ANN ARBOR
Charter Township

Ann Arbor Township Climate Action Plan

November 20, 2023

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ACKNOWLEDGEMENTS

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FOREWORD AND VISION

The Ann Arbor Township Climate Action Plan will guide and integrate with Township operations, services, planning, policies, ordinances, and investments to ensure the most sustainable, inclusive, greenhouse gas (GHG) emission reduction options are implemented. The CAP will foster regional cooperation and community engagement in meeting climate and sustainability goals. Ann Arbor Township will specifically collaborate on the implementation of Resilient Washtenaw the county's Climate Action Plan, along with other cities, townships, and villages in Washtenaw County.[1]

PROJECT OVERVIEW

The Ann Arbor Township Climate Action Plan identifies mitigation, adaptation, and supporting actions needed to reduce carbon emissions and/or adapt to a changing climate in the Township.

Washtenaw County (County) recently developed and adopted *Resilient Washtenaw* – the first county-wide climate action plan in Michigan that sets aggressive and ambitious goals to reduce carbon emissions from County operations to zero by 2030 and county-wide emissions to zero by 2035. Resilient Washtenaw sets a course that all of the county's municipalities can follow to reduce and eliminate carbon emissions.

It's important to note that many actions recommended in Resilient Washtenaw are not included in the Ann Arbor Township plan, largely because the Township either lacks jurisdiction/legal authority to undertake those actions, or because they are not applicable to the Township.

What the Ann Arbor Township Climate Action Plan does provide is:

- A target for emission reductions that aligns with the Washtenaw County carbon neutrality goals of carbon neutrality by 2035.
- A baseline estimate of current emissions broken down by residential and non-residential sectors.
- A baseline estimate of current emissions generated by Township operations.
- A baseline estimate of emissions per square foot of residential buildings.
- An analysis that identifies how much each recommended action will reduce carbon emissions from across the Township and for Township operations.
- A set of recommended actions to reduce emissions in Township operations.
- A set of recommended actions to reduce emissions and adapt to the impacts of climate change for the entire Township.
- Recommended metrics to evaluate the progress the Township is making on its goals.

This Ann Arbor Township Climate Action Plan has a strong focus on implementation – those areas under Township control where the Township community can focus limited resources to effect the change they are seeking.

[1] For more information on Resilient Washtenaw, please visit https://www.washtenaw.org/DocumentCenter/View/29331/Resilient-Washtenaw---Final.

EXECUTIVE SUMMARY

In June of 2021, the Ann Arbor Township Board of Trustees adopted Resolution Declaring The Ann Arbor Township Policy to Mitigate Climate Change. This policy resolves that:

- Ann Arbor Township acknowledges that climate change imminently threatens our Township, region, state, nation, civilization, humanity and the natural world;
- Ann Arbor Township commits to an urgent effort, which, with appropriate financial, technical, and regulatory assistance from State and Federal authorities, seeks to end Township-wide greenhouse gas emissions as quickly as possible;
- Ann Arbor Township will evaluate Township buildings, vehicles, utilities, and other municipal operations to plan for the most cost effective and rapid conversion of those operations to be carbon neutral;
- Ann Arbor Township commits to accelerating strategies to adapt to intensifying climate impacts and improve the Township's resilience to climate change;
- Ann Arbor Township commits to educating our residents about the need for urgent climate change actions and mobilizing in concert with regional, state, and national entities to provide maximum protection for our residents and natural environment; and
- The Ann Arbor Township Climate Resilience Committee is charges with developing plans and priorities for these above urgent actions and making recommendations to the Township Board of Trustees.

To reach it's climate goals, the Township needs an all of the above approach. While the Township's GHG emissions make up a small proportion of the Washtenaw County emissions inventory, the Township is taking a leadership role in exploring climate action at the Township scale.

The Project Team estimated the various sources of carbon emissions across the Township. The Project Team used known data for Township operations including electricity and natural gas bills and vehicle fuel purchases. For Township wide estimates – many of these data are estimated from county level data provided by utilities and downscaled to the Township population (Residential Building Energy Use) or jobs (Office Building Energy Use). The Investor-Owned Utilities (i.e., DTE and Consumers Energy) will not provide local Township level data. We anticipate this will change in the future. Transportation data are measured in Vehicle Miles Traveled (VMT) and these estimates include Township resident trip estimates, commuter estimates for commuters driving into the Township, and the VMT of commuters passing through on M14 and US23. Each inventory sector is listed below and ordered by each sectors' proportion of overall Township emissions.

Inventory Sector	Estimate	Unit	MTCO2e	%
On-road Transportation: Gasoline & Diesel	114,074,264	vehicle miles traveled	50,079	37.6%
Commercial & Industrial Electricity Use in Buildings	80,120,411	kWh	43,493	32.7%
Commercial & Industrial Natural Gas Use in Buildings	3,985,409	ccf	21,719	16.3%

Residential Natural Gas Use in Buildings	1,356,607	ccf	7,393	5.5%
Residential Electricity Use in Buildings	12,477,664	kWh	6,774	5.1%
Solid Waste Disposal: All Waste Generated in the Township	7,073	Tons	2,418	1.8%
Propane Use	87,842	gallons	504	0.4%
Transit Buses	54,392	gallons fuel	223	0.2%
Building Electricity Use - Township Operations			127	0.1%
Wastewater Generated in the Township			118	0.1%
Off-road Transportation			110	0.1%
Fugitive Emissions Associated with Natural Gas Use			87	0.1%
Fuel Oil & Kerosene Use	6,968	gallons	71	0.1%
Building Natural Gas Use- Township Operations			48	0.0%
Fleet- Township Operations			43	0.0%
Biological Treatment of Waste: All Waste Generated in the Township	201	Tons	1	0.0%
Total			133,208	100.0%

This Plan recommends 29 Climate Actions that either 1) reduce greenhouse gas (GHG) emissions at the Township Wide (TW) or Township Operations (TO) scope, 2) support other recommended GHG reduction actions, and/or 3) support climate adaptation or carbon sequestration. These climate actions are developed in more detail at the end of the document. Some of these actions are lower in priority because the likely emission reductions are low or - while the emission reduction potential may be high - the Township has little direct influence over the recommended action. Each Climate Action highlights whether the cost of the action is part of existing Township or Community Investments, a new Township Government Investment (e.g., Joining the Resilience Authority), or an Investment by the Community (e.g., residents investing in new electric heat pumps) with no cost to the Township Government. Several of the recommended actions can be implemented by creating a strong education and outreach program for residents and businesses that connects them quickly to existing programs and new opportunities.

Emissions from Transportation and Commercial Building energy use are the largest contributors to GHG emissions in the Township. Transportation emissions are high in Ann Arbor Township because the Township is bordered by two major freeways and emissions from these trips accrue to the Township. The Township has no control over most of these emissions. The emissions from Commercial and Residential Building energy use are also not in the direct control of the Township. However, the Township can play a strong role in leading by example and building an education and outreach program to increase awareness and support the community investments in energy efficiency and renewable energy. Most of these recommended Climate Actions will be funded by members of the community without direct Township Government investment. The Plan recommends that the Township Government invest in a local partnership to ensure that members of the Township community have access to the best available information before and when they make investments in energy efficiency and renewables. Several of the recommended actions rely on advocacy in Lansing to support new legislation or amend existing law to allow the Township to develop stronger climate-friendly programs.

Recommended Climate Actions

Recommended Climate Actions are listed below by Township Priority. The scope of the action is denated by TW for Township-Wide Actions or TO for Township Operations Actions. The GHG benefit column highlights the estimated GHG reduction in MTCO2e for each action. Township Government Investment highlights the estimated costs of recommended actions and whether the investment will be made by the Township Government, Grants, or the Community.

Township Priority	Scope	Climate Action	GHG Benefit (MTCO2e)	Township Government Investment
1	TW	On-going Climate Education and Public Engagement	High (9,866)	$150,000/yr
2	TW	Home Energy Advisor Program		
3	TW	Residential & Commercial Weatherization and Energy Efficiency		
4	TW	Community Bulk Buy for Solar and Building Electrification		
5	TW	Join the Regional Resilience Authority	Support	TBD
6	TW	Carbon Pricing in Decision Making	Support	
7	TW	100% Renewable Energy Options for Everyone	High (44,648)	Lobbyist
8	TW	Enabling Legislation for Township Energy Programs		Lobbyist
9	TW	Improve Transit Access in the Township	Low (201)	TBD
10	TW	Expand the Active Transportation Network	Medium (1,250)	TBD
11	TW	Update Stormwater Regulations	Adaptation	Existing Investment
12	TW	Natural Area Preservation	Adaptation/Sequestration	Existing Investment
13	TW	Farmland Preservation	Adaptation/Sequestration	Existing Investment
14	TW	Provide Comment on Infrastructure	Adaptation	Existing Investment

Township Priority	Scope	Climate Action	GHG Benefit (MTCO2e)	Township Government Investment
		Agency Planning Projects		
15	TW	Time of Marketing Energy Rating Disclosure	Support	Adopt Model Ordinance
16	TW	Expand Rain Garden Program	Adaptation	Existing Investment
17	TW	Expand Electric Mobility Options	High (18,308)	Community Investment
18	TW	Emissions Accounting Mechanism	Support	TBD
19	TW	Prioritize Capital Projects that Reduce Emissions and Prepare for Extreme Weather	Adaptation	Existing Investment
20	TW	Develop a Township Organics/Compost Program	Low (342)	Community Investment
21	TW	Reduce Vehicle Miles Traveled (VMTs)		Community/Grant/Township Investment
22	TW	Support and Grow the Washtenaw Regional Resource Management Authority (WRRMA)	Support	Existing Investment
23	TO	100% Renewable Energy for Township Operations	Low (83)	Township Investment
24	TW	Create Resilience Hub	Adaptation	Township Investment/Grant Opportunity
25	TW	Maintain and Expand Township Tree Canopy	Adaptation/Sequestration	Community Investment
26	TW	Stormwater Basin Inspection and Retrofit	Adaptation	Existing Investment
27	TW	Materials Management Program	Low (838)	Community Investment
28	TW	Incentivize Local Food Production	Support	Existing Investment
29	TO	Township Fleet Electrification	Low (25)	TBD

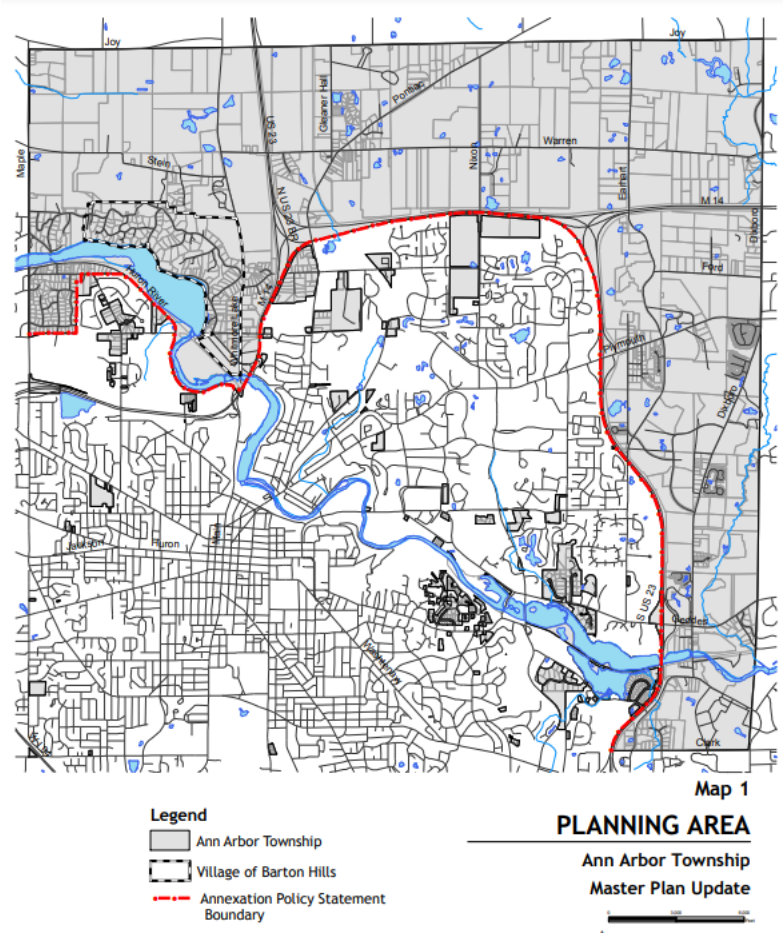
Implementing these actions will be more efficient with partnerships among Washtenaw County governments. To expedite implementation, the Township should invest in key areas including education and mechanisms to share funding and incentive opportunities with residents and businesses. While the

overall cost of implementing these actions is expensive, most of these expenses will be borne by residents and businesses and most of these actions also return significant economic and other co-benefits to the community.

This plan also makes recommendations on making the Township more resilient. The Township can build on its strong track record of preserving working and natural lands that also contributes to the Township's ecosystem services. It is imperative that the Township build climate adaptation into its capital planning to ensure that these investments recognize the threats that a changing climate poses to roads, grid reliability, drinking water systems and private wells, and public and environmental health of the Township community.

COMMUNITY PROFILE

This section provides an overview of the many features and unique characteristics of Ann Arbor Township. The character of the Township is an important context when exploring the community's GHG footprint and contextualizing it amongst neighboring jurisdictions and communities of similar size and characteristics.



Ann Arbor Township is located north and east of the City of Ann Arbor - covering an area of 17.2 square miles (10,496 acres). According to the 2021 American Community Survey (ACS), the Township had a population of 4,747 residents with a population density of 288.6 people per square mile. The Township is considerably less dense than neighboring Pittsfield Township (1443 people/sq. mile), Scio Township (554 people/sq. mile), Superior Township (424 people/sq. mile); and the City of Ann Arbor (4,310 people/sq. mile) but is consistent with northern neighbor Northfield Township (242 people/sq. mile), which is more similarly a rural community.

