based on the collective prioritization results, residents see a need for education and outreach focused on sustainability-related services and programs. Most survey-takers gave the City a grade of a B or C on the guiding principle “communication is key,” indicating that there is room for improvement. The decentralization of services makes it difficult for residents to know where to start when they are in need and/or how they can get involved. Most survey participants were unaware of the City of Ypsilanti Climate Action Plan (69%), let alone the strategies that the City is using to adapt to and mitigate the impacts of climate change that require buy-in from residents. Because sustainability topics are wide-reaching, and there is no single dedicated department, inquiries are not directed to one person but are diffused amongst several. While the ultimate goal is to hire an Energy Manager, in the meantime, the City shall designate a point person that can direct questions and comments to the correct department.

Residents will be impacted by the effects of climate change and need easy access to resources that will help them respond to the negative impacts on their families and their health. Through its already established communication channels like the monthly newsletter and social media, the City can share its sustainability vision, efforts to fulfill it, and ways that residents can participate. Easy-to-follow tips for residents to reduce consumption could also be shared on a regular basis as a friendly reminder that it will require everyone to make change. Wide-scale reach would necessitate that Ypsilanti develop municipal marketing materials and have a plan for regularly schedule distribution.

When it comes to sustainability specifically, the public has also noted that sustainability education should place substantial emphasis on youth. Residents want to see a sustainability curriculum incorporated in

the school district, pulling on the strength of local experts to teach these lessons. This has yet to be done at a national or state level, but some local efforts have incorporated sustainability into youth's curriculum. In the foreseeable future, most of this education will have to remain extracurricular due to limited funding.

Sustainability Policy: Education and Communication

To increase the climate resiliency of residents, the City must make information easier to access, provide emergency response training for extreme events, and help residents take proactive measures to reduce GHG emissions. Community education is an important step in promoting adaptation and mitigation strategies on an individual and community level, and the City is in a good position to provide easily accessible and well-publicized information through its established channels. One practical adaptation action the City to take on would be the promotion of the Great Lakes Water Authority, and other helpful but unknown services, that provide direct assistance to low-income households who have trouble with paying water bills or making repairs to leaky plumbing. The hope is that as the City develops and disseminates informational materials that residents can access and rely on, a beneficial partnership will continue to be strengthened.

A federal grant was awarded to the Southeast Michigan Stewardship Coalition to educate students across nine schools, including one school in Ypsilanti, about climate resiliency. Discussion on this topic included identifying potential solutions to make communities more resilient through a community-based project. Ypsilanti Community High School students worked with City Council and the Sustainability Commission; all hope to forge a lasting partnership to complete more projects.⁷⁴

Working with the Sustainability Commission is the likely path forward for the City to educate its youth and residents on such issues. As the educational leader for sustainability initiatives, the Sustainability Commission can create and present a series of learning opportunities for energy savings and other assistance programs that lower monthly expenses and expose residents to new resources. Ideally, these sessions will be held at different venues throughout the City and focus on reaching the most vulnerable populations in need of home repair, utility assistance, and energy efficiency measures. A fun way to educate the community is to introduce a friendly competition. Competitions can be set up between city staff, businesses, schools, neighborhoods on any measure the Sustainability Commission wishes to teach. For example, a designated "zero waste" day for waste management or "commute challenges" for alternative transportation would entice people to modify their behavior and have other groups to discuss the challenges and benefits to it. Other ideas proposed by community members included energy treasure hunts, adopting catch basins or green infrastructure, and a "Bring Your Green to Work" day.

Action Plan

Adaptation & Mitigation Model

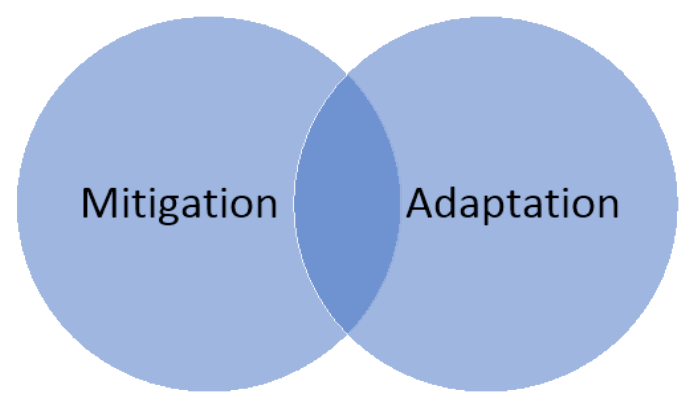
In practice, the actions that address the three pillars of sustainability fall into a common policy framework that differentiates "adaptation" strategies from "mitigation" strategies. Adaptation refers to actions that address the *effect* of the problem, but not the *root* of the problem. Adapting to climate change necessitates changing behaviors, systems, and our way of life *in response* to the results of climate change.

⁷⁴ Michigan Radio. "Centering the Classroom on Climate Resilience." December 2019. <https://www.michiganradio.org/post/centering-classroom-climate-resilience>

One example would be relocating electricity and communication lines from overhead to underground locations to prevent power outages during extreme weather.

Mitigating, or *reducing the risk of future changes* to the climate, necessitates dramatically reducing future GHG emissions and increasing the sequestration or storage of existing GHG in natural sinks such as forests or soil. While mitigation strategies will take decades to positively impact rising temperatures, reducing GHG emissions now will reduce future risk and make it easier to adapt to the future impacts of climate change. An example of a mitigation strategy would be increasing the deployment and utilization of renewable energy.

Where the two categories overlap is where resiliency is born – if an action can simultaneously mitigate negative effects of climate change and help a community adapt, then it rises to priority status. Because the tangible positive effects of mitigation will take the entire world’s coordination, not just the region’s, Ypsilanti’s focus on adaptation to the inevitable changes coming its way is the most prudent.



Energy

- Increased Energy Efficiency
- Renewable Energy
- Light Pollution

Appendix

Table X: Contamination and LUSTs by Census Tract

Census Tract	Sites of Environmental	Leaking Underground	Leaking Underground	Total
--------------	------------------------	---------------------	---------------------	-------

	Contamination	Storage Tanks (Open)	Storage Tanks (Closed)	
Tract 4108	8	2	13	23
Tract 4106	4	3	3	10
Tract 4107	1	1	4	6
Tract 4103	3	1	7	11
Tract 4110	2	2	4	8
Tract 4112	1	1	1	3
Tract 4109	1	1	2	4
Tract 4102	0	0	1	1
Tract 4111	0	0	1	1
Total	20	11	36	67

Source: Michigan Department of Environment, Great Lakes, and Energy, EnviroMapper

Action Plan Prioritization for Ypsilanti’s Sustainability Plan

ENERGY: Decrease government operation emission in support of attaining citywide net zero by 2030		
	Action	Term
1	Establish an Energy Manager position to be responsible for the following duties: • Improve knowledge of energy management among city staff and appointed officials among staff • Create a data-driven system that is replicable over time, and includes annual forecasts, benchmarks for energy use reductions, and an internal reporting protocol • Work with the Sustainability Commission to produce an annual report that highlights where emission reductions and procedural improvements have been made • Improve communications with facility managers, utility providers, and relevant contractors to resolve issues quickly • Increase outreach to and participation of industrial and commercial customers in renewable energy and energy efficiency projects • Research and utilize the most efficient equipment available	Mid
2	Continue to incorporate renewable energy into the energy portfolio of each government building including back-up generation	Mid
3	Re-establish the City’s revolving loan fund for energy efficiency projects.	Mid
4	Conduct a GHG inventory every 5 years using input from 2012 & 2018 findings in the ICLEI GHG framework	Long
5	Improve fleet fuel efficiency with clean diesel, alternative fuels, and electrification.	Long
6	Publicly report on progress made toward those energy goals.	Near
ENERGY: Decrease the community’s emissions by 171,310 metric tons of C02e by 2030		
	Action	Term

1	Work with the City of Ann Arbor to investigate bulk buying of renewable energy through the Community Choice Aggregation Legislation	Long
2	Purchase renewable energy credits (RECs) for City operations	Long
3	Promote state policies, incentives, grants, and Community Energy Management programs that encourage energy efficiency and renewable energy to property owners	Near
4	Promote Washtenaw County’s weatherization program for low-income homeowners.	Near
5	Work with community stakeholders to initiate an energy competition. The university and City can partner together to challenge another city and university to an energy reduction competition.	Near
6	Implement an inter-departmental site plan review process with attention to sustainability-related strategies such as energy use and efficiency, generation and offsetting of emissions, on-site water management and infiltration, etc.	Near
7	Investigate the feasibility of a microgrid	Near
8	Review and incorporate aspects of the International Dark Sky Model ordinance to reduce energy waste (i.e. motion activated lighting on municipal buildings)	Near
9	Participate in or sign-on to regional, national, or international commitments energy, climate, and sustainability including: • The Paris Climate Agreement • The Sierra Club’s “Ready for 100” pledge • The Global Covenant of Mayors for Climate and Energy.	Near
10	Develop an electric charging vehicle infrastructure strategy	Long
11	Create a green rental certification program to encourage energy-efficient improvements	Mid

12	Work with the HDC to incorporate historically compatibly fixtures that are dark sky compliant	Mid
----	---	-----

*with an Energy Manager

EARTH		
WASTE MANAGEMENT: Reduce the amount of waste generated in Ypsilanti that enters landfills		
	Action	Term
1	Expand recycling to public spaces and all City facilities by placing artful, educational, and engaging waste sorting stations throughout the community	Mid
2	Create a coordinated recycling system that has a one stop for difficult-to-recycle materials including electronics and refrigerant management	Long
3	Define Zero Waste for Ypsilanti using the Zero Waste hierarchy. Set a goal for City operations to be zero waste (excluding medical waste) by a specific date with annual benchmarks.	Near
4	Require government operations to use durable or compostable materials	Near
5	Implement a pilot program for a municipal kitchen compost system with high food-waste generators.	Mid
6	Increase access to curbside recycling services to multi-family units	Mid
7	Investigate a partnership with a commercial-scale compost operation	Near

8	Pilot curbside community composting services for leftover food	Mid
9	Conduct a waste audit to understand the baseline composition of the waste stream at the municipal operations and community level	Near
10	Investigate funding sources to bring down the cost of a biodigester	Mid
11	Implement an educational campaign on recycling and composting	Mid
12	Require that any events with a City permit provide for recycling, compost, and provide a discount for Zero Waste events	Near

	Action	Term
Biodiversity: Expand and protect natural habitats		
1	Create informational materials for property owners on preferred and prohibited plants	Near
2	Rezone Mansfield and Clark to a more protective zoning district	Near
3	Train inspectors to spot wildlife-friendly plants to prevent their removal	Near
4	Partner with the County to inventory land that could be nominated for NAPP	Near
5	Encourage warm light to protect insects	Near

Trees: Preserve and expand a resilient tree canopy		
1	Implement a tree preservation ordinance	Near
2	Increase and diversify the public tree stock according to the Community Forestry Management Plan	Long
3	Invest in tree maintenance	Long
4	Renew the City’s Arbor Day designation	Mid
5	Update street planting guidelines to prioritize tap roots species and vary pit size by species	Near
Soil Contamination: Eliminate new instances of soil contamination and responsibly deal with the legacy of existing polluted sites		
1	Continue to use the Zoning Ordinances to limit land uses that have a higher likelihood of contaminating soil	Near
2	Consult residents prior to the public hearing regarding rezoning as a tool to mitigate contamination	When applicable
3	Confirm sites of contamination with EGLE	Near
COMPLETE NEIGHBORHOODS		
Transportation: Maintain and expand transportation options including the development of bicycle, pedestrian, and sharing networks.		
	Action	Term

1	Implement a parking cash-out alternative benefit option for employees	Long
2	Prioritize transit-oriented development	Ongoing
3	Partner with the DDA and AATA to provide a discounted transit pass as an alternative to downtown parking permits	Mid
4	Encourage corporate sponsorship of transit passes and infrastructure to encourage employee bus and bikeshare ridership	Mid
5	Partner with Eastern Michigan University to create a bike-sharing program and car-sharing network	Mid
6	Make it easier for pedestrians and bicyclists to cross the street safely • Add bicycle lanes to major thoroughfares and trunklines • Retain the mix of uses within each corridor but allow them throughout the area. • Restore two-function to Cross, Huron, and Hamilton Streets. • Separate Cross and Washtenaw. Restore Harriet Street as the Main Street of adjacent neighborhoods.	
7	Coordinate with Townships and WCRC on Border to Border (B2B) trail development	Ongoing
8	Encourage police enforcement and legislative support for bike and pedestrian safety	Near
9	Improve neighborhood walkability by improving sidewalk connectivity and conditions. Prioritize the improvement of nonmotorized connections that link neighborhoods and job centers.	Long
10	Continue to support the development of the Amtrak station	Long

Development: Incentivize energy efficient and socially responsible development

1	Consider density bonuses on commercial corridors in exchange for developers meeting criteria that achieve city goals	Near
2	Incentivize US Green Building Council's LEED for Neighborhood Development standard for new development	Near
3	Develop a Green Business/Neighborhood Certification program	Mid
4	Seek affordable housing development and identify parcels where it can locate near services	Ongoing
5	Provide a Sustainability Commissioner liaison to a neighborhood interested in developing an eco-district	When applicable

WATER		
	Action	Term
Quality: Protect the watershed from further contamination		
1	Establish a Sensitive Features Overlay Zoning District along the Huron River and implement LID standards and chemical bans	Near
2	Invest in consistent enforcement for compliance to the Sensitive Feature Overlay	Mid
3	Connect homeowners to Washtenaw County rain garden services	Near

Flooding: Expand the City's capacity to deal with heavy rainfall to mitigate negative effects on people and property.

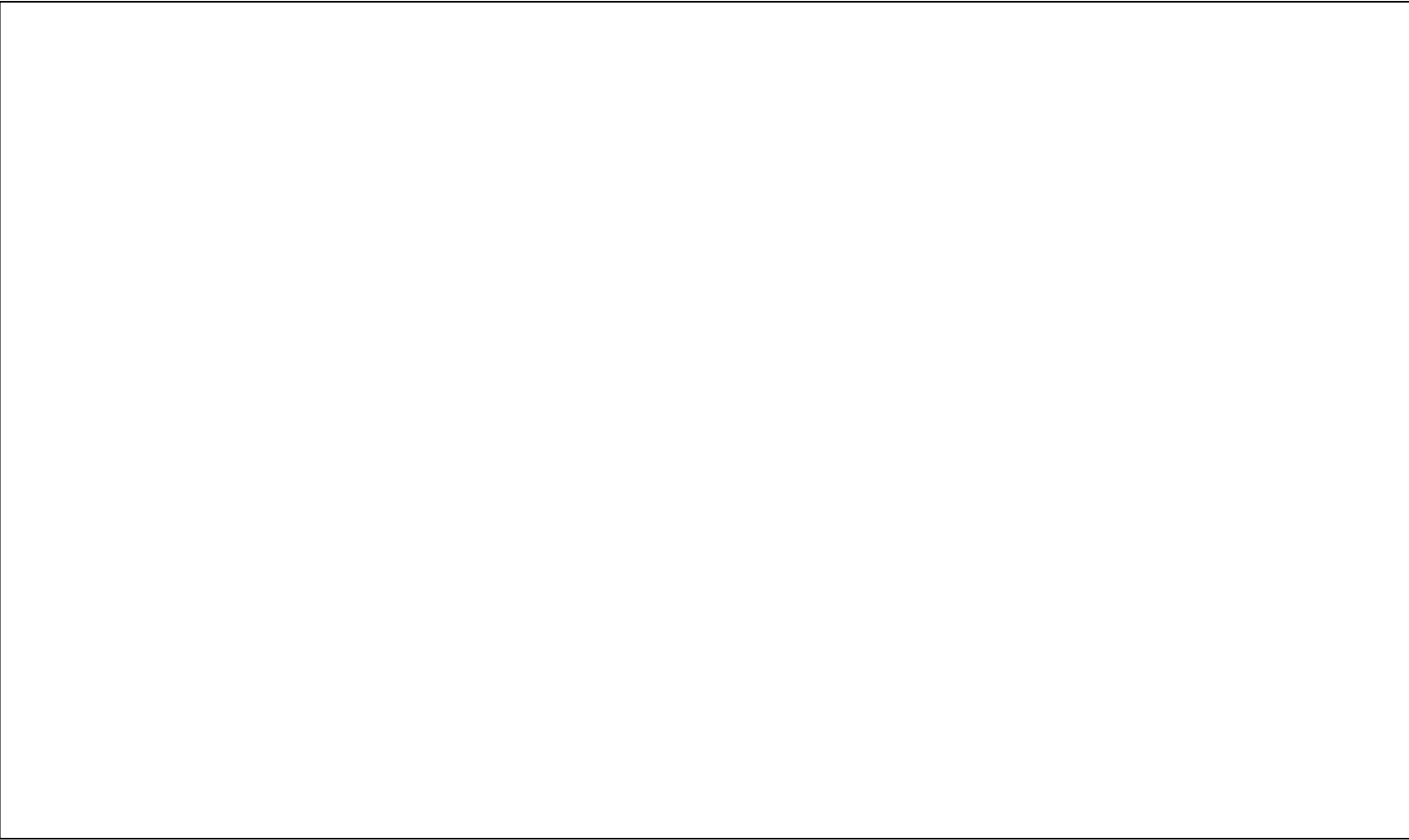
1	Incorporate capacity upgrades for grey stormwater management into the CIP based on predictions for greater precipitation	Mid
2	Update the flood maps based on climate projections and changes to the river channel	Near
3	Investigate an equitable stormwater fee schedule that encourages converting impervious to pervious surfaces and proper use of rain barrels	Mid
4	Ban basements or enforce floodplain standards its boundaries where the soil has limited capacity to handle stormwater	Near
5	Develop a Stormwater Management Plan	Near
6	Continue to financially support the removal of the Peninsular Dam	Ongoing

Efficiency: Promote resources for water conservation and testing to ensure access to clean water and efficiency upgrades

7	Work with YCUA to develop home and business water efficiency financing programs	Near
8	Promote Great Lake Water Authority program WRAP to perform conservation audits and funds for repairs to help reduce low-income households reduce water bills	Near
9	Research the status of wells and provide resources for testing water quality to property owners	Near

EDUCATION AND COMMUNICATION		
	Action	Term
Learning: The City of Ypsilanti plays a leading role in educating its residents on sustainability topics		
1	Implement an educational series about energy efficiency in different venues with a focus on teaching the most vulnerable populations about resources that help reduce their utility bills	Near
2	Sustainability Commissions shall continue to work with sustainability-related organizations to develop and offer in school guest lectures, field trips, and other learning opportunities with local schools	Ongoing
3	The city determines a designated point person to direct sustainability-related questions or comments to the correct department	Near
4	Promote the city's energy, climate, and sustainability vision through the establish monthly newsletter and develop other municipal marketing materials to update residents on city efforts, key sustainability topics, and easy-to-follow tips at home	Near
5	Organize competitions between municipal employees, business owners, and neighborhoods that promote sustainability-focused activities: • “Bring Your Green to Work,” • Energy treasure hunts, • Adopting catch basins or green infrastructure, • Zero waste days, • Smart commute weeks, and challenges to bike, walk, or take public transit to work.	Mid

Disaster Preparedness: Develop the datasets necessary to determine where disaster relief efforts should be targeted		
1	Conduct an Environmental Justice analysis that identifies vulnerable populations and structures that are disproportionately impacted by climate change	Near
2	Conduct an urban heat island assessment	Near
3	Work with the County to expand local air quality monitoring system	Near
4	Investigate infrastructure materials that can weather extreme weather	Near
5	Implement renewable backup power systems for areas of refuge and emergency facilities	Mid
6	Partner with Washtenaw County to expand emergency preparedness and communication tools including a multilingual and universally accessible plan that includes climate change predictions	Near
7	Work with the County to identify additional warming and cooling shelters	Near
8	Require occupied residential rental units to have one air-conditioned room	Near
9	Review response protocol and update where needed to respond to severe storm events	Near
10	Improve snow and ice response for sidewalks	Near





**ANN ARBOR'S
LIVING CARBON NEUTRALITY PLAN**
APRIL 2020

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WELCOME LETTER

Friends –

Even during the COVID-19 global pandemic, we face no greater threat than climate change.

It already affects us locally in the significant increase in precipitation falling on our community compared to previous years. We feel it in increasing temperatures and greater weather volatility. We see it in the spread of disease and infection. We know it's in disruptions to our supply chains, our agricultural systems, and our Great Lakes. We anticipate it in regard to the movement of people from vulnerable regions to areas with less susceptibility to climate disruption.

These existing and future changes will cause significant impacts to our public health, safety, general welfare, local economy, transportation networks, natural environments, and our overall quality of life. We cannot solve this crisis on our own, but in an era of national retreat, state and local communities must do their part. It is because of this that the Ann Arbor City Council unanimously declared a climate emergency and directed the City to immediately begin crafting an aggressive and living strategy to achieve community-wide carbon neutrality by 2030.

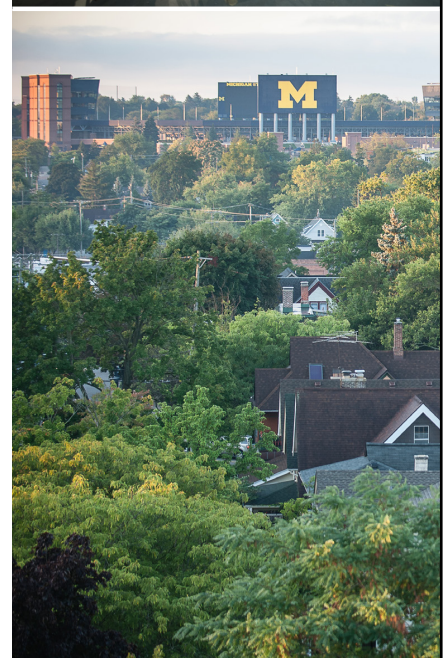
We recognize that this is an ambitious goal, but we know that Ann Arborites have the passion, intellect, creativity, and the compassion necessary to see it met. To be clear, achieving carbon neutrality within a decade will necessitate that we all work together. It will necessitate collaboration, innovation, and disruption. If we are to achieve our goal, Ann Arbor 2030 must be vastly different from Ann Arbor 2020.

As the following pages describe, carbon neutrality means that we must adopt new land use strategies and break our dependence on internal combustion engine vehicles. It means that we must power our homes, businesses, vehicles, and recreational sites with 100% renewable energy. It means that we must change the way we interact with materials and resources. It means that we must reinvest in our relationships with our vulnerable neighbors, elders, and youth. We must rethink an Ann Arbor that is open and accessible to all.

Every person -- every home owner, renter, student, visitor, community member, business owner, worker, youth, and elected leader has a significant role to play in achieving community-wide carbon neutrality. This living A²Zero Carbon Neutrality Plan tells us what we need to do and begins to detail how we get there. Over the coming months and years, the City of Ann Arbor and our 60+ partner organizations will work with community members and stakeholders to get the job done. We hope that you will join us because together, we can achieve a rapid and equitable transition to community-wide carbon neutrality.

Sincerely,

Christopher Taylor
Mayor



EXECUTIVE SUMMARY



The global climate is changing and nowhere are the effects felt more acutely than at the local level. Moreover, the growing economic, social, political, environmental, and cultural impacts associated with a changing climate are causing immediate and long-term damages to our society, public health, safety, and our overall quality of life.

In light of these realities, on November 4th, 2019, Ann Arbor City Council unanimously adopted a Climate Emergency Declaration, stating that climate change is one of the most important issues of our time and that responding to the climate crisis necessitates a mobilization on par with those activated during times of disaster. In passing the resolution, the Council also committed to charting a path for how the entire Ann Arbor community could achieve carbon neutrality by the year 2030.

This is an ambitious goal, but one that aligns with the values and sentiments of Ann Arborites. Ann Arbor is a community of great strength, leadership, intellect, compassion, and ability. It is only by unlocking the full potential in all of these areas that we will be able to achieve carbon neutrality within the next decade.

This document outlines the path needed to achieve a just transition to carbon neutrality, community-wide, by the year 2030. This was created with input from thousands of Ann Arborites over the course of an intensive four month planning process. The result is this living A²Zero Carbon Neutrality Plan which centers around six core strategies and one catch-all strategy:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Forty-four actions have been identified to fully implement these seven strategies. Each of these actions is outlined in the following pages. Combined, these actions get us to carbon neutrality, based on our current greenhouse gas emissions profile. By necessity, this Plan is considered living since many things, can and likely will, change in the coming years.

To achieve carbon neutrality, the entire Ann Arbor community must eliminate 2.1 million metric tons of carbon dioxide equivalent emissions annually – this is the quantity of greenhouse gas emissions we emitted, as an entire community, in 2018. Although the City recognizes the importance of upstream and embedded emissions, this figure does not include emissions associated with the production of the goods and services Ann Arborites

EXECUTIVE SUMMARY

use. As the science and policy around carbon neutrality grows, we will continue to look for and contribute to methodologies to calculate community-wide upstream and embedded emissions in future inventories.

For now, this Plan focuses on eliminating the 2.1 million metric tons of carbon dioxide equivalent that primarily come from natural gas, electricity, gasoline, coal, and diesel used by residents, visitors, students, and businesses in Ann Arbor. Importantly, the seven overarching strategies proposed in this Plan are intrinsically linked. This means that care was taken to understand how given actions work together to achieve carbon neutrality. This also means that removing one action from consideration has a more significant impact than is denoted on any one given actions' summary page. As such, caution should be taken before removing any given action from consideration without fully understanding how it interacts with and informs other actions proposed in this Plan.

Where available, cost estimates are also provided for each action in the Plan. These cost estimates integrate soft, physical, and human capital costs associated with various actions. All costs estimated are incremental, meaning that the dollars allocated for each action are additional to resources, if relevant, already supporting a given action. In our analysis, the value of externalities was often calculated for information purposes. We did not, however, include those values in each individual cost calculation.

Additionally, we have identified an array of co-benefits associated with each action in the Plan. In total, 10 co-benefits were identified, including:



Supports local economy



Improves public health



Produces local energy



Cost savings accrued



Improves air quality



Supports biodiversity preservation



Creates jobs and/or develops workforce



Benefits the most vulnerable



Improves local resilience



Scalable or transferable to other communities



EXECUTIVE SUMMARY

Combined, the seven overarching strategies and accompanying 44 actions outlined in this Plan are projected to reduce emissions by 2.1 million metric tons of carbon dioxide equivalent and cost just over \$1 billion additional dollars over the next ten years (Figure ES-1; ES-2; and ES-3). As we move forward with implementation, we will make tough decisions about how to fund and finance the actions outlined in this Plan.

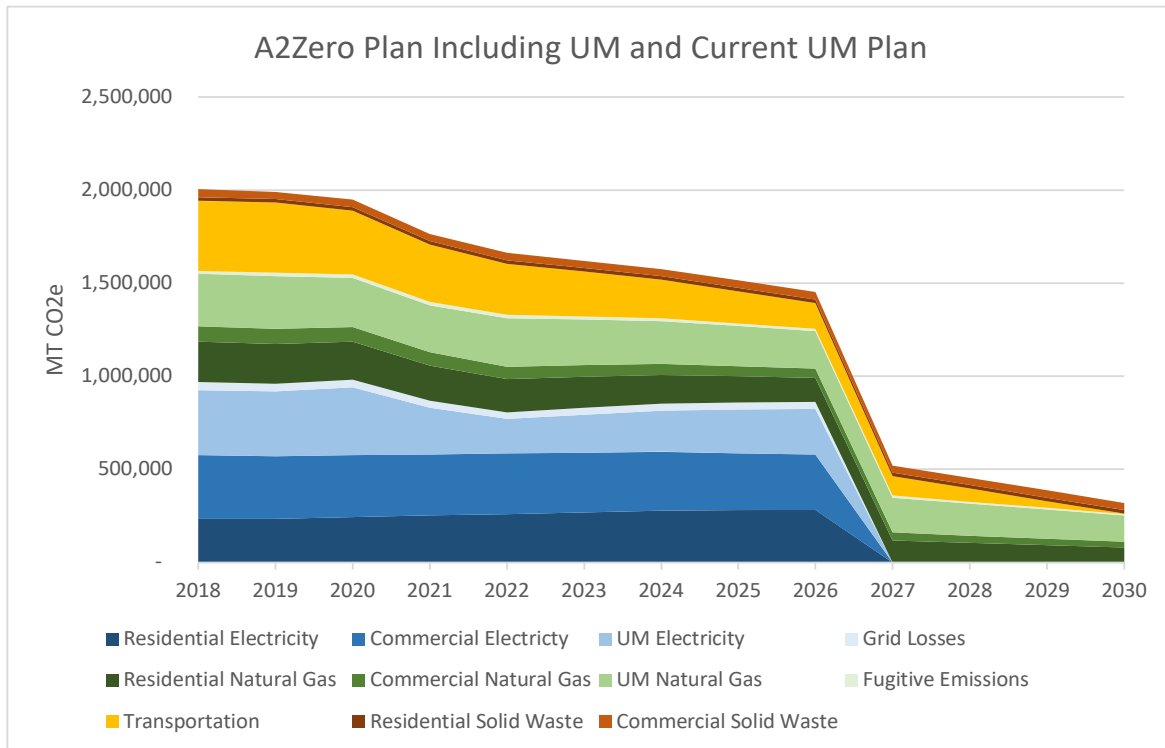


Figure 1: A “Win Scenario” outlining one possible path towards achieving carbon neutrality by 2030. The actions outlined in this Plan are centered on achieving this “win scenario”. This “win scenario” assumes that the University of Michigan mirrors the actions of the City.



EXECUTIVE SUMMARY

However, the University is currently undertaking their own carbon neutrality planning process so these assumptions will change once more information is available. Overall, this Plan is considered living and iterative, meaning that changes to this “win scenario” will be necessary over time.