The Township is divided into a more urbanized section with water and sewer service in the southeast corner of the Township that is defined by Clark Road on the south, N. Dixboro Rd on the east, US 23 on the west, and M-14 to the north. The remainder of the Township is largely rural with significant acreage

protected as agricultural land or natural areas. There are isolated sections of Ann Arbor Township contained inside the City of Ann Arbor limits. These "Township Islands" are being annexed into the City over time.

Household and Population Characteristics

Ann Arbor Township's population of 4,747 is 1.3% of the total population of Washtenaw County. It is the smallest municipality in terms of population in the eastern half of the County. According to the 2021 American Community Survey (ACS), there are 1,958 households (2.4 persons/household), which is the same household density as Washtenaw County overall.

The following graphics are taken from the U.S. Census Reporter service.

Figure 1: Households - Ann Arbor Township (source U.S. Census Bureau)

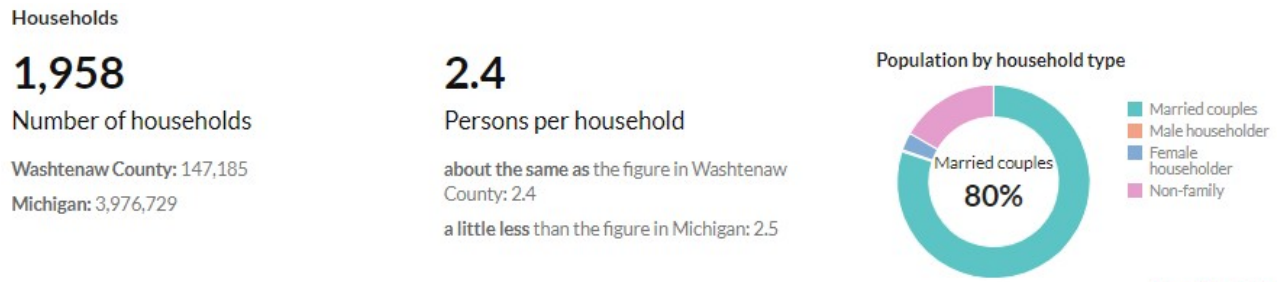


Figure 2: Age characteristics - Ann Arbor Township (source: U.S. Census Bureau) – Note: t designates a margin of error at least 10% of total value

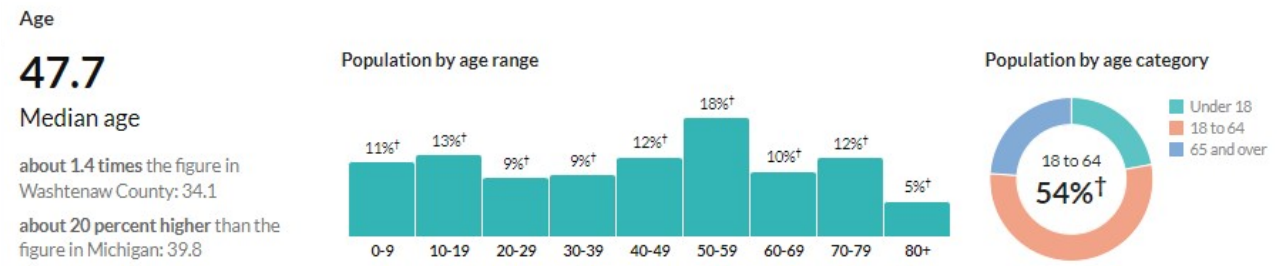


Figure 3: Housing Units and values - Ann Arbor Township (source: U.S. Census Bureau)

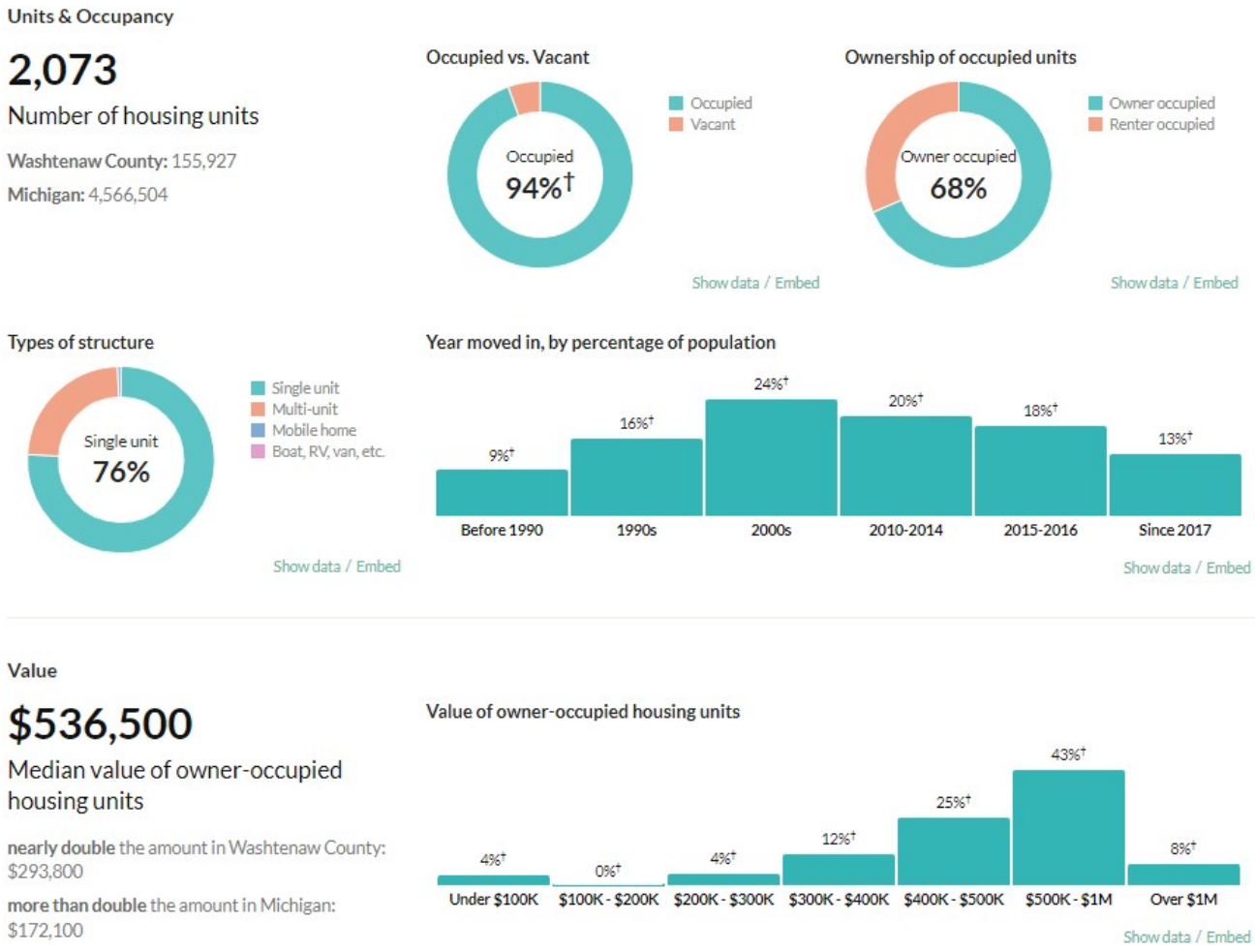
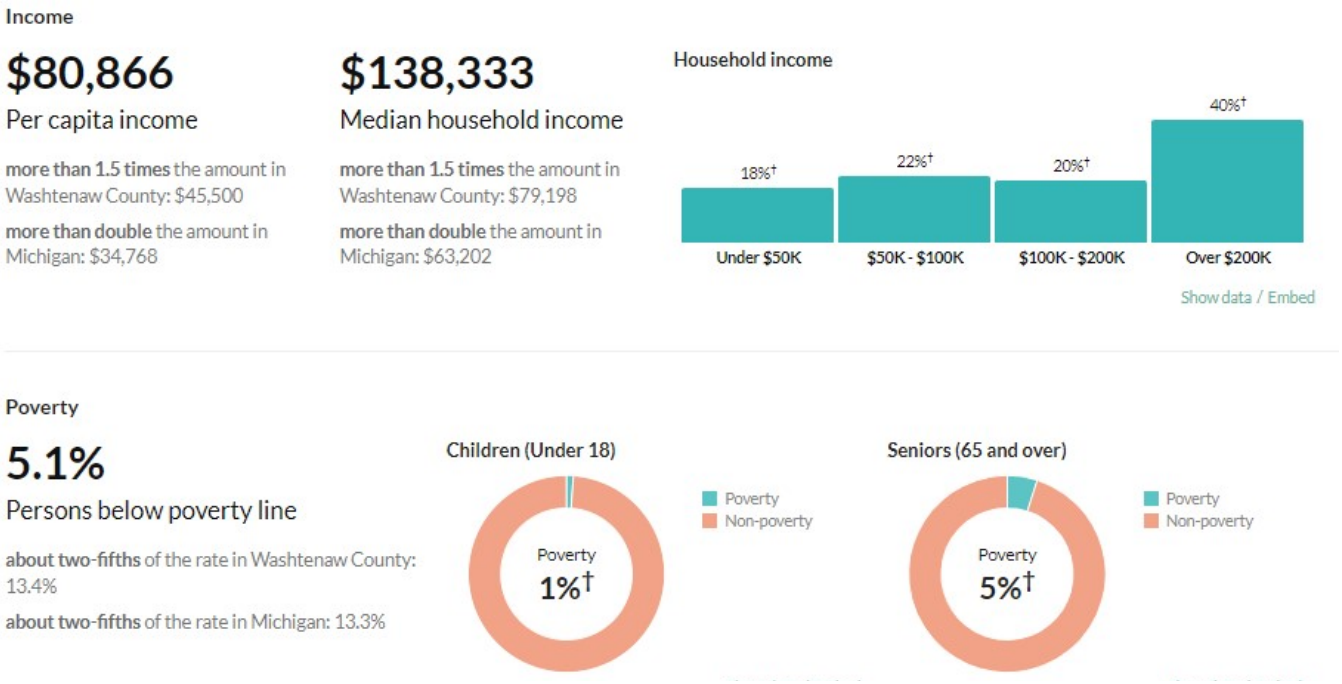


Figure 4: Income and poverty - Ann Arbor Township



In summary, Ann Arbor Township has a significantly higher income (both per capita and median household income) than the rest of Washtenaw County and a lower poverty rate. It is significantly older, and 76% of the housing units are single-unit homes.

Based on the above Census information, Ann Arbor Township can be classified as a relatively affluent community that is significantly older than the overall County population profiles. These data are important because the Township's wealth may make the Township less competitive for federal climate action grants that tend to be directed to low income and disadvantaged communities (LIDCs). Taken as a whole, many households can be resilient in the event of a climate related loss. However, within the community are individuals and neighborhoods that are more vulnerable to the financial impact of climate-related events. While the data in this plan do not locate these populations, it is critically important to remember that financial vulnerability varies greatly from household to household.

This information is also useful to help begin identifying populations and locations that may be particularly vulnerable to the impacts of climate change.

Land Use

Land use in the Township is varied but is still largely rural in nature with 42% of the land area still used for agricultural production or rural residential use with additional significant land areas that remains vacant or preserved lands. The map below shows the Future Land Use for the Township.

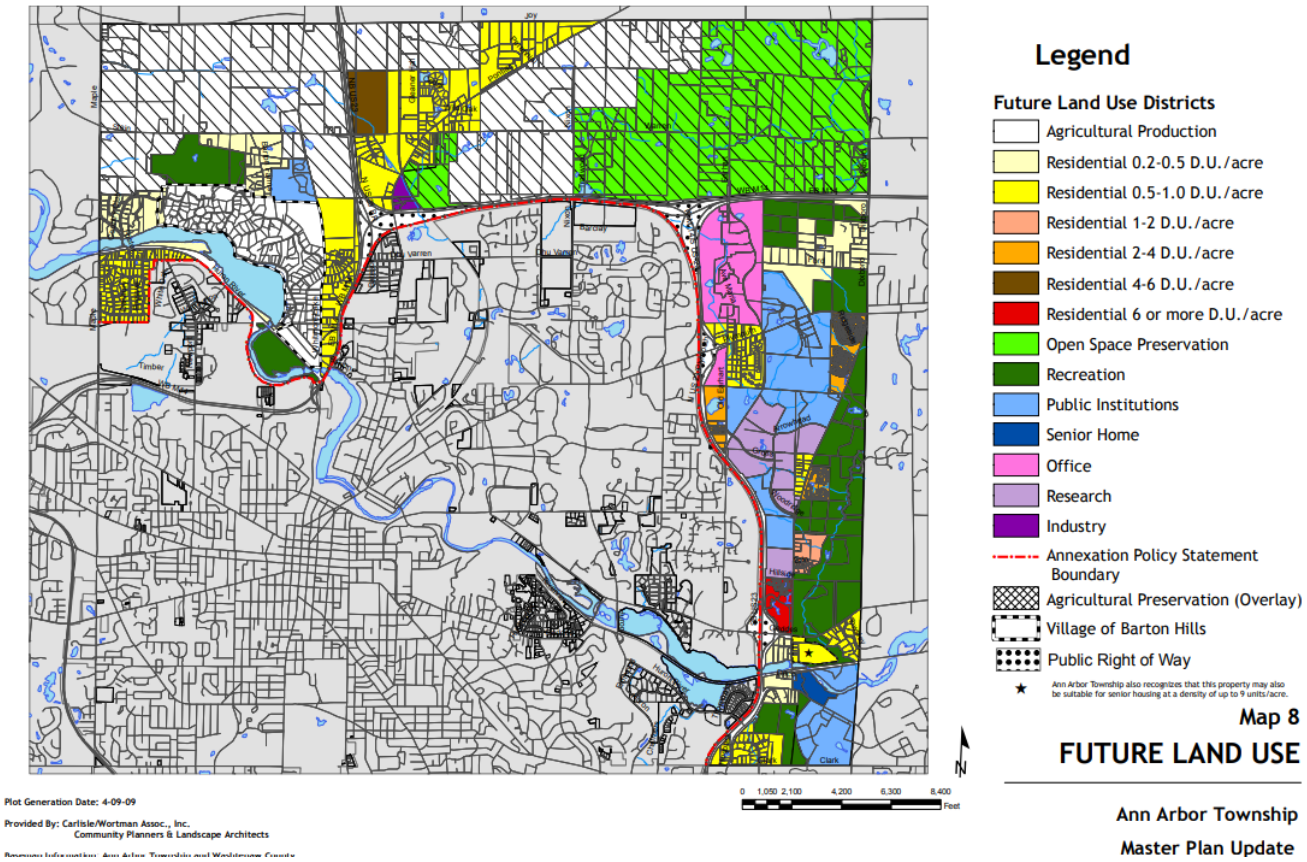


Table 1: Land Area of Parcels Categorized by Type of Use (Source: SEMCOG)

Land Use	Total Acres	Percentage of Total Area
Single-Family Residential	937	9%
Attached Condo Housing	8	>1%
Multi-Family Housing	72	1%
Mobile Home	0	0%
Agricultural/Rural Residential	4416	42%
Non-Residential	1084	10%
Recreational/Open Space	1247	12%
Vacant/Undeveloped	1395	13%
Water	225	2%
Not Parceled	1040	10%
Total	10,423	100%

- **Agricultural / Rural Residential includes any residential parcel containing 1 or more homes where the parcel is 3 acres or larger.**
- **Not Parceled includes all areas within a community that are not covered by a parcel legal description.**
- **Parcels that do not have a structure assigned to the parcel are considered vacant unless otherwise indicated, even if the parcel is part of a larger development such as a factory, school, or other developed series of lots.**

Township Natural Lands and Ecosystem Services

A snapshot of the Township's ecosystem services can be gleaned from SEMCOG's 2020 land cover data and the Huron River Watershed Council Landcover data in the tables below.

Table 2 - SEMCOG's 2020 land cover data

Landcover Type	Description	Acres	Percent
Impervious Surfaces	buildings, roads, driveways, parking lots	942	9.2%
Trees	woody vegetation, trees	4,697	45.7%
Open Space	agricultural fields, grasslands, turfgrass	4,425	43.1%
Bare	soil, aggregate piles, unplanted fields	33	.3%
Water	rivers, lakes, drains, ponds	180	1.8%
Total Acres		**10,277**	**100%**

As a part of SEMCOG's mapping and land use analysis, they identified 5,351 acres of tree canopy, which is 52.1% of total Township land. SEMCOG defined tree canopy as the layer of tree leaves, needles, branches, and stems that provide tree coverage of the ground, viewed from an aerial

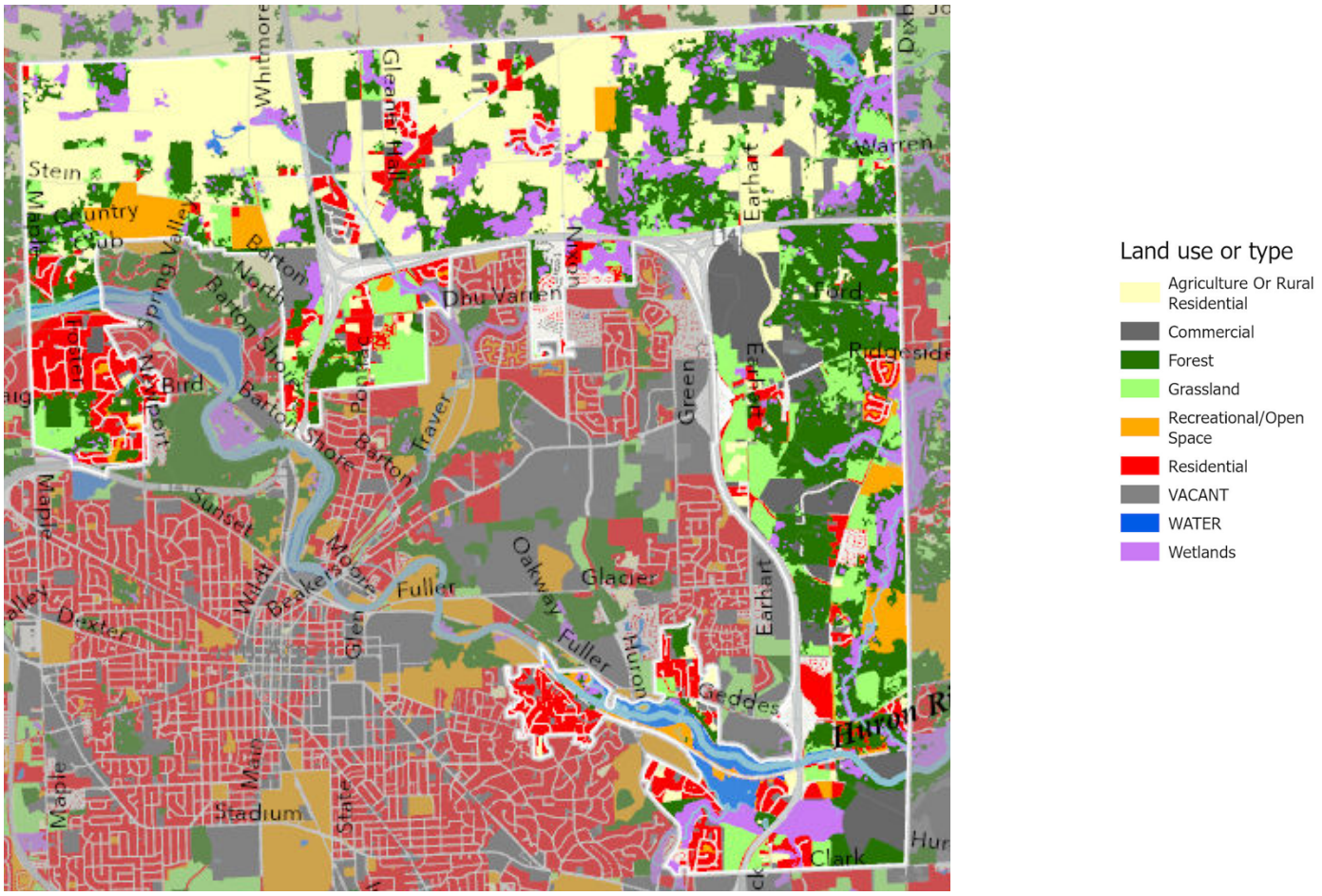
perspective. This total is different than the land cover acreage based on the different methodology used to identify tree canopy.

Table 3 - Land Use and Land Cover Data - HRWC 2023

Landcover Type	Acres	Percentage
Agriculture Or Rural Residential	2,620	25%
Commercial	655	6%
Forest	2,649	25%
Grassland	998	10%
Recreational/Open Space	433	4%
Residential	1,175	11%
VACANT	539	5%
WATER	240	2%
Wetlands	1,103	11%
TOTAL	10,416	100%

HRWC's Land Use and Land Cover Table (above) and Map (below) - combines SEMCOG's 2020 land use layer and contains one polygon for each of 20 land use categories present in each community.

Figure 5 - Land Use and Land Cover Map (Huron River Watershed Council 2023)



As demonstrated by the statistics in the previous tables and maps, Ann Arbor Township *provides significant ecosystem services within Washtenaw County* and far more than its more urban neighbors. Ecosystem services include food production, carbon sequestration through existing and preserved forest cover and agricultural crops, aquifer recharge areas, habitat, and recreation space.

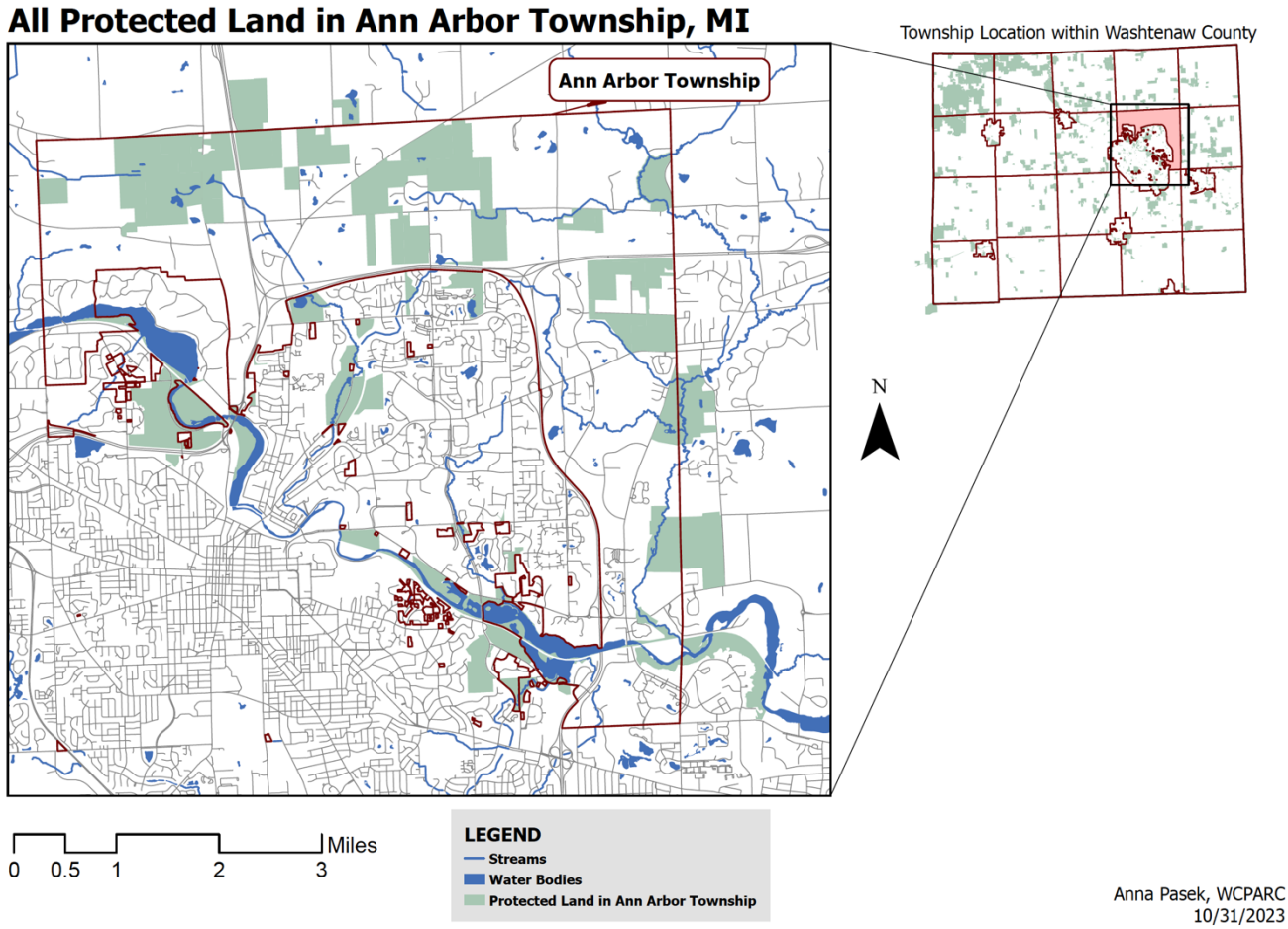
There is considerable value for these ecosystem services – in terms of biodiversity, stormwater control, drinking water source preservation, food production. These services provide considerable financial value as well. An April 2021 paper, *Assessing and Communicating Climate and Water Ecosystem Services of the City of Ann Arbor Greenbelt Program*, estimated that the aboveground carbon stored in the Ann Arbor Greenbelt at 119,519 MTCO2e. Using the Biden Administration Social Cost of Carbon value of $51/MTCO2e, this has a value of $6,095,473. The estimated carbon in the uppermost layer of forested and wetland soils of the Greenbelt properties was 183,356 MTCO2e, with a social cost of carbon value of $9,351,156. It is difficult to estimate the carbon sequestration value of the forested and agricultural land in the Township.

A map of Township protected properties is shown on the right. Preserving working and natural lands has been a priority for the Township and provides several climate mitigation and adaptation benefits including more:

- Working farmland available for local food production;
- Preserved land to help sequester carbon;
- Preserved land to help hold and infiltrate stormwater to reduce flooding; and
- Preserved forests and wetland to provide habitat and connected wildlife corridors.

A table of natural features associated with Township protected properties is included as an appendix to this plan.

Figure 6 - Protected Land in Ann Arbor Township



What Are Ecosystem Services?

The Millennium Ecosystem Assessment (MA), a major UN-sponsored initiative/program, explores the impact of human actions on ecosystems and human well-being. The MA has identified four major categories of ecosystem services: provisioning, regulating, cultural and supporting services. All four are provided within Ann Arbor Township.

1. Provisioning Services

Fruits, vegetables, trees, fish, and livestock are available to us as direct products of ecosystems. A provisioning service is any type of benefit to people that can be extracted from nature. Along with food, other types of provisioning services include drinking water, timber, wood fuel, natural gas, oils, plants that can be made into clothes and other materials, and medicinal benefits.

2. Regulating Services

A regulating service is the benefit provided by ecosystem processes that moderate natural phenomena. Regulating services include pollination, decomposition, water purification, erosion and flood control, and carbon storage and climate regulation.

3. Cultural Services

A cultural service is a non-material benefit that contributes to the development and cultural advancement of people, including how ecosystems play a role in local, national, and global cultures; the building of knowledge and the spreading of ideas; creativity born from interactions with nature (music, art, architecture); and recreation.