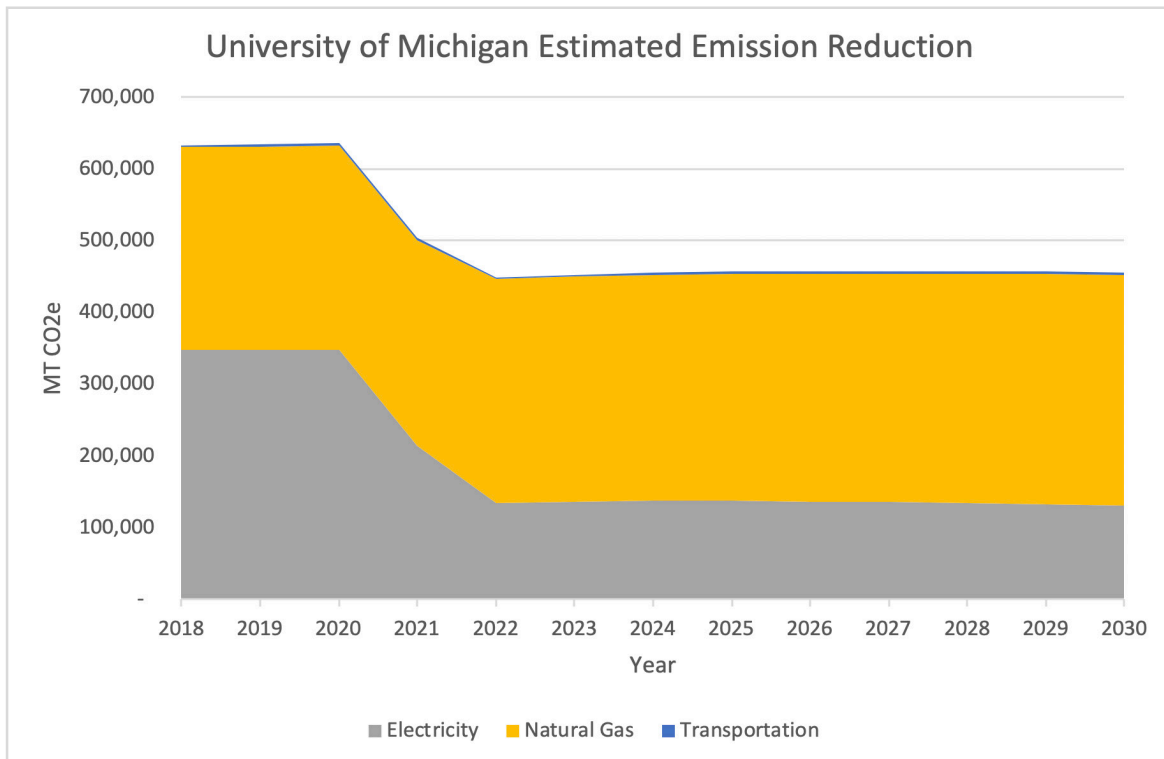


Figure 2: Summary of the University of Michigan’s current strategies to reduce their emissions over the next two years. The University of Michigan is currently developing recommendations to achieve carbon neutrality by an undetermined date. Since the University’s Plan was not finalized by the time the City’s Plan was drafted, their participation in the actions outlined in this Plan was modeled. An update will be provided to this Plan once the University has formally adopted a path towards carbon neutrality. For now, this graph shows the University’s currently projected emissions reduction activities.

One of the most pressing first steps in implementing this strategy is ensuring we have the human capital needed to immediately begin taking action. Models run as part of this analysis showed that a minimum staffing of 15 full time equivalent employees are needed, combined with a varying number of consultants, to fully implement this Plan. Not surprisingly, the more physical staff that are focused on the Plan, the more likely the Plan is to succeed. As such, decisions will need to be made not only about how best to fund the actions outlined in this Plan, but how best to build the human capital needed to design and support implementation of the Plan. Guiding this work as a living A²Zero Investment Plan, A²Zero Prioritization Framework, and an A²Zero Governance Model.

Achieving a just transition to carbon neutrality, community-wide, by the year 2030 is audacious, ambitious, and inspirational. This Plan outlines a concrete path for how we can immediately make progress towards that goal. Time is of the essence if Ann Arbor is to seriously achieve this goal. From the engagement we’ve already seen with A²Zero, we know City employees, partner organizations, technical advisors, neighborhoods associations, businesses, and members of the public stand ready to take this audacious goal and turn it into a reality. The time to start is now.

ACTION SUMMARY TABLE

STRATEGY 1	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Community Choice Aggregation	\$3,245,000	784,000	35.8%	\$4	AIR; \$\$; EQU; SCALE
Bulk Purchase of Renewables	\$605,000	85,000	3.9%	\$7	LOCAL; NRG; AIR; JOBS; RES; \$\$; SCALE
Community Solar Program	\$205,000	11,500	0.5%	\$18	LOCAL; NRG; AIR; JOBS; RES; \$\$; EQU; SCALE
Landfill Solar Project	\$80,000	23,000	1%	\$3.5	LOCAL; NRG; AIR; SCALE
STRATEGY 2	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Home & Business Electrification	\$7,100,000	362,200	16.5%	\$ 20	LOCAL; AIR; JOBS; HEALTH; SCALE
Bus Electrification	\$86,000,000	13,800	0.6%	\$ 5,839	LOCAL; AIR; RES; HEALTH; EQU
Bulk Purchase EVs	\$700,000	122,900	5.6%	\$6	AIR; JOBS; RES; HEALTH; \$\$; SCALE
Private EV Fleets	\$123,000	Not Calculated			AIR; RES; \$\$; HEALTH; SCALE
City EV Fleet	\$4,000,000	1,100	0.05%	\$3,636	AIR; JOBS; RES; HEALTH; \$\$; SCALE
EV Infrastructure	\$42,000,000	Not Calculated			AIR; JOBS; HEALTH; SCALE
STRATEGY 3	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Bulk Purchase of Energy Efficiency	\$950,000	242,500	11.1%	\$ 4	LOCAL; AIR; JOBS; HEALTH; \$\$; EQU; SCALE
Building Code Requirements	\$1,935,000	48,300	2.2%	\$ 40	LOCAL; JOBS; RES; \$\$; EQU; SCALE
LED Lighting	\$3,140,000	2,600	.1%	\$1,208	AIR; \$\$
Benchmarking	\$2,370,000	Not Calculated			JOBS; \$\$; SCALE
Loan Loss Reserve	\$1,578,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; \$\$; EQU; SCALE
Energy Concierge & Community Education	\$820,000	Not Calculated			JOBS; \$\$; EQU; SCALE
Net Zero Energy Affordable Housing	\$800,000	400	0.0%	\$2,000	LOCAL; NRG; AIR; JOBS; RES; HEALTH; \$\$; EQU
Green Rental Housing Program	\$530,000	Not Calculated			LOCAL; AIR; JOBS; RES; HEALTH; \$\$; EQU; SCALE
Green Business Challenge	\$700,000	Not Calculated			LOCAL; NRG; AIR; JOBS; RES; \$\$; SCALE
Aging in Place Efficiently	\$155,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; \$\$; EQU
Weatherization Expansion	\$1,550,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; \$\$; EQU

KEY					
EQU	Benefits the most vulnerable	RES	Improves local resilience	LOCAL	Produces local energy
COST	Cost savings accrued	HEALTH	Improves public health	ENV	Supports biodiversity preservation
\$\$	Supports local economy	SCALE	Scalable or transferable to other communities		
AIR	Improves air quality	JOBS	Creates jobs and/or develops workforce		

ACTION SUMMARY TABLE

STRATEGY 4	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Non-Motorized Plan	\$2,400,000	60,400	2.8%	\$40	AIR; RES; HEALTH; \$\$; EQU
Local and Regional Transit	\$656,780,000	93,200	4.3%	\$7047	LOCAL; AIR; JOBS; RES; HEALTH; \$\$; EQU
Park and Ride	\$170,000,000	28,400	1.3%	\$5,986	AIR; EQU; SCALE
Increase Housing Diversity	\$250,000	2,200	0.1%	\$114	LOCAL; AIR; RES; SCALE
Mixed-Use Zoning	\$365,000	Not Calculated			LOCAL; AIR; RES; HEALTH
Parking Rates	\$4,500,000	Not Calculated			LOCAL; AIR
STRATEGY 5	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Year Round Composting	\$26,000,000	400	0.0%	\$65,000	LOCAL; NAT; JOBS; SCALE
Commercial Recycling	\$18,400,000	5,600	0.3%	\$3,286	JOBS; SCALE
Sustainable Material Use and Reuse	\$270,000	Not Calculated			LOCAL; ERS; HEALTH; \$\$; NAT; EQU
Circular Economy	\$270,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; \$\$; NAT
Plant-Based Diets	\$208,400	Not Calculated			HEALTH; NAT
Refrigerant Recycling	\$179,400	Not Calculated			JOBS; HEALTH
STRATEGY 6	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Resilience Hubs	\$5,025,000	2,500	0.1%	\$2,010	LOCAL; NRG; RES; HEALTH; EQU; SCALE
Neighborhood & Youth Ambassadors	\$350,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; EQU; SCALE
Tree Canopy	\$1,160,000	450	0.0%	\$2,578	AIR; RES; HEALTH; NAT; EQU; SCALE
Neighborhood Asset Mapping	\$300,000	Not Calculated			LOCAL; RES; EQU; SCALE
Emergency Kits	\$350,000	Not Calculated			RES; HEALTH; EQU; SCALE
Sensors and Data Monitoring	\$300,000	Not Calculated			RES; HEALTH; \$\$; NAT; EQU; SCALE
STRATEGY 7	Total Costs	GHG Reduction	%total emissions	\$/ton	Co-Benefits
Equity Programs	\$200,000	Not Calculated			LOCAL; RES; EQU
SA2T Grant Program	\$1,000,000	Not Calculated			LOCAL; RES
Internal Carbon Tax	\$75,000	Not Calculated			LOCAL; NRG; RES; \$\$; SCALE
Offsets	\$9,440,000	298,500	13.6%	\$32	SCALE
Total	\$1,056,408,800	2,188,950	100.0%		

Figure 3: Summary of Strategies, Actions, Cost, and Co-Benefits for Proposed Actions in the A²Zero Plan. Estimates incorporate engagement with the University of Michigan.

INTRODUCTION

In November 2019, Ann Arbor City Council passed Resolution 19-2103: A Resolution in Support of Creating a plan to Achieve Ann Arbor Community-Wide Carbon Neutrality by 2030. In this Resolution, City Council called on the City to work with the public to create a living plan for achieving carbon neutrality, and to present that plan by Earth Day 2020.

To initiate this work, the Office of Sustainability and Innovations launched A²Zero: the City's carbon neutrality planning and implementation initiative. From the outset, A²Zero was designed to be iterative, transparent, failure-positive, and grounded in justice and equity. A²Zero was crafted so as to have extensive and broad public input and engagement, to be technically robust, to be visionary, and to be inclusive.

Achieving a just transition to carbon neutrality, community-wide, by 2030 will necessitate action from all members of our community. It will necessitate some subtle as well as some significant changes to our community. Not everyone will be excited about every change. But we know the goal – carbon neutrality – is a scientific imperative and one that Ann Arborites are ready to embrace.

But what does carbon neutrality mean? Simply defined, carbon neutrality is reducing the emissions our community puts into the air down to zero, through actions that minimize output and/or by purchasing greenhouse gas emissions offsets. Ann Arbor regularly conducts a greenhouse gas emissions inventory to track our emissions. From this, we know that community-wide emissions, as of 2018, were 2.1 million metric tons (Figure 4). This means that we have to devise a plan to reduce emissions by 2.1 million metric tons over the next 10 years.

Simultaneously, we need to ensure that we continue preparing our community for the impacts of climate change that are already here, as well as those projected to come. For example, we already know that:

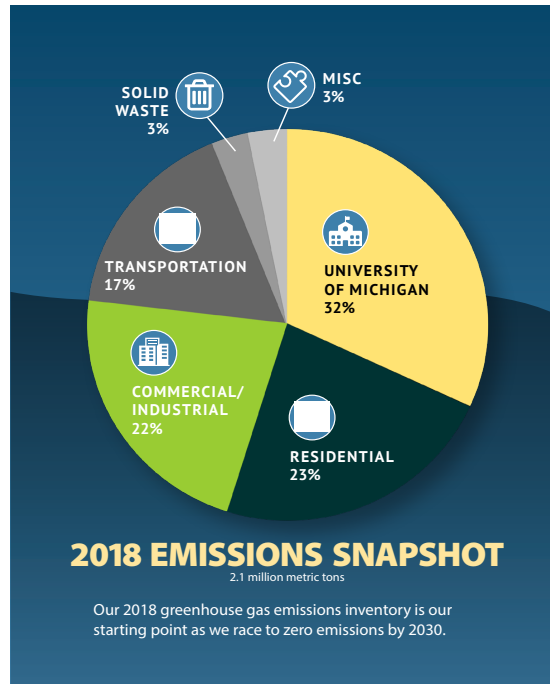


Figure 4: 2018 Greenhouse Gas Emissions by Sector.

- The average annual temperature in Ann Arbor has already increased nearly 1°F since the 1900s. And temperatures are expected to rise by 3–7°F more by 2050.
- Ann Arbor is projected to have 12–36 more days per year above 90°F by 2050 and 30–42 more by end of the century.
- Average annual precipitation has increased by 44% since the 1950s and continues to rise.
- The total amount of rain falling during extreme events has increased by 37% since 1981.

Given these realities, A²Zero was designed to develop actions that change how we manage the unavoidable impacts of climate change by ensuring we invest in the resilience of our people and place, while avoiding the unmanageable impacts of climate change by doubling down on our efforts to reduce greenhouse gas emissions in an effective and timely manner. And, at the core of all of this work is equity; ensuring that our work does not disproportionately burden our low-income, minority, and frontline populations (Figure 5). This is A²Zero.

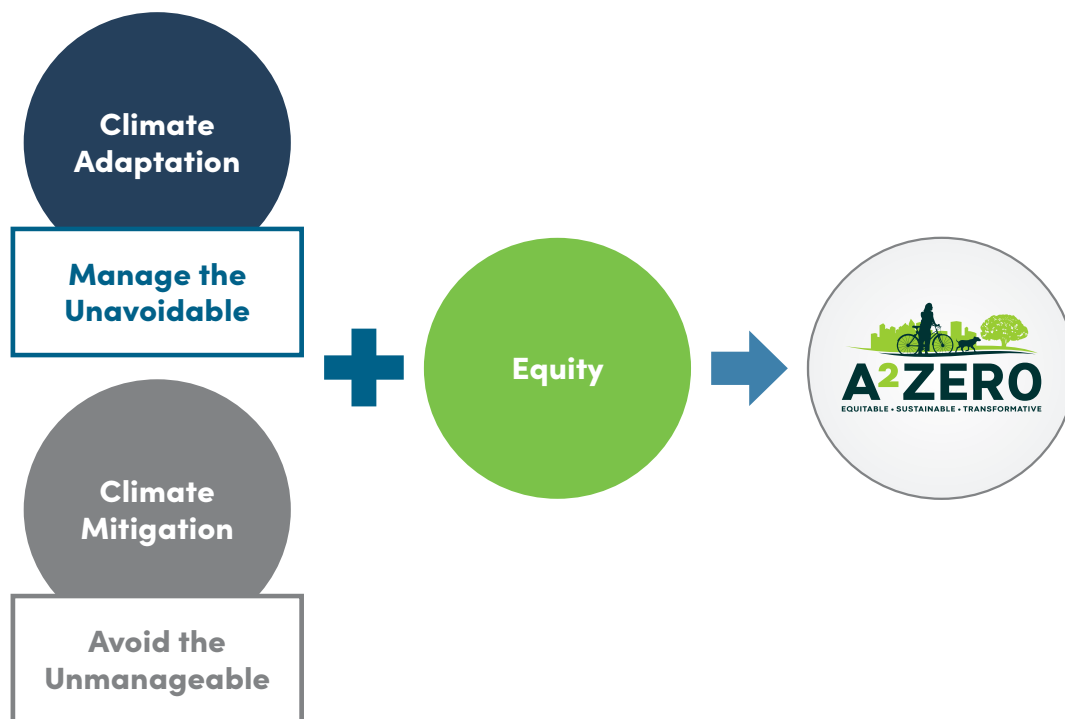


Figure 5: The Core Components of A²Zero.

A²ZERO VALUES

Three overarching values are fundamental to and guide the A²Zero initiative: Equity, Sustainability, and Transformation. The table below highlights what each of these values mean and what characteristics were applied to integrate these values into the A²Zero.

	Equity / Equitable	Sustainability / Sustainable	Transformation / Transformative
Definition	Ensuring everyone gets what they need to succeed based on where they are and where they need to go.	Capable of enduring, able to be sustained in perpetuity. Meeting the needs of the present without jeopardizing the ability of future generations to meet their own needs.	Causing a major change to something or someone, especially in a way that makes it or them better.
Characteristics	• Transparent • Community-Led • Inclusive • Prioritizes Frontline Populations	• Living / Iterative • Holistic	• Failure-Positive • Diversified • Accessible to All

A²ZERO MISSION

The A²Zero mission is the same as the City of Ann Arbor's mission: deliver exceptional services that sustain and enhance a vibrant, safe, and diverse community.

A²ZERO VISION

A²Zero strives toward one unifying vision: Together, creating and implementing a just transition to carbon neutrality, community-wide, by the year 2030. This vision guides all things related to A²Zero.



A²ZERO STRATEGY

Combining the A²Zero values, mission, and vision allowed us to land on seven overarching strategies that are essential to and make up the backbone of the A²Zero Carbon Neutrality Plan:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Public input, guidance from technical advisory committees and peer communities, combined with staff expertise determined that 44 specific actions were needed to fully achieve the seven strategies outlined above. The majority of this Plan outlines these specific actions and how we, as a community, can immediately get started working towards carbon neutrality.

A²ZERO PLANNING PROCESS

Ann Arbor has been working on climate action since the early 2000s. A²Zero builds upon nearly two decades of planning, action, and local leadership. The City initiated A²Zero on November 13th, 2019 with a deadline of plan completion by mid-March 2020 – an incredibly accelerated, four-month creation period. What’s unique about this Plan is the urgency and speed with which this Plan was created. In this four month period, the Ann Arbor Office of Sustainability and Innovations mobilized dozens of community partners and volunteers, thousands of members of the public, dozens of technical advisors, and peer communities to provide input into this Plan.

THE PROCESS



This reminder of this section provides detail on the planning processes undertaken to arrive at this living A²Zero Carbon Neutrality Plan.

A²ZERO’S FIVE PILLARS OF PLANNING

To complete a holistic, comprehensive, and realistic carbon neutrality plan, the Office of Sustainability and Innovations designed a planning process that rests on five pillars:

1. Public Engagement
2. Technical Advisory Committees
3. Partner Support
4. Staff Expertise
5. Peer Learning and Literature Review

PUBLIC ENGAGEMENT

Public engagement is at the heart of A²Zero. Three primary means of public engagement were undertaken in order to create this Plan: 1) public events; 2) public surveys; and 3) regular communication via traditional means and social media. In terms of public events, staff in the Office of Sustainability and Innovations hosted 68 public events between November 13th, 2019 and March 12th, 2020 (Appendix 1). Public events focused on engaging underrepresented constituencies and leveraging partner networks to reach as wide of a swath of the community as possible. Partner organizations also encouraged to their members to take the three surveys as part of the planning process. Finally, the City leveraged its social media channels and partner networks to let people know about events, opportunities for feedback, and to share general information about the A²Zero initiative.

Three public surveys were administered as part of A²Zero:

Survey 1: Gathered ideas from the public about what they would like to see in the City's carbon neutrality work.

Survey 2: Collected feedback on which ideas the public supported to reduce greenhouse gas emissions as well as how the City should fund carbon neutrality efforts.

Survey 3: Focused on identifying what stakeholders need to support implementation of the final carbon neutrality strategy.

TECHNICAL ADVISORY COMMITTEES

Technical advisory committees (TACs) were established to ensure that experts within the community could help identify what would technically be needed to achieve carbon neutrality. Four TACs were established: 1) energy; 2) mobility; 3) resource reduction; and 4) adaptation and resilience. Over 80 individuals volunteered their time as technical advisors on at least one of the four committees. Technical advisors helped identify potential actions, evaluate actions (including those recommended by the public), and create a prioritized list of candidate strategies for potential inclusion in the final Plan (see Appendix 2 for TAC meetings).

PARTNER ORGANIZATIONS

To support outreach and engagement, as well as the eventual implementation of the A²Zero, the Office of Sustainability and Innovations sought partner organizations. Partner organizations had to agree to co-host a carbon neutrality event with the Office, share information about the initiative with their membership/networks, and to share their logo on partner messaging materials. As of early March 2020, 67 organizations had signed up to be partners of A²Zero, including:

The National Wildlife Federation; The Neutral Zone; Community Action Network; Citizens Climate Lobby - Ann Arbor; The Ecology Center; The Ann Arbor 2030 District; Interfaith Council for Peace and Justice; Michigan Environmental Council; Washtenaw 350; Ann Arbor Area Elders Climate Action Chapter; The American Institute of

Every month, from December – March, a partner messaging kit was developed and circulated to make it easy for partners to share updates about A²Zero with their networks.

Architects Huron Valley Chapter; The University of Michigan; Washtenaw Climate Reality; Building Matters Ann Arbor; Michigan League of Conservation Voters; Sierra Club Huron Valley Group; A2 Climate Mobilization; Leslie Science and Nature Center; The Hands on Museum; Michigan Climate Action Network; Ann Arbor/Ypsilanti Regional Chamber; Ann Arbor Housing Commission; THRIVE Collaborative; Michigan Interfaith Power and Light; Washtenaw County Democrats; American Society of Adaptation Professionals; Washtenaw Bicycling and Walking Coalition; Colonial Square Cooperative; Walker Miller Energy Services; United Way of Washtenaw County; Lean and Green Michigan; Washtenaw Housing Alliance; Citizens Climate Lobby - UM Chapter; Forest Hills Cooperative; Ann Arbor Meals on Wheels; International Brotherhood of Electrical Workers Local 252; Ann Arbor Center for Independent Living; UM College Democrats; Students for Clean Energy; Great Lakes Renewable Energy Association; UM Climate Action Movement; Washtenaw Area Apartment Association; Washtenaw County; The Ride;

Ann Arbor SPARK; National Association for the Advancement of Colored People–Ann Arbor Chapter; Ann Arbor Public Schools; Ann Arbor Indivisible; University of Michigan President’s Commission on Carbon Neutrality; Washtenaw County Food Policy Council; Huron Valley Democratic Socialists of America; Bee Safe Ann Arbor; City of Ypsilanti; Ann Arbor Summer Festival; Ann Arbor District Library; Pesticide-Free Ann Arbor; Slow Food Huron Valley; Common Cycle; Earth Sciences; Natural Resources Defense Council; Ann Arbor Main Street Association; Washtenaw Optimal Wellness; Downtown Development Authority; Mindful City Ann Arbor; and The Old Fourth Ward.

STAFF EXPERTISE

Staff expertise and research and analysis of published carbon neutrality literature, including Project Drawdown, were an integral component of planning. This included reviewing historical planning initiatives within the City, identifying existing successful initiatives, and reaching out to staff across the City to round out planning and engagement aspects of A²Zero.

PEER LEARNING AND LITERATURE REVIEW

A key piece of our work was reaching out to and learning from peer communities working on carbon neutrality. This involved reading other community plans, talking to peer community liaisons, and researching key recommendations on community carbon neutrality from peer reviewed and technical sources.

OTHER

In addition to the aforementioned activities, the Office of Sustainability and Innovations also:

- Created a website to track activities around A²Zero: www.A2Zero.org
- Created a listserv where stakeholders could continue to learn about A²Zero
- Created a meeting-in-a-box kit that included materials so individuals could host their own A²Zero events

The meeting-in-a-box toolkit includes the following:

- Guide on how to host your own A²Zero meeting
 - A²Zero slide deck with talking points, including discussion questions
 - A terminology sheet
 - A²Zero overview sheet with is a 1-page document that summarizes the A²Zero process and provides a snapshot of the initiative
 - Climate Change Overview – which is a 1 page document that introduces folk to the existing and projected climate change impacts in Ann Arbor
 - Sign-In sheet to track the individuals attending an event
 - Links to relevant A²Zero surveys
 - Event results form to gather feedback about the event
 - Trivia questions to help make events more interactive and fun
 - Photo release form in case anyone was taking photos they intended to share
- Hired a communications firm to create a brand for the City’s carbon neutrality work, through which A²Zero emerged.

- Worked with Elevate Energy to assess the greenhouse gas reduction potential and costs associated with each action included in the final Plan.
- Created a [1-page fact sheet](#) about A²Zero and the City's carbon neutrality work.
- Created a [1-page document](#) summarizing the different sectors included in the City's carbon neutrality planning.
- Sent 11,000 backpack fliers to all K-5th grade students in Ann Arbor Public Schools.
- Developed A²Zero flyer for Ann Arbor Meals on Wheels to distribute to home bound residents.
- Developed flyer for all partners to display advertising the February 22nd Town Hall and the final A²Zero survey.

All of these activities were integral to creating A²Zero. In the end, this Plan was made by the community, for the community

THE LIVING CARBON NEUTRALITY PLAN



The remainder of this document highlights the actions that are part of the City's living A²Zero Carbon Neutrality Plan.

These actions are organized around the seven overarching strategies:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other



STRATEGY 1:

Power Our Electrical Grid with 100% Renewable Energy

This strategy focuses on ensuring that all of the electricity used within our community is powered with renewable energy such as solar, geothermal, and wind. To achieve this strategy, four specific actions are proposed:

1. Implement Community Choice Aggregation
2. Support Onsite Renewables and Battery Storage
3. Develop Community Solar Program
4. Launch Landfill Solar Project

Combined, these four actions are projected to reduce community-wide greenhouse gas emissions by 41% and cost just over \$4,100,000.

STRATEGY 1: Power Our Electrical Grid with 100% Renewable Energy

1. IMPLEMENT COMMUNITY CHOICE AGGREGATION

Community Choice Aggregation (CCA) program is an agreement among stakeholders to allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while receiving transmission and distribution services from their existing utility providers. CCA allows communities to have more control over the production of their energy, including integrating community values such as 100% renewable energy into their purchasing decisions. Generally, a CCA is an opt-out program meaning that it allows economies of scale to be achieved which leads to close to or actual cost parity to existing electricity costs. In order to implement a CCA, the State will need to enact legislation to allow for CCA.

Vision for Implementing Community Choice Aggregation

Community Choice Aggregation legislation has been enabled by the State and Ann Arbor administers its first bulk buy of 100% new renewable energy by 2027. Through an opt-out structure and little change in energy rates, all residents and commercial entities, including the University of Michigan, participate.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- State legislature
- Other Michigan municipalities
- Michigan Municipal Association on Utility Issues (MI-MAUI)
- Michigan nonprofits focused on energy choice

Equity Impacts

CCA provides clean, renewable energy for the whole community. This is a particularly useful option for residents who may not have the ability to otherwise install renewable energy systems at their residence, whether due to renting or to cost. A CCA program would provide renewable energy to those who may not otherwise be able to access this resource.

Assumptions

- 100% of residential customers participate in the CCA
- 100% of commercial and industrial enterprises participate in the CCA
- 100% of any municipal operations not yet powered by renewable energy are included in the CCA
- Capacity of program accounts for changes in consumption due to (a) reductions in consumption achieved through widespread energy efficiency improvements, (b) increases in consumption related to switching from fossil fuel powered heating and vehicles to renewable energy, and (c) projected growth rates
- Renewable energy credits from the sources procured through the program are retired, and the energy sources offset fossil fuel generation

Indicators of Success / Goals

By 2030, 100% of our community's electrical needs are met with renewable energy sources, thanks in large-part to the CCA.

Target Demographic

Entire community

Timeline and Initial Actions

2020

The City begins working on recommendations for what to include in a CCA program.

2021

The City begins working with legislators to develop CCA legislation. Public education begins about CCA

2024

The City begins planning the startup of the CCA program, undertaking feasibility studies, public engagement, and business model planning.

2025

CCA is enabled in Michigan through the passing of state legislation.

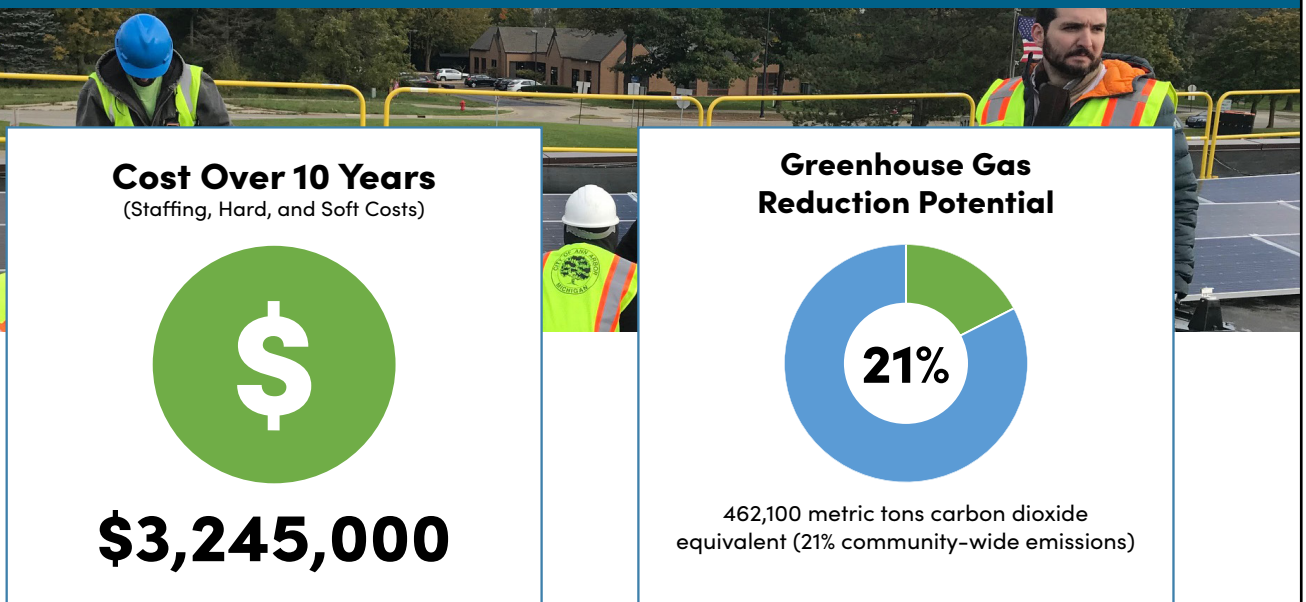
2026

Ann Arbor public vote to allow a local CCA purchase.