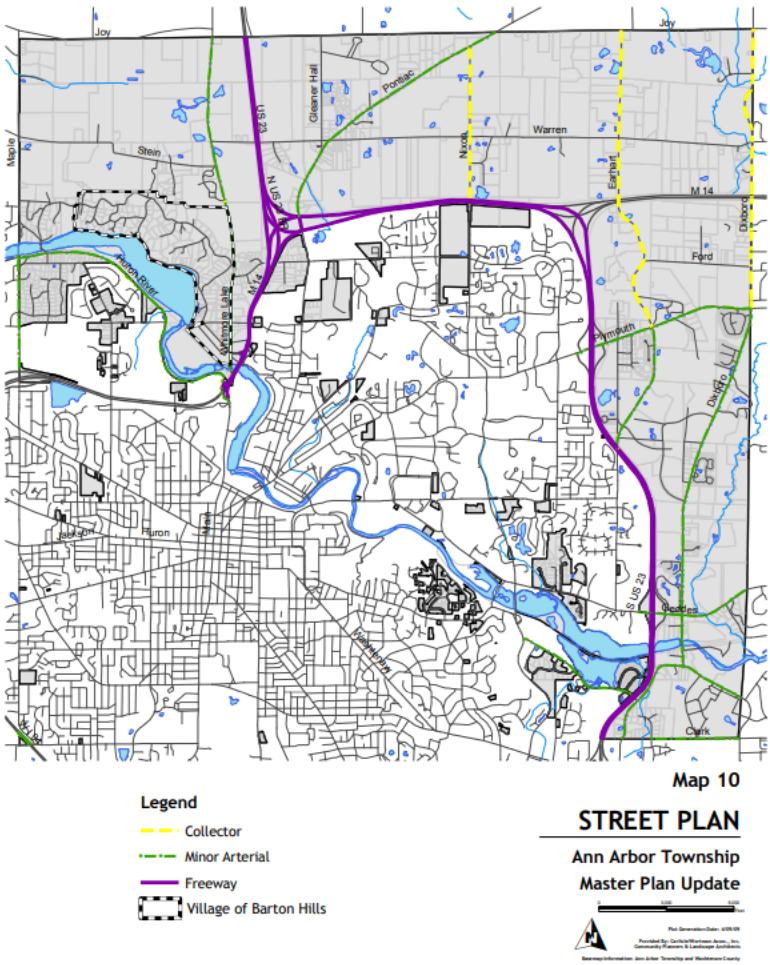
4. Supporting Services

Ecosystem health is dependent upon the consistency of underlying natural processes, such as photosynthesis, nutrient cycling, the creation of soils, and the water cycle. Without supporting services, provisional, regulating, and cultural services wouldn't exist.

Transportation

As a primarily rural community with low-density development, Ann Arbor Township residents and commuters are primarily car-dependent, resulting in many vehicle miles traveled (VMT). Furthermore, the Township is flanked by major trunklines like M-14 and US-23 and arterial roads like Plymouth Road that serve commuters and commercial vehicles from around region.

Table 4 - Ann Arbor Township Street Plan



The Township has the following road types:

Table 5: Township Roadway Length By Road Type

Road Type	Length (mi)
Freeway	30.82
Minor Arterial	6.15
Collector or Local Neighborhood Road	80.85
Ramp	4.55

Among Township households, 97.4% have cars, and 73.0% drive alone to work, with an average commute time of more than 25 minutes. The majority of residents drive vehicles with internal combustion engines.

Table 6: Means of Transportation to Work (ACS 2021 5-year)

Mode	Percent
Car, truck, or van - drove alone	73.00%
Car, truck, or van - carpooled	4.70%
Public transportation (excluding taxicab)	2.10%
Bicycle	0.40%
Walked	0.80%
Taxicab, motorcycle, or other means	0.00%
Worked from home	**18.90%**

Table 7: Travel Time to Work (ACS 2021 5-year)

Duration	Percent
Less than 10 minutes	8%
10 to 14 minutes	16%
15 to 19 minutes	21%
20 to 24 minutes	15%
25 to 29 minutes	7%
30 to 34 minutes	12%
35 to 44 minutes	11%
45 to 59 minutes	4%
60 or more minutes	6%

COMMUNITY ENGAGEMENT SUMMARY

Community Engagement for the Ann Arbor Township Climate Action Plan brought forward information gathered from the public during the Resilient Washtenaw process and was supplemented with specific feedback from Township farmers, the Township's Climate Resilience Committee, the Farmland and Open Space Preservation Committee, Planning Commission, Township Board of Trustees, and the public. The following sections summarize the input provided by the community as a part of this project.

Resilient Washtenaw – Township Specific Input

During the Resilient Washtenaw outreach efforts, the project team held County Commissioner district meetings across the County. At least three of these meetings were in or near Ann Arbor Township in County Commission District 2. Additional information was also submitted to the Resilient Washtenaw Team from residents of Ann Arbor Township via the CoUrbanize on-line portal. A heatmap of respondents is shown below. Ann Arbor Township residents accounted for 4% of the responses in the Resilient Washtenaw Plan.

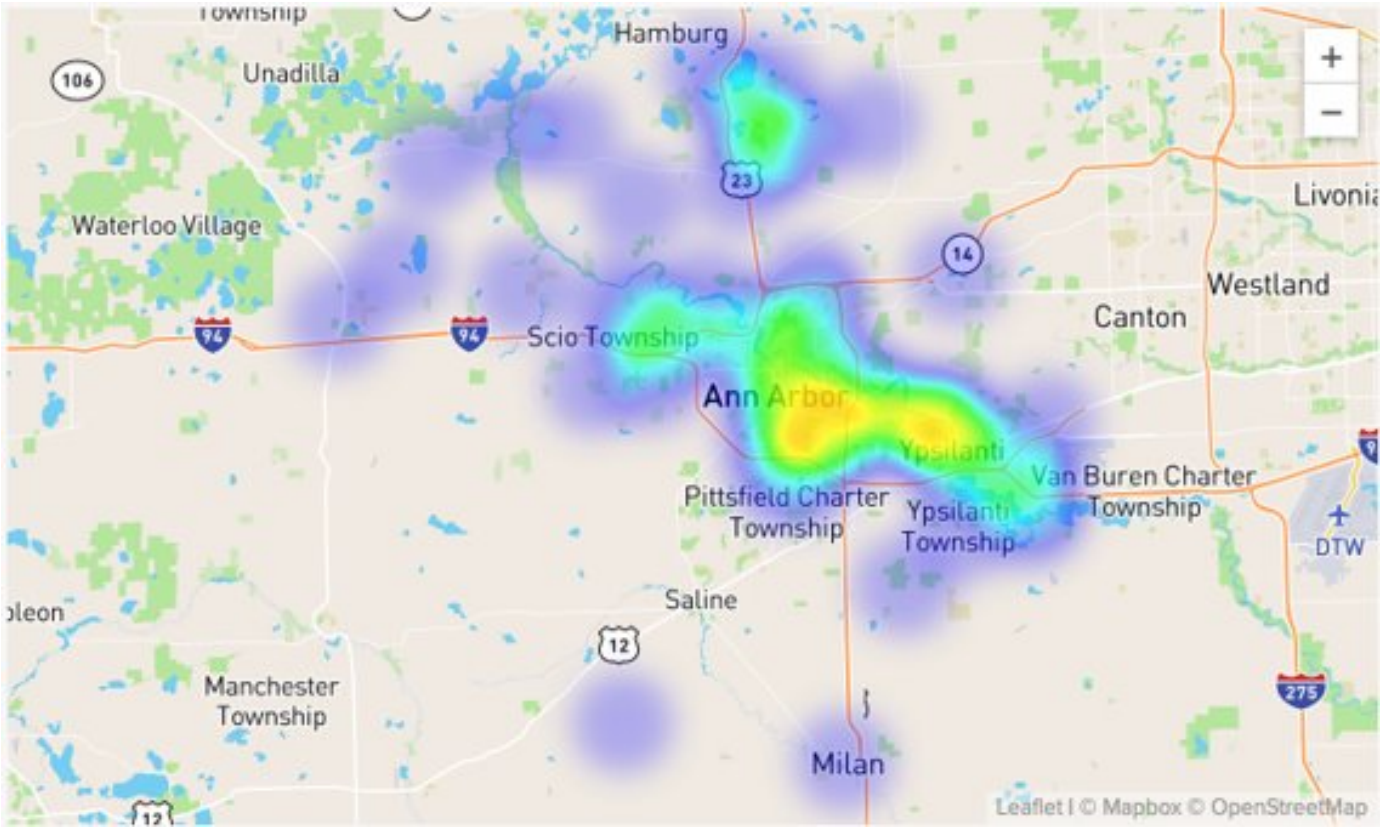


Figure 7 - CoUrbanize Heat Map of responses

Agricultural Interests Meeting

In March of 2023, local farmers were invited to discuss their thoughts on a changing climate and what the Township could do to support local farmers. 12 farmers attended and participated for 2 hours. Highlights from the meeting are included below. Some of these areas of interest are not directly related to climate change but are included because of their importance to local farmers.

- Deer - Deer management was a priority concern from the very beginning. More and more deer are causing problems for farmers. The farmers are concerned that land preservation has increased the property available to grow unmanaged herds of deer. They recognize that conservation is a benefit, but it can also have unintended consequences that need to be managed. The farmers noted they have data to document crop loss from deer.
- Moving Farm Equipment – Farmers raised concerns about moving farm equipment and the dangers associated with this seasonal transportation conflict.
- Zoning – Farmers raised concerns about putting homes on 10 acre lots where good agriculture land just sits and grows weeds that blow on to adjacent farmland. Farmers suggested focusing development in areas with sewers. Farmers raised specific examples and concern about a new development using 200 acres for 50 houses and another where a builder gave 102 acres to the Township.
- Smaller Windows to Farm – The window available for farmers to sow their fields has become smaller, however efficiency has kept farming viable. Yields are higher now with efficiency. Farms and equipment are getting larger. All of the farmers in the discussion were local farmers. Several also farmed in adjacent communities as well.
- Concerns About Young Farmers – What can the Township do to support the next generation of farmers?
- Taxes – Farmers raised the concern that Preserved Farmland is still taxed at a high rate and would welcome options to reduce farmland taxes.
- Processing Challenges – Farmers noted that they would like local options to process meats and grain. These processing options would create new businesses in the Township or county and could increase the amount of food grown in the community that stays in the community.
- Insufficient Local Production – Farmers noted that for some foods, there is very little local production (e.g., dairy farms) to supply local demand.
- Fertilizers – Farmers stated that they could use/purchase all of the organics/compost produced in the community if they knew it was clean. PFAS and other chemicals of concern were discussed as problematic.
- Farmers were concerned about a solar project in another county that took down 125 acres of mature woods. Farmers noted the conflict in that both they and solar developers want 1000 acres of cleared land. Farmers stated they would prefer preserving prime ag land over solar production.
- Carbon Sequestration – Farmers recognize the value of farming for carbon sequestration, noted that they are already farming in climate friendly ways, and would like to see that work recognized. Farmers would like to be involved in developing any local carbon offset program.

- Regular Meetings – Farmers suggested monthly opportunities to meet especially in the off- or mid-season. They suggested broadening the conversation to include the County Conservation District, NRCS, MSU Extension, Biologists from MDNR (e.g., Deer Management), State Climatologist, etc. Farmers suggested including both commodity and small farmers in these meetings and holding the meetings in person to the extent practicable.

COMMUNITY MEETINGS

To Be Updated

Township Government Participation

The project team engaged with Township Boards and Committees on several occasions. Specifically, the project team met with the following Boards and Committees:

- Scope Development Meeting – Township Climate Resilience Committee – June 8, 2022
- Multi-Board Meeting: Ann Arbor Township Climate Resilience Committee Meeting - February 13, 2023 included members from the Board of Trustees, Planning Commission
- Agricultural Interests Meeting - March 7, 2023
- Insights presented to the Climate Resilience Committee in April 2023
- Township Climate Resilience Committee Meeting - April 12, 2023
- Township Climate Resilience Committee Meeting Aug 9, 2023 – Draft Plan initial review
- Township Climate Resilience Meeting – August 29, 2023 – Revised Draft Review
- Township Climate Resilience Committee Meeting – September 27, 2023 – Action on Draft Plan
- Township Board Draft Plan presentation and review

Priorities and Strategies Workshop Summary – February 13, 2023

The Project Team met with the Township Climate Resilience Committee, members of the Township Board of Trustees, Planning Commission, and Farmland and Open Space Preservation Committee as well as interested members of the public. The meeting, held on February 13, 2023, was a hybrid meeting, with participants either in-person at Township Hall or on-line via Zoom. The purpose of the workshop was to have a deeper discussion on energy use and transportation, as these are the areas with the largest climate impacts. A summary - including recommendations from the participants - is provided below.

Energy Transition Discussion: 100% Renewable Energy Option for Everyone - Discussion

To fully decarbonize the energy system, residents and businesses must have equitable access to 100% renewable energy options from the grid. There are multiple pathways to achieve this. Community Choice Aggregation (CCA) which requires a change in state law and Sustainable Energy Utilities (SEU) are two examples. State law also would need to be changed to allow townships to form/operate an SEU.

The City of Ann Arbor has set 2030 for their target of providing 100% renewable electricity, and it will require a coordinated effort at all levels of government and community support to meet this target in the city and across the rest of the County.

Proposed Measures of Success:

- 100% Renewable Energy Options Available to All Residents, Businesses, and Local Units of Government
- Renewable Energy Options Available at or Below Current Cost of Electricity
- Renewable Energy comes from Local Sources

The following opportunities were discussed and are captured in the recommended Climate Actions.

Opportunities

- Change zoning to allow more solar and wind - the group felt that the current ordinance is sufficient but there may be opportunities to make it better. (Township Priority 7)
- Provide EV charging stations at all Township owned/controlled sites and support EV charging at businesses. (Township Priority 23)
- Partner with local programs for solar group buys for Township residents. (Township Priority 4)
- Arrange for private-public partnership to place solar on all business/commercial rooftops especially Dominoes' Farms. (Township Priority 4)
- Place solar on parking lots or other places. (Township Priority 4)
- The Township can purchase green power (MIGreenPower) or enter into EPA's green power partnership for its operations but has limited authority to improve accessibility to or availability of renewable energy from the grid for the broader community. (Township Priority 7)
- For distributed generation, the Township can assist via expedited permitting, adjust zoning to include bonuses for onsite generation, encourage the use of flat roofs for solar use, etc. The Township could also explore options for siting of medium and large-scale renewable energy production within the Township avoiding the use of prime agricultural land. (Township Priority 7)

Strategies to reduce building energy use include:

- Build awareness of federal tax credits and utility energy efficiency rebates (Township Priority 3)
- Emphasize HVAC - either heat pumps or geo-exchange technologies. (Township Priority 3)
- Provide energy concierge services - to reduce information and transaction costs for property owners interested in energy efficiency. The Township should partner with the Resilience Authority to leverage concierge services the County provides. (Township Priority 1)
- Increase distributed energy generation via solar – a high proportion of homes in the Twp have roof or ground space for plenty of PV. (Township Priority 7)

New federal programs have been created under the IIJA and IRA acts to make funding available for energy efficiency and renewable programs. The State of Michigan MI Healthy Climate Plan may have similar albeit smaller funding opportunities.

Workshop Energy Recommendations Discussion

- The Township should build grant writing and management capacity to take advantage of these new funding opportunities. (Township Priorities 1-4)
- The Township Master Plan Update should incorporate incentives for developers/builders to reduce energy use, install renewable resources, support micro-grids in existing commercial districts, and over build the infrastructure for electric vehicles and EV chargers. (Township Priority 3)

- The Township must ensure that Township staff, including building inspectors, should be fully trained on energy efficiency and distributed energy and should be ambassadors/educators to property owners and trade when performing inspections. (Township Priority 2)

Mobility and Access Discussion: Reduce Vehicle Miles Travelled (VMT)

Reduction in VMTs is a very challenging goal, requiring significant behavior change and investments in alternative modes of transportation, specifically transit and safe non-motorized and multimodal routes. Creating these improvements and incentivizing behavior change requires a true multi-jurisdictional approach to mobility planning. WATS is the primary transportation planning agency for the County and prepares both the Transportation Improvement Plan and Long-Range Transportation Plan. The Washtenaw County Road Commission (WCRC) maintains and manages the road network within the Township, and the Township works with MDOT on bridges. Washtenaw County Parks and Recreation Commission (WCPRC) oversees the Border-to-Border Trail. The Ann Arbor Area Transportation Authority (AAATA or The Ride) operates the regional transit system. All of these agencies must be involved in efforts to reduce the number of VMT in the Township.

Proposed Measures of Success:

- Reduce total Countywide VMTs by 50% by 2035. (Township Priority 21)
- Increase the number of lane miles of bicycle and pedestrian facilities by 50% BY 2035 (Township Priority 10)
- Increase the number of miles of designated natural beauty roads within the Township (Township Priority 12)
- Incentivize private and public connections from residential and commercial areas to the Border-to-Border Trail. (Township Priority 10)
- Establish a database for VMTs and associated emissions and changes due to road expansions (and/or lane reductions) and new developments in the Township by 2024. (Township Priority 18)
- Use VMT calculations to consider carbon price as a part of all road projects and proposed developments. (Township Priority 6)

Workshop Transportation Recommendations Discussion

- The Township should prioritize development along existing areas served by transit and improve transit service in more developed areas of the Township. (Township Priority 9)
- The Township has rezoning power to increase density in the areas of the Township served by water and sewer and can use form-based codes and mixed use to make these areas more walkable, bike commutable, and mass transit-friendly. (Township Priority 9)
- The Township should also encourage additional bicycle and pedestrian network improvements, particularly at the boundaries with other jurisdictions. For example, connections such as Nixon Rd. from Huron Parkway approaching M-14 and the Warren Rd. and Joy Rd. bridges should be prioritized to improve non-motorized access. These

new infrastructure improvements should be built with commuting in mind (wider and separated paths) and not just recreational uses. (Township Priority 10)

CLIMATE CHANGE AND ANN ARBOR TOWNSHIP: OVERVIEW AND VULNERABILITY/OPPORTUNITY ANALYSIS

BACKGROUND

A recent New York Times article summarized climate risks by county across the US[2]. Most Michigan counties including Washtenaw County received no, low, or medium risk from Heat Stress, Extreme Rainfall, Sea Level Rise, Hurricanes, Water Stress or Wildfire. Ann Arbor Township similarly has very low climate risk for a host of reasons – location, limited floodplain within the Township, socio-economic profile of Township residents, low percentage of impervious surface and high amount of tree canopy cover within

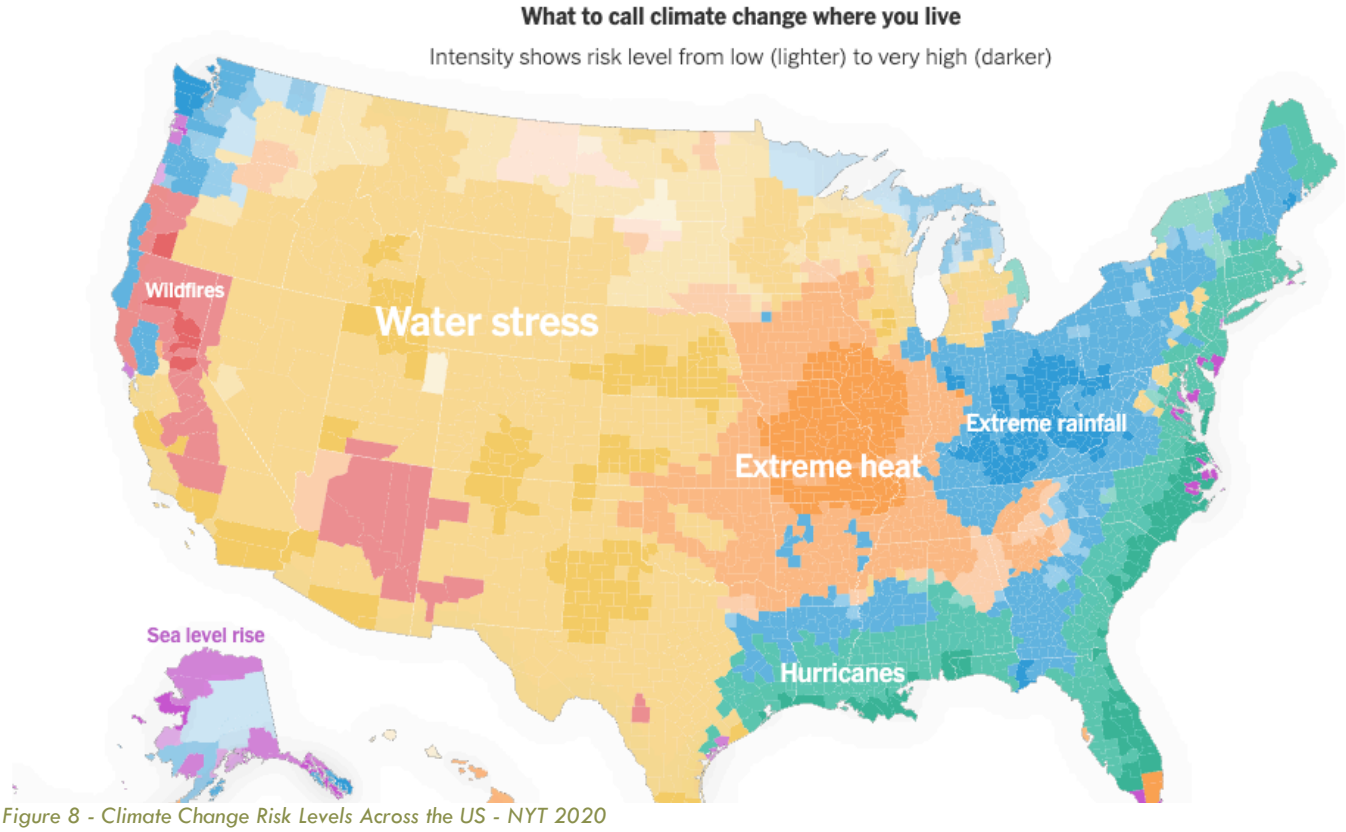


Figure 8 - Climate Change Risk Levels Across the US - NYT 2020

[2] https://www.nytimes.com/interactive/2020/09/18/opinion/wildfire-hurricane-climate.html

the Township. While there are long-term risks and concerns (detailed below), the Township is well positioned to both adapt to changing conditions and to contribute to mitigation by reducing carbon emissions.

Ann Arbor Township faces similar risks and vulnerabilities as other local governments in Washtenaw County. There will continue to be more precipitation, more extreme storms, and more extreme temperatures (both high heat and intense cold events). The Great Lakes Integrated Sciences and Assessment (GLISA) program is a NOAA funded research center bringing best available climate science to the Great Lakes Region. Detailed research and data on climate changes that are measured and predicted can be found in the Resilient Washtenaw plan and on the GLISA website. Highlights of importance to Ann Arbor Township are included below.

We know from GLISA research that:

- Total annual precipitation in Southeast Michigan has increased by 20% when compared to the same period 1951-1980.
- Precipitation has increased 48% in Ann Arbor compared to a 20% increase across Southeast Michigan. Precipitation is a highly localized event and preparing for a range of change is necessary.
- Winter total precipitation has increased 65% in Ann Arbor.
- Number of days with greater than 1 inch of precipitation has increased by 2.3 days/year.

"The observed trends in temperature, precipitation, and seasonality are projected to continue or accelerate into the future. The rate of warming has been fastest during the winter, with some locations experiencing twice the annual warming rate of the Great Lakes region. Temperatures will continue to warm at a pace near or faster than the current rate, and precipitation will likely continue to increase, though variability and multi-year dry periods should still be anticipated. By 2050, summer and spring temperatures may have greater increases compared to fall and winter." (SOURCE: GLISA - *Climate Hazards and Impacts in the Great Lakes – October 2023*)

A summary of the Climate Hazards in the Great Lakes Region is included below with likely amplifications from climate change estimated for mid and end of the century.

Figure 9 - Climate Hazards in the Great Lakes Region

Climate Hazards in the Great Lakes Region

Risk	By Mid Century	By End of Century	Summary
Convective Weather (Severe Winds, Lightning, Tornadoes, Hail)	↑	↑	Warmer temperatures and additional moisture increase the potential for severe weather (e.g., tornadoes and hail) and allow for a longer severe weather season.
Severe Winter Weather (Ice/Sleet Storms, Snow Storms)	↑	↑	Warmer, shorter winters will reduce winter-related impacts, though lake-effect snow will continue increasing in the near future. Due to natural variability, cold air outbreaks are still possible and can lead to ice, sleet, freezing rain, and wet snow.
Extreme Heat	↑	↑↑	The number of extremely hot days (over 95°F and 100°F) will likely increase. Overnight lows have warmed faster than daytime highs, which may lessen opportunities for relief during heat waves. Increased heatwaves and humid conditions elevate the risk of heat-related deaths and illnesses.
Extreme Cold	↓	↓↓	The number of extremely cold days (i.e., days below 10°F) have decreased in the region and are projected to decrease even more in the future. However, cold air outbreaks are still possible due to natural varibility.
Dam Failures	↑	↑↑	Stronger and more extreme precipitation events coupled with aging dam infrastructure will increase the probability of dam failure.
Flood Hazards	↑↑	↑↑	Stronger and more extreme precipitation events will be more likely to overwhelm stormwater infrastructure.
Drought	↑	↑↑	Summer drought and the number of consecutive dry days will likely increase, interspersed with periods of increased rainfall.
Wildfires	↑	↑	Increased summer drought and the number of consecutive dry days will increase the risk of wildfires, particularly in the northern portions of the region.
Infestation	↑	↑↑	Shorter, warmer winters and longer growing seasons will create more suitable conditions for the spread of invasive species and pests (e.g., ticks, mosquitoes) and associated vector-borne illnesses.

The arrows in this table reflect a qualitative assessment made by the GLISA team based on analysis in the Fourth National Climate Assessment. These trends represent an average across the Great Lakes region, and will vary by location due to the localized nature of extremes.

Last updated: October 2023

glisa.umich.edu

RISKS AND VULNERABILITIES SPECIFIC TO ANN ARBOR TOWNSHIP

Climate vulnerability is defined as the "degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes" (IPCC, 2014). Within the southeast Michigan region, as described previously, increased precipitation, more intense storms, and extreme temperatures will have many impacts on the Township. These will include flooding and drought, water quantity and quality issues, air quality issues, and infrastructure (e.g., roads, stormwater, sewer, electricity) that will be damaged or overtaxed by the impacts of climate change. Climate change may have an adverse impact on public health and the financial well-being of vulnerable residents.

Climate change will undoubtedly impact the Township and residents, sometimes catastrophically, and this plan contains strategies to mitigate these impacts and to adapt to the new climate reality. What's particularly important to realize, is that Ann Arbor Township has considerable ecosystem services – protected natural areas and agriculture, recreational and undeveloped land, that are significant for reducing the impacts of a changing climate. These benefit Township residents especially, but also the County and larger region as well and are important to continue preserving.

The following section examines specific vulnerabilities within Ann Arbor Township, addresses general actions to build and track resilience and adaptation, and provides general metrics to track progress in each area.

Community and Population Vulnerability

Based on the census information in the previous section, Ann Arbor Township is a relatively affluent community with a significantly older population than the overall County population profiles. These data are important, because the relative wealth of the Township precludes competing for most federal climate action dollars, which tend to be directed to low income and disadvantaged communities. The community's affluence also means there are fewer individual households that are energy cost burdened. The Township has a real opportunity to encourage households to electrify and upgrade the energy efficiency of their homes as many residents can afford these upgrades and be patient for longer payback periods for some projects. Ann Arbor Township should explore partnering on grant proposals with Washtenaw County or surrounding communities with larger Low Income Disadvantaged Communities (LIDCs).

As mentioned previously, many households in Ann Arbor Township can be resilient in the event of a climate related loss. However, there are individuals and neighborhoods within the community that are more vulnerable to the financial impact of climate-related events. Even within relatively affluent communities and census tracts, there are individuals and families who are financially vulnerable to the impacts of a changing climate, and it is important to recognize these conditions for some residents.