2027

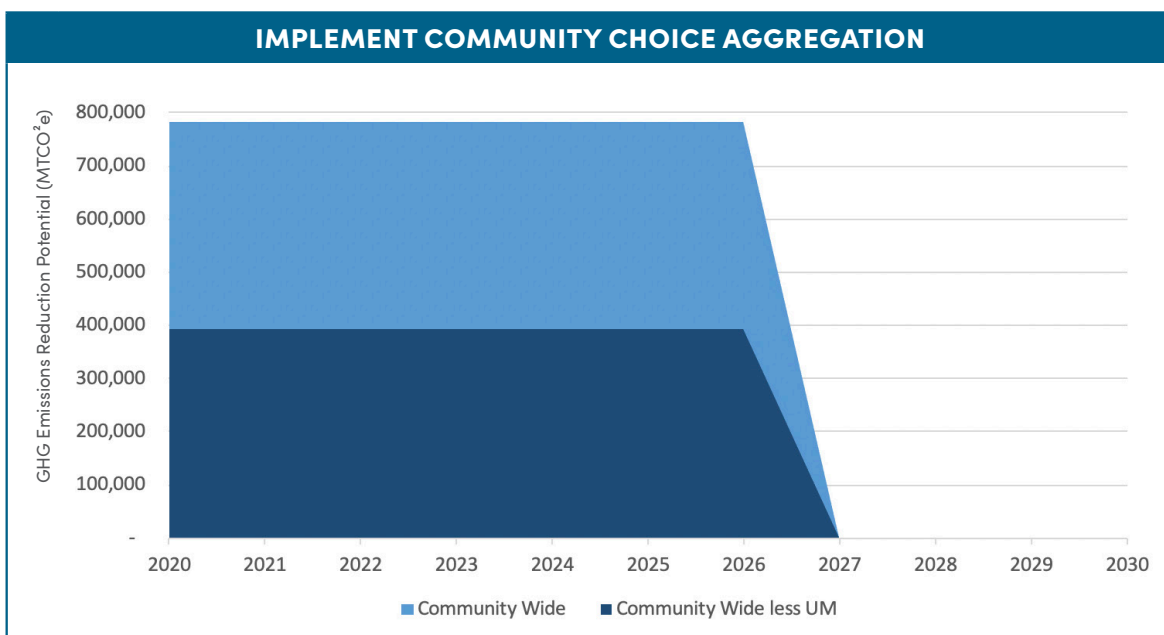
CCA program launches in Ann Arbor and continues.

ACTION 1: Implementing Community Choice Aggregation



By 2027, the Implement **Community Choice Aggregation** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of Community Choice Aggregation (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of Community Choice Aggregation if only the community (not the University) participates in the program.



STRATEGY 1: Power Our Electrical Grid with 100% Renewable Energy

2. SUPPORT ONSITE RENEWABLE ENERGY GENERATION WITH BATTERY STORAGE

(BULK BUYS)

Renewable energy systems like geothermal, solar, and energy storage pay for themselves over their lifetime, but the upfront costs of installation can be a barrier for many people. To help reach our A²Zero goals, the City proposes establishing a bulk purchase program that enables residents and businesses to procure onsite renewables for a discounted price by achieving economies of scale.

Vision for Supporting Onsite Renewable Energy Generation with Battery Storage

By 2030, through the provision of bulk buys and discount programs, 78MW of local renewable energy is being generated on viable buildings, parcels of land, and carports. At least ¼ of these installations also have some form of battery storage, which is helping enhance the resilience of our local community and economy.¹

Party Responsible for Implementation

Office of Sustainability and Innovations' Solarize Coordinator, with support from the OSI team

Equity Impacts

Nonprofit organizations and public institutions may benefit from this program, but the benefits flow primarily to property owners.

Collaborators / Project Co-Designers

- City of Ann Arbor Building, Rental, and Inspection Services
- Renewable energy contractors and installers
- Michigan Saves
- Potentially local banks

Indicators of Success / Goals

78MW of new, local, onsite renewable energy generation is installed in Ann Arbor by the year 2030.

Assumptions

- 78MW of local renewable energy generation is achieved by 2030
- Pricing discounts of 5%, 10%, and potentially 15% are offered through the program
- The capacity generated through this initiative is not included in the CCA

Target Demographic

Individuals who can install renewable energy on the buildings they own or operate, including homeowners, businesses, schools, and institutions

¹ In administering this program, OSI will also be looking to tie in energy efficiency support and electrification support so that each household or business receives a package of support as opposed to multiple different programmatic offerings.

Timeline and Initial Actions

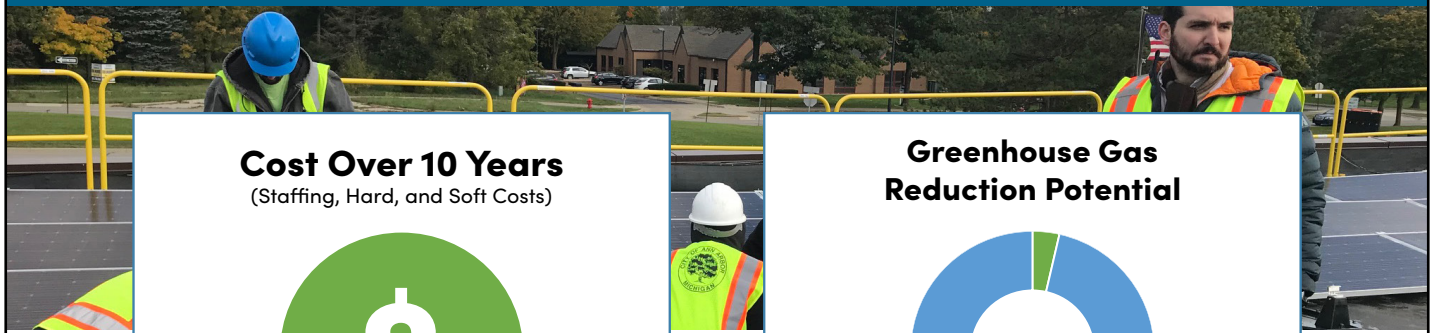
2020

Pilot test group buy in residential sector. Coordinate program with contractors. Conduct public outreach.

2020

Revise program based on lessons learned. Scale and continue to administer until at least 2030 (or until the program stops generating demand).

ACTION 2: Supporting Onsite Renewable Energy Generation with Battery Storage (Bulk Buys)



Cost Over 10 Years

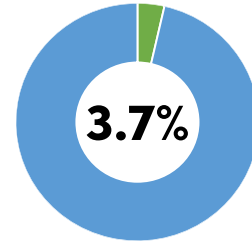
(Staffing, Hard, and Soft Costs)



Estimated
\$605,000

(\$540,000 in staffing and \$65,000 in stipends to community residents)

Greenhouse Gas Reduction Potential

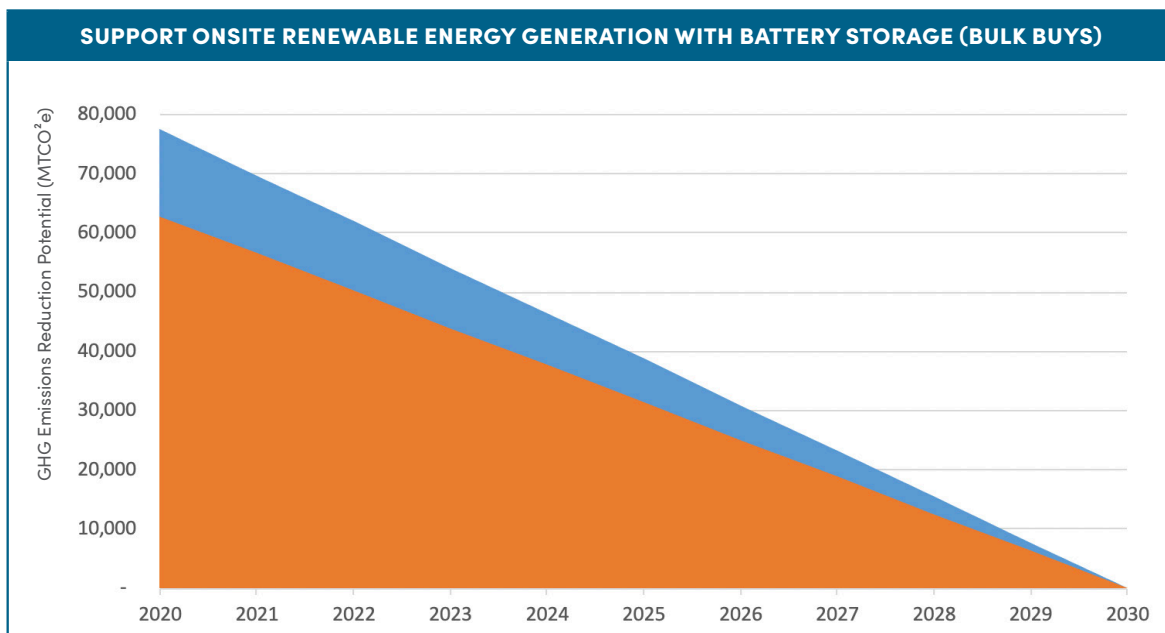


81,000 metric tons carbon dioxide equivalent (3.7% of community-wide emissions).

If the University of Michigan participates in this action, an additional 4,000 metric tons carbon dioxide equivalent could be reduced, resulting in a total of 85,000 metric tons carbon dioxide equivalent (3.9% community-wide emissions).

By 2030, the Support **Onsite Renewable Energy Generation with Battery Storage (Bulk Buys)** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program. The orange shows the impact of onsite renewable energy generation if only the community (not the University) participates in the program.



STRATEGY 1: Power Our Electrical Grid with 100% Renewable Energy

3. DEVELOP COMMUNITY SOLAR PROGRAM

Not all residents and businesses are able to install solar on their property. This may be because of inadequate solar exposure, not owning one's home, or financial barriers associated with renewable energy. To provide options to all who want to invest in solar locally, the City of Ann Arbor, in partnership with our utility, will create and support a robust community solar program which allows solar installations on public properties. Community solar programs allow residents and business to purchase solar panels from an existing solar farm and receive an on-bill credit as if those panels were actually on their roof. State legislation is needed to enable community solar programs but the City is already working with state legislators to move this idea forward.

Vision for Developing Community Solar Program

By 2030, 11 MW of community solar has been established locally. As our community builds demand for community solar, the landfill solar site is opened for public subscriptions and the City's demand for renewable energy is moved to create even more local renewable energy generation.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- Community solar is enabled at the state
- Demand for community solar reaches at least 11MW by 2030
- On-bill financing is possible

Equity Impacts

Community solar primarily benefits those without the ability to install their own renewable energy projects.

Indicators of Success / Goals

By 2030, 11MW of new renewable energy has been created and is subscribed through a community solar program.

Target Demographic

Those who face barriers to installing solar on the buildings they inhabit, including renters, low-income residents, and those with shaded or obstructed roofs

Timeline and Initial Actions

2021

Enabling legislation passed and City works with DTE Energy to create local pilot community solar program.

2022

Local pilot program launches.

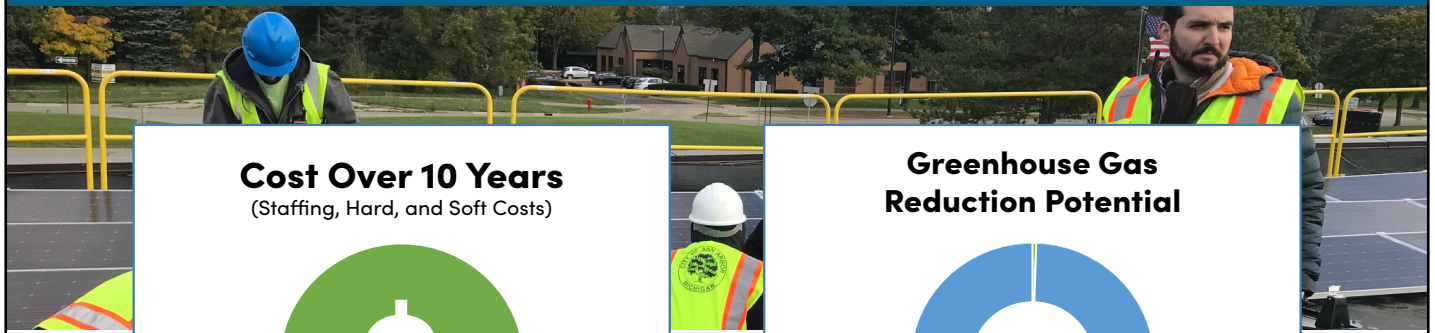
2024

Expansion of community solar program locally. Includes recruitment of individuals into program.

2026

Landfill solar site opens up for community subscriptions given the success of the initiative. Allows City to take its demand to stimulate more renewable energy development.

ACTION 3: Develop Community Solar



Cost Over 10 Years

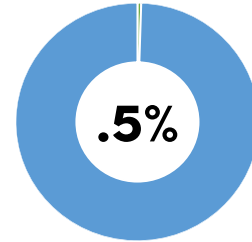
(Staffing, Hard, and Soft Costs)



Costs to the City are
\$205,000

over 10 years to help administer the program. If the City becomes an anchor tenant, the costs would rise.

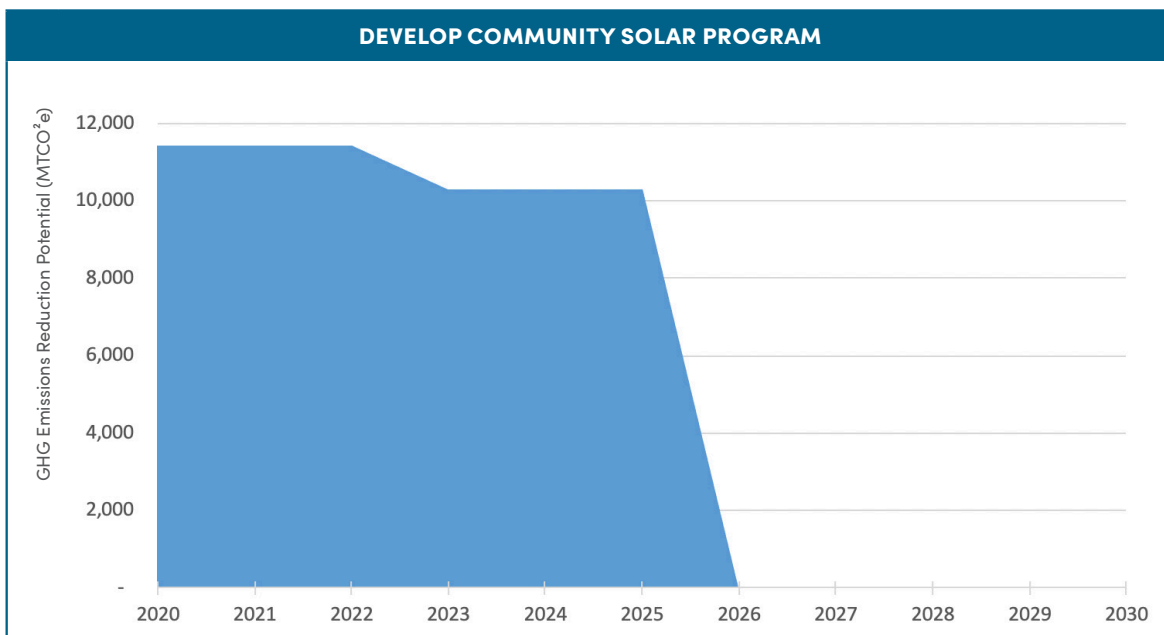
Greenhouse Gas Reduction Potential



11,500 metric tons carbon dioxide equivalent (.5% of community-wide emissions)

By 2026, the Develop **Community Solar Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program.



STRATEGY 1: Power Our Electrical Grid with 100% Renewable Energy

4. LAUNCH LANDFILL SOLAR PROJECT

The City of Ann Arbor is developing a utility scale solar project with DTE Energy to operate on the City-owned landfill and in Pittsfield Township. The intention is that this installation will provide enough energy to offset roughly 80% of Ann Arbor municipal energy usage. In addition to ground mounted solar, the project incorporates a pilot of solar panels installed on a retention pond, provides a portion of clean energy for Pittsfield Township to offset their municipal operations, and has many co-benefits including creating habitat for local pollinators. If demand exists and enabling legislation is passed, the solar project may be integrated into a community solar program.

Vision for Launching Landfill Solar Project

By 2030, the City-owned landfill and surrounding property has 24 MW of installed solar capacity, the vast majority of it used to offset Ann Arbor municipal energy use.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- The landfill is deemed a viable site for utility-scale solar
- Current federal tax credits are leveraged to reduce cost of project

Equity Impacts

Should the landfill solar project include community solar provisions, it could serve many Ann Arborites who cannot install their own solar arrays, whether due to renting, cost, or those with roofs not optimal for solar.

Indicators of Success / Goals

By the end of 2023, a 24MW solar installation is fully operational at the former Ann Arbor landfill and on the land held in PUD with Pittsfield Township.

Target Demographic

The City of Ann Arbor and Pittsfield Township. Once local demand is established, the project may be turned into a community solar program

Timeline and Initial Actions

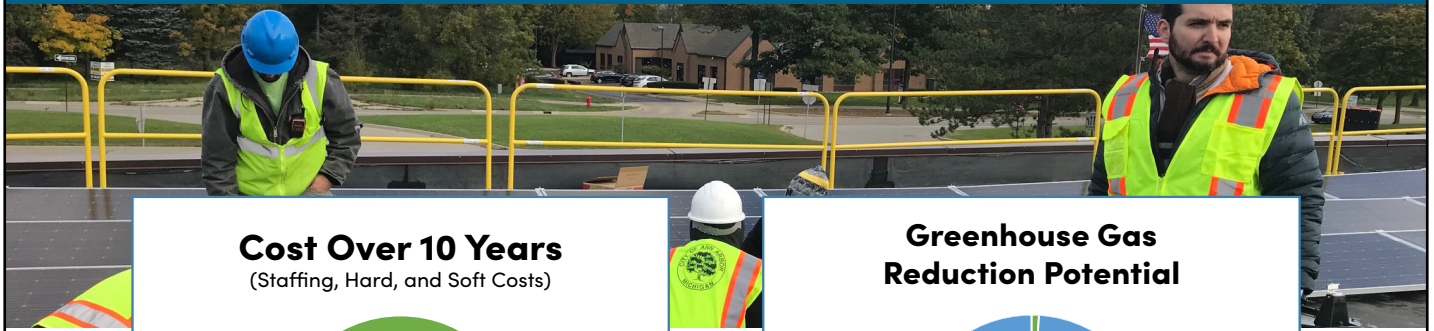
2020

The City of Ann Arbor, in partnership with DTE Energy and Pittsfield Township, completes feasibility and technical assessments of the site. If the project is deemed feasible, an RFP is released and safe harboring of equipment is undertaken.

2023

The landfill solar project begins operation, providing local renewable energy.

ACTION 4: Launch Landfill Solar



Cost Over 10 Years (Staffing, Hard, and Soft Costs)

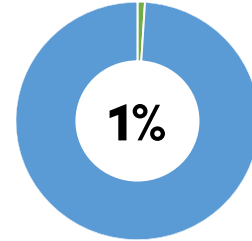


Estimated
\$80,000

for staffing support

Final cost to be determined based on any required costs to upgrade the grid at the point of intersection.

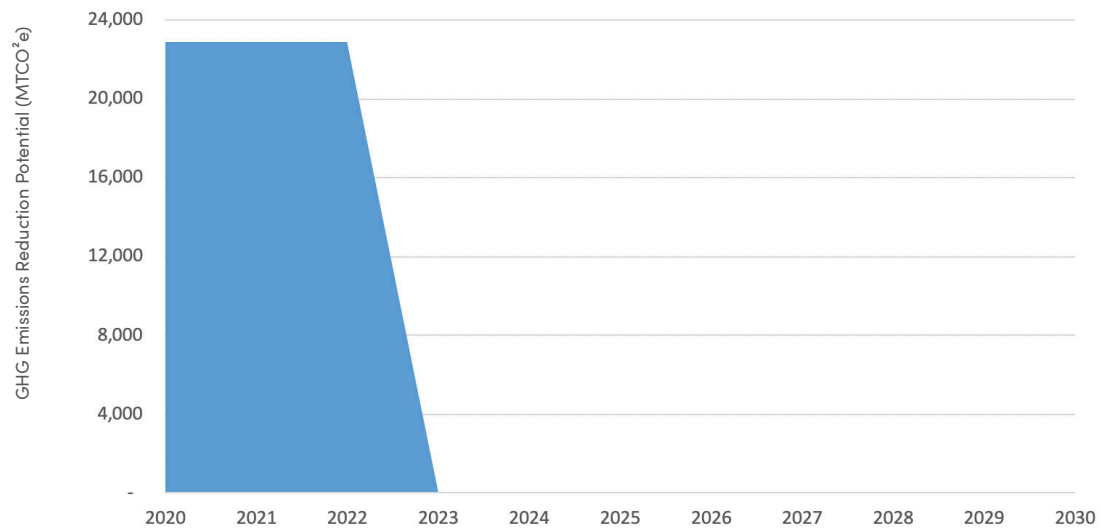
Greenhouse Gas Reduction Potential



23,000 metric tons carbon dioxide equivalent (1% of community-wide emissions)

By 2023, the Launch **Landfill Solar Project** strategy will have achieved all of its potential greenhouse gas emissions reduction potential.

LAUNCH LANDFILL SOLAR PROJECT





STRATEGY 2:

Switch our Appliances and Vehicles from Gasoline, Diesel, Propane, Coal, and Natural Gas to Electric

This strategy focuses on converting the vast majority of our existing gasoline, diesel, propane, coal, and natural gas powered equipment, appliances, and vehicles to electric. This is particularly important since we are working to ensure our electrical grid is powered with 100% renewable energy. To achieve this strategy, 6 specific actions have been identified:

1. Promote Home & Business Electrification
2. Electrify Buses
3. Support Community Electric Vehicle and Solar Bulk Buys
4. Electrify City Fleet
5. Electrify Private Fleet
6. Expand Electric Vehicle Charging Infrastructure

Combined, these six actions are estimated to reduce community-wide emissions by 23% and cost just over \$143,000,000.

STRATEGY 2: Switch our Appliances and Vehicles from Gasoline, Diesel, Propane, Coal, and Natural Gas to Electric

1. PROMOTE HOME & BUSINESS ELECTRIFICATION

The use of natural gas for heating space and water, as well as cooking in buildings represents over 25% of our community's greenhouse gas emissions. Transitioning away from natural gas to electric, especially given our work to ensure that all electricity is powered with renewable energy, is a pivotal component of A²Zero. To support the electrification of appliances, the City of Ann Arbor will work to establish policies that promote electrification of heating and cooking systems by evaluating options in codes, incentive programs, and through other avenues. The City of Ann Arbor will lead this effort by electrifying all municipal buildings.

Vision for Promoting Home & Business Electrification

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and conducted air sealing and insulation improvements. The electricity now used by these systems is sourced from renewable energy, and the additional capacity has been incorporated into plans for community-wide renewable energy purchasing initiatives. Additionally, building occupants benefit from better indoor air quality.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- For City buildings – Facilities with support from Office of Sustainability and Innovations

Equity Impacts

Few equity impacts from this action except as part of the community solar program (above).

Collaborators / Project Co-Designers

- City of Ann Arbor legal team
- City of Ann Arbor Building, Rental, and Inspection Services
- Michigan Saves
- Home Improvement Stores
- Contractors (i.e., energy efficiency, repair, installation)

Indicators of Success / Goals

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and the electricity powering those homes is coming from renewable energy sources.

Assumptions

- 30% of single family homes are all electric by 2030, not including the 20% already using electric heat
- 25% of rentals are all electric by 2030
- City commits to and achieves 100% electrification by 2030
- A 1:1 replacement of natural gas energy to electricity, with 1CCF gas transitioning to 30.36kWh electricity
- All new residential and commercial buildings are designed and built to operate without the use of natural gas, reducing the increased cost associated with retrofitting existing systems
- All additional electric consumption is powered by an associated increase in renewable energy sources

Target Demographic

All buildings in Ann Arbor, including single-family homes, rentals, and businesses. The action was modeled to show the impact if the University of Michigan participates as well as if it does not

Timeline and Initial Actions

2020

Conduct legal analysis and finalize electric vehicles (EV) readiness ordinance.

2021

Develop electrification policy. Begin planning administrative program. Capacity building by ensuring enough contractors are trained in electric heating systems appropriate for Ann Arbor's climate. EV readiness ordinance adopted.

2023

Public outreach and education, including visible and accessible alternatives to natural gas systems. Program launches and is enforced.

2024

Buildings transition at a steady rate annually.

ACTION 1: Promote Home & Business Electrification

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



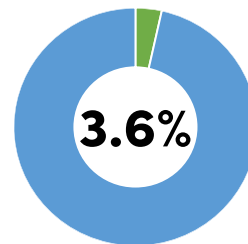
Estimated
\$1,400,000

staffing, trainings, and administrative costs for community portion of electrification program.

\$5,700,000

for transitioning City facilities to all electric.

Greenhouse Gas Reduction Potential



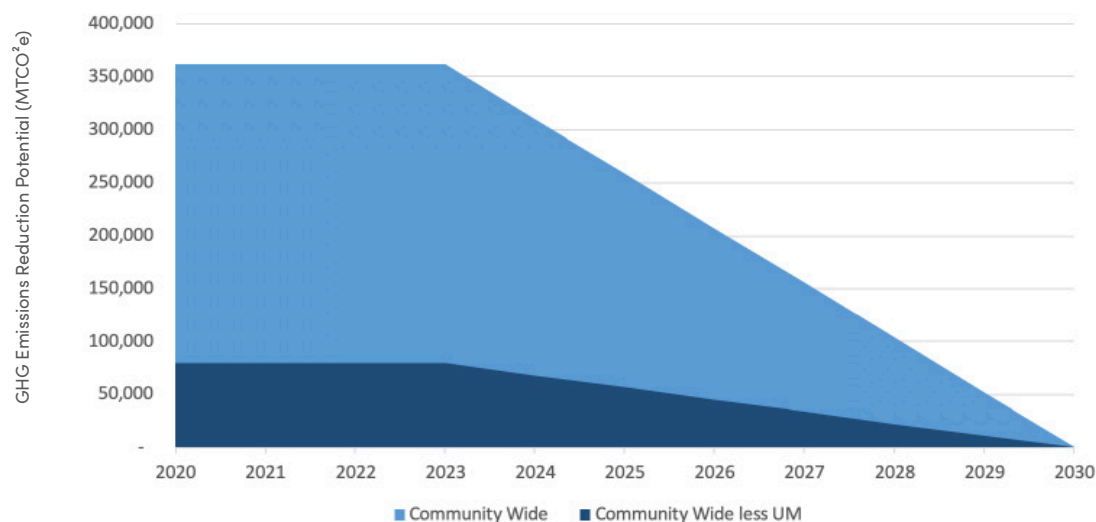
79,200 metric tons carbon dioxide equivalent (3.6% of community-wide emissions) for residential and municipal electrification.

If the University of Michigan were to electrify all of their operations and power that additional electrical demand with clean energy, it would be an additional reduction of 283,000 metrics tons of carbon dioxide equivalent (13% of community-wide greenhouse gas emissions), resulting a total of 362,200 metric tons of carbon dioxide equivalent (16.5% of community-wide emissions).

By 2030, the **Promote Home & Business Electrification** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of home and business electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of home and business electrification if only the community (not the University) participates in the program.

PROMOTE HOME AND BUSINESS ELECTRIFICATION



2. ELECTRIFY BUSES

This action involves electrifying TheRide's diesel and diesel-hybrid fleet of 87 buses as well as the University of Michigan's ethanol, biodiesel, and gasoline buses on an aggressive time line.

Vision For Electrifying Buses

By 2030, TheRide and UM's bus fleet have transitioned to electric propulsion. Consequentially, both entities are enjoying lower maintenance, operating, and fuel costs. Solar has been installed on AATA and UM properties so that the electricity running the buses is 100% carbon-free.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department, with support from the Office of Sustainability and Innovations

Equity Impacts

Electrifying buses will give riders a cleaner, more comfortable, and healthier ride. Communities who live along electrified bus routes will benefit from reduced asthma and COPD rates, which disproportionately impact communities of color and low-income communities.

Party Responsible for Implementation

- DTE Energy
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- UM Energy Institute
- UM Carbon Neutrality Commission

Indicators of Success / Goals

By 2030, TheRide and UM's entire fleet of buses are electric and their power is drawn from renewable energy.

Assumptions

- Annually, 9 new electric buses are purchased starting in 2021 for TheRide
- UM replaces buses at a rate of approximately 5 per year
- Bus fleets stay at their current level
- A traditional bus is \$525,000; an electric bus is \$750,000
- No value calculated for selling diesel or gasoline buses
- 2 additional electric buses are purchased per year to grow the fleet and expand service
- Assumes limited operational savings in the first few years of operation as facilities adjust to new types of buses
- Costs are only calculated for TheRide's portion of electric buses
- Air quality improves along the bus corridors

Target Demographic

Bus riders and potential bus riders

Timeline and Initial Actions

2020

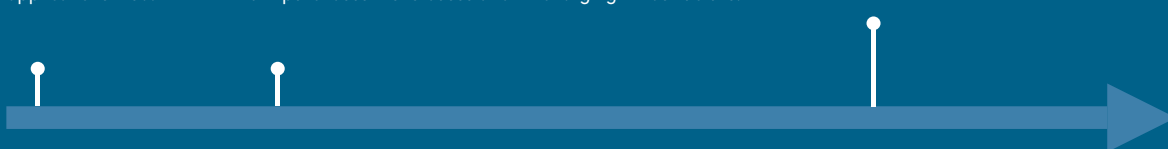
Planning for e-buses commences. Grant applications filed.

2021

TheRide purchases 9 new e-buses and installs EV charging infrastructure that will be needed for first 5 years of operation. UM purchases first 5 buses and EV charging infrastructure.

2030

All buses operated by TheRide and UM are electric.