Ann Arbor Township's population is older than Washtenaw County as a whole. 22% or 1,070 residents are over the age of 60. We note this only because the very young and the elderly are more vulnerable to the impacts of high heat events and air pollution than younger adults and school age children. Unfortunately, the data do not allow for more specific location and identification of vulnerable households – households vulnerable due to health conditions, age, or economics. This information is useful for the Township to understand the different types of vulnerabilities within the community.

Climate Migration

Many Michigan communities, including Washtenaw County and its political subdivisions, have been rated as low-risk climate communities, a designation that is likely to attract new residents fleeing regions of the country where climate change has severely impacted quality of life. Some climate migrants with financial resources have already moved and will continue to move to the region over time and by choice. Others will be forced to move during or after natural disasters and will be climate refugees in the region. Several Great Lakes communities have already started to explore how they can plan for climate migration and better manage the opportunities associated with Climate Receiver Communities. Ann Arbor Township is not well positioned for an influx of climate migrants, as the portion of the Township with water and sanitary sewer services is either built-out or is held in institutional ownership and is not being considered for residential development. Additional residential growth in the areas of the Township without urban services would be at the expense of agricultural and ecosystem services.

Resilience Hub

Progress and Metrics

- The Township should explore creating resilience hubs that may provide heating and cooling centers particularly during power outages, serve as information and food/water distribution centers. (Township Priority 24)
    - The Township should explore Resilience Hub partnership opportunities with other municipal governments and private property owners.

Heat Island Resilience

- Modify land development standards to require vegetated roofs (green roofs) on all non-residential buildings that are or will not be using solar panels.

Infrastructure Vulnerability

Infrastructure – public roads, water and sewer lines, stormwater systems, electricity distribution networks, natural gas lines, wells, and buildings – is also vulnerable to the impacts of climate change.

Roads

Roads will be impacted in several ways. First, increased winter rain followed by freeze/thaw cycles will result in a shorter lifespan for all Township roads – both paved and gravel – and will require more maintenance during the road's functional lifespan. Second, more intense rainfall may undermine sections of roadway and wash out culverts and gravel roads. During periods of intense rainfall, many gravel roads and sections of gravel roads will wash out due to the volume and speed of the stormwater runoff. These same roads will experience "washboarding" or rutting, and more and larger potholes resulting from stormwater flow that is exacerbated by use during these weather events. It can be expected that the Township will need to work with the Road Commission to address the increased frequency of maintenance over time. The Township will need to plan for increased road maintenance expenses.

Extreme heat also adversely impacts asphalt roads. With more days expected over 90 degrees, this heat may buckle roads, melt sealant, and create failures at the edge of pavements. There currently is no tracking of heat-related repair or maintenance by the Washtenaw County Road Commission.

Progress and Metrics

- As road design and construction techniques evolve to better address the impacts of climate change, the Township and Washtenaw County Road Commission will need to continue to incorporate new construction and maintenance approaches.
- Tracking community progress in building resilience will include tracking the location and frequency of road maintenance and major replacement projects over time.

Electrical Grid

The Townships electrical distribution system, which belongs to DTE, has become increasingly vulnerable to storm damage due to the confluence of a higher number of more intense storms and weather events (wind, snow, ice) and the aging distribution equipment and lack of adequate maintenance. The result is more frequent and longer power outages for Township residents.

Progress and Metrics

- The Township should begin inviting residents to volunteer information including the frequency of power outages, flooding, heat, or air quality related health emergencies so that these can be measured over time. This can be measured by creating and maintaining a database and map with this information.
- The Township should work with DTE to track and build a database of electrical outages to better monitor the reliability of the DTE grid within the Township and Township islands. This can be measured by creating and maintaining a database and map with this information.
- The Township should explore creating resilience hubs that may provide heating and cooling centers particularly during power outages, serve as information and food/water distribution centers.
    - The Township should explore Resilience Hub partnership opportunities with other municipal governments and private property owners.

Water and Sewer

The bulk of the Township is on well water and septic systems. The Township has two areas with water and sewer service – one in the southeast corner of the Township and another in the southwest corner of the Township. Climate change impacts both water and sanitary sewer infrastructure. Typically, water mains and lines are subject to more stress due to extreme freeze and thaw cycles. Sanitary lines are often impacted when major precipitation events overwhelm the Ann Arbor Wastewater Treatment Plant and cause untreated sewage to be discharged into the Huron River.

Progress and Metrics

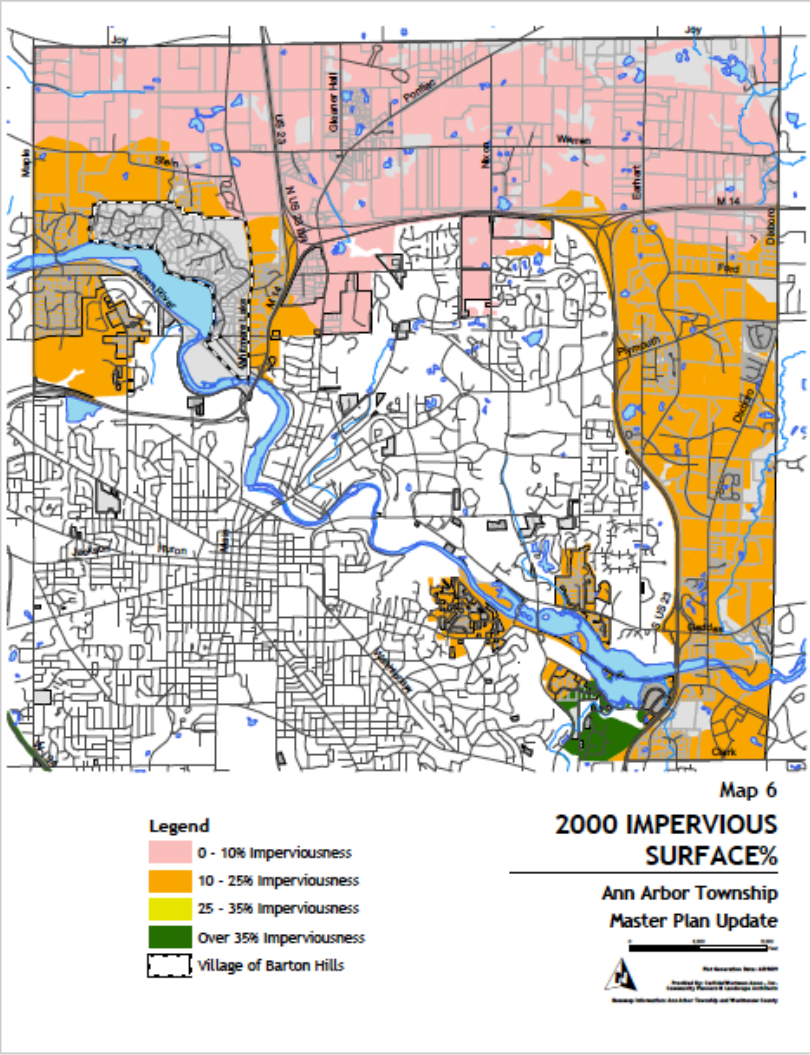
- The Township should share data with the City of Ann Arbor to track water and sewer disruptions (e.g., main breaks, major leaks or blockages, pipe failures, pump station failures etc.) in the Township. While many of the issues may not be attributable to climate change, it will be important to collect and track this data to properly analyze the increased impacts of climate change on water and sanitary sewer systems.

Stormwater

As discussed in the previous section, the Township has a very low area of impervious surface – just 9% of the Township land area is impervious. However, different watersheds within the Township have higher levels of impervious surface than others. Once a watershed exceeds 10% impervious surface, it begins to

lose habitat and experience reductions in water quality. The considerable amount of open space, forested land, and agricultural land is an adaptive asset for the Township – particularly for stormwater management and reducing current and future vulnerability to flooding.

Table 8 – Township Percent Impervious Surface by Watershed



The stormwater system is most vulnerable to increased precipitation. The great concern is the combination of stormwater volume and the velocity of runoff. Higher precipitation totals in more intense storm events leads to increased runoff velocity (called the runoff coefficient). High volumes of stormwater runoff

travelling at high speeds undermines roads, washes out creek and riverbanks, increases siltation in water bodies, overwhelms stormwater systems, and creates flash flooding hazards.

The Township does not have a dedicated community-wide storm sewer network, and relies on a combination of infiltration, some privately-owned and maintained stormwater impoundment basins, and county drains to address stormwater runoff.

The Township's low levels of impervious surface and relatively small area of land within the 100- and 500-year floodplains significantly lessen the risk for catastrophic flood damage within the Township.

There will be more precipitation, localized flooding, and likely more periods of drought in between extreme storms. This may impact residents and some businesses; however, the greatest impact of flooding will be damage to creeks, roads and the stormwater system (as discussed on the previous page).

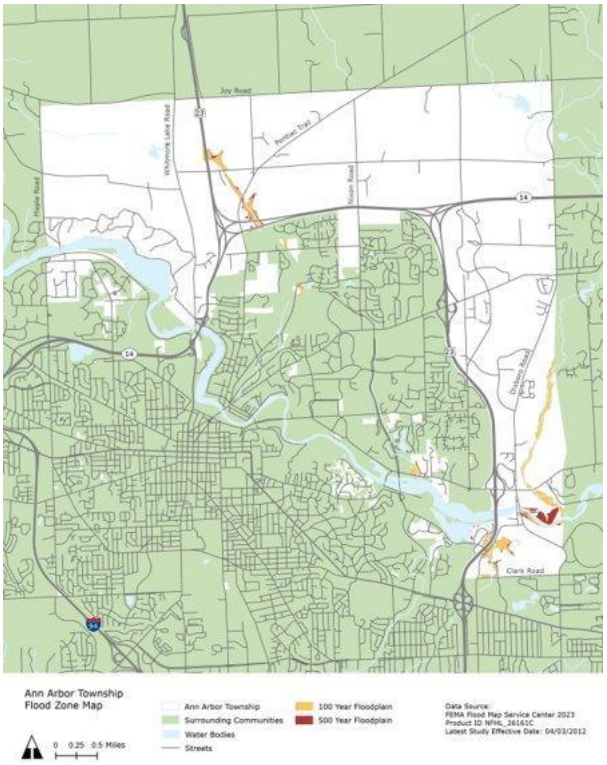


Figure 10: Ann Arbor Township Floodplains.

The combination of more stormwater volume and more intense events creates a much higher runoff coefficient or stormwater velocity. This combination of more water moving faster through the Township will lead to creek and streambed washouts potentially damaging properties located along the creeks and streams and degrading water quality. Slowing the velocity of stormwater runoff is as important as providing opportunities for infiltration and/or detention.

Drought will also become an on-going issue. What we have observed in Washtenaw County is longer prolonged periods without rain events followed by very intense storms. These swings stress native plants and trees, agricultural crops and may require extensive irrigation for gardens and farms. Drought also compounds the stormwater runoff issues described above because dry soils cannot absorb water as quickly and it increases both the velocity and volume of stormwater runoff.

Progress and Metrics

- The Township can measure progress by tracking the inventory and condition of both County drains and privately owned impoundment basins and stormwater systems and further tracking maintenance performed to those systems.
- Modify Township land development standards and zoning requirements to require increased stormwater infiltration and use of Green Stormwater Infrastructure[3] (GSI) where possible. Green infrastructure is designed to manage stormwater and help it infiltrate into the ground instead of directing runoff into the stormwater system.

[3] https://www.washtenaw.org/631/Green-Infrastructure

- The Township and Washtenaw County Water Resources Commissioner (WCWRC) should establish regular meetings to share information about these stormwater systems beginning in 2024.
- Modify land development and zoning standards to require green stormwater management, trees, and landscaping in new or improved surface parking lots.
- The Township should modify existing zoning and land development regulations to limit building in the 500-year flood plain.

Water Availability and Water Quality Vulnerability

Figure 10 (right) illustrates the location of drinking water and other wells in the Township and Township islands.

Portions of the Township that are reliant on well water may face challenges with a changing climate. The Township relies on the County and EGLE for well water quality monitoring and regulation. There is currently no system to track groundwater levels by either Washtenaw County or EGLE. Some data are available that may inform the Township (e.g., water quality monitoring at contaminated sites). Being able to monitor aquifer levels will be increasingly important to identify aquifer changes likely to affect water supply resources.

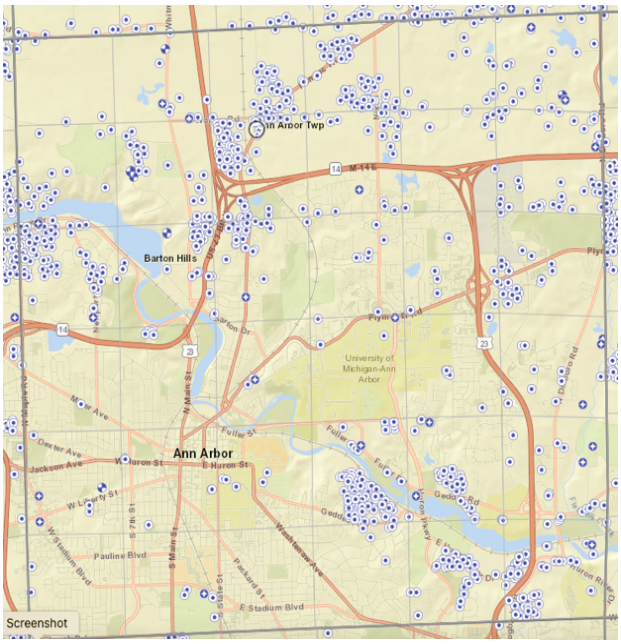


Figure 11: Well Water Map. (source: EGLE)

As mentioned previously, the increased precipitation that is expected and a higher runoff coefficient (velocity of stormwater), does not correlate to additional infiltration into groundwater. The combination of drought and more intense storm events creates conditions where much of the precipitation will fall so quickly on hard ground that it will runoff into water bodies and stormwater systems across the Township without infiltrating and replenishing the aquifers.

Monitoring aquifer levels is important as both commercial activity and increased large lot residential development in the unsewered portion of the Township will create additional pressures on groundwater. Preserving pervious surfaces in all groundwater recharge areas is vital to ensuring the long-term health of the aquifer.

Water quality is an issue as well. Flooding may cause well heads to be contaminated. The EPA states: "Swiftly moving flood water can carry large debris that could loosen well hardware, dislodge well construction materials or distort casing. Coarse sediment in the flood waters could erode pump components. If the well is not tightly capped, sediment and flood water could enter the well and contaminate it. Wells that are more than 10 years old or less than 50 feet deep are likely to be contaminated, even if there is no apparent damage. Floods may cause some wells to collapse." (Source: What to do After the Flood? August 2005. United States Environmental Protection Agency)

Progress and Metrics

- The Township should begin dialogue with EGLE and the WCWRC and Washtenaw County Health Department to discuss potential monitoring of groundwater levels and water quality.
    - Disseminate results to Township residents, perhaps through the creation of a dashboard on either the Township or EGLE website. It may be necessary to partner with the County for a drinking well groundwater study.
- Map groundwater recharge areas and develop zoning standards that restrict impervious surfaces within important aquifer recharge zones.

Agriculture Vulnerability

Farmers in the Township already face increased operational challenges as climate change impacts planting and harvesting schedules. More chaotic weather patterns may repeat early thaw and hard freeze events that have decimated fruit tree crops in Michigan. Farmers that can normally get two crops a year on their farms may only get one in some years. Overall crop yields may decline. On the other hand, farmers will also likely see longer growing seasons and may be able to diversify the crops that can be successfully grown in the Township. The project team is not aware of the extent of farmers using irrigation. Anecdotal evidence from farmer interviews suggested it was not significant. Extended periods of drought may increase the need for irrigation and potentially further deplete aquifers that would affect residential well water availability.

Progress and Metrics

- Convene regular meetings with the farming community to discuss ongoing issues (climate, development). Work with farmers and Washtenaw County staff to develop a database tracking agricultural flows (e.g., food crops sent outside the County or remaining in the County).

Natural Systems Vulnerability

Climate change will have an impact on natural systems within the Township. Specifically, native species of flora and fauna may not be compatible with changes in temperature and precipitation and will either migrate north or die off over the next 100 years. New invasive pests, fungi, and diseases that are more adaptable to the new climate reality will likely provide challenges for agriculture and native plants and trees.

The Township has extensive natural areas preserved with an array of different ecosystem types. These are an asset for both the Township and the larger region as they serve as carbon reservoirs. While these are an asset, they will certainly evolve due to climate change and the health of these systems and the flora and fauna within them will need to be monitored.

Progress and Metrics

- In the long-term, the Township and partners may conduct flora inventories on preserved lands and track the numbers and health of these species to better understand the impact of climate change on the Township's flora and fauna.
- The Township should encourage residents to plant native landscape species and decrease the amount of turfgrass lawn.

Renewable Energy Resilience

The following scenario explores the amount of land needed to power residential homes in Ann Arbor Township. This scenario is not feasible under current state law. It is included here to demonstrate the scale of the area that would be needed.

Ann Arbor Township is home to over 4,000 residents in 2,073 Housing units (68% owner-occupied). Owner occupied homes will benefit from solar installations and tax incentives. The average home uses 11,000 kWh/year and needs approximately 32 panels (17.5ft^2/panel) (10kW system) to power the whole house.

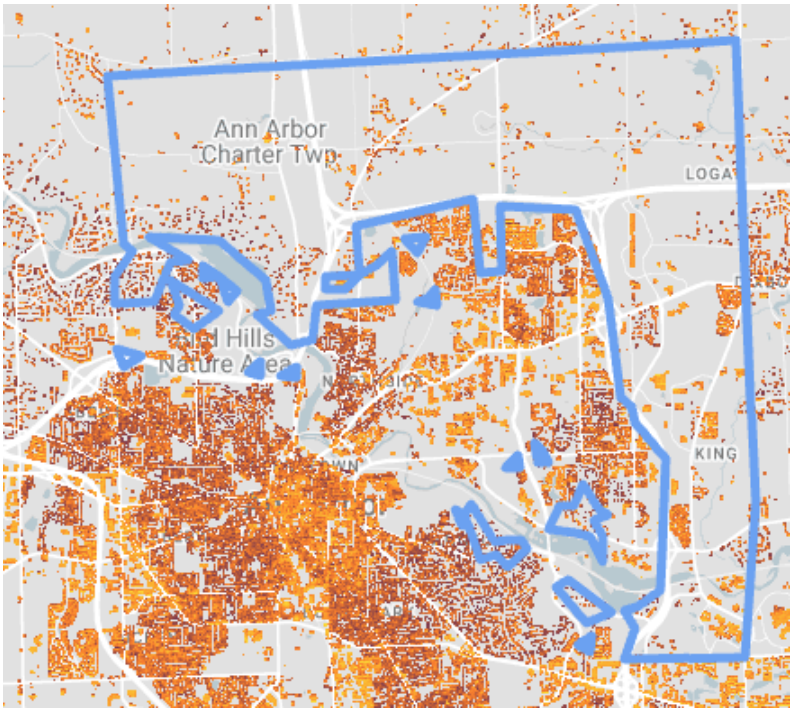


Figure 12 - Available Roof Areas in Ann Arbor Township for Solar Installations - Google Project Sunroof

Scaling this across the Township, 2,000 homes would require 64,000 panels and collectively generate 22 million kWh/year. These panels would cover 1,120,000 ft^2 of roof space or 25.7 acres. A rough estimate of the parking area east of Domino Farms is 1,126,925 ft^2 – enough area to power all Township homes. The parking lot at the University of Michigan East Medical Campus is approximately 370,000 ft^2 – enough area to power 1/3 of the Township homes. The parking lot at the Toyota Tech Center is about 400,000 ft^2 – enough area to power 1/3 of the Township homes.

Google Project Sunroof (https://sunroof.withgoogle.com) estimates solar potential for a geographic region. For Ann Arbor Township (see graphic below), they estimate:

- 73% of all roofs are available = 1,400 roofs
- 2.9 million ft^2 of roof space for 41MW DC capacity to generate 45,700 MWh AC per year
- Estimated avoided CO_2 emissions from the electricity sector would be 37,700 MTCO2e.

Figure 13 - Estimated Costs and Benefits of Solar - Google Project Sunroof

kWhs of Solar	45,700,000
Years	25
kWh Cost	$0.099
Panel Cost per Watt	$2.353
Total Avoided Cost	$113,655,900
Total Installed Cost	$58,925,974
Net Return	$54,729,926
Total MTCO2e Saved	290,711

Using the Google rooftop analysis of 45.7 MWh generated, a $59 million investment across the Township would avoid $113,655,900 in costs and save the community $54 million while eliminating 290,711 mTCO2e emissions.

Progress and Metrics

- The Township Building Official should compile and maintain a database of installed solar panels based on building permits issued.
- Using the solar installation database, the Township should establish a goal of increasing solar panel installation within the Township by 10% in 2024.
- The Township should establish goals for solar installation and renewable energy generation based on the real-time permit data. This information should be reported to the Township Board monthly and provided on a public facing dashboard.

GREENHOUSE GAS (GHG) EMISSIONS

GHG Inventory

This task has two parts. The first is to understand the GHG emissions associated with Township operations and the second is to estimate the GHG emissions for the whole Township.

Greenhouse Gas Inventories were created for both the Township's operations and the Township-wide community. The Township provided data on their energy consumption across it's building portfolio as well as information about its fleet of vehicles. Emissions for the community were calculated based on locally available data and standard methods to estimate emissions where local data were not available.

The baseline year for data was set to 2019, as the global Covid-19 pandemic caused 2020 and 2021 to be outliers in terms of emissions and not representative of future trends.

Local data sources:

- Utility data from DTE and Consumers Energy
- Consumption by year, customer class, and the total number of accounts
- Customers utilizing Green Pricing, EV Rates, and Distributed Generation Tariff programs
- Information on local natural gas infrastructure that produces emissions
- Vehicle emissions data from Google Energy Insights
- Waste management data on local landfills and waste management facilities

Methodology – Township Operations

For Township operations, electricity and gas consumption data were provided for all Township buildings in the form of annual utility bill information. Emissions profiles were calculated using eGRID[4]. Municipal transportation emissions were calculated from the fleet mileage data provided by the Township and applied to the emissions profile of the county fleet.

Progress and Metrics

- Document start of year and end of year odometer readings for each vehicle and track fuel/energy purchases for vehicles by fuel type (e.g., gas vs. diesel vs. electric).

Township Operations GHG Emissions Inventory

The project team analysis of Township operations data estimates the GHG emissions from Township operations at 218 MTCO2e (Metric Tons of CO2 equivalent). This represents a very small proportion (0.2%) of the Township-wide emissions[5].

- Township Operations Transportation – 43 MTCO2e
- Township Operations Buildings – 175 MTCO2e

[4] https://www.epa.gov/egrid

[5] Detailed data are provided in Appendix A

Methodology – Township-Wide Emissions

For all Township-wide emission estimates, Township operations are included in the totals. Electricity and gas consumption data for households was calculated based on the total share of households in Ann Arbor Township compared to the County and the per household emissions profile. Emissions for commercial and industrial buildings were calculated based on the total share of jobs in Ann Arbor Township compared to the County and the per business emissions profile.

Business as Usual (BAU) buildings emissions were calculated using SEMCOG growth projections for the County. Job growth is expected to increase by 5.6% while population is expected to grow by 15.5% by 2035. Additional changes to the BAU include expected changes to the number of heating and cooling degree days per year and a grid with more renewables in the fuel mix due to existing policy commitments by the utilities.

Transportation emissions were calculated as a portion of the County's emissions based on the daytime population share of Ann Arbor Township compared to the County. Ann Arbor Township has a significant increase in daytime population, indicating a larger share of transportation emissions from commuters into the Township.

Township-Wide GHG Emissions Inventory

In 2019, Ann Arbor Township emitted 138,884 MTCO2e-which is about 3% of the 4.48 MTCO2e emitted from the entire county. The Township has a higher proportion of the county emissions that would be expected per capita. Ann Arbor Township is 1.17% of the county population but has a daytime population - including commuting workers - that is 3.64% of the county total. Township-wide emissions can be broken down in the following categories:

- Township-wide Waste Emissions – 2,536 MTCO2e
- Township-wide Transportation Emissions – 56,307 MTCO2e
- Township-wide Building Emissions – 80,041 MTCO2e

Figure 14 - Ann Arbor Township Greenhouse Gas Inventory by Sector

Inventory Sector	Estimate	Unit	MTCO2e	%
On-road Transportation: Gasoline & Diesel	114,074,264	vehicle miles traveled	50,079	37.6%
Commercial & Industrial Electricity Use in Buildings	80,120,411	kWh	43,493	32.7%
Commercial & Industrial Natural Gas Use in Buildings	3,985,409	ccf	21,719	16.3%
Residential Natural Gas Use in Buildings	1,356,607	ccf	7,393	5.5%
Residential Electricity Use in Buildings	12,477,664	kWh	6,774	5.1%
Solid Waste Disposal: All Waste Generated in the County	7,073	Tons	2,418	1.8%
Propane Use	87,842	gallons	504	0.4%
Transit Buses	54,392	gallons fuel	223	0.2%
Building Electricity Use - Township Operations			127	0.1%
Wastewater Generated in the County			118	0.1%
Off-road Transportation			110	0.1%
Fugitive Emissions Associated with Natural Gas Use			87	0.1%
Fuel Oil & Kerosene Use	6,968	gallons	71	0.1%
Building Natural Gas Use- Township Operations			48	0.0%
Fleet- Township Operations			43	0.0%
Biological Treatment of Waste: All Waste Generated in the County	201	Tons	1	0.0%
Total			133,208	100.0%

These estimates do not include Scope 3 emissions - the upstream and downstream emissions associated with goods and foods purchased, used, and disposed of in the Township.

To put Ann Arbor Township's 138,884 MTCO2e in perspective, the following entities have estimated their respective GHG emissions as follows:

- State of Michigan – 174,900,000 MTCO2e
- Washtenaw County – 4,490,000 MTCO2e
- Ann Arbor – 1,490,000 MTCO2e
- The University of Michigan – 487,000 MTCO2e

GHG Reduction Targets

The project team recommends that Ann Arbor Township adopt the emission reduction targets pledged by Washtenaw County and reflected in their Resilient Washtenaw Climate Action Plan. These recommended targets are:

- Net Zero – Township Operations by 2030
- Net Zero – Township-wide by 2035

In the following sections, the Project Team used the same assumptions from Resilient Washtenaw regarding electrification and the rate of decarbonization in various sectors to develop emission reduction outcomes.

What is net zero[6]?

Put simply, net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance. A zero net energy building (ZNEB) is one that is optimally efficient, and over the course of a year, generates energy onsite, using clean renewable resources, in a quantity equal to or greater than the total amount of energy consumed onsite[7].

Why is net zero important?

The science shows clearly that in order to avert the worst impacts of climate change and preserve a livable planet, global temperature increase needs to be limited to 1.5°C above pre-industrial levels. Currently, the Earth is already about 1.1°C warmer than it was in the late 1800s, and emissions continue to rise. To keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050.

How can net zero be achieved?

Transitioning to a net-zero world is one of the greatest challenges humankind has faced. It calls for nothing less than a complete transformation of how we produce, consume, and move about. The energy sector is the source of around three-quarters of greenhouse gas emissions today and holds the key to averting the worst effects of climate change. Replacing polluting coal, gas and oil-fired power with energy from renewable sources, such as wind or solar, would dramatically reduce carbon emissions.

[6] https://www.un.org/en/climatechange/net-zero-coalition
[7] https://www.mass.gov/info-details/what-is-a-zero-net-energy-building

Neither the City of Ann Arbor A2Zero plan nor the Resilient Washtenaw plan achieve their carbon neutrality goals solely with their actions - both plans require carbon offsets to achieve carbon neutrality by the above deadlines. Ann Arbor Township will likely require some carbon offsets to meet its Township-wide emission reduction target.