ACTION 2: Electrify Buses

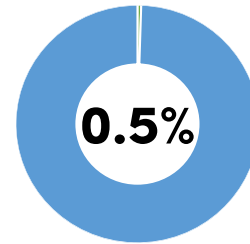
Cost Over 10 Years (Staffing, Hard, and Soft Costs)



Estimated
\$86,000,000

(only accounting for TheRide's
electric buses)

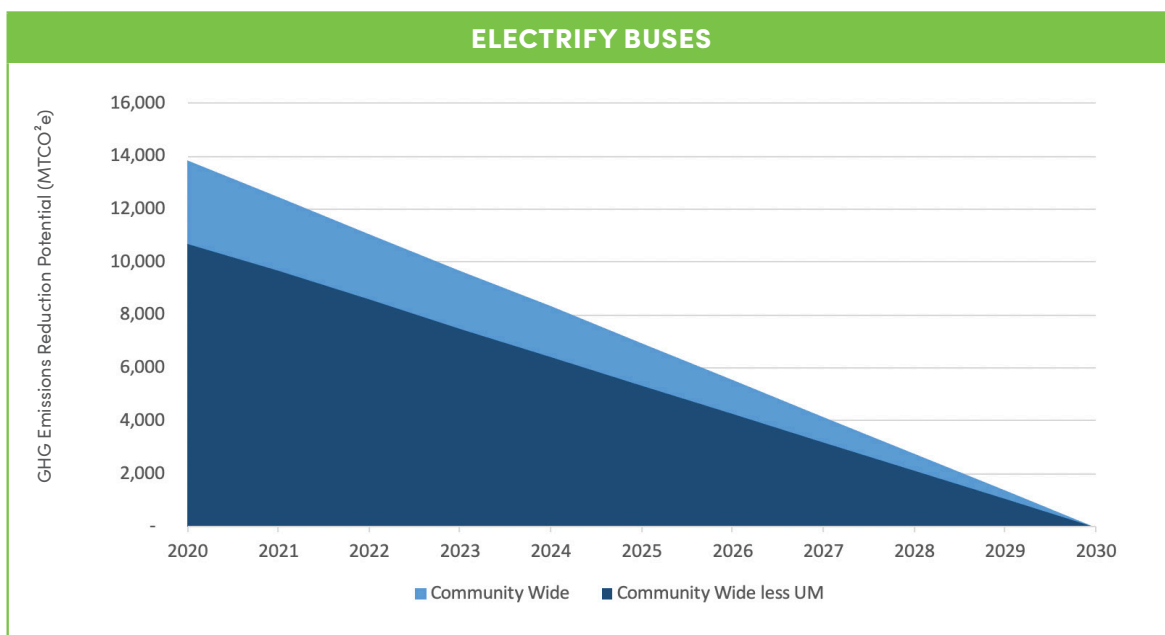
Greenhouse Gas Reduction Potential



10,700 metric tons of carbon dioxide equivalent (0.5% of community-wide emissions) if TheRide buses are electrified. If the University of Michigan participates and also converts their buses, an additional 3,100 metric tons of carbon dioxide equivalent (0.1% of community-wide emissions) are also reduced. In total, 13,800 metric tons of carbon dioxide equivalent (0.6% of community-wide emissions)

By 2030, the **Electrify Buses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of bus electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of bus electrification if only the community (not the University) participates in the program.



3. SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS

Group-buy programs increase the accessibility of EVs by allowing potential EV purchasers to take advantage of bulk purchase or lease discounts. In order to promote immediate EV purchases, group-buy programs are only offered for a limited time, typically a few months. Coupling EV group-buy programs with purchase programs for residential solar installation allows EV owners to reduce their EV charging costs, while helping the City of Ann Arbor transition towards clean, renewable energy. The program includes the creation of incentives for low-income residents to purchase off-lease or used EVs.

Vision for Supporting Community Electric Vehicle and Solar Bulk Buys

Residents and businesses in Washtenaw County can purchase new and used EVs at a discount of 10–15%. Local dealerships participate with their auto manufacturers to ensure ample EV stock is available on dealerships' lots and that their sales teams are educated about EVs. Residents are able to pair solar (through Solarize program) with EVs, which should significantly reduce the payback period for solar and the EV.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- Michigan Saves
- Energy Commission
- Transportation Commission
- Washtenaw Electric Auto Association
- Urban Sustainability Directors Network
- Local auto dealerships
- Major auto companies (OEMs)
- Plug In America's PlugStar program
- Smart Columbus Electrified Dealers program
- University of Michigan

Equity Impacts

We will explore offering bulk buys for EVs that are coming off leases, and offer bulk buys for e-scooters and e-bikes to ensure equitable and affordable options for all.

Indicators of Success / Goals

By 2030, 50% of all vehicles miles traveled are in electric vehicles.

Assumptions

- DTE Energy will continue partnering with the City
- OEMs will have enough cars to meet demand
- Reduced rates are available through the bulk buy
- The CCA purchase will help reduce new electricity demand from Ann Arbor EV owners

Target Demographic

Residents and local car dealership employees

Timeline and Initial Actions

2020

OSI and DTE Energy kick off a group buy program for City staff with one or two OEMs participating.

2021

OSI and DTE Energy expand the program to all DTE Energy customers in their service territory. The program also includes more OEMs and dealerships participating.

2022

OSI and DTE Energy expand the offering to include paired solar installations.



ACTION 3: Support Community Electric Vehicles and Solar Bulk Buys

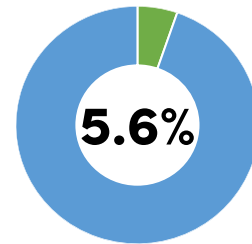


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$700,000

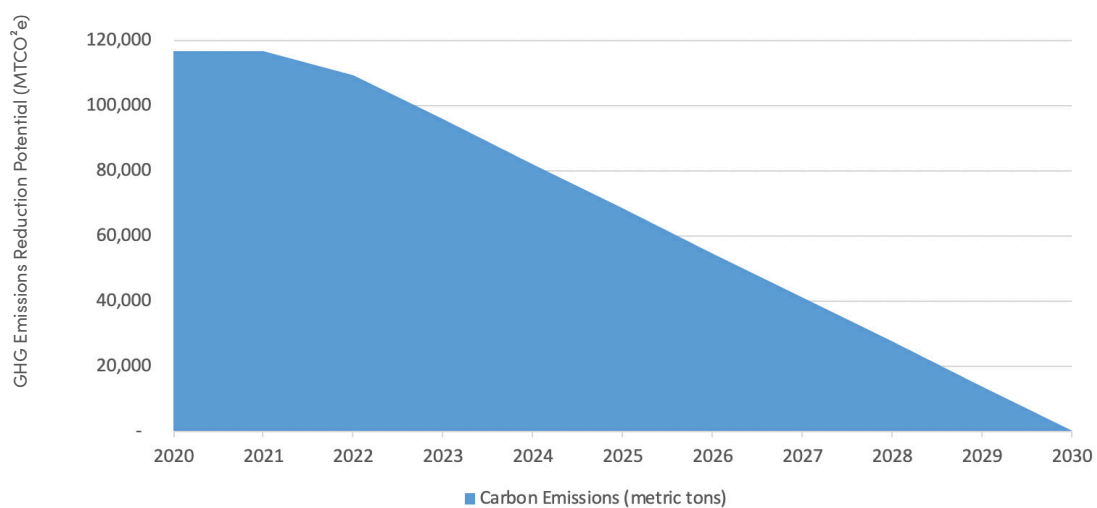
Greenhouse Gas Reduction Potential



122,900 metric tons carbon dioxide
equivalent (5.6% of community-wide
emissions)

By 2030, the **Support Community Electric Vehicle and Solar Bulk Buys** strategy will have achieved all of its potential greenhouse gas emissions reductions.

SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS



4. ELECTRIFY CITY FLEET

In June 2017, City Council approved Resolution R-17-237, directing the City Administrator to update and revive the City's Green Fleets Policy, promote the purchase of plug-in electric vehicles, and incorporate updated best practices and lessons learned from peer municipalities. The Green Fleets Team (GFT) was given until the first quarter of 2020 to develop a plan for electrifying the City fleet by 2025. Because there are so many more electric vehicle options for light duty vehicles at this time, the GFT focused first on transitioning those and then on electrifying construction equipment and medium- and heavy-duty vehicles.

Vision for Electrifying City Fleet

By 2025, 90% of the City's fleet has transitioned to electric. The remaining 10% are pieces of medium- and heavy-duty vehicles and equipment that cannot be electrified.

Party Responsible for Implementation

- Fleets and Facilities Department, with support from the Office of Sustainability and Innovations

Equity Impacts

Improved local air quality for all.

Collaborators / Project Co-Designers

- Green Fleets Team
- The Electrification Coalition
- Ecology Center

Indicators of Success / Goals

By 2025, 90% of the City's fleet has transitioned to electric.

Assumptions

- EV market continues to grow and move into new market shares
- Electricity from the EVs is powered through CCA or onsite solar

Target Demographic

Ann Arbor City Employees

Timeline and Initial Actions

2020

Municipal fleet electrification strategy complete and updated fleet replacement rates calculated.

2021

New fleet replacements rates integrated into the budget.

2025

90% of fleet is transitioned to electric.



ACTION 4: Electrify City Fleet



Cost Over 10 Years

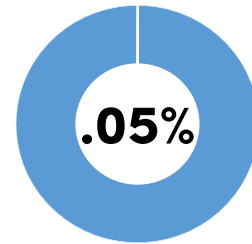
(Staffing, Hard, and Soft Costs)



\$4,000,000

(only accounting for TheRide's electric buses)

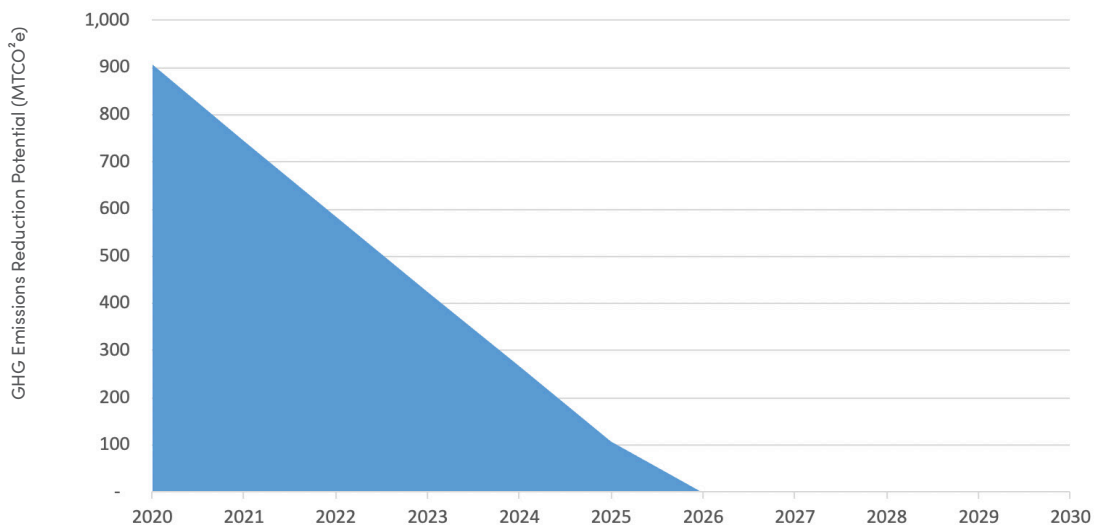
Greenhouse Gas Reduction Potential



1,100 metrics tons of carbon dioxide equivalent (0.05% of community-wide emissions)

By 2026, the **Electrify City Fleet** strategy will have achieved all of its potential greenhouse gas emissions reductions.

ELECTRIFY CITY FLEET



5. ELECTRIFY PRIVATE FLEETS

Programmatic support is offered, along with an ambitious outreach and education program, to support private companies with transitioning their fleets to electric. This includes working with the State and utilities to offer more rebates and incentive programs, and sharing information about existing rebates for charging.

Vision for Electrifying Private Fleets

Medium and large companies in Ann Arbor help the City meet its ambitious climate neutrality goal by transitioning their fleets to electric, encouraging their employees to drive EVs, and installing EV charging infrastructure. Ridesharing companies have agreed to franchise agreements which require that at least half of their fleets are EVs.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

Improved local air quality for all.

Collaborators / Project Co-Designers

- DTE Energy
- The Electrification Coalition
- Ecology Center
- Washtenaw Electric Automobile Association
- Ann Arbor 2030 District
- Ceres
- DDA
- EGLE
- Employers in Ann Arbor with large fleets
- Ridesharing and ride hailing companies
- Delivery companies

Indicators of Success / Goals

By 2030, 50% of private fleets within the City are electric.

Assumptions

- Corporate fleets will encourage a transition to EVs
- The State and utilities will continue to provide incentives for fleet electrification

Target Demographic

Employees and owners of medium to large business in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not fee based).



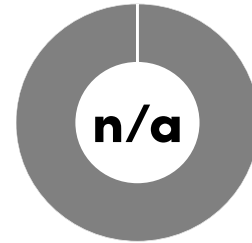
ACTION 5: Electrify Private Fleets

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$123,000

Greenhouse Gas Reduction Potential



The impact of this action was not calculated separately but included in the EV bulk buy action.

ELECTRIFY PRIVATE FLEETS



6. EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

In the next three decades, electric vehicles (EVs) will replace internal combustion engine (ICE) vehicles as the dominant type of vehicles on the market. This action item aims to significantly increase electric vehicle charging infrastructure at parking lots and garages, park and ride lots, ride sharing spots, workplaces, and City facilities to support this transition.

Vision for Expanding Electric Vehicle Charging Infrastructure

Ann Arbor has plentiful EV charging infrastructure deployed to meet the needs of a burgeoning transition from ICE vehicles to EVs. While 80% of EV charging will continue to happen at home, public and workplace charging has expanded to fill in the remaining gaps.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Downtown Development Authority
- City's Engineering Department Transportation Group

Collaborators / Project Co-Designers

- State of Michigan (EGLE)
- Private businesses for workplace charging
- Property owners for multifamily charging
- Residents for home-based charging
- UM for campus charging
- Transportation Commission
- Ann Arbor 2030 District
- EV charger manufacturers and installers
- Affordable housing community
- Project developers for new housing and commercial projects
- DTE Energy

Equity Impacts

Placement of new EV chargers prioritizes renters in multifamily housing and street-side for residents who do not have a garage or driveway. Expanded public charging in garages and lots will ensure that some basic level of charging is available to all who need it.

Indicators of Success / Goals

10% of all public and private parking spaces are equipped with level 2 EV chargers and 2% with Direct Current Fast Chargers (DCFCs).

Assumptions

- 1,250 level two chargers are installed a year starting in 2021; each year 200 of these chargers are paid for through utility rebates
- 2 fast chargers are installed in the community each year; both are paid for through utility rebates
- Any additions to electrical capacity will be paid for separately
- New EV chargers will be prioritized for placement in low-income areas
- All additional electricity demand is integrated into the CCA

Target Demographic

Current and future EV owners who drive in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not free to use)



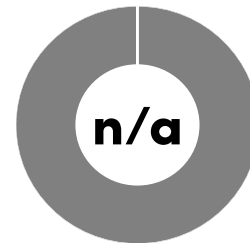
ACTION 6: Expand Electric Vehicle Charging Infrastructure

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$42,000,000

Greenhouse Gas Reduction Potential



This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to invest in electric vehicles.

EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE





STRATEGY 3:

Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

This strategy focuses on drastically improving the energy efficiency of our homes, businesses, schools, places of worship, government buildings, and recreational sites. To achieve this strategy, 11 specific actions have been identified:

1. Transition to More Energy Efficient Homes and Businesses
2. Update Building Codes
3. Power Street Lighting and Traffic Signals with LED
4. Benchmark and Disclose Energy Usage
5. Establish Loan Loss Reserve
6. Develop Energy Concierge and Community Engagement Program
7. Transition Affordable Housing Sites to Net Zero Energy
8. Promote Green Rental Housing Program
9. Launch Green Business Challenge
10. Support Aging in Place Efficiently
11. Expand Weatherization Program

Combined, these 11 actions are projected to reduce community-wide emissions by 13.4% and cost just over \$14,500,000.

STRATEGY 3: Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

1. TRANSITION TO MORE ENERGY EFFICIENT HOMES AND BUSINESSES

As much as 80% of energy consumed in our buildings is wasted, through gaps in building envelopes or unnecessary operation of lights and electronics. Improving building envelopes with better insulation and windows, efficient lighting and appliances, and advanced heating and cooling systems can have a significant impact on the amount of energy our community uses to heat and cool our buildings. While energy efficiency improvements pay for themselves through energy savings over time, the upfront cost of installing them can be a barrier for many. Through a widespread, comprehensive group-buy program, the City of Ann Arbor can encourage and enable residents and businesses to procure energy efficiency products for a discounted price.

Vision for Transitioning to More Energy Efficient Homes and Businesses

Through a broad-reaching public engagement campaign, 80% of residents and businesses participate in energy efficiency group-buys, incentivized through discounts achieved through economies of scale. The campaign is inclusive, designed with input from the public and helps reduce energy use of participating buildings by 20%.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Equity Impacts

If coupled with the Green Rental Housing Policy, all rental housing in homes will be mandated to achieve energy efficiency standards as part of maintaining a rental license through the City.

Collaborators / Project Co-Designers

- Local contractors and energy efficiency financiers, like Michigan Saves
- City of Ann Arbor Building, Rental, and Inspection Services
- Community liaisons, including neighborhood ambassadors
- Ann Arbor 2030 District
- DTE Energy

Indicators of Success / Goals

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses achieve a 20% reduction in electricity usage and 15% reduction in natural gas usage by 2030.

Assumptions

- 85% of owner occupied homes are retrofitted and achieve a 20% electricity savings and 15% natural gas savings
- 80% of tenant occupied and commercial enterprises are retrofitted and achieve a 20% electricity savings and 15% natural gas savings

Target Demographic

This program reaches all homeowners, landlords, and businesses through targeted engagement strategies

Timeline and Initial Actions

2020

Program design and contractor outreach and education.

2021

Program launches and first bulk buy takes place. Participation steadily increases annually.

2030

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses have had an energy efficiency improvement.



ACTION 1: Transition to More Energy Efficient Homes and Businesses

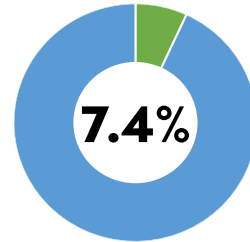
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$950,000

Greenhouse Gas Reduction Potential

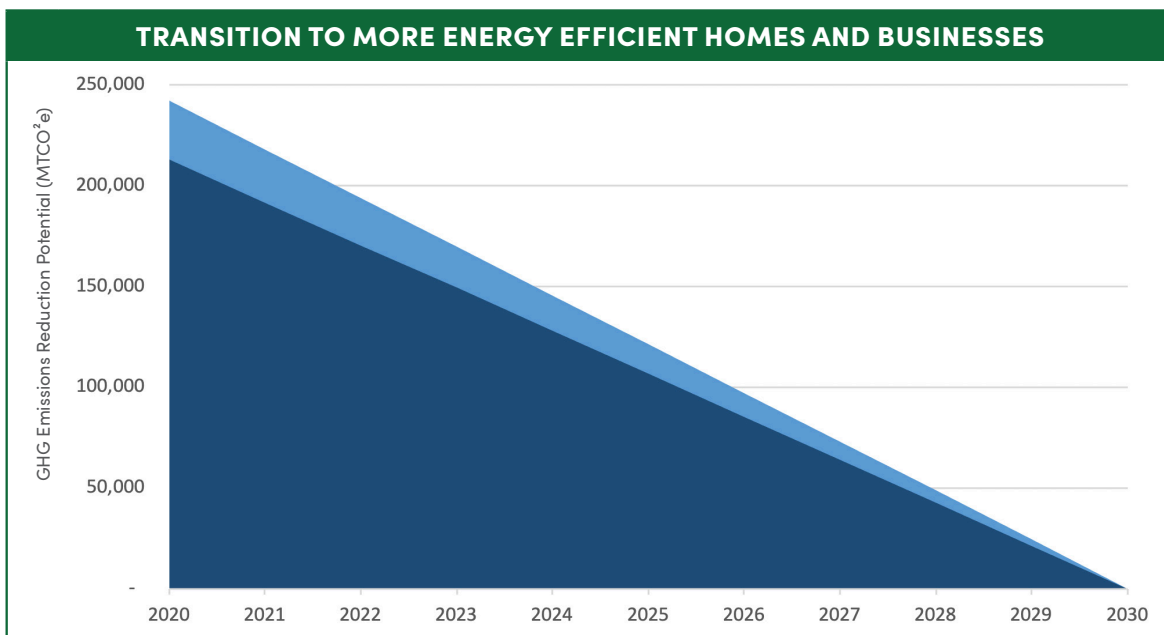


161,000 metric tons of carbon dioxide equivalent (7.4% of community wide emissions).

If the University of Michigan participates and achieves a 20% reduction in total energy usage, an additional 81,500 metric tons of carbon dioxide equivalent could be reduced, resulting in a total of 242,500 metric tons of carbon dioxide equivalent (11.1% of community-wide emissions).

By 2030, the **Transition to More Energy Efficient Homes and Businesses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of efficiency initiatives (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of efficiency initiatives if only the community (not the University) participates in the program.



STRATEGY 3: Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

2. UPDATE BUILDING CODES

Buildings are the largest source of greenhouse gas emissions locally. Doing all we can to reduce their energy consumption and greenhouse gas emissions will have a significant impact on our ability to achieve carbon neutrality. In Michigan, local municipalities are constrained by the State's building code, meaning that efforts to advance more energy efficient and ideally net zero energy buildings will need to be done through changes in the State's building code. This action focused on working with the state to pass the 2021 building code and the zero code appendix so that all new developments and major renovations in Ann Arbor can be net zero energy.

Vision for Updating Buildings Codes

By 2030, through an update to the State's building code, all new buildings and major renovations have been built to net zero energy standards. Any and all growth in Ann Arbor is done so sustainably and equitably.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Equity Impacts

At first, primarily higher income residents will occupy the new buildings that will be more energy efficient. However, over the long term, all Ann Arborites will benefit from stronger building codes.

Collaborators / Project Co-Designers

- State of Michigan
- Developers and contractors

Indicators of Success / Goals

By the end of 2030, 2,120 residential units and 160 commercial units are net zero energy buildings.

Assumptions

- All new construction from 2022 through 2030 (and beyond) is built to net zero energy standards, which includes no natural gas consumption and all electricity usage offset through the CCA
- Annual growth rate of 265 housing units for residential, based on past growth rate of housing units per census data
- Annual growth rate of 21 units annually for commercial enterprises, based on past growth rate of commercial units per building permit data
- Does not include savings associated with renovations as those are calculated in other areas of this Plan

Target Demographic

Developers constructing new and renovating buildings

Timeline and Initial Actions

2020

Work with state and local partners to garner support for adopting the 2021 building code and zero code appendix.

2021

State adopts updated building code. City creates infrastructure to support developers, the construction community, electricians, and others in achieving the Code. City works with state on educational material and trains inspectors. Enforcement begins.

2022

City maintains administrative support to achieve code. Enforcement continues. City works with 2030 District to launch net zero energy districts.

ACTION 2: Update Building Codes



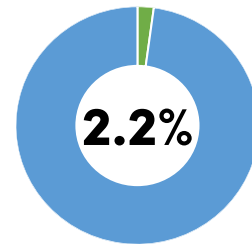
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$1,935,000

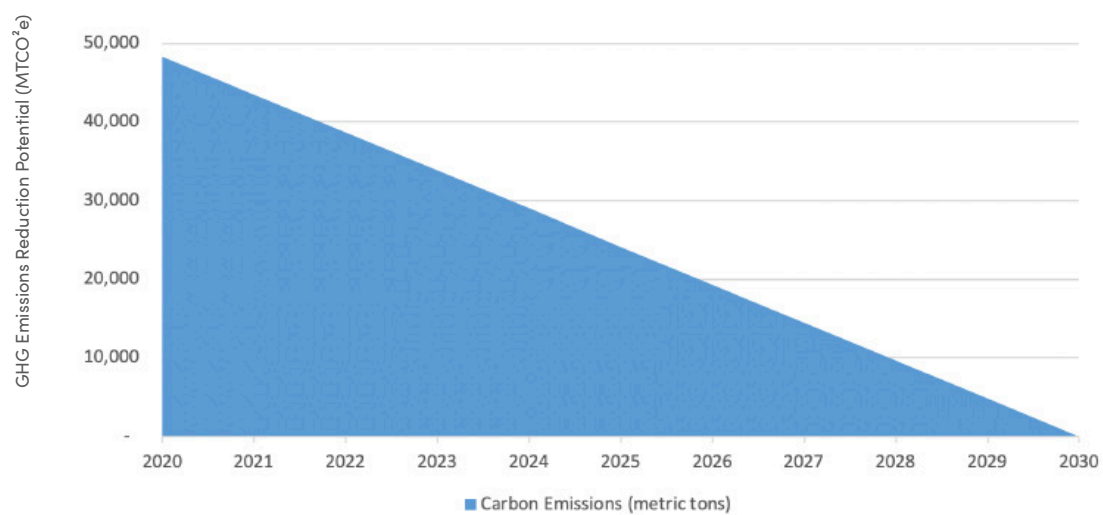
Greenhouse Gas Reduction Potential



48,300 metric tons carbon dioxide equivalent (2.2% of community-wide greenhouse gas emissions)

By 2030, the **Update Building Codes** strategy will have achieved all of its potential greenhouse gas emissions reductions.

UPDATE BUILDING CODES



STRATEGY 3: Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

3. POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED

Lighting accounts for 15 percent of global energy use and a significant portion of municipal energy consumption in the form of lighting our streets for safety. The City has started converting streetlights in our community from conventional lights to LEDs, the most energy-efficient bulbs available. This can reduce energy usage by up to 70 percent, significantly reduce maintenance costs, and offer more control over when and how lights shine.

Vision for Powering Street Lighting and Traffic Signals with LED

By 2030 all of our community's public streetlights and traffic signals are LED.

Party Responsible for Implementation

- City of Ann Arbor Signs and Signals

Equity Impacts

Few equity issues except slightly increased pedestrian safety.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- DTE Energy

Indicators of Success / Goals

By 2029, all streetlights and traffic signals have been converted to LEDs.

Assumptions

- City will gain ownership of 2/3 of the streetlights currently owned by utility
- 60% kWh savings by replacing 4,467 lights with LED lighting; Average savings are between 50-70%
- City will replace all traffic lights with LED; 85% efficiency savings
- City will assess/identify opportunity to replace all crosswalk lighting with LED efficient lighting

Target Demographic

This action applies to municipal streetlights, crosswalks, and outdoor lighting

Timeline and Initial Actions

2020

The City initiates negotiations with DTE Energy about purchasing streetlights.

2021

City begins purchasing streetlights and replacing with LEDs. Traffic signals are replaced on a rolling basis.

2029

Replacement of streetlights and traffic signals complete.



ACTION 3: Power Street Lighting and Traffic Signals with LED



Cost Over 10 Years

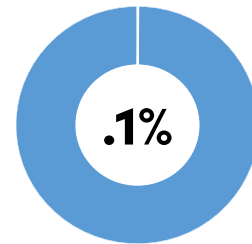
(Staffing, Hard, and Soft Costs)



\$3,100,000

including the cost to purchase the assets from DTE Energy and finance the conversion to LEDs.

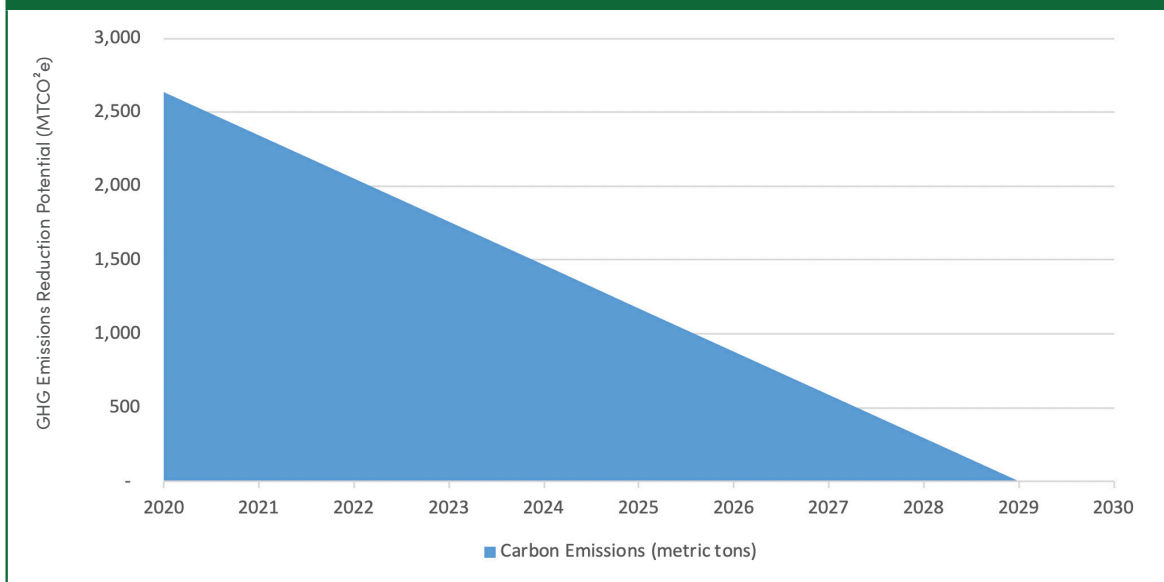
Greenhouse Gas Reduction Potential



2,600 metrics tons of carbon dioxide equivalent (.1% of community-wide emissions)

By 2029, the **Power Street Lighting and Traffic Signals with LED** strategy will have achieved all of its potential greenhouse gas emissions reductions.

POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED



STRATEGY 3: Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

4. BENCHMARK AND DISCLOSE ENERGY USAGE

In order to understand our community's potential for and achievement of energy efficiency improvements, we need more granular information about how we use energy. Benchmarking, through the disclosure of energy usage, identifies where we can make the most significant impacts, and serves to motivate performance improvements.

Vision for Benchmarking and Disclosing Energy Usage

Through standardized energy audits and self-reporting, residents and businesses take ownership of their energy usage, and have worked towards significant energy improvements. Achievements have been recognized across sectors, and as a community we have reduced our energy usage by 20%.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Ann Arbor Information Technology Department
- Commercial property owners and tenant Real estate agents, brokers, and homeowners
- Energy auditors
- DTE Energy and Consumers Energy
- Ann Arbor 2030 District

Equity Impacts

Lower-income homeowners may suffer lower sales prices for their homes if they have inefficient homes. Rents may rise for highly efficient rental units, which may further exacerbate race and income disparities in the community.

Indicators of Success / Goals

Benchmarking requirements are passed, with 90% compliance by the residential, commercial, and institutional sectors by 2025.

Assumptions

- A back-end portal to automatically report energy usage is built between the utilities and the City
- Sufficient Code Enforcement staff exist to ensure compliance in the program
- Support resources are available to help building owners and tenants reduce energy after benchmarking; this initiative contributes to participation in other energy efficiency initiatives in this Plan

Target Demographic

Homeowners, landlords, businesses, and institutions

Timeline and Initial Actions

2021

Design program. Conduct building inventory for all sectors. Create reporting platform, educate, and pilot.

2022

Fully administer the program. Continually revisit customer service support, enforcement, and program administration for areas of improvement.

2025

Achieve 90% compliance in the residential, commercial, and institutional sectors.



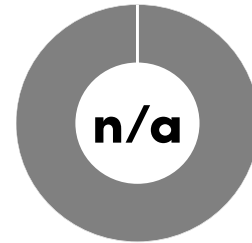
ACTION 4: Benchmark and Disclose Energy Usage

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$2,370,000

Greenhouse Gas Reduction Potential



Not assumed to directly reduce greenhouse emissions but action is foundational for work.

BENCHMARK AND DISCLOSE ENERGY USAGE



5. ESTABLISH LOAN LOSS RESERVE

Well-designed renewable energy, energy efficiency, and electrification improvements pay for themselves over their lifetime. However, the upfront cost of installation can be a barrier to many, especially to those who cannot secure financing. The City of Ann Arbor proposes establishing a loan loss reserve to provide credit enhancements for residents with lower credit scores, expanding those who can finance energy efficiency, renewable energy, fuel switching, and electric vehicle purchases.

Vision for Establishing Loan Loss Reserve

All Ann Arborites can secure the financing they need, at a reasonable rate, to make the energy efficiency, renewable energy, and fuel switching activities needed to achieve carbon neutrality.

Party Responsible for Implementation

- Michigan Saves, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local and regional banks
- Ann Arbor Finance Department

Equity Impacts

Homeowners with lower credit scores will benefit from the City establishing a loan loss reserve. Banks and Michigan Saves can lower the minimum credit scores needed to qualify for loans to do energy efficiency and renewable projects.

Indicators of Success / Goals

By 2021, Ann Arbor has created a \$1,000,000 loan loss reserve fund that enables lenders to loan to low-income residents to undertake energy efficiency and renewable energy improvements.

Assumptions

- \$1,000,000 is placed into a loan loss reserve to initiate the program
- Average loan terms of 6% APR over 10 years
- The seed funding has a leverage ratio of 1:20
- 5% default rates

Target Demographic

Low-income residents

Timeline and Initial Actions

2020

Meet with Michigan Saves to initiate concept. Work on program design and secure lenders.

2021

Launch loan loss reserve.

2022

Monitor progress and revise.



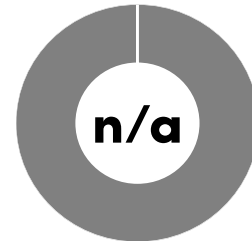
ACTION 5: Establish Loan Loss Reserve

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$1,578,000

Greenhouse Gas Reduction Potential



This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and small businesses with lower credit scores being able to access financing for energy efficiency, renewable energy, electrification, and other activities outlined in this plan.

ESTABLISH LOAN LOSS RESERVE



6. DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM

Many of the actions proposed rely on effective, inclusive, and accessible community engagement programs to reach the required levels of participation to achieve carbon neutrality. The City of Ann Arbor proposes creating an easy to use energy concierge service to help residents and businesses understand the best, highest impact, and most affordable methods to carry out greenhouse gas reduction activities.

Vision for Energy Concierge and Community Engagement

It is 2030, and through an easy to reach energy concierge service and effective, widespread community education, we have reached our carbon neutrality goal. Efforts to install renewable energy, improve energy efficiency, and transition away from fossil fuels have been coordinated at both a community-wide and individual level to ensure that we use the least amount of energy possible.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Contractors
- Michigan Saves
- Solarize Coordinator
- DTE Energy

Assumptions

- Programs are highlighted through the concierge that serve all members of our community
- High levels of outreach achieved for all sectors of our community

Equity Impacts

Property owners, including owners of rental housing, will primarily benefit from this program. Low-income residents may benefit from programs targeted to help them achieve energy savings.

Indicators of Success / Goals

By 2025, the Energy Concierge has helped 2,500 Ann Arborites access energy-related program, funding, and support resources, leading to the implementation of activities that have reduced community-wide greenhouse gas emissions.

Target Demographic

This action is foundational to the entire carbon neutrality effort, and includes all Ann Arborites

Timeline and Initial Actions

2021

The City develops an energy concierge and engagement program and soft launches

2022

The program continues to operate throughout the community even after carbon neutrality is achieved. The program is continuously improved based on community needs and emerging programs



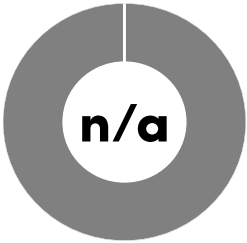
ACTION 6: Develop Energy Concierge and Community Engagement

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$820,000

**Greenhouse Gas
Reduction Potential**



This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to find, access, and implement energy efficiency, renewable energy, electrification, and other activities outlined in this Plan.

DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM



7. TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY

Through a deep and collaborative partnership, the Office of Sustainability and Innovations and the Ann Arbor Housing Commission have been working to transition all existing and new affordable housing sites to net zero energy. These systems are also being designed to handle electric vehicle charging and battery storage.

Vision for Net Zero Energy Affordable Housing

Every affordable housing site in the City is net zero energy by 2030. Savings accrued through the program are directly invested in more programming for Housing Commission tenants and into more affordable housing sites.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Ann Arbor Housing Commission

Equity Impacts

Ann Arbor Housing Commission funding that would have assisted in paying energy bills can be redirected to help meet Ann Arbor's annual affordable housing goals.

Collaborators / Project Co-Designers

- UM Battery Lab
- Energy Contractors
- U.S. Housing and Urban Development
- DTE Energy

Indicators of Success / Goals

By 2030, every affordable housing site in the City is net zero energy.

Assumptions

- The Office of Sustainability and Innovations continues to provide \$200,000 to support energy efficiency improvements and renewable energy at Housing Commission sites through 2021
- Starting in 2022 through 2025, the Office of Sustainability and Innovations provides \$100,000 in direct support to the Housing Commission
- Fundraising is conducted to finance the rest of the energy improvements

Target Demographic

Those currently residing in affordable housing and those in need of affordable housing

Timeline and Initial Actions

2020

City continues partnership with AAHC to retrofit existing facilities to highest energy standards possible.

2021

City seeks external funding to support more rapid transition of sites.



ACTION 7: Transition Affordable Housing Sites to Net Zero Energy

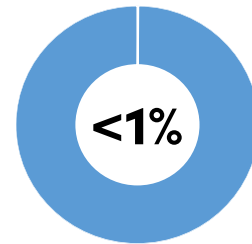


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$800,000

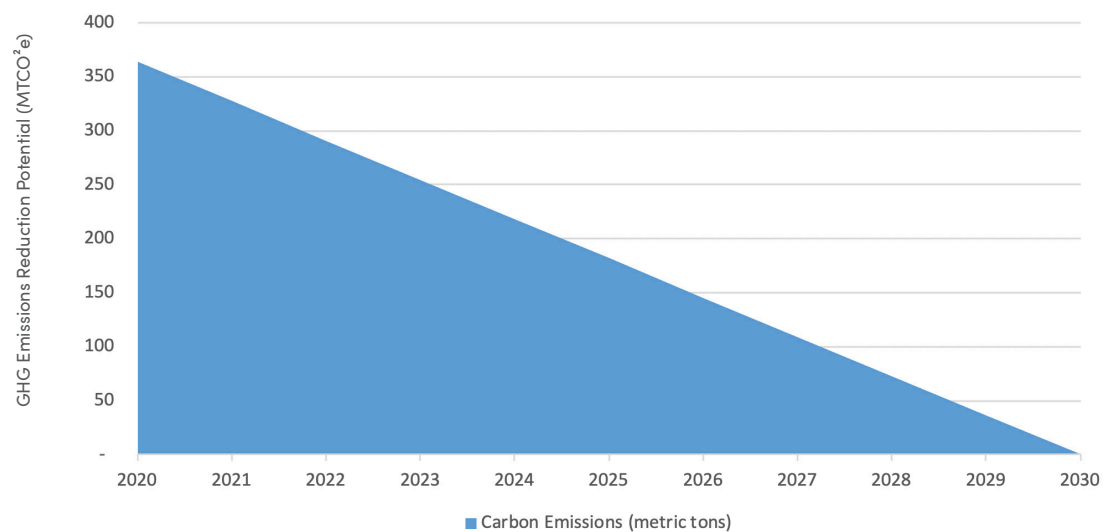
Greenhouse Gas Reduction Potential



400 metric tons of carbon dioxide equivalent (less than 1% of community-wide emissions)

By 2030, the **Transition Affordable Housing Sites to Net Zero Energy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY



8. PROMOTE GREEN RENTAL HOUSING PROGRAM

The Green Rental Housing Program improves energy efficiency and reduces greenhouse gas emissions associated with our rental buildings. Since rental units make up 55% of Ann Arbor's housing stock, actions in this area are vital to reducing greenhouse gas emissions. The Green Rental Housing program is accomplished by adding energy efficiency requirements into the existing City rental licensing process, thereby ensuring that every rental unit in Ann Arbor meets a minimum energy efficiency performance standard. Trainings, rebates, and financing support are provided as well to help transition rental units to greater efficiency.

Vision for Promoting Green Rental Housing Program

Renters are living in vastly more energy efficient homes and are saving on their energy bills and/or rents. Property owners are investing in the value of their properties and are seeing increased tenant retention and satisfaction.

Party Responsible for Implementation

- Office of Sustainability and Innovations and Community Services

Equity Impacts

Renters in Ann Arbor may be able to rent more energy efficient homes as soon the ordinance goes into effect, and as more buildings become more energy efficient.

Collaborators / Project Co-Designers

- Rocky Mountain Institute
- Urban Sustainability Directors Network
- University of Michigan's Beyond the Diag
- Washtenaw Area Apartment Association
- Michigan Saves
- DTE Energy

Indicators of Success / Goals

10% reduction in energy usage in rental properties within the City by 2030.

Assumptions

- We are able to integrate energy efficiency requirements into existing City rental licensing processes
- 80% compliance with the policy after the policy has been in effect for 4 years
- No net increase in average rents, outside of normal market inflation, 5 years post policy adoption

Target Demographic

Renters in Ann Arbor, with a special emphasis on low-income and student renters

Timeline and Initial Actions

2020

Stakeholder engagement and policy development commences.

2021

Policy brought forward and adopted by Council; workforce development and training begins to administer the program.

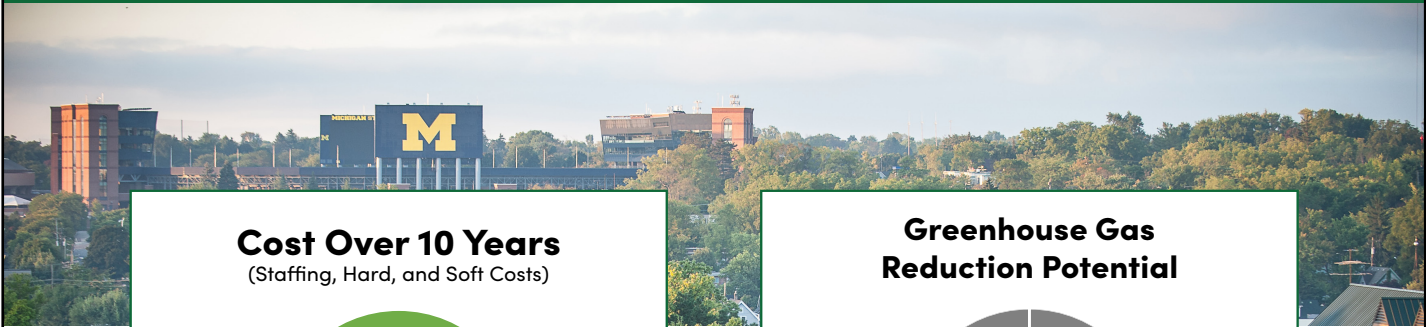
2022

Policy goes into effect.

2025

Policy reviewed and revised, if needed.

ACTION 8: Promote Green Rental Housing Program

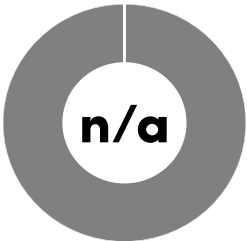


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$530,000

**Greenhouse Gas
Reduction Potential**



Impact of this action is included in other calculations.

PROMOTE GREEN RENTAL HOUSING PROGRAM



9. LAUNCH GREEN BUSINESS CHALLENGE

This action encourages our businesses to engage in more sustainable behaviors by providing technical assistance, guidance, and recognition to local businesses that voluntarily become more sustainable and lower their environmental footprint. At the core of the program are energy efficiency, renewable energy usage, waste reduction and material reuse, water reduction, and alternative transportation.

Vision for Launching Green Business Challenge

Ann Arbor businesses are some of the most sustainable in the nation, thanks in part to the City's Green Business Challenge. By providing incentives, guidance, and recognition for local businesses, the Green Business Challenge helped businesses lower their operating costs and reduce their environmental footprints. It has also increased support for the City's thriving small, medium, and large businesses.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department, with support from the Office of Sustainability and Innovations

Equity Impacts

Few equity impacts.

Indicators of Success / Goals

By 2025, participating businesses have reduced their energy consumption by 10%, increased waste diversion by 10%, reduced water consumption by 10%, and eliminated single-use plastics.

Collaborators / Project Co-Designers

- Ann Arbor – Ypsilanti Regional Chamber of Commerce
- Ann Arbor SPARK
- Public Services
- DTE Energy
- Consumers Energy
- Ecology Center
- Huron River Watershed Council
- Michigan Saves
- Local banks
- Downtown Development Authority
- Ann Arbor 2030 District
- TheRide

Assumptions

- 2030 District is a partner in educating and engaging/recruiting businesses
- 50 local businesses are participating by 2025

Target Demographic

Local businesses – initially those in the downtown but eventually any local business in town

Timeline and Initial Actions

2020

Launch Green Business Challenge stakeholder committee.

2021

Design the Challenge; recruit participants.

2022

Administer the first year of the Challenge.



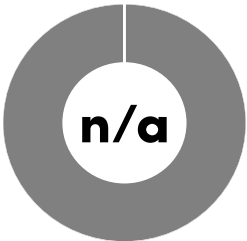
ACTION 9: Launch Green Business Challenge

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$700,000

**Greenhouse Gas
Reduction Potential**



Impact of this action is included in other calculations.

LAUNCH GREEN BUSINESS CHALLENGE



10. SUPPORT AGING IN PLACE EFFICIENTLY

The Aging in Place Efficiently program helps low-income seniors age in a place of their choosing for longer by providing physical and energy efficiency improvements to their residences. More specifically, this program aims to integrate energy efficiency improvements into a wide variety of existing services available to seniors in our community.

Vision for Supporting Aging in Place Efficiently

It is 2035 and all low-income seniors in our community have healthier outcomes. Thanks to physical improvements to their homes and energy efficiency upgrades that reduce their monthly expenditures, they are able to age gracefully and stay in their homes longer.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- Washtenaw County Department of Community and Economic Development
- Meals on Wheels

Equity Impacts

This program will provide expanded weatherization services to a broader segment of low-income senior citizens than the County program is allowed to currently serve.

Collaborators / Project Co-Designers

- Local aging organizations
- Energy efficiency experts
- Michigan Saves
- Dr. Tony Reames
- DTE Energy
- Housing Bureau of Seniors
- City Transportation Team
- TheRide

Indicators of Success / Goals

By 2023, at least 20 low-income seniors have reduced their energy bills by at least 15% and are recording improved quality of life thanks to improvements made in the program.

Assumptions

- Funding is secured through Partners for Places Grant
- Existing partners continue to engage in the initiative
- The model proves scalable and replicable throughout the City and region

Target Demographic

Low-income seniors

Timeline and Initial Actions

2020

Apply for external funding to initiate program. If successful, hire program assistant.

2021

Pilot the program in Ann Arbor.

2022

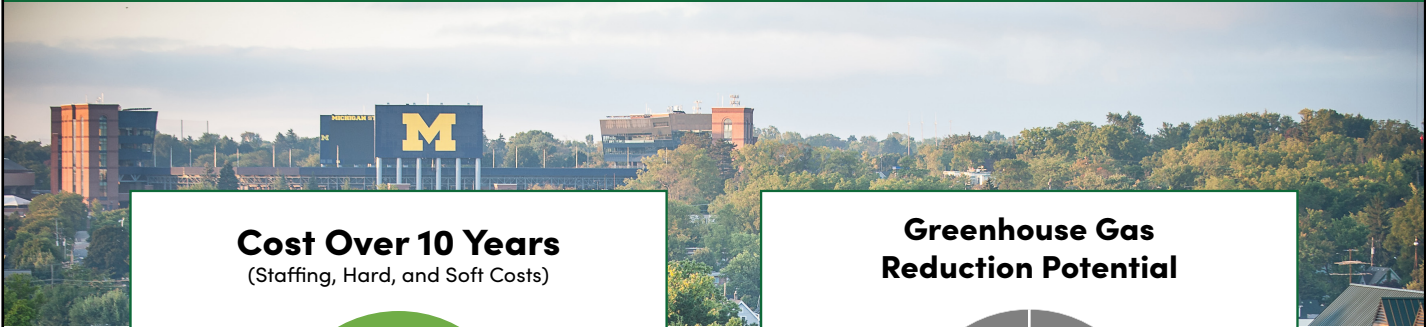
Review, make revisions, and work with partners to expand in Ann Arbor and begin piloting throughout Washtenaw County.

2025

Program at full scale in the City and launched in the County.



ACTION 10: Support Aging in Place Efficiently

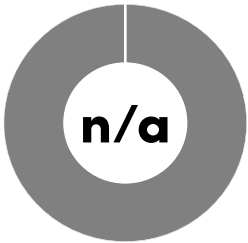


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$150,000

**Greenhouse Gas
Reduction Potential**



Impact of this action is included in other calculations.

SUPPORT AGING IN PLACE EFFICIENTLY



11. EXPAND WEATHERIZATION PROGRAM

Washtenaw County and multiple nonprofits offer weatherization services to low-income homeowners in Ann Arbor. Weatherization is the practice of protecting a building and its interior from the elements, particularly from sunlight, precipitation, wind, and of modifying a building to reduce energy consumption and optimize energy efficiency. Through this program, the City of Ann Arbor will expand weatherization support so that more low-income homeowners can access these services.

Vision for Expanding Weatherization

By 2030, all low-income residents have been offered weatherization services.

Party Responsible for Implementation

- Washtenaw County Office of Community and Economic Development

Equity Impacts

This program will expand weatherization services to more low-income Ann Arbor homeowners than can be served by the County weatherization program.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Michigan Saves
- Ann Arbor Meals on Wheels
- Habitat for Humanity
- DTE Energy
- Consumers Energy

Indicators of Success / Goals

By 2030, all low-income residents in the City have been offered weatherization services.

Assumptions

- Expansion of weatherization includes funding to support electrification of homes
- Contract is passed by Council to support program and administering of funds to County to implement

Target Demographic

Low-income residents in Ann Arbor

Timeline and Initial Actions

2020

Background research into the number and needs of low-income homeowners in Ann Arbor; work with County Office of Community and Economic Development to design weatherization expansion program.

2021

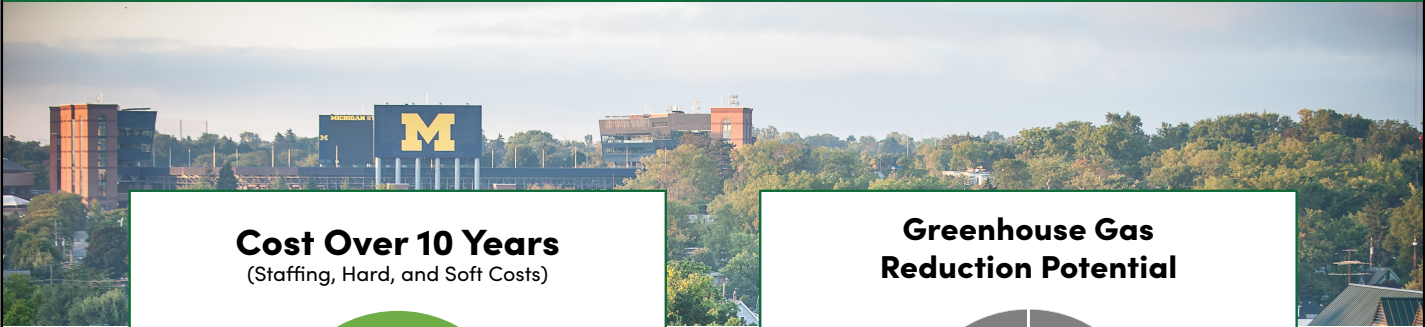
Create operating agreements with Washtenaw County and pilot program.

2022

Review, make revisions, and work to serve more individuals in Ann Arbor.



ACTION 11: Expand Weatherization Program

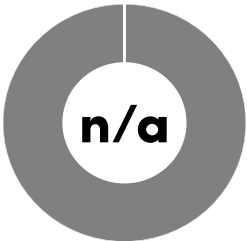


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$1,550,000

**Greenhouse Gas
Reduction Potential**



Impact of this action is included in other calculations.

EXPAND WEATHERIZATION PROGRAM





STRATEGY 4:

Reduce the Miles we Travel in our Vehicles by at least 50%

This strategy focuses on reducing the miles we travel in our vehicles, regardless of type, by at least 50%. This is particularly important as emissions from transportation are on the rise, meaning that if we don't act to curtail this source, our greenhouse gas emissions reductions in other areas may be offset by gains in transportation-related emissions. To achieve this strategy, 7 specific actions have been identified:

1. Implement Non-Motorized Transportation Plan
2. Expand and Improve Local Transit
3. Expand and Improve Regional Transit
4. Increase Number of Park and Rides and Ensure Seamless Connection to Transit
5. Increase Diversity of Housing
6. Establish Mixed-Use Neighborhoods
7. Tiered Parking Rates

Combined, these seven actions are projected to reduce just over 8% of community-wide emissions and cost just over \$901,000,000 due to mainly physical infrastructure costs.

STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

1. IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN

The City's Non-Motorized Transportation Plan was designed to ensure an interconnected network of options to achieve 25% of in-city trips through non-motorized transit. New infrastructure such as sidewalks, road crossings, separated bike lanes, streetlights, traffic devices, and connections between public transit and active transport modes will be needed to achieve this goal, which strongly overlaps with the A²Zero initiative.

Vision for Implementing Non-Motorized Transportation Plan

All Ann Arbor residents, employees, students, and visitors have safe, convenient, and enjoyable choices to move around the City, whether by foot, bicycle, or other self-propelled modes.

Party Responsible for Implementation

- Ann Arbor Engineering Department Transportation Team, with support from Ann Arbor City Council

Collaborators / Project Co-Designers

- Transportation Department
- Transportation Commission
- Planning Commission (Capital Improvement Plan)
- Downtown Development Authority
- Ann Arbor Area Transit Authority
- Michigan Department of Transportation
- Washtenaw Bicycling and Walking Coalition
- University of Michigan
- Smart City group
- Private micromobility companies
- Private employers

Equity Impacts

Residents who cannot afford to buy and maintain private automobiles often bike, walk, or travel by micromobility modes. Investing in new infrastructure will enable those already using non-motorized modes of travel to have safer, more convenient, and faster trips. These investments will also encourage more residents to travel by bike or foot. However, pedestrians and cyclists are often vulnerable road users, and have faced increasing injuries and deaths from traffic collisions. Safe, ubiquitous infrastructure is needed.

Indicators of Success / Goals

By 2030, 25% of in-city trips are conducted by walking or bicycling thanks to ubiquitous and safe infrastructure.

Assumptions

- 25% of in-city trips are done with bicycling and walking
- These trips are in-city trips only
- 5 miles of new bike lanes installed per year – the majority are protected
- At least 5 major mid-block crosswalks and 2 minor mid-block crosswalks installed per year
- 90% of sidewalk gaps are filled by 2030

Target Demographic

Implementing the Non-Motorized Transportation Plan will primarily benefit pedestrians and bicyclists, although the increased safety and access to infrastructure will also reduce vehicle collisions. Drivers will also benefit from less congested streets as people switch to walking and biking.

Timeline and Initial Actions

2020

Continue implementing elements on the Non-Motorized Plan. Finalize the VisionZero Transportation Plan update.

2021

Continue hosting public meetings to understand weaknesses in current infrastructure and opportunities for improvement.

2026

Full implementation of the Non-Motorized Transportation Plan.



ACTION 1: Implement Non-Motorized Transportation Plan



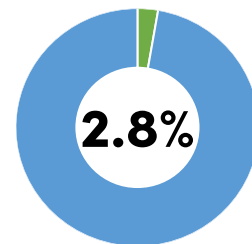
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$2,400,000

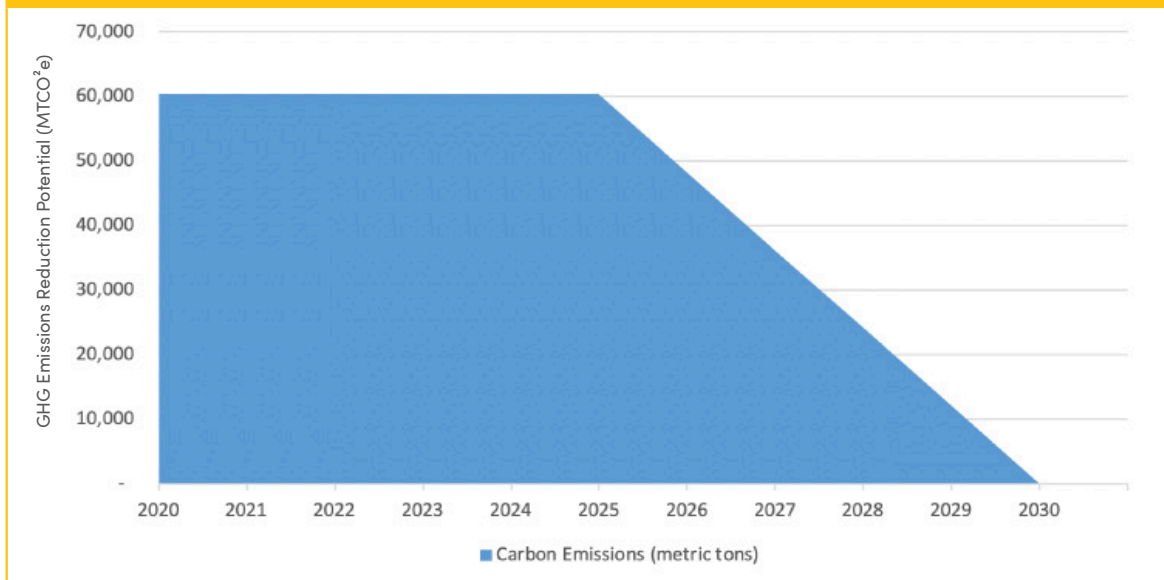
Greenhouse Gas Reduction Potential



60,400 metric tons carbon dioxide equivalent (2.8% of community-wide emissions).

By 2030, the **Implement Non-Motorized Transportation Plan** strategy will have achieved all of its potential greenhouse gas emissions reductions.

IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

2. EXPAND AND IMPROVE LOCAL TRANSIT

An extremely common theme during public outreach was the need to expand and improve local transit services. Ideas suggested included longer service, new service routes, dedicated bus lines and bus rapid transit along major transportation corridors, and expanding the Get Downtown Program to companies outside of downtown. This action focuses on how we can expand and improve transit service with the aim of significantly increasing ridership.

Vision for Expanding and Improving Local Transit

By 2030, ninety-five percent of Ann Arbor residents have access to transit within a 10 minute walk with frequencies of 20 minutes or faster. This leads to residents taking transit for 40% of their journeys to work. This extensive transit service is powered with electric vehicles, all fueled with renewable energy.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Collaborators / Project Co-Designers

- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments (SEMCOG)
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration (FTA)
- Senator Stabenow, Senator Peters, and Congresswoman Dingle
- Downtown Development Authority (DDA)
- University of Michigan
- Michigan Department of Transportation (MDOT) SPARK
- Ann Arbor 2030 District
- Ann Arbor Engineering Department
- Transportation Team
- Private employers

Equity Impacts

Those who stand to benefit the most are those who may not have access to many forms of transportation due to disability, age, or income. The entire community can become economically stronger and more resilient from investments such as improved transit since investments in public transportation generate 31 percent more jobs per dollar than new construction of roads and bridges. Since property values tend to increase with new transit investments which would directly benefit property owners, it is important to find ways of keeping fares low for these new services so low-income residents are not disproportionately burdened by these improvements.

Indicators of Success / Goals

Residents take transit for 40% of their journeys not done through walking and biking.

Target Demographic

All residents of Ann Arbor

Timeline and Initial Actions

2020

Vision Zero Transportation Master Plan is finished and adopted by Council. Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal.

2021

The Get Downtown Program is expanded to include all businesses with more than 20 employees in Ann Arbor, and also to Ann Arbor residents who are not working for a participating company.

2030

Bus Rapid Transit is built along transportation corridors.



ACTION 2: Expand and Improve Local Transit

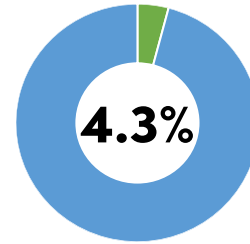
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$656,780,000

Greenhouse Gas Reduction Potential



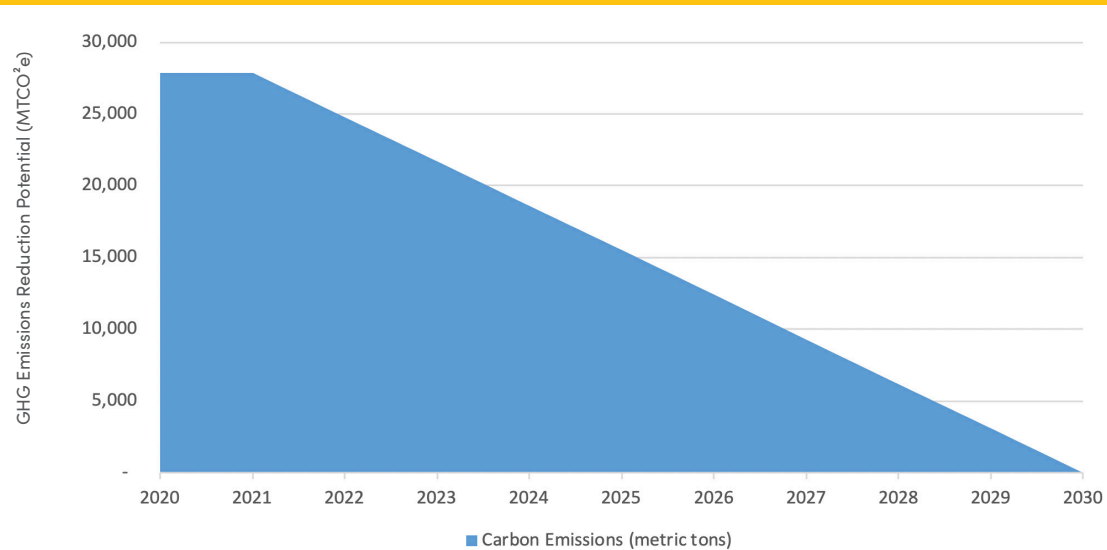
93,200 metric tons carbon dioxide equivalent (4.3% of community-wide emissions).

Assumptions

- Quadrupling of current bus ridership, with the average of 3.5 miles per trip
- Includes costs of new bus rapid transit lines
- Weekday bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 5 days a week, or 48 weeks
- Weekend bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 2 days a week, for 52 weeks
- Includes 22 queue jump facilities for regular buses
- Includes stop amenities and signal priority equipment for priority corridors
- Only calculates emissions reductions starting at the border of Ann Arbor (note: staff are working to gather comprehensive origin and destination data to update these figures)
- 2 new electric buses a year for 10 years added to the fleet to expand service

By 2030, the **Expand and Improve Local Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE LOCAL TRANSIT



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

3. EXPAND AND IMPROVE REGIONAL TRANSIT

Upwards of 80,000 individuals commute into Ann Arbor on any given day for work, school, or recreation. Regional transit service can help significantly reduce these numbers, thereby decongesting roads, improving local health, and reducing stress. Regional transit service into and from Plymouth, Jackson, Detroit, Brighton, Ypsilanti, and Ypsilanti Township are the areas prioritized at this time.

Vision for Expanding and Improving Regional Transit

By 2030, a high capacity transit and express transit system exists that connects Ann Arbor with nearby jurisdictions such as Detroit, Ypsilanti, Chelsea, and Brighton. Twenty-five percent of commuter trips into and out of Ann Arbor occur through these highly effective regional transit services.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Equity Impacts

High capacity regional transit and express transit will primarily benefit commuters to and from Ann Arbor. Such service would broaden opportunities and access to jobs for those without access to other forms of transportation. Quality regional transit can also attract occasional riders and all-purpose riders who find it desirable to take transit to and from Ann Arbor to avoid traffic, parking fees, and the hassles of driving. It will be important to ensure that low-income riders have convenient and affordable access to expanded transit opportunities.

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Washtenaw, Oakland, and Wayne counties and the cities and townships in those counties
- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration
- Federal Railroad Administration WATCO
- Senator Stabenow, Senator Peters, and Congresswoman Dingell
- University of Michigan
- Michigan Department of Transportation

Indicators of Success / Goals

By 2030, 25% of the regional commuting trips into the City are done via regional transit options.

Assumptions

- Bus rapid transit lines are created and can be utilized by regional transit lines
- The average regional trip is 8 miles or less, running 5 days a week for 48 weeks
- 25% of the commuter trips will be taken by regional transit
- Includes calculations related to supporting more work from home programs. Estimated 5% participation rate for those with a one-way commute of 10 miles or less and a 10% participation rate for those with a one-way commute of 11 miles or more.

Target Demographic

Regional transit will primarily benefit people who work or school in Ann Arbor and the jurisdictions where transit stops exist

Timeline and Initial Actions

2020

Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal. Regional transit to Detroit is established.

2021

Regional transit to surrounding municipalities is established.



ACTION 3: Expand and Improve Regional Transit



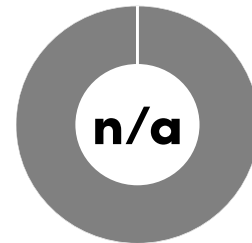
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



The majority of costs for this action are covered in other actions.

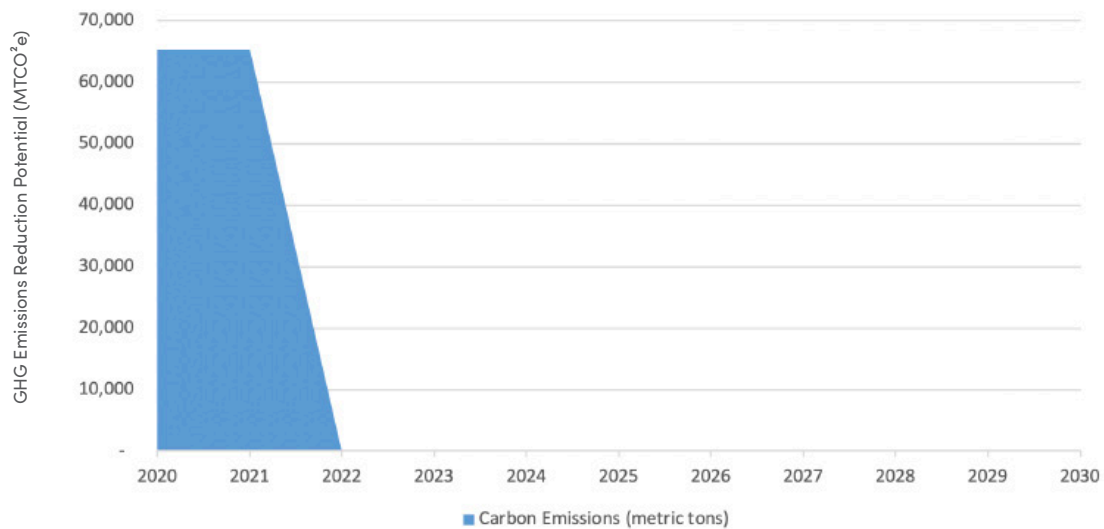
Greenhouse Gas Reduction Potential



The greenhouse gas reduction potential of this action is captured in other actions

By 2022, the **Expand and Improve Regional Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE REGIONAL TRANSIT



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

4. INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT

More than 80,000 individuals commute into the City every day for work, school, or recreation. Intercepting people as soon as they arrive and diverting vehicular traffic to park and rides that provide electric vehicle charging and seamless connection to public transit so they can rapidly get to where they need to go is an important component of reducing vehicular miles traveled in the city. Right now, there are just over 1,300 available free Park and Ride parking spaces. We propose at least a 10x increase in the number of spots to reduce in-city traffic.

Vision for Increasing Park and Rides with Seamless Connection to Transit

Through a significant increase in park and ride infrastructure that is seamlessly connected to transit, we have displaced 25% of commuter trips into the City.

Party Responsible for Implementation

- Michigan Department of Transportation with support from the Ann Arbor Area Transit Authority

Equity Impacts

Park and Rides primarily benefit commuters coming into Ann Arbor, including low-income residents of nearby towns. Parking at Park and Rides would remain free, which would save drivers money, as compared to paying for parking downtown.

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Downtown Development Authority
- Washtenaw Area Transportation Study
- Employers
- Transportation

Indicators of Success / Goals

By 2030, commuter trips from the border of the City to their destination within the City has declined by 25%.

Assumptions

- 10x more parking spots are provided at park and rides; These spots are free
- Increased transit ridership accounted for in other actions
- Integrates demand management programs such as carpooling and ridesharing

Target Demographic

Transit riders, bicyclists, pedestrians, and car drivers would all benefit from reduced traffic congestion in the downtown core and by major work and educational centers

Timeline and Initial Actions

2020

Initiate planning for desired park and ride locations.

2021

Begin working with MDOT to acquire necessary properties and fundraise for infrastructure costs.

2023

Begin building new park and ride lots.

ACTION 4: Increase Number of Park and Rides to Ensure Seamless Connection to Transit



Cost Over 10 Years

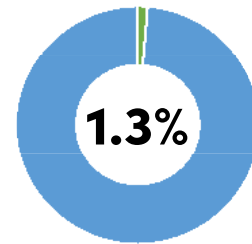
(Staffing, Hard, and Soft Costs)



\$170,000,000

(Note: This does not include the costs to purchase the land on which park and rides will reside)

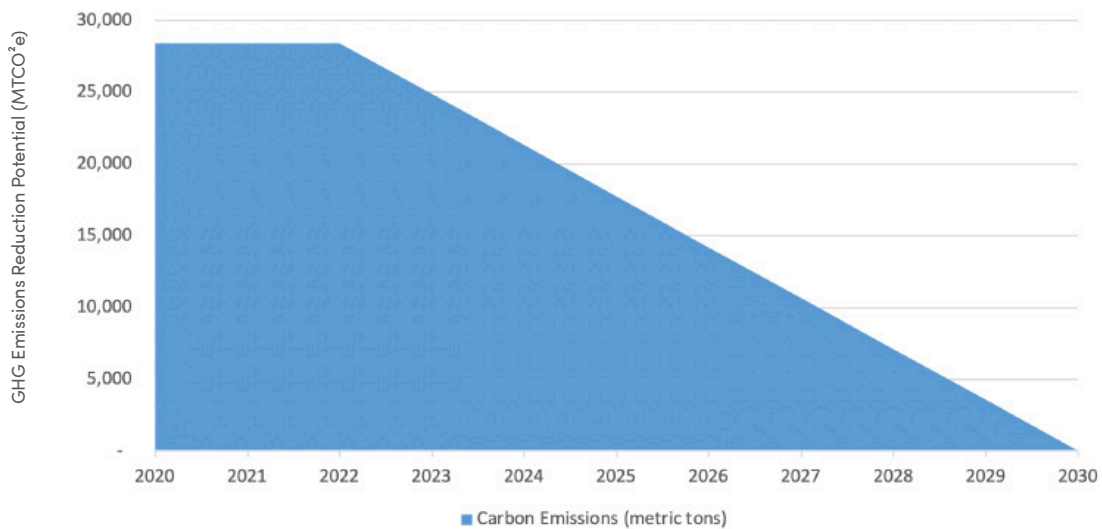
Greenhouse Gas Reduction Potential



28,400 metric tons carbon dioxide equivalent (1.3% of community-wide emissions).

By 2030, the **Increase Number of Park and Rides and Ensure Seamless Connection to Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

5. INCREASE THE DIVERSITY OF HOUSING

This action focuses on supporting policies to increase housing opportunities within the City. This action was identified numerous times as a way to reduce greenhouse gas emissions, diversify housing options, and address affordability concerns. Overall, this action focuses on increasing the walkability and livability of neighborhoods while creating more accessible housing to a wider array of community members.

Vision for Increasing the Diversity of Housing

Ann Arbor neighborhoods grow slightly while maintaining their character and charm. Ann Arbor begins meeting its goal for reducing single occupancy trips by half while making notable progress toward providing more accessible and affordable housing.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Equity Impacts

Allowing, multi-units and promoting ADUs will benefit renters, lower-income residents, in-commuters, and project developers. Reduced income disparity benefits all of Ann Arbor, both socially and economically.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Ann Arbor Housing Alliance
- Ann Arbor Historic District Commission

Indicators of Success / Goals

2,000 new units of residential multi-family or ADUs are built in residential neighborhoods by 2030.

Assumptions

- City Council will approve an updated Comprehensive Master Plan
- 7-10% increase in housing availability
- Reduces new occupants commute by 20 miles each way and increases public transit usage
- 85% of new residential units are in mixed use areas

Target Demographic

Renters and property owners

Timeline and Initial Actions

2020

Public Engagement on Master Plan Update.

2021

Complete Comprehensive Master Plan Update. Present to Planning Commission and Council.

2024

If needed, zoning code amendments are adopted and implementation begins.

2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.

ACTION 5: Increase the Diversity of Housing

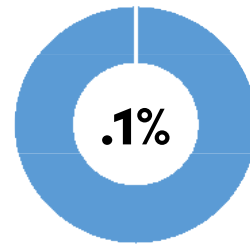


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$250,000

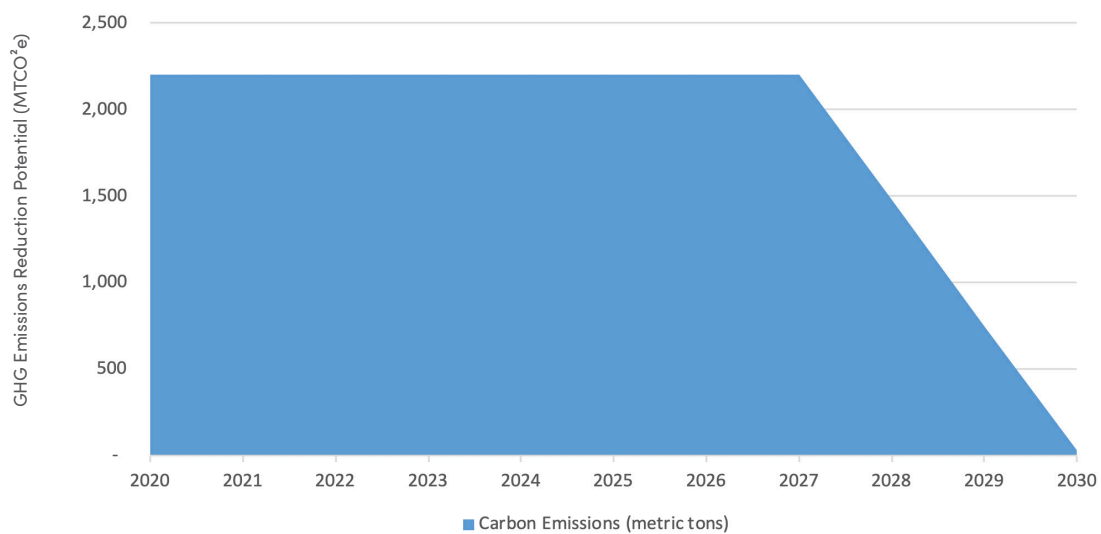
Greenhouse Gas Reduction Potential



2,200 metric tons of carbon dioxide
equivalent (.1% of community-wide
emissions)

By 2030, the **Increase the Diversity of Housing** action will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE THE DIVERSITY OF HOUSING



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

6. DEVELOP MIXED-USE NEIGHBORHOODS

Helping residents walk and bike to places of their choosing necessitates having the proper infrastructure in place as well as having the places they desire going within walking and biking distance. This action focuses on updating the zoning code to allow mixed-uses in residential neighborhoods so that things such as bakeries, grocery stores, breweries, coffee shops, etc. can be accessible in nearly all of our neighborhoods. This increases walkability and reduces vehicular miles driven.

Vision for Developing Mixed-Use Neighborhoods

More errands and entertainment are accessible by foot and bike thanks to mixed-use zoning, which has allowed us to maintain the integrity of Ann Arbor's neighborhoods while adding in amenities that enhance quality of life.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Equity Impacts

Increasing mixed-use zoning positively impacts residents and small business owners in mixed use neighborhoods.

Collaborators / Project Co-Designers

- Neighborhood associations
- Local businesses
- Ann Arbor Historic District Commission

Indicators of Success / Goals

By 2030, 20% of in-city trips are done by walking or biking

Assumptions

- Increased social cohesion
- Increased walking and biking
- Reduced driving and car ownership in mixed use neighborhoods

Target Demographic

Residents and small business owners

Timeline and Initial Actions

2020

Initiate Comprehensive Master Plan Update.

2021

Complete Comprehensive Master Plan Update. Start working on corresponding zoning amendments.

2024

Zoning code amendments are adopted and implementation begins.

2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.

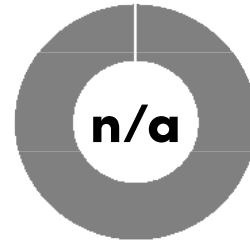
ACTION 6: Develop Mixed-Use Neighborhoods

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$365,000

Greenhouse Gas Reduction Potential



Emissions reduction potential included in other actions.

DEVELOP MIXED-USE NEIGHBORHOODS



STRATEGY 4: Reduce the Miles we Travel in our Vehicles by at least 50%

7. ESTABLISH TIERED PARKING RATES

This action focuses on dis-incentivizing driving into the City by having a sliding parking fee structure that increases the cost to park, but has lower rates for low-income residents, residents with disabilities/specific parking needs, and electric vehicle drivers. This includes deploying smart metering and establishing dynamic pricing. Excess on-street parking in the DDA will be removed and replaced with more beneficial street uses, such as infrastructure for pedestrians, bicyclists, transit, and street activities (such as outdoor restaurant seating). Action includes eliminating all parking minimums and setting low parking maximums through the Plan review process.

Vision for Establishing Tiered Parking Rates

Many city streets will be transformed into Complete Streets through the repurposing of on-street parking to more active and pedestrian friendly activities.

Party Responsible for Implementation

- Downtown Development Authority with the Ann Arbor Engineering Department Transportation Group

Collaborators / Project Co-Designers

- Michigan Department of Transportation
- Office of Sustainability and Innovations
- Transportation Commission
- Ann Arbor 2030 District
- Ann Arbor Area Transit Authority
- Ann Arbor Smart City group
- University of Michigan
- Planning Department
- Planning Commission
- US Department of Transportation

Equity Impacts

Biking and walking become safer and more convenient ways to get around, which will open more mobility options for lower-income residents who cannot afford a car. For lower-income residents who must drive, parking rates will be tiered so as to offer lower cost options.

Indicators of Success / Goals

10% increase in walking and biking in the downtown corridor.

Assumptions

- More transportation users help active and sustain transportation modes
- Reduced parking rates for EV drivers and for low-income drivers

Target Demographic

This action will prioritize users of active and sustainable transportation modes

Timeline and Initial Actions

2020

Investigate what equipment and software other cities have used to enable dynamic parking rates.

2021

Develop a partnership to launch new parking technology and pilot dynamic parking rates somewhere in the DDA; eliminate parking minimums in UDC and replace with parking maximums.

2022

Full scale launch of tiered rates.

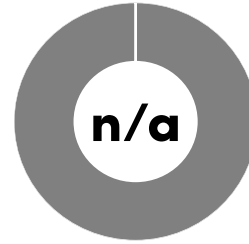
ACTION 7: Establish Tiered Parking Rates

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$4,500,000

Greenhouse Gas Reduction Potential



Emissions reduction potential included in other actions.





STRATEGY 5:

Change the Way We Use, Reuse, and Dispose of Materials

This strategy focuses on changing our relationship with what we buy and use, how we buy and use materials, and how we dispose of materials once we are done using them. The calculations in this section only focus on the greenhouse gas savings associated with reducing the disposal of materials and products. City staff will continue working on a methodology to capture upstream emissions associated with extracting and creating the goods and materials we use. For now, however, upstream emissions are not included in calculations. To achieve this strategy, six specific actions have been identified:

1. Expand Composting Program
2. Expand Commercial Recycling
3. Require Sustainable Materials in New and Existing Developments
4. Move Toward a Circular Economy
5. Support a Plant Rich Diet
6. Enhance Refrigerant Recycling and Reuse Program

Combined, these six actions reduce baseline community-wide greenhouse gas emissions by 0.3% and cost just over \$45,000,000.

STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

1. EXPAND COMPOSTING PROGRAM

The action focuses on moving to year round composting, which includes diverting food and yard waste from the waste stream into more productive uses in our compost system. This reduces methane emissions and helps produce valuable compost that can be used locally.

Vision for Expanding Compost Program

As food waste gets discarded as compost there's a gross reduction in the amount of methane produced from rotting food and a reduced impact on our GHG production.

Party Responsible for Implementation

- Department of Public Works

Equity Impacts

Through the new market for imperfect produce, low-income residents could benefit from being able to access more affordable fruits and vegetables.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Food collection and distribution organizations
- Restaurants
- Communication Department

Indicators of Success / Goals

By 2022, year round and commercial composting has led to over 5,000 tons of yard and food waste being diverted from our waste stream annually.

Assumptions

- Solid Waste Resource Management Plan (SWRMP) estimates that increasing to year round composting would put collection at 1,000 – 2,784 tons
- SWRMP estimates increasing collection of food from food-related businesses would add another 1,000– 2,400 tons per year
- Includes creating markets for imperfect fruit and vegetables to ensure they don't enter waste stream
- Increased education to ensure food waste doesn't freeze to cart
- Necessitates changes in the downtown area to allow compost pick-up; These costs are not factored into the cost estimate below

Target Demographic

All business and residences in Ann Arbor

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan or at least elements related to compost expansion.

2021

Year round composting begins along with extensive outreach and engagement with businesses and residents about what is compostable and what is not.



ACTION 1: Expand Composting Program



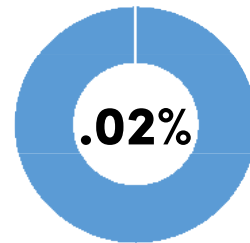
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$26,000,000

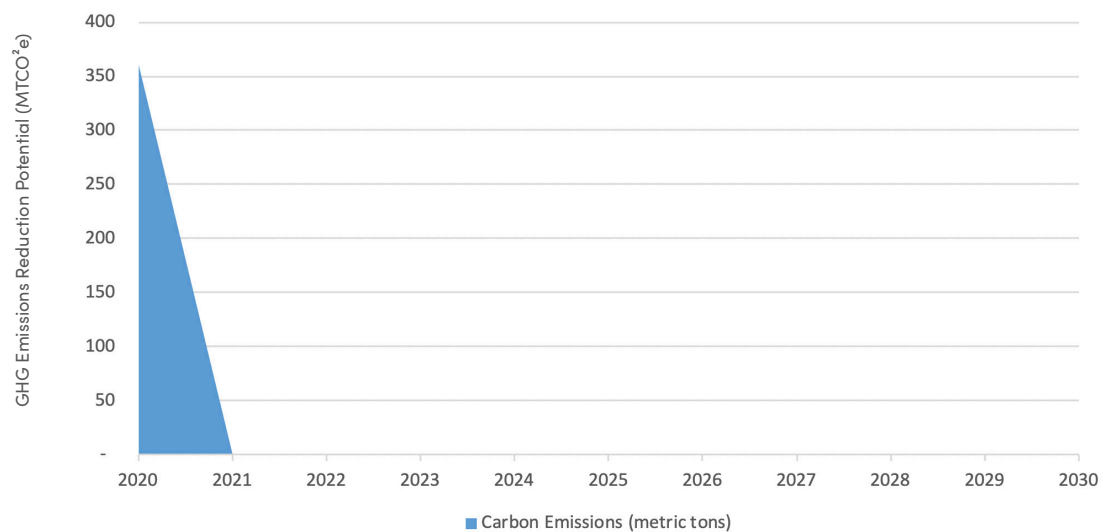
Greenhouse Gas Reduction Potential



400 metric tons carbon dioxide equivalent
(.02% of community-wide emissions)

By 2021, the **Expand Composting Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMPOSTING PROGRAM



STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

2. EXPAND COMMERCIAL RECYCLING

Through incentives, education, and enforcement policies, this action focuses on getting commercial sector recycling rates to at least 30%.

Vision for Expanding Commercial Recycling

The Solid Waste Resource Management Plan (SWRMP) estimates a range of 1700 to 4400 tons of waste diverted from landfill as a result of increased participation in commercial sector recycling.

Party Responsible for Implementation

- Department of Public Works, with support from Resource Recycling Associates

Equity Impacts

No equity impacts explicitly identified.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Commercial businesses
- State of Michigan

Indicators of Success / Goals

By 2028, City of Ann Arbor diverts 30% of commercial sector recyclable waste from the landfill to recycling centers.

Assumptions

- Requiring recycling at restaurants will increase recycling rates in the commercial sector
- Businesses will divert more recyclables from landfill
- Commercial sector diversion rate is 4,400 annual tons
- Increase in enforcement of commercial establishments who don't recycle and compost

Target Demographic

Ann Arbor businesses

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan, or at least elements related to expanding commercial recycling, and education begins.

2021

Policies enacted and formal enforcement begins along with extensive outreach and engagement with businesses about what is recyclable and what is not.



ACTION 2: Expand Commercial Recycling



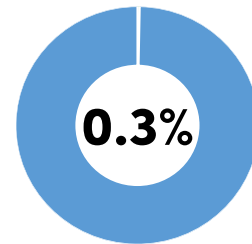
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$18,400,000

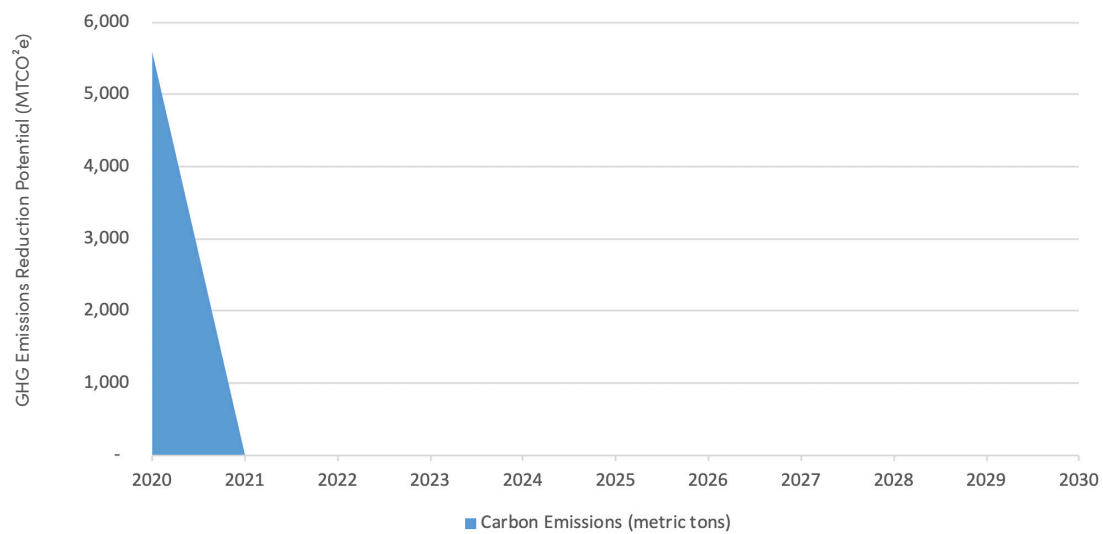
Greenhouse Gas Reduction Potential



5,600 metric tons carbon dioxide
equivalent (.3% of community-wide
emissions)

By 2021, the **Expand Commercial Recycling** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMMERCIAL RECYCLING



STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

3. REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS

This action involves the implementation of existing draft City plan for Construction and Demolition Waste to ensure 100% of debris is captured and repurposed. This includes expanding the plan to require sustainable designs in new building approval processes.

Vision for Requiring Sustainable Materials in New and Existing Developments

Ann Arbor has moved one step closer to a circular economy by removing 80% of construction and demolition waste from the landfill and supports it being repurposed for other constructive uses.

Party Responsible for Implementation

- Ann Arbor Department of Public Works, with support from Planning Department

Equity Impacts

No equity impacts explicitly identified.

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Resource Recycling Associates
- Construction community

Indicators of Success / Goals

Would consist of development of an ordinance to require construction and demolition projects to submit waste and diversion data as a component of their building permit or occupancy permit.

Target Demographic

Construction companies, developers, businesses, and community at large

Timeline and Initial Actions

2020

Review existing draft policy and revise, as necessary.

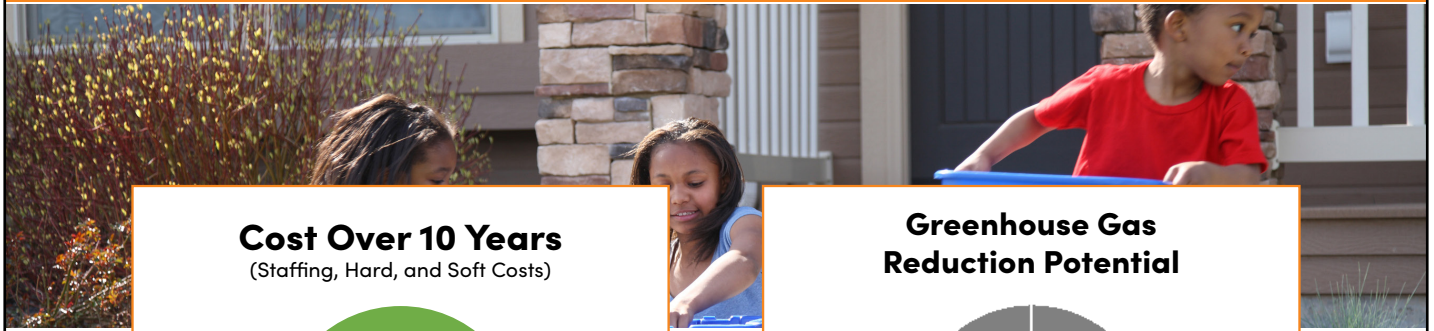
2021

Bring policy to Council for consideration. If passed, begin developing education and outreach materials immediately.

2022

Full scale implementation of policy.

ACTION 3: Require Sustainable Materials in New and Existing Developments

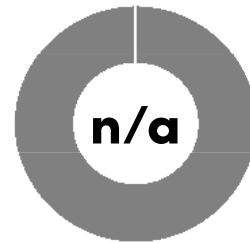


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$270,000

Greenhouse Gas Reduction Potential



Not calculated

REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS



STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

4. MOVE TOWARD A CIRCULAR ECONOMY

This action focuses on moving towards a circular economy, including actions to promote resource reduction, material reuse, and regeneration. By working with peer municipalities, we can create tools that allow for more transparency, traceability, and the calculation of embedded greenhouse gas emissions for different materials, goods, and services.

Vision Statement for Moving Toward a Circular Economy

The City of Ann Arbor will create a model of Circular Economy where goods and materials are recovered, reused, and recycled.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Equity Impacts

Lower-income residents may benefit from being able to buy repurposed and refurbished items.

Collaborators / Project Co-Designers

- Peer Municipalities
- Repair Centers
- Tool Libraries / Lending Libraries
- Thrift Stores
- Curbside textile collection companies

Indicators of Success / Goals

- Repair centers for bicycles, appliances, etc. are promoted as first choice as opposed to replacement
- Support for toy, book and tool libraries to decrease the number of new purchases
- Support for thrift stores and reuse centers, along with having curbside textile collection to reduce the number of materials entering the landfill
- There is no City-coordinated textile collection program; curbside collection of textiles would be contracted for by the City with a private collector to provide weekly curbside collection from single family homes initially with potential future expansion to multi-family properties

Target Demographic

Ann Arbor residents and businesses

Timeline and Initial Actions

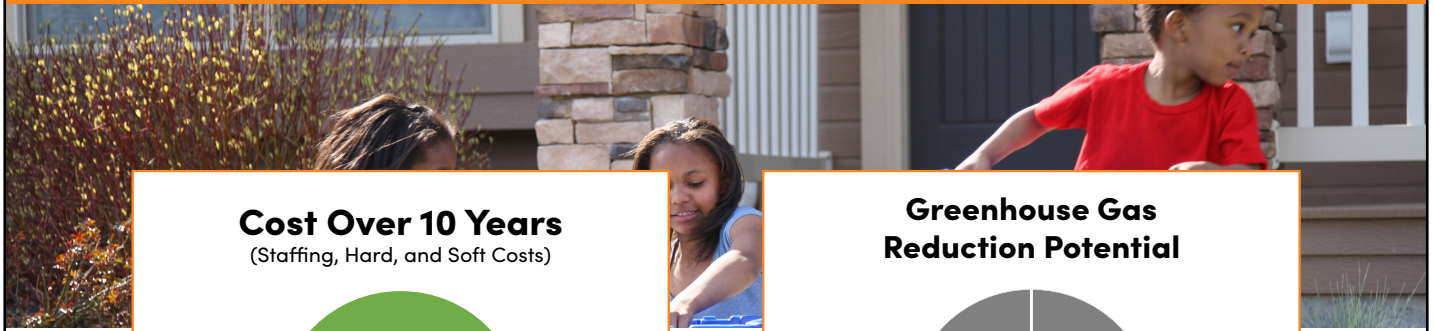
2020

Solid Waste Resource Management Plan gets adopted.

2022

Circular Economy strategy gets finalized and integrated into other planning initiatives.

ACTION 4: Move Toward a Circular Economy

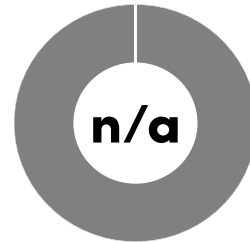


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$270,000

Greenhouse Gas Reduction Potential



Not calculated

MOVE TOWARD A CIRCULAR ECONOMY



STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

5. SUPPORT A PLANT RICH DIET

Eating less meat and more fruits, vegetables, and grains is known to reduce one's environmental footprint and improve one's overall health. This action focuses on educating the community about the benefits of reducing meat consumption. Included in the action is the exploration of a greenhouse gas emissions footprint disclosure (like a calorie disclosure) on food sold at City facilities in order to educate people on the environmental footprint of their dietary choices.

Vision for Supporting a Plant Rich Diet

Ann Arborites are healthier, happier, and more sustainable by increasing the amount of fruits, vegetables, and grains they consume and lowering the amount of meat they consume.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Farmer's Market staff

Collaborators / Project Co-Designers

- Ann Arbor City Council
- Local farmers
- Washtenaw Optimal Wellness
- Department of Public Works
- Growing Hope
- Local grocery stores
- Local Chefs and restaurant owners
- Cultural centers

Equity Impacts

Food deserts exist in our region meaning residents do not have access to healthy and nutritious food. This action can help ensure that everyone in the City, especially our low-income residents, have access to healthy, nutritious options.

Indicators of Success / Goals

When asked, consumers indicate that they are better educated about the environmental impacts of their consumption choices and factor environmental impacts into their decision making.

Target Demographic

All Ann Arbor residents

Timeline and Initial Actions

2021

Work with University of Michigan to understand environmental food labeling program; explore expanding to all City facilities where food is stored.

2022

Continue working with partner organizations to develop and disseminate materials about the benefits of a plant rich diet.



ACTION 5: Support a Plant Rich Diet

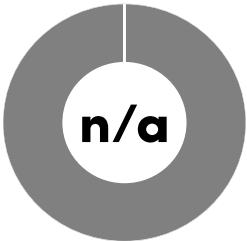


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$208,400

**Greenhouse Gas
Reduction Potential**



Not calculated

SUPPORT A PLANT RICH DIET



STRATEGY 5: Change the Way We Use, Reuse, and Dispose of Materials

6. ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM

The use of refrigerants emits potent greenhouse gases, and removing them from use can have a significant impact on emissions reduction. This action focuses on enhancing refrigerant recycling programs and discouraged refrigerant use where possible.

Vision for Enhancing Refrigerant Recycling and Reuse Program

By banning refrigerants from disposal at City of Ann Arbor landfills we will drastically reduce greenhouse gas emissions from refrigerant emissions.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Equity Impacts

No equity impacts explicitly identified.

Collaborators / Project Co-Designers

- Local businesses
- City Communication Team

Indicators of Success / Goals

95% reduction in the amount of refrigerants disposed of at City facilities.

Assumptions

- Program focuses on education; explores penalties for violation

Target Demographic

All Ann Arborites, especially renters, homeowners, and businesses

Timeline and Initial Actions

2021

Work with partners to launch an aggressive refrigerant education campaign; ensure systems are in place to properly recycle all refrigerants that are disposed of in the community.



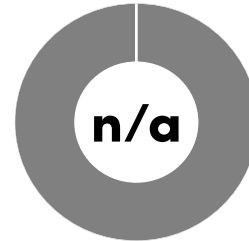
ACTION 6: Enhance Refrigerant Recycling and Reuse Program

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$179,400

Greenhouse Gas Reduction Potential



Not calculated

ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM





STRATEGY 6:

Enhance the Resilience of Our People and Our Place

This strategy focuses on enhancing the resilience of our people and our place. In particular, this strategy focuses on ensuring our community can not only survive, but thrive, regardless of what disruptions or changes may take place. To achieve this strategy, six actions were prioritized:

1. Invest in Resilience Hubs
2. Foster Neighborhood and Youth Ambassador Program
3. Preserve and Enhance the Local Tree Canopy
4. Conduct Asset and Needs Mapping of Neighborhoods
5. Assist in Assembling and Distributing Emergency Preparedness Kits
6. Implement Sensors to Monitor Heat, Air Quality, Waterways, and Flooding

While reducing greenhouse gas emissions were not the priority in selecting these actions, they do have a modest value to the community's carbon neutrality goals. In total, these actions contribute a 0.1% reduction in community-wide greenhouse gas emissions and cost around \$7,500,000.

STRATEGY 6: Enhance the Resilience of Our People and Our Place

1. INVEST IN RESILIENCE HUBS

Resilience hubs are community-serving facilities augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event. At their core, resilience hubs empower communities to take action around preparedness and increase community and neighborhood capacity. Resilience hubs operate at the nexus of climate mitigation, climate adaptation, and equity, and they strive to enhance community sustainability and resilience through a bottom-up approach centered on co-development and leadership.

Vision for Investing in Resilience Hubs

Ann Arbor's five resilience hubs are equitably enhancing community resilience while reducing greenhouse gas emissions. The hubs improve local quality of life for all of our residents, especially for our front line communities. Our robust network of resilience hubs empower residents to care for one another during a disaster for up to five days before government assistance resources may be needed. The hubs have reduced the poverty rate, increased local economic opportunities, reduced crime rates, and significantly increased people's satisfaction with their community.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Residents
- Local businesses
- Community-based organizations
- The city's communications team
- Police department
- Fire department
- Finance and procurement
- Washtenaw County Department Of Community and Economic Development
- City planning team
- Washtenaw County Health Department
- Public Works
- Legal
- Transportation Manager
- Local community institutions
- Parks and Recreation
- Others as co-determined with

Equity Impacts

Many lower-income residents do not have access to a variety of resources in case of an emergency. Resilience hubs provide residents the ability to support one another in a crisis as well as to access community and City services day to day.

Indicators of Success / Goals

Every Ward within the City has a functioning, community-designed and -operated resilience hub that helps improve community sustainability, resilience, and social cohesion by 2030.

Target Demographic

The first few hubs will be placed in our underserved neighborhoods. Eventually, the goal is to have at least one resilience hub in each Ward and, ideally, a resilience hub in all of our front line communities/ neighborhoods

Assumptions

- External funding will be available to support the development of hubs
- External parties will be able and interested to operate the hub once developed
- The community is able to come to near consensus on what to include in their hub

Timeline and Initial Actions

2020

Continue working with community to explore resilience hub in southeastern Ann Arbor; continue seeking funding to support the hub.

2021

Initiate planning and community involvement for second hub; continue seeking funding for hubs and work on design with the community.

2022

Aim to launch first resilience hub.

2023+

Continue working with community to design, fundraise for, and launch hubs throughout the community.

ACTION 1: Invest in Resilience Hubs



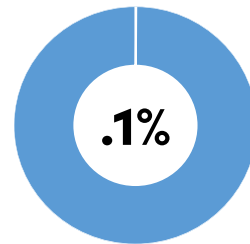
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$5,025,000

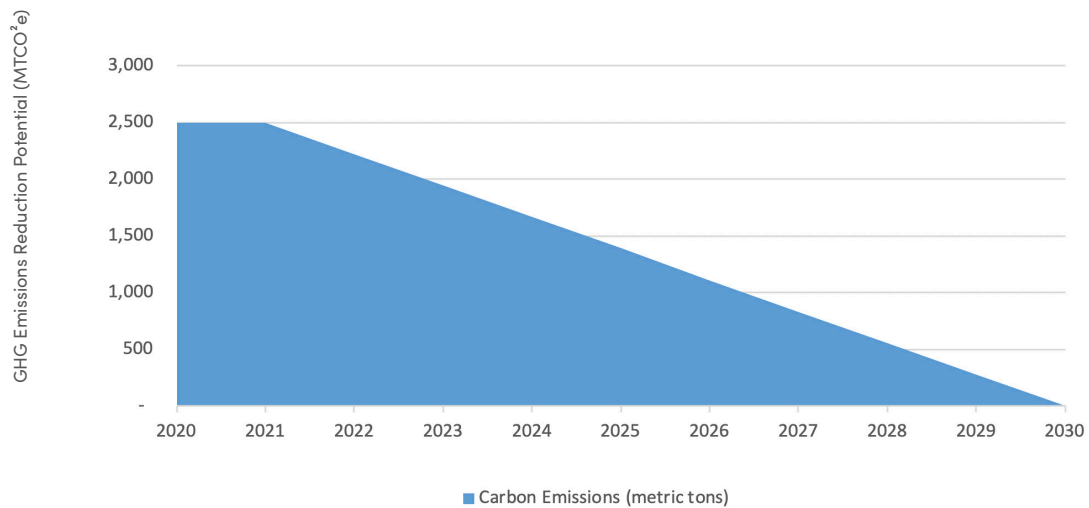
Greenhouse Gas Reduction Potential



2500 metric tons carbon dioxide equivalent
(0.1%)

By 2030, the **Invest in Resilience Hubs** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INVEST IN RESILIENCE HUBS



STRATEGY 6: Enhance the Resilience of Our People and Our Place

2. FOSTER NEIGHBORHOOD AND YOUTH AMBASSADOR PROGRAM

Achieving carbon neutrality will require mobilization of Ann Arborites on a nearly unprecedented scale. This action seeks to work with interested stakeholders to rapidly scale up and out our carbon neutrality work and the actions outlined in this Plan. In particular, this action calls for the creation of neighborhood as well as youth ambassadors. These individuals will be trained and given the tools and resources to work with their peers to implement many of the actions identified in this document.

Vision for Fostering Neighborhood and Youth Ambassador Programs

Through education and engagement, youth elevate their voices and take ownership of mitigation and adaption initiatives – helping to drive significant community-wide action. Neighborhood ambassadors lead a variety of projects related to energy and water consumption, waste reduction and recycling, transportation, and local food efforts. These actions foster community resource stewardship, climate action, and enhance local social cohesion.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Neighborhood associations
- A²Zero youth representatives
- Ann Arbor Public Schools
- Community Action Network
- United Way
- Neutral Zone

Equity Impacts

OSI could partner with a nonprofit like United Way to train a cohort of adult residents who are living in affordable housing or who are low-income to be Climate Ambassadors. There could also be a youth cohort who are from underserved communities who could be trained as Youth Ambassadors. Participants in each of these groups would receive stipends. OSI could lead a group of other adults who would not need as much training in a similar program. These people would not get a stipend.

Assumptions

- Individuals will want to serve as neighborhood or youth ambassadors
- All regions of the City will have someone volunteer to serve as an ambassador (or be recruited to serve) so that there aren't spatial gaps

Indicators of Success / Goals

100 individuals are trained as youth or neighborhood ambassadors by 2025 and are actively working with their peers and neighbors to implement that A²Zero strategy.

Target Demographic

All Ann Arborites interested in helping support the implementation of the A²Zero Plan

Timeline and Initial Actions

2020

Design the neighborhood and youth ambassador program; work with interested stakeholders.

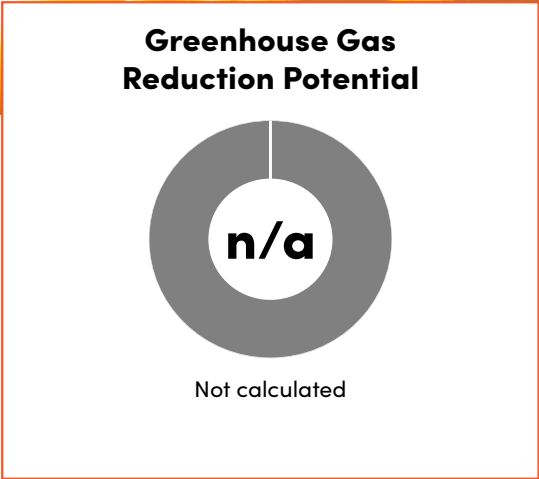
2021

Launch training and first tranche of ambassadors.

2022

Revise the ambassador program and scale throughout the City.

ACTION 2: Foster Neighborhood and Youth Ambassador Program



STRATEGY 6: Enhance the Resilience of Our People and Our Place

3. PRESERVE AND ENHANCE THE LOCAL TREE CANOPY

This action begins with conducting an analysis and creating a shared inventory of the local tree canopy as well as updating the master plan to incentivize shade tree and vegetation planting for private projects. This will increase the impact of shade trees as a natural cooling mechanism in urban areas. Tree type and placement are important considerations in advancing this action.

Vision for Preserving and Enhancing the Local Tree Canopy

A properly managed and diverse urban forest increases resiliency against invasive insects that carry diseases and impact the human population. By planting diverse tree species, the community benefits from increased shade and decreased heat island effects, while supporting biodiversity. Careful planning and management help the City mitigate and adapt to changing climate conditions.

Party Responsible for Implementation

- City Forrester/Public Works, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local nurseries
- Neighborhood associations
- Ambassadors

Equity Impacts

Studies have found that tree canopies in low-income communities and communities of color tend to be smaller. Ann Arbor's first Health Impact Assessment should be updated to ensure equitable enhancement of tree canopy in underserved neighborhoods is prioritized.

Indicators of Success / Goals

By 2030, 10,000 new trees are planted on city property and in the right of way and 10,000 new trees are planted on private property.

Assumptions

- City continues to plant 1,000 trees per year on City property and in the right of ways
- Community plants 1,000 trees per year on private property; These trees all survive
- Over the duration of this Plan, a single tree will absorb 48 pounds of carbon dioxide

Target Demographic

City facilities and private property owners

Timeline and Initial Actions

2020

City to continue annual tree planting.

2021

Launch neighborhood tree planting initiative.



ACTION 3: Preserve and Enhance the Local Tree Canopy



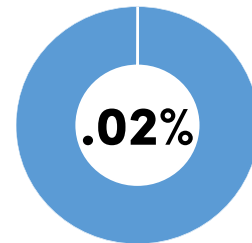
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)



\$1,160,000

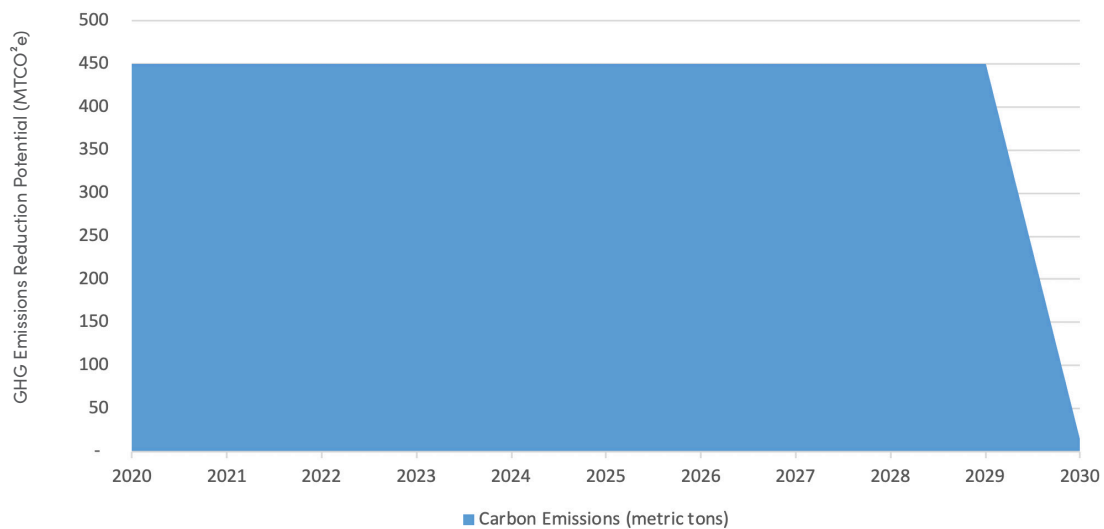
Greenhouse Gas Reduction Potential



450 metric tons of carbon dioxide
equivalent (0.02% of community-wide
emissions)

By 2030, the **Preserve and Enhance the Local Tree Canopy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

PRESERVE AND ENHANCE THE LOCAL TREE CANOPY



STRATEGY 6: Enhance the Resilience of Our People and Our Place

4. CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS

This action involves working with neighborhoods to systematically identify what assets and needs exist in the area. Local assets are then leveraged to create a plan that prioritizes and addresses community needs.

Vision for Conducting Asset and Needs Mapping of Neighborhoods

Community mapping leads to the identification of safe gathering points in neighborhoods when events such as natural disasters and power outages occur. Physical spaces, such as homes, are activated as shelters during necessary times.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents do not have financial security when faced with crisis situations. By identifying assets in advance, community mapping will help residents better rely on each other in crisis situations.

Indicators of Success / Goals

By 2025, every neighborhood in Ann Arbor has an asset map and knows how to activate it in the case of an emergency.

Assumptions

- Enough individuals volunteer to help with the exercise to ensure the entire community is covered
- Capacity exists to update and maintain the asset map

Target Demographic

All Ann Arborites

Timeline and Initial Actions

2020

Develop asset mapping exercise; convene neighborhood associations and those interested in neighborhood ambassador program to get feedback on mapping.

2021

Launch neighborhood asset mapping exercise; create methodology to update and maintain asset map.

2022

Work with volunteers to ensure all neighborhoods have a preliminary asset map at least.



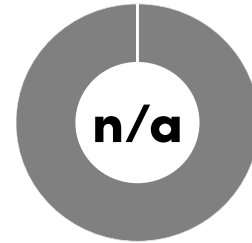
ACTION 4: Conduct Asset and Needs Mapping of Neighborhoods

Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$300,000

Greenhouse Gas Reduction Potential



Not calculated

CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS



STRATEGY 6: Enhance the Resilience of Our People and Our Place

5. ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS

This action involves working directly with partners and community organizations to educate Ann Arborites on emergency preparedness and prepare emergency preparedness kits and plans that residents can keep to ensure they are safe during an emergency.

Vision for Assembling and Distributing Emergency Preparedness Kits

Residents have the resources they need to care for themselves and their families for multiple days during a disaster situation.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents, whether due to cost, language, or other barriers may not have the resources to build emergency preparedness kits for their families on their own. Working as a group will help all residents be better prepared for emergencies.

Indicators of Success / Goals

1000 residents have emergency preparedness kits by 2030 thanks to support from this action.

Assumptions

- AAPS partners with the City on hosting emergency preparedness events
- Some supplies are donated by local businesses

Target Demographic

All Ann Arbor residents with a priority given to low-income residents

Timeline and Initial Actions

2020

Work with Emergency Management to create a list of essential emergency supplies and a template emergency plan.

2021

Work with schools to launch emergency preparedness sessions with students and caregivers throughout the community.

2022

Integrate emergency preparedness module into the Neighborhood and Youth Ambassador programs.

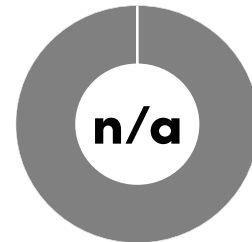
ACTION 5: Assist in Assembling and Distributing Emergency Preparedness Kits

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$350,000

**Greenhouse Gas
Reduction Potential**



Not calculated

ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS



STRATEGY 6: Enhance the Resilience of Our People and Our Place

6. IMPLEMENT SENSORS TO MONITOR HEAT, AIR QUALITY, WATERWAYS, AND FLOODING

This action focuses on collecting data and using sensors to proactively understand risks and mitigate vulnerabilities. Includes the usage of drones and sensors to collect data and to respond to events, when necessary.

Vision for Implementing Sensors to Monitor Heat, Air Quality, Waterways, and Flooding

Ann Arbor's ubiquitous system of sensors and monitors allows the City to proactively manage threats and risks, while ensuring that Ann Arborites enjoy an exceptional quality of life. Monitors and sensors throughout the City provide real-time data that helps protect the public health, safety, and general welfare.

Party Responsible for Implementation

- Ann Arbor Information Technology Unit

Equity Impacts

Few equity impacts.

Collaborators / Project Co-Designers

- Stormwater, wastewater, and water system
- Office of Sustainability and Innovations
- Emergency Management
- University of Michigan
- Huron River Watershed Council
- Downtown Development

Indicators of Success / Goals

Ann Arbor's landscape of sensors and monitors provides real-time information that has been utilized to protect the public from acute and chronic disruptions.

Assumptions

- Any technology adopted can tie into the City's existing IT infrastructure
- The various technologies used can inter-operate

Target Demographic

This action mostly impacts local government staff and regional decision-makers/planners

Timeline and Initial Actions

2020

Finish Smart City Strategy; include needs for monitoring.

2021

Pilot sensors throughout the City with UM and other partners.

2024

Install sensors and monitors throughout the City as an interconnected network.

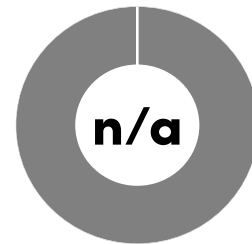
ACTION 6: Implement Sensors to Monitor Heat, Air Quality, Waterways, and Flooding

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)



\$300,000

**Greenhouse Gas
Reduction Potential**



Not calculated

IMPLEMENT SENSORS TO MONITOR HEAT, AIR QUALITY, WATERWAYS, AND FLOODING





OTHER STRATEGIES:

This strategy covers the remaining programs and activities that don't fit into other areas. It also includes greenhouse gas emissions offsets to close out any lingering gaps in achieving community-wide carbon neutrality. To achieve this strategy, four specific actions have been identified:

1. Advance Equity Programs
2. Promote Sustaining Ann Arbor Together Grant Program
3. Establish Internal Carbon Price
4. Offset Greenhouse Gas Emissions

Combined, these four actions equate to just under 14% of community-wide emissions reductions and are estimated to cost just under \$6,000,000.

OTHER STRATEGIES

1. ADVANCE EQUITY PROGRAMS

The Office of Sustainability and Innovations (OSI) is committed to ensuring climate protection and mitigation work improves the lives of Ann Arbor residents who have been historically underrepresented and under-resourced. Our Equity Program works to ensure that equity is embedded in all of the work we do – from the programs we advance, to the stakeholders we engage with, to the advisors we seek.

Vision for Advancing Equity Programs

By 2028, all of OSI's programs have an equity focus, OSI staff reflect the diversity of Ann Arbor and Washtenaw County, and staff have developed strong working relationships with members of local low-income communities and communities of color.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Washtenaw County's Racial Equity Program Manager
- Dr. Tony Reames
- Urban Sustainability Directors Network
- City Administrator
- All City Service Areas
- OSI's Equity Fellow
- City of Ann Arbor's Diversity, Equity and Inclusion Manager

Equity Impacts

OSI will continue to center equity in their work, and will expand their decision-making and implementation to authentically include marginalized communities who are most at risk due to climate change.

Indicators of Success / Goals

By 2028, all of OSI's programs have an equity focus.

Assumptions

- Resources will continue to exist to support racial equity training for staff

Target Demographic

Ann Arbor City employees and staff of allied organizations, Ann Arbor residents of color, and low-income Ann Arbor residents and workers

Timeline and Initial Actions

2020

OSI staff will receive and lead continuing education about equity issues (ongoing); hire equity fellow to help with aging in place efficiently work

2021

OSI staff will conduct baseline equity trainings with the Energy and Environmental Commissioners; hire summer equity fellow

2023

OSI Equity Advisory Commission formed



ACTION 1: Advance Equity Programs

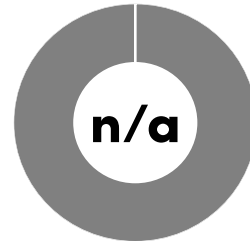


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$200,000

Greenhouse Gas Reduction Potential



Not calculated

ADVANCE EQUITY PROGRAMS



OTHER STRATEGIES

2. PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM

This program provides small grants to residents, schools, local nonprofits, and local businesses to advance sustainability-related activities in Ann Arbor's right of way.

Vision for Promoting Sustaining Ann Arbor Together Grant Program

Through the Sustaining Ann Arbor Together grant program, Ann Arborites are able to unlock financial capital to implement solutions that are making our community a healthier, more sustainable place to live.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

These resources can help underserved areas of the community unlock capital to address their specific sustainability concerns and opportunities.

Collaborators / Project Co-Designers

- Nonprofit organizations serving Ann Arbor residents
- Neighborhood associations
- University of Michigan
- Ann Arbor Public Schools

Indicators of Success / Goals

At least 10 grants are awarded, per year, through the Sustaining Ann Arbor Together grant program.

Assumptions

- \$100,000 will continue to be available, annually, for the program
- The program will be fully subscribed

Target Demographic

Ann Arbor residents

Timeline and Initial Actions

2020

OSI staff continue to administer the program, conducting outreach regularly to let people know about the opportunity.



ACTION 2: Promote Sustaining Ann Arbor Together Grant Program

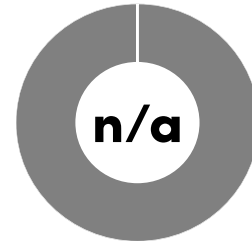


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$1,000,000

Greenhouse Gas Reduction Potential



Not calculated

PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM



OTHER STRATEGIES

3. ESTABLISH INTERNAL CARBON PRICE

This action creates a financial mechanism whereby all City Service Areas holistically integrate greenhouse gas emissions and their impacts into decision-making. This will happen through the use of an internal carbon tax (e.g., payment by each service area for each ton of greenhouse gases emitted). These resources will then be given back in the form of energy efficiency improvements and renewable energy installations at City facilities.

Vision for Establishing Internal Carbon Price

Citywide greenhouse gas emissions are carbon neutral thanks in part to our internal carbon tax that encourages Service Areas to reduce emissions while providing funding support through the fee collected to finance energy efficiency and renewable energy improvements.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

No explicit equity impacts were identified.

Collaborators / Project Co-Designers

- Finance
- Information Technology
- DTE Energy
- City Administrator
- Consumers Energy
- Fleet and Facilities

Indicators of Success / Goals

All City operations are powered with 100% clean and renewable energy by the year 2030.

Assumptions

- Funding generated by enterprise funds will remain available for use only by the enterprise funds
- Any funds generated will be applied to energy efficiency work and/or renewable energy activities that reduce the overall greenhouse gas emissions of the unit
- Price will not grow to more than the social cost of carbon

Target Demographic

All City Service Areas

Timeline and Initial Actions

2020

OSI staff create internal carbon tax work plan and work with finance to pilot a \$5/ton charge

2021

OSI work to increase fleet rates and administer a \$10/ton charge

2022

Review program and suggest any needed revisions



ACTION 3: Establish Internal Carbon Price

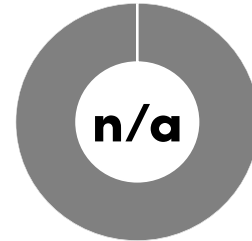


Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$75,000

Greenhouse Gas Reduction Potential



Not calculated

ESTABLISH INTERNAL CARBON PRICE



OTHER STRATEGIES

4. OFFSET GREENHOUSE GAS EMISSIONS

Our community has a lot of work to completely eliminate our greenhouse gas emission by 2030. For the activities that we cannot currently reduce emissions from, due to a lack of technical or financially feasible solutions, we can purchase carbon offsets to reduce greenhouse gas emissions outside of our community. Because greenhouse gases act the same way in the Earth's atmosphere, regardless of where they are produced, our community can purchase and retire renewable energy credits replacing fossil fuels to offset our own emissions as we work towards our target.

Vision for Offsetting Greenhouse Gas Emissions

Offsets are only used to close the greenhouse gas emissions gap between what we are able to do locally and what needs to be offset to achieve our goal of carbon neutrality by 2030.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Energy Commission
- Environmental Commission
- University of Michigan

Equity Impacts

While local offsets may or may not be feasible, the City will aim to invest our carbon offset funds into programs that will decrease income and/or racial justice inequities. This includes looking at potentially making investments in the global south which has been disproportionately burdened by extractive economies.

Indicators of Success / Goals

The amount of greenhouse gas emission offsets purchased decline over time as the City undertakes more local actions.

Assumptions

- All offsets are additional, meaning that they wouldn't have happened without our investment
- Reduces demand for fossil fuels and other greenhouse gas emissions sources
- Preference given to investing in projects that take place in low-income and front line communities
- Any renewable energy credits generated will be retired
- Includes investigating options for a local carbon offset program

Target Demographic

Entire community

Timeline and Initial Actions

2020

Provide recommendations on characteristics of offsets and get Council's agreement

2021

Solidify the source for purchasing greenhouse gas emissions offsets

2028

Undertake first greenhouse gas emissions offset purchase and continue as needed.

ACTION 4: Offset Greenhouse Gas Emissions

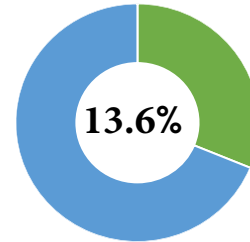
Cost Over 10 Years (Staffing, Hard, and Soft Costs)



\$9,440,000

– this assumes two years of purchasing offsets and the staffing support to set-up the purchase.

Greenhouse Gas Reduction Potential

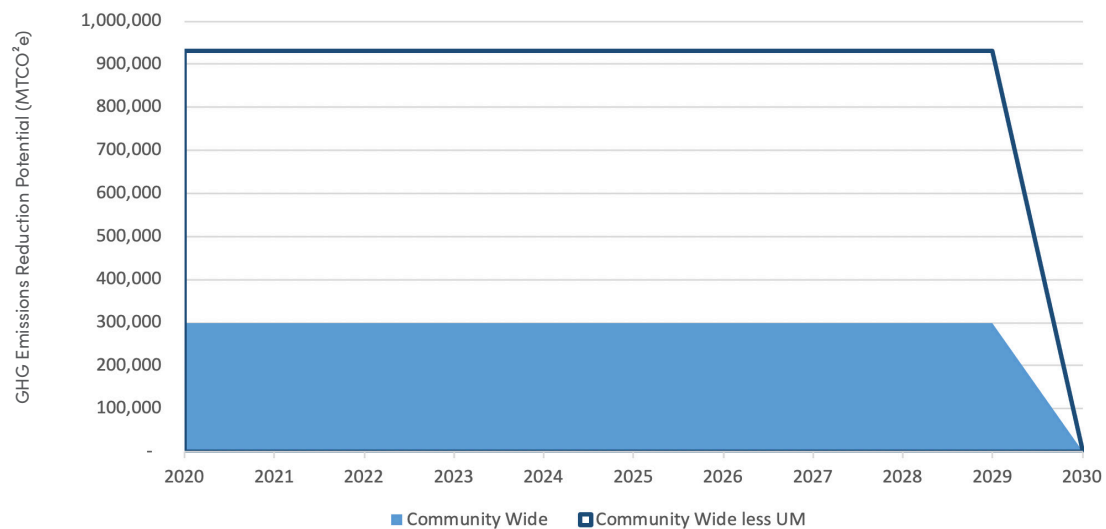


298,500 metric tons carbon dioxide equivalent (13.6% of community wide emissions if UM participates in all programs).

By 2030, the **Offset Greenhouse Gas Emissions** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the estimated total amount of offsets (in light blue) that will need to be purchased assuming the community and University participate in all actions of the Plan outlined above. The dark blue outline shows the amount of offsets that will need to be purchased if the University does not participate in any of the actions outlined.

OFFSET GREENHOUSE GAS EMISSIONS



CLOSING

The A²Zero Plan is a holistic living Plan. It will change. It will evolve. It will get better as the community comes together to implement these and other actions. It is also the beginning of the journey that many other Michigan municipalities will follow in their own efforts to achieve carbon neutrality. With no blueprint for us to follow, A²Zero is our effort to reimagine Ann Arbor in a manner that's equitable, sustainable, and transformative for all Ann Arborites while ensuring we create a more resilient community.

Grounded in equity, the Plan works to ensure the most vulnerable in Ann Arbor can thrive as we bounce forward from any shock or stressors the future may hold. The Plan recommends investing in land use strategies that allow for denser and mixed use neighborhoods to both close the wealth gap by providing more affordable housing so those who work here can also live here, and by providing more accoutrements within walking and biking distance to our homes. A²Zero encourages more residents and visitors to use an expanded, energy efficient multimodal transportation network to move about our community. It encourages investment in local renewable energy and in our connection to each other and our place.

A²Zero also gives respite to those seniors who desire to age in the places they are most familiar with by ensuring they have access to weatherization programs that lower their energy costs, by launching aging in place programs, and by fostering greater neighborhood social networks.

A²Zero builds upon the significant recent science indicating that society needs to move as rapidly as possible to achieve significant reductions in greenhouse gas emissions in order to avoid the most catastrophic impacts associated with climate change. That is why staff within the Office of Sustainability and Innovations created this Plan as a foundation for achieving community-wide carbon neutrality by 2030.

Time is of the essence, and action is desperately needed. Some of the programs in this Plan will be wildly successful. Others will be moderately successful. And yet others will prove inadequate for the challenge ahead. Our job is not to be beholden to what is written in the pages of this document, but to move intentionally, aggressively, and wholeheartedly towards a significant reduction in local greenhouse gas emissions.

Ann Arbor has the intellect, the human power, the resources, and the skills needed to move climate action and sustainability forward. What is currently missing is the will, and what is lacking is time. Join us as we combat the most significant crisis of our era. Together we can avoid the unmanageable, manage the unavoidable, and create a more equitable and just society for all.



APPENDIX 1 – LIST OF PUBLIC EVENTS

1. November 13, 2019 – Public launch of the A²Zero initiative at Cobblestone Farm. Over 250 individuals attended.
2. November 18, 2019 – Washtenaw International High School sustainability talk to 60 High School students.
3. November 19, 2019 – met with leader of Old Fourth Ward Neighborhood Association to discuss A²Zero.
4. November 20, 2019 – Lunch and Learn with City Staff on A²Zero.
5. November 21, 2019 – Climate Reality Presentation at Vertex Coffee.
6. November 26, 2019 – Ypsilanti Sustainability Committee Climate Reality Presentation at Park Ridge Community Center.
7. December 3, 2019 – Power Hour at Westgate Library discussing energy efficiency and solar power.
8. December 4, 2019 – Meeting to discuss how we can disseminate the word about A²Zero and launch a neighborhood climate ambassadors program.
9. December 4, 2019 – Commercial Power Hour in partnership with the 2030 District & large scale commercial building owners.
10. December 10, 2019 – Cohosted event at Forest Hills Cooperative to begin teaching recycling and composting to over 15 residents and children. Including an introduction to A²Zero.
11. December 11, 2019 – Met with Extinction Rebellion to explain and gather feedback about A²Zero.
12. December 15, 2019 – Tabled at Homegrown at The Cobblestone Art Show to share information about A²Zero.
13. December 18, 2019 – Convened 12 High School and 1 middle school student to glean their thoughts on how they would like to assist in A²Zero at their schools.
14. December 19, 2019 – Tabled about A²Zero at the Ann Arbor Hands on Museum.
15. December 20, 2019 – Climate Reality Presentation at Wheeler Service Center to 140 staff; included an introduction to A²Zero.
16. January 6, 2020 – A²Zero Meeting with Fire Department Management.
17. January 6th, 2020 – A²Zero meeting with Safety unit.
18. January 8, 2020 – Tabled at Veterans Memorial Park during High School Hockey game.
19. January 11, 2020 – A²Zero discussion with Washtenaw 350.
20. January 13, 2020 – Discussed A²Zero and opportunities for resident engagement with property manager of Arrowwood Hills.
21. January 14, 2020 – A²Zero presentation and discussion with the Energy Commission.
22. January 14, 2020 – A²Zero discussion with Clerks Office.
23. January 15, 2020 – Presentation and discussion on A²Zero to the Washtenaw Food Policy Council.
24. January 15, 2020 – A²Zero presentation at the Ann Arbor Housing Commission meeting.
25. January 17, 2020 – Youth and A²Zero discussion with local youth leaders.
26. January 17, 2020 – A²Zero and the Transportation, Energy, Environmental, and Planning Commissions.
27. January 21, 2020 – A²Zero discussion at the Slow Food Huron Valley member meeting.

28. January 21, 2020 – A²Zero presentation and discussion with the Huron Valley Sierra Club members.
29. January 21, 2020 – A²Zero meeting with Forest Hills Cooperative.
30. January 23, 2020 – Arrowwood Youth Conversation.
31. January 23, 2020 – A²Zero discussion with the Attorney's Office.
32. January 26, 2020 – A²Zero presentation and discussion with Citizens Climate Lobby members.
33. January 28, 2020 – A²Zero discussion with Ann Arbor's IT Department.
34. January 29, 2020 – A²Zero presentation to the Ann Arbor School Board.
35. January 30, 2020 – A²Zero Lunch and Learn United Way of Washtenaw County.
36. January 30, 2020 – Sustainability Forum in A²Zero and the Energy Sector.
37. January 30, 2020 – A²Zero presentation and discussion with neighbors in Pittsfield Village.
38. February 6, 2020 – A²Zero presentation and discussion with Main Street Association members.
39. February 8, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.
40. February 12, 2020 – A²Zero presentation at Michigan Municipal League event.
41. February 13, 2020 – Sustainability Forum on A²Zero and Mobility.
42. February 13, 2020 – Shared details about A²Zero at Michigan Environmental Justice Summit.
43. February 15, 2020 – A²Zero presentation and discussion with Ann Arbor Indivisible.
44. February 18, 2020 – A²Zero materials shared at The Polar Vortex Climate Change and Weird Weather event.
45. February 19, 2020 – Bryant Community Center, A²Zero, & A2 Housing Commission Outreach.
46. February 19, 2020 – A²Zero presentation and discussion with the Transportation Commission.
47. February 19, 2020 – A²Zero and Climate Night Trivia.
48. February 20, 2020 – Presentation to Zingerman's Community of Businesses on A²Zero.
49. February 20, 2020 – Presentation on A²Zero to the Washtenaw Area Apartment Association.
50. February 20, 2020 – Presentation to the Ann Arbor Street Design Team on A²Zero.
51. February 22, 2020 – Dive-In Movie (Moana) and Climate Brainstorming.
52. February 22, 2020 – 2nd Carbon Neutrality Town Hall.
53. February 22, 2020 – Washtenaw 350 Environmental Justice Dialogues, including sharing details about A²Zero.
54. February 24, 2020 – A²Zero presentation and discussion with Finance Department.
55. February 26, 2020 – 21 Day Equity Challenge Summit and opportunity to share about A²Zero.
56. February 26, 2020 – A²Zero discussion at the Ann Arbor Climate Partnership meeting.
57. February 27, 2020 – A²Zero discussion with Environmental Commission.
58. February 27, 2020 – Climate change and the Great Lakes presentation and discussion about A²Zero.
59. February 27, 2020 – A²Zero forum with local and regional solar installers.
60. February 29, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.

61. March 2, 2020 – A²Zero and Sustainability presentation to Washtenaw International High School.
62. March 4, 2020 – Climate Leadership Conference– Presentation on A²Zero.
63. March 6, 2020 – Presentation at the New Strategies for Resilient Local Economies about A²Zero.
64. March 9, 2020 – ²Zero presentation at the Local Food Summit.
65. March 9, 2020 – A²Zero presentation at Symposium on Societal Engagement in Climate and Space Sciences.
66. March 9, 2020 – A²Zero presentation to Old West Side Neighborhood Association Board of Directors.
67. March 18, 2020 – A²Zero discussion with Transportation Commission.
68. March 19, 2020 – Sustainability, A²Zero and Local Climate Action at Ford School.
69. March 26, 2020 – A²Zero discussion with Environmental Commission.

Postponed or Delayed Events

1. TBD: Neutral Zone Environmental Justice Forum with A²Zero (rescheduled due to weather).
2. March 11, 2020 – Climate Action Teach-In at University (Cancelled due to Coronavirus Pandemic).
3. March 11, 2020 – A²Zero and Student Engagement presentation (Cancelled due to Coronavirus Pandemic).
4. March 12, 2020 – Michigan Climate Action Summit and Panel on A²Zero and local climate action (Cancelled due to Coronavirus Pandemic).
5. March 12, 2020 – Wege Lecture on Sustainability (Cancelled due to Coronavirus Pandemic)
6. March 12, 2020 – Rise Up for the Earth – Community Earth Day Celebration brief introduction to A²Zero (Cancelled due to Coronavirus Pandemic).
7. March 14, 2020 – Finding the Middle Ground and American Climate presentation (Cancelled due to Coronavirus Pandemic).
8. March 14, 2020 – Climate Strategies: What actions will keep us at 1.5-2oC presentation (Cancelled due to Coronavirus Pandemic).
9. March 14, 2020 – Climate Change and the Great Lakes (Cancelled due to the Coronavirus Pandemic).
10. March 19, 2020 – Sustainability Forum on Carbon Neutrality in the Resource Sector at Downtown Library (Postponed due to Coronavirus Pandemic).
11. March 22, 2020 – Solar Faithful Workshop and discussion on A²Zero (Cancelled due to the Coronavirus Pandemic).

APPENDIX 2 – LIST OF TECHNICAL ADVISORY COMMITTEE MEETINGS

1. November 13, 2019 – Hosted four technical advisory committee meetings simultaneously to launch this element of our work. The four technical advisory committees were: 1) mobility; 2) energy; 3) resource reduction; and 4) adaptation and resilience.
2. December 16, 2019 – Adaptation and Resilience TAC meeting.
3. December 17, 2019 – Resource Reduction TAC meeting.
4. December 17, 2019 – Energy TAC meeting.
5. December 19, 2019 – Mobility TAC meeting.
6. January 9, 2020 – Adaptation and Resilience TAC meeting.
7. January 16, 2020 – Energy TAC meeting.
8. January 22, 2020 – Resource Reduction TAC meeting.
9. January 23, 2020 – Mobility TAC meeting.
10. January 27, 2020 – Adaptation and Resilience TAC meeting.
11. January 31, 2020 – Mobility TAC meeting.
12. February 6, 2020 – Resource Reduction TAC meeting.
13. February 11, 2020 – Adaptation and Resilience TAC.
14. February 21, 2020 – TAC celebration breakfast.

APPENDIX 3 – LIST OF A²ZERO PARTNER EVENTS

1. December 13, 2019 – Hosted first meeting of the A²Zero partners.
2. December 19, 2019 – Hosted equity and climate training for A²Zero partners.
3. March 20, 2020 – A²Zero partners only unveiling of the final strategy.

APPENDIX 4 – COUNCIL RESOLUTION IN SUPPORT OF CREATING A PLAN TO ACHIEVE ANN ARBOR COMMUNITY-WIDE CLIMATE NEUTRALITY BY 2030

..Title

Resolution in Support of Creating a Plan to Achieve Ann Arbor Community-Wide Climate Neutrality by 2030

..Body

Whereas, By adopting the Climate Action Plan (CAP) in 2012, the Ann Arbor City Council ("City Council") committed to an ambitious, multi-strategy vision to address climate change by reducing community-wide greenhouse emissions (8% by 2015, 25% by 2025, and 90% by 2050 relative to year 2000 baseline carbon dioxide equivalent (CO₂e) emissions levels);

Whereas, The Environmental Commission and many community and student groups have advocated for Ann Arbor's declaration of a climate emergency;

Whereas, The Office of Sustainability and Innovations ("OSI") was created in FY19 in order to actualize the goals created and reaffirmed by City Council;

Whereas, The Office of Sustainability and Innovations has created a 5-year work plan that will help the City achieve a 25% reduction in community-wide greenhouse gas emissions by the year 2025, based on 2000 levels;

Whereas, Despite the City's goals and progress to-date, the global climate is changing at a rate that necessitates bolder action to reduce greenhouse gas emissions, including getting to net zero emissions as soon as possible;

Whereas, Over 19,000 scientists have signed a Second Warning to Humanity proclaiming that "a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided";

Whereas, City Council realizes that climate change has direct and pressing impacts on all aspects of public health, safety, and general welfare;

Whereas, Great community interest exists to support the efforts to achieve community-wide carbon neutrality in a just and equitable manner;

Whereas, The University of Michigan has convened The President's Commission on Carbon Neutrality (PCCN), which commission includes Ann Arbor staff, for the purpose of working together with community and regional partners toward shared carbon neutrality goals;

Whereas, Creating a climate neutrality plan is necessary to identify, plan for, budget, and work towards implementing the actions required to achieve community-wide carbon neutrality; and

Whereas, Funding for public engagement is available in the FY2020 Office of Sustainability and Innovations budget;

RESOLVED, That the Ann Arbor City Council declares a climate emergency and commits to take action as a result of that declaration;

RESOLVED, The Ann Arbor City Council supports a public engagement process, beginning immediately, that helps outline how the entire Ann Arbor Community could achieve carbon neutrality by the year 2030, a target date that is both ambitious and achievable;

RESOLVED, City Council requests that the City Administration develop a draft plan for how the Ann Arbor community could achieve carbon neutrality ("2030 Carbon Neutral Ann Arbor Plan") to be presented to Council not later than March 31, 2020 to support its presentation on Earth Day 2020;

RESOLVED, City Council directs the City Administrator to design and execute a community engagement process that culminates with a draft strategy for how the Ann Arbor community could achieve carbon neutrality around the year 2030;

RESOLVED, City Council direct the City Administrator to seek and facilitate collaboration with the University of Michigan and the PCCN to create and realize the 2030 Carbon Neutral Ann Arbor Plan; and

RESOLVED, City Council request the City Administrator to consider the likely outcomes of the in-development 2030 Carbon Neutral Ann Arbor Plan as he develops the FY21 Budget Planning process and, ultimately, the FY21 Budget.

Sponsored by: Mayor Taylor, Councilmembers Bannister, Smith, Ramlawi, Grand, Ackerman, Eaton, Nelson and Griswold

As Amended and Approved by Ann Arbor City Council on November 4, 2019

APPENDIX 5: LIST OF IDEAS CONSIDERED FOR A²ZERO

Through the A²Zero process, we received input from a diverse group of stakeholders, including technical experts, partner organizations, residents, and the general public interested in providing feedback to the A²Zero Initiative. Ideas were generated at public events, like the first A²Zero Town Hall, through multiple public surveys, and from four technical advisory committees. The Plan presented above includes the ideas evaluated to be the most impactful to reducing our community-wide emissions, fairly improving our community's quality of life, and the most feasible to implement. The list of ideas below serves to document the full list of ideas received, and to be turned to should adjustments to the Plan be required. Many of the ideas listed below would enhance our community, and is a testament to our community's dedication, creativity, and hopes and dreams.

TOPIC: ENERGY

Energy Production

- Regional methane digester
- Solar energy on greenbelt
- County/city energy efficiency and renewable energy concierge service
- Create microgrids
- Create community solar on non-city property, university of Michigan, municipal property, or Ann Arbor Public Schools
- Bulk-buy purchasing opportunities for renewable energy, energy efficiency, and electric vehicles and infrastructure
- Target high-energy "districts" with renewables, energy efficiency, electrification: residential, commercial
- Change solar incentives
- Create volunteer solar opportunities

Energy Efficiency

- New building requirements: energy efficiency, renewables
- Net zero affordable housing
- Reduce property taxes based on energy efficiency upgrades to buildings
- Develop carbon neutral districts: zero energy zones, 2030 districts
- DTE Energy on-bill financing for energy efficiency improvements
- Geothermal districts
- Require green/white roofs
- Energy disclosure policies: rental/single family/commercial

Electrification

- Require all existing appliances and HVAC systems be electrified
- Increase grid capacity for electrification

Financing

- Create financing opportunities/loan loss reserve
- Create carbon tax
- Create on-bill financing for renewable energy and energy efficiency projects

Sequestration

- Increase carbon sequestration practices in Ann Arbor

Offsets

- Offset programs

Education, Outreach, and Marketing

- Youth education on carbon neutrality
- Create information sessions on energy efficiency, electrification, renewables, and electric vehicles for different sectors

- Spread information about DTE Energy's existing energy efficiency programs
- Increase awareness of existing programs
- Change zoning laws to allow for more density
- Expedite permitting for more efficient construction
- Create more zoning opportunities for solar

TOPIC: MOBILITY

Motor Vehicle Electrification

- Require new construction to include EV charging stations and expand existing charging (chargers in low demand areas, car-sharing, ride-hailing, Park and Ride lots)
- Allow homeowners to make chargers available/charge others to use
- Encourage/support electrifying car-sharing. Implement a shared-use program (City)
- Incentivize/Convert fleets to EV (City, car sharing, ride-hailing, commercial delivery needs)
- Create a total cost of ownership target commitment for EVs
- Pair EV charging stations (both private and public) with solar power (and storage)
- Set up EV bulk buy program (for individuals, institutions, employers)
- Subsidize EVs and charging for low income households
- Organize buyback program for ICE vehicles
- Encourage pilot/autonomous vehicle programs, electric delivery options. Infrastructure (5G, DSRC, Wifi) that enables connected and autonomous vehicles
- Reduce congestion at chargers by using rotating system (people could be employed to switch chargers between cars?) that emphasizes fast charging, not charging to full battery
- Make battery recycle program for utility batteries to be used in school and public buses
- Hub deliveries to downtown (larger vehicles stay outside of downtown area and transfer deliveries to smaller green vehicles)
- DTE Energy: Coordinate a Workplace Charging Challenge with DTE, Leverage DTE rebates
- Require/encourage electrifying lawn equipment

Active Transportation

- Implement e-bike and e-scooter program to electrify short-distance travel. Offer safe options for riding e-bikes and e-scooters.
- Expand sidewalks and crosswalks in areas that are currently un-walkable
- Maintain and repair bike lanes preferentially (including clearing gravel). Improve snow-clearing to encourage biking and walking year-round.
- Make more bike lanes. Improve bike access to downtown. Increase regional/connected bikeways
- Make more protected bike lanes or elevated bikeways. Prioritize safety on scenic bike routes. Increase bike lanes separated from roads (greenways)
- Expand services like "Common Cycle," a volunteer-based bike repair clinic
- Encourage bike banks/bike sharing
- Provide City snow clearing of sidewalks
- Make interconnecting with public transit easier (allow bikes inside buses)
- Enforce codes protecting bikes and bike lanes (driving distance, parking and obstructions in bike lanes)
- Traffic signals reflect active transport needs and prioritize safety. Safer lighting for crosswalks and bike lanes.
- Add skywalks between major buildings

Transit and Paratransit

- Make public transportation free
- Expand Go-Pass area. Reduce transit fees/offer pass deals (annual)
- Expand TheRide bus routes and connect routes more
- Increase the speed and efficiency of bus transit. Provide rapid transit along major corridors
- Use better technology to make bus system more accurate, on-time, etc.
- Power bus stop shelters with solar power (security lighting, cameras, and info)
- Create bus and carpool lanes
- Create student shuttles to reduce demand for student cars (e.g. shuttle from campus to nearest grocery stores). Collaborate with/address UM transit. Work with UM to create incentives for students not to bring cars on campus. Make shuttle to WCC.
- Develop light rail (commuter, local). Develop electrified regional public transit
- Electrify TheRide vehicles
- "Right size" transit vehicles
- Create "mobility hubs" dispersed through city that act as home-base for multiple transit options (e-bikes, e-scooters, zip cars, bus stops, EV chargers, autonomous delivery vehicles, carpools, etc.)
- Improve public school transit (school of choice, etc.)
- Increase availability and convenience of Park and Ride lots for commuters
- Allow multiple modes of fare payment
- Encourage alternatives to flying (increase trains, etc.)

Policies, Funding, Public Outreach, and Education

- "Upzone" to encourage density and affordability. Make zoning allowances for mixed-use neighborhoods. Walkable grocery stores. Encourage tiny houses and accessory dwelling units (ADUs). Transit-oriented urban planning along transit corridors
- Build affordable workforce housing near workplaces to reduce commuting
- Incentivize work-from-home, 4-day-work-week, and shorter work day policies (with health care credits, bonuses, etc.) to reduce employee commuting. Provide free internet to support telecommuting
- Reduce availability of parking, reduce/eliminate parking minimums. Work towards a parking-space free campus. Tax vacant lots and development of new parking lots
- Enact car-free (or petrol-free) zones. Make downtown pedestrian-only on weekends, linked with shuttles from Park-n-Rides
- Implement odometer tax or congestion tax. Price vehicles on occupancy. Implement City gasoline tax on pumps/new development. Tax large local industries. Implement City income tax
- Enforce no idling laws
- Alter Act 51 (act for distributing funds for road infrastructure) to give locals more control over types of projects. Lobby for state policy that creates a dedicated funding source for non-motorized and electric transportation (like there is for highways)
- Lobby to eliminate state registration fees for EVs
- Increase education about biking and walking through middle and high school (there is nothing after Safety Town). Incentivize driver's education programs use EVs
- Create education, certification, and/or incentive program for auto dealers to sell EVs. Develop certification program for EV-qualified maintenance shops
- Leverage Forth Mobility for education and outreach
- Work with health-care systems to educate patients about health benefits of active transportation
- Leave behind level of service measures – use a better method like people through-put

- Adopt transportation pyramid (walking as priority to single occupancy driving at the bottom). Carbon neutrality mobility requirements in master plan
- Permeable pavement
- One-way street design
- Encourage carpooling for larger companies using apps
- Spotlight organizations who are taking action/success stories. Provide sample sites, pilots, and working examples of new ideas
- Help people understand their carbon footprint related to transportation and impact of changes

Process-Related

- Improve GHG tracking from transportation
- Using property taxes for funding can create equity concerns
- Always consider accessibility concerns
- Run lifecycle analysis on all ideas to see what is most effective
- Youth need to be at the table
- Carbon off-sets and sequestration (for travel)
- Plans from other communities with carbon neutrality goals (statewide coalition to move legislation at the state level)

TOPIC: RESOURCE REDUCTION

Waste Reduction

- Conduct environmentally-extended input-output analysis: City, University, hospitals
- Create a Zero Waste Plan
- Require all city-wide events be Zero Waste
- Leverage partnerships
- Report out on what happens to recovered waste
- Discourage landfilled waste:
 - Extend time between trash pick ups
 - Initiate payment by amount of trash model
 - Limit size of/availability of containers
 - Use funds from trash can fees for educational campaign
- Reduce single use plastics:
 - Organize a local cohort of business who do not use single use plastics
 - Tax/ban single use plastics (bags, takeaway containers, etc.)
 - Require bottle-filling stations
 - Encourage/enable price incentives for using reusable containers
 - A²Zero branded compostable alternatives to single-use plastics
- Electrify waste truck fleet
- Choose/require methane recovery at landfills in active use

Recycling

- Renovate city-owned Materials Recovery Facility
- Develop new city-owned Materials Recovery Facility
- Educate public/resolve recycling uncertainty
- Eliminate drop-off fees for recycling

- Multi-stream recycling pick-up
- Neighborhood level recycling rather than drop-off
- Improve textile recycling
- Enforce recycling

Organics

- Address waste water
- Methane recovery on waste water (Cross cutting: Energy)
- Improve composting pick up:
- Accessible to commercial, industrial, multi-family
- Ease of use
- Year round composting
- Local composting:
- Compost in neighborhoods/locally
- Return to local farmers
- Provide free compost to residents
- Create compost market
- Encourage/incentivize/educate on homeowner composting
- Provide information on environmental impacts of different compostable materials

Plant Based Diets

- Scale pledge programs, Blue Zone Program
- Incorporate AAPS and institutions
- Provide cooking classes focused on plant-based, local, seasonal foods (Rec & Ed)
- Education/ban on commodity beef/CAFO meat

Local Food Production

- Scale community gardens/local food production
- Local food waste recovery (gardeners, farms, restaurants, grocery stores)
- Farmers Markets Expansion
- Year round
- More locations
- Expanded food hubs/food stops/local food in grocery stores
- Protect SNAP in appropriate scaled sizes
- Pilot local food subscription meals with circular/reusable packaging
- Collaborate with AAPS, UM on food planning, purchasing, and waste

Circular Economy

- Reskilling and skill sharing opportunities
- Repair centers for bikes, appliances, etc.
- Toy and tool library/shed, shared play areas
- Support thrift stores, reuse center, flea markets
- Create a time bank/local currency

Sustainable Purchasing

- Charge a carbon price on the embedded GHG of products
- Create a local market for reusable goods
- Closed loop reusable packaging
- Offer refillable bulk containers, takeout containers, cups (at point of sale)
- Create/enforce purchasing policies, guidelines, or incentives for:
 - Municipal operations
 - Institutions
 - Individuals
- Create consumption-based inventories for:
 - The City
 - Institutions

Construction and Development

- Require sustainable materials in new development

Community Engagement

- Engage with commercial and institutional sector
- Commercial reuse packaging program
- Accelerate/scale current data collection/plans:
 - Green Business Challenge
 - Engagement with private sector
 - Require/encourage disclosure from businesses/community groups

Community/Education

- Publicize available data/educate on:
 - Decreasing and recovering food waste
 - Reducing packaging, single use plastics
 - Purchasing transparency: traceable, embedded GHG, recyclability/compostable, Energy Star
 - Increasing composting and its benefits
 - What is recyclable and how to recycle
- Ongoing community engagement team (provide inventory management)
- Demystify terminology
- Compost at schools, local food at schools
 - School curriculum on environmental science
- Link to public health initiatives (diet, pollution)
- Recognition program for successes, spotlight organizations who are taking action
- Promote sample sites, pilots, and working examples

TOPIC: RESOURCE REDUCTION

Preparation

- Develop new/leverage existing infrastructure as resilience hubs
- Activate some homes as shelters with resources, energy, etc.
- Identify safe gathering points in neighborhoods during power outages, extreme heat/cold, etc.
- Conduct needs mapping of neighborhoods based on specific support residents require
- Generate neighborhood-based resiliency plans, incorporate residential best practices.

- Activate neighborhood climate ambassadors/captains to help
- Enable/organize ongoing training via Red Cross/CERT/partners
- Coordinate across Red Cross/AmeriCorps/partners
- Develop redundant communication (e.g., Code Red), not dependent on internet
- Assist/organize preparing/distribute residential emergency kits
- Host a National Preparedness Month campaign
- Engage behavior change scientists and define actors/actuators
- Conduct risk assessments and incorporate into planning
- Conduct a resilience-aesthetic charrette
- Strengthen relationships with other local governments

Community cohesion

- Activate strong neighborhood community networks that support local efforts
- Activate neighborhood welcome ambassadors
- Educate and engage community on the expected risks/how to prepare/how to respond, sharing experiences, climate tours
- Increase local workshops and space for public input
- Youth participation/education through actions/videos/ambassadors/curriculum/training/competitions
- Develop a program to recognize neighborhood-level efforts
- Enable/organize block parties for energy/resilience themes
- Provide support for emotional resilience, grief management, psychological services, etc.
- Create shared childcare programs.
- Create communal kitchens

Response

- Develop climate refugee support/networks
- Develop program to use city buses for evacuation and power sources during a disaster

Urban Planning

- Implement/leverage sensors and data to monitor heat, air quality, waterway and floods. Assist with drones for data/response.
- Track public health metrics from state and CDC
- Urban planning to moderate heat via shade trees, lighter contract, more rain gardens
- Design for increased urban density and walkability/bike-ability. Update city zoning.
- Street trees: Analysis of shading/inventory/update master plan/incentivize private tree planting
- Improve parking lot design standards for shading, storm water retention, heat island mitigation, trees
- Incentivize white/green roofs
- Purchase repetitive loss properties. Redevelop vacant space as green space.
- Prioritize affordable housing.
- Require all City functions be zero waste.
- Allow/encourage telecommuting

Energy

- Transition to underground power lines
- Create redundancy in energy systems (storage)
- Decentralize energy infrastructure. Incentivize individual energy production.
- Increase renewable energy systems, storage, microgrids, and community solar.

- Plan for higher energy loads due to increasing temperatures.

Green Spaces

- Connect green spaces
- Increase natural area preservation and stewardship for carbon sequestration and storm water management
- Educate on native and invasive plants
- Increase land use for local food production. Host an improved food infrastructure innovation challenge.
- Encourage fruit trees/foraging, collect fallen fruit. Allow food production on city lands in neighborhoods.

Water

- Enable/encourage water generation and reuse and natural water/flood capture systems
- Design flexible water systems that adapt to conditions
- Remove dams/coordinate dam management
- Use accessory dwelling units for drinking water security
- Add vegetated buffers along waterways for storm water management
- Stricter floodway/floodplain management/planning

Transportation

- Design roads for flexibility, networked, alternative transportation, slower traffic, storm water management, trees, boulevards, durability. Fully implement green streets.
- Leverage Common Cycle to keep bikes on the road
- Encourage/enable car sharing
- Minimize parking available
- Install EV chargers at stores/apartments

Residential/Commercial Support

- Define and educate on residential best management practices
- Create a resilience fund/funding focused on equity
- Educate on DTE Energy support for energy efficiency upgrades
- Strengthen building code for efficiency/weatherization. Require 2030 District standards across all buildings.