Ann Arbor Township GHG and Net Zero Analysis Methodology

A Net Zero analysis examines the amount of predicted emission reduction from a set of actions. This analysis helps to prioritize actions and place the emissions inventory in a larger, regional context. In each section, Township Operations and Community-wide emissions, a set of assumptions have been made to develop the analysis. The methodology used in these assumptions is explained in each section.

Township Operations

Buildings

Business as Usual (BAU) buildings emissions were calculated assuming that 1) there are no new Township facilities, 2) no changes to the number of heating and cooling degree days per year and 3) the electricity grid serves the Township with more renewables based on existing policy commitments by the utilities.

Actions modeled to reduce emissions include:

- 35% energy savings through deep energy efficiency investments in facilities
- 100% of natural gas usage transitioning to 100% electricity usage for building operations
- 30% of electricity being provided by on-site renewable energy

Transportation

Business as Usual (BAU) fleet emissions were calculated assuming no expected increases in fleet activity, but slight changes in purchases of electric vehicles and better fuel economy that would naturally happen over time.

Actions modeled to reduce emissions include:

- 70% of fleet miles transitioned to electric vehicles by 2030
- 20% better fuel economy from purchased fleet vehicles, for both gas and electric vehicles, than BAU estimates
- 50% of electric fleet miles powered by on-site renewable energy at Township facilities

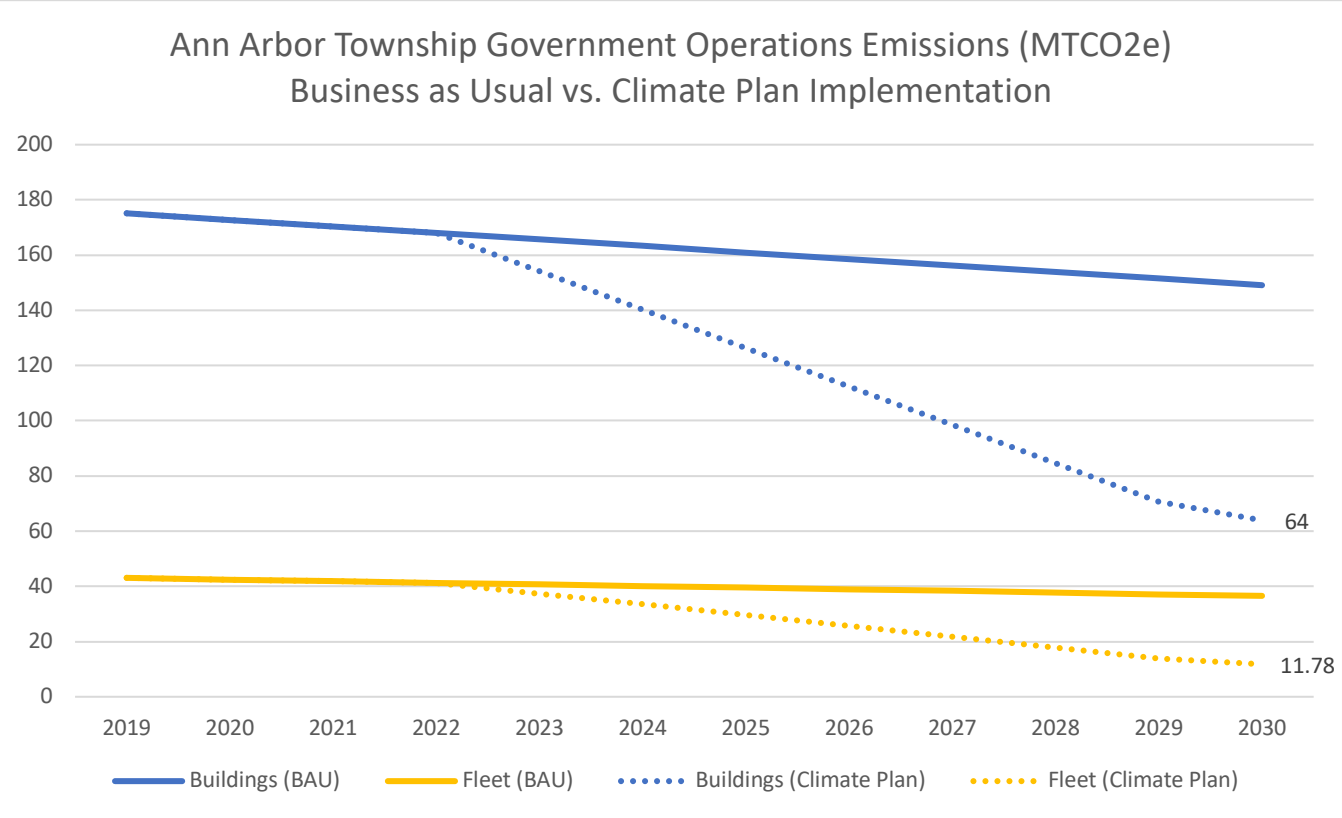
Township Operations Net Zero Analysis

A net zero analysis compares the Business as Usual (BAU) case with our assumptions of reductions in Building Energy Use, Building Natural Gas Use, Fleet Electrification, and Grid Renewable Energy.

The Township has a recommended goal of reaching carbon neutrality in Township operations by 2030. The current mix of actions in the plan leads towards reductions from the BAU forecast. The graph below shows where different net zeros of emissions will be reduced from the BAU forecast through 2030.

Remaining emissions reductions will come from renewables added to grid-supplied electricity.

Figure 15 - Township Operations Net Zero Analysis



Community-wide Emissions

Buildings

Electricity and gas consumption data for households was calculated based on the total share of households in Ann Arbor Township compared to the County and the per household emissions profile. Emissions for commercial and industrial buildings were calculated based on the total share of jobs in Ann Arbor Township compared to the County and the per business emissions profile.

Business as Usual (BAU) buildings emissions were calculated using SEMCOG growth projections for the County. SEMCOG estimates that county employment is expected to increase by 5.6% while population is expected to grow by 15.5% by 2035. Additional changes to the BAU include expected changes to the number of heating and cooling degree days per year and a grid with more renewables in the fuel mix due to existing policy commitments by the utilities.

Actions modeled to reduce emissions include:

- 50% energy savings through energy efficiency investments in existing buildings. This would the equivalent of 865 households and 342 commercial and industrial buildings.

- 50% of buildings natural gas or propane use transitioning to electricity use. This would be the equivalent of 721 households and 157 commercial and industrial buildings.
- 50% of all new buildings would be all-electric and energy efficient buildings. This would be the equivalent of 134 new households and 43 commercial and industrial businesses.
- 30% of electricity coming from on-site renewable energy. This would be the equivalent of 599 households and 218 commercial and industrial businesses.

Examples of efficiency investments include:

- Lighting Upgrades: Upgrading from traditional incandescent bulbs to LED lighting can lead to electricity savings of around 75% to 80% for lighting-related consumption.
- Appliance Upgrades: Replacing older, energy-inefficient appliances with Energy Star-rated or other energy-efficient models can result in electricity savings of 10% to 50% per appliance.
- HVAC Improvements: Upgrading to energy-efficient heating, cooling, and ventilation systems can lead to electricity savings of 20% to 50% for HVAC-related consumption.
- Insulation and Sealing: Improving insulation and sealing air leaks can result in electricity savings of 10% to 20% or more by reducing the need for heating and cooling.
- Smart Technologies: Implementing smart thermostats, energy management systems, and other automation technologies can help optimize energy use and lead to electricity savings of around 10% to 20%.

Figure 16 - Township Building Emissions (MTCO2e)

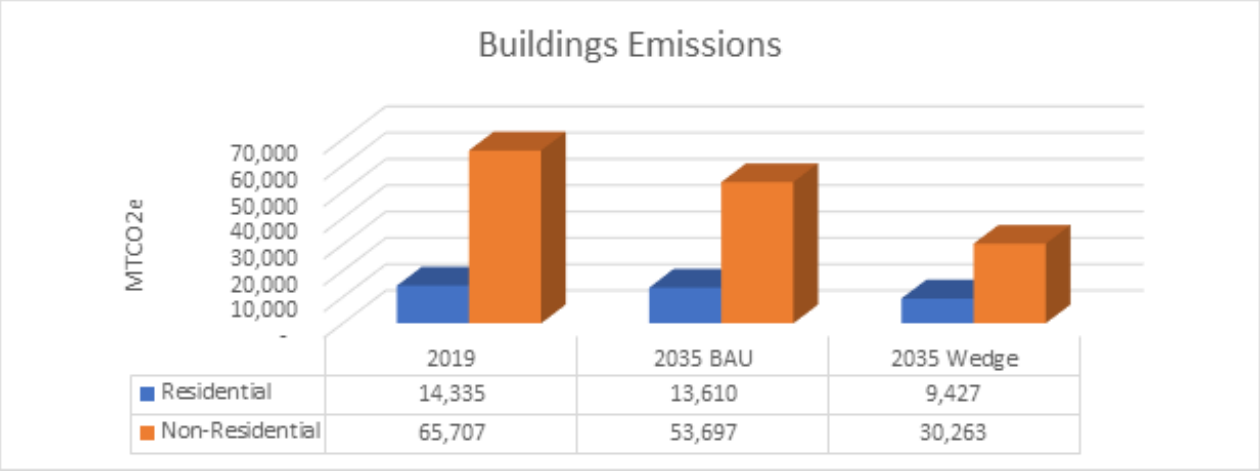


Figure 17 - Township Building Emissions (per square foot)

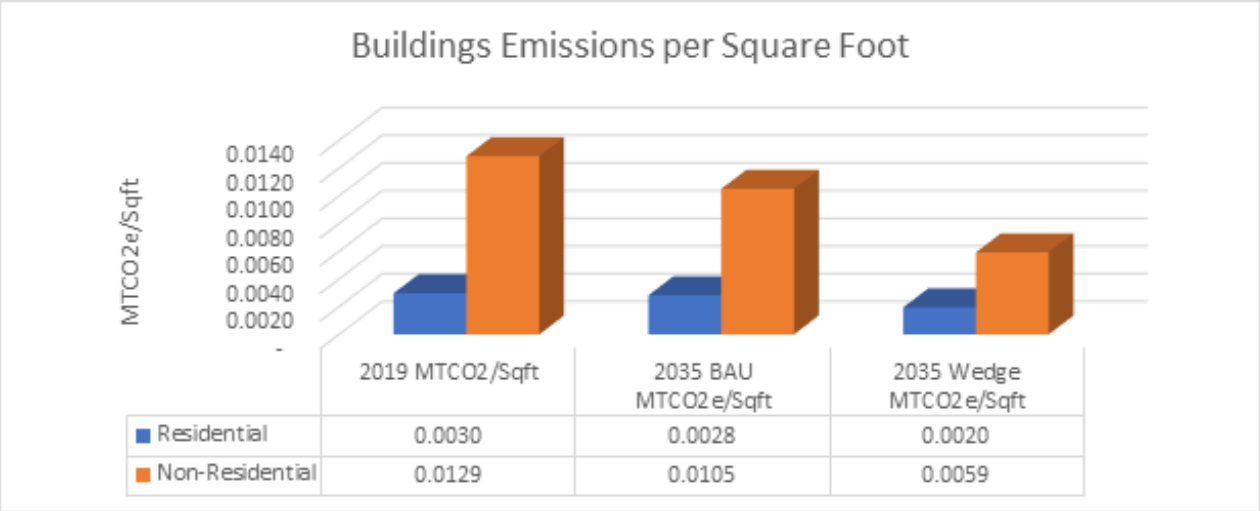
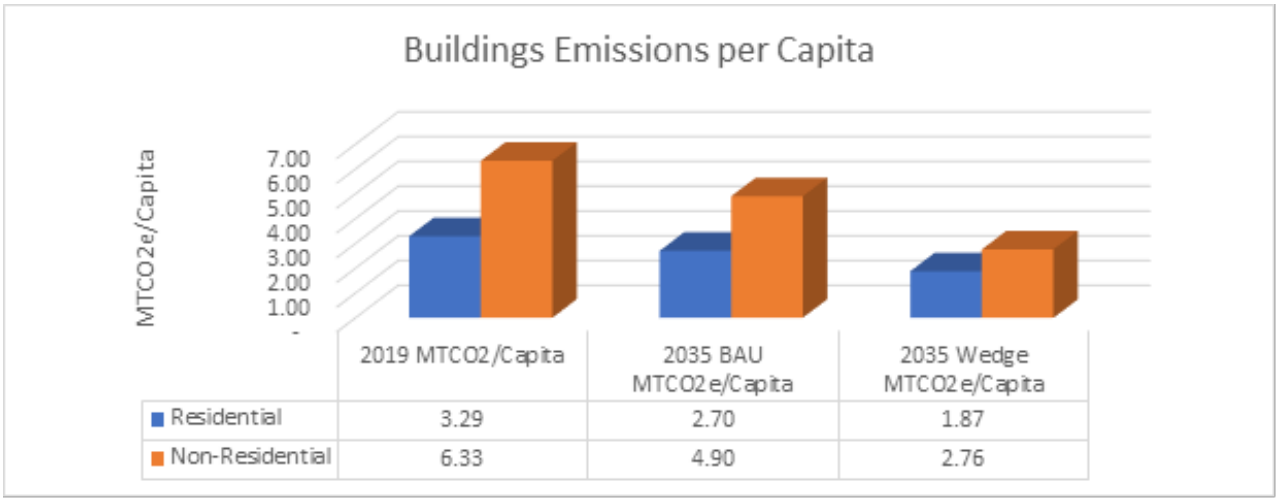


Figure 18 - Township Building Emissions (per capita)



Note: Per Capita for Residential is Population and Per capita for Non-Residential is Jobs

Transportation

Transportation emissions were calculated as a portion of the County's emissions based on the daytime population share of Ann Arbor Township compared to the County. Ann Arbor Township has a significant increase in daytime population, indicating a larger share of transportation emissions from commuters into the Township.

Actions taken to reduce emissions include:

- 20% reduction in vehicle miles traveled within the Township
- 1% of vehicle miles traveled reduced through transit
- 50% of vehicle miles traveled transitioned from gas to electric vehicles

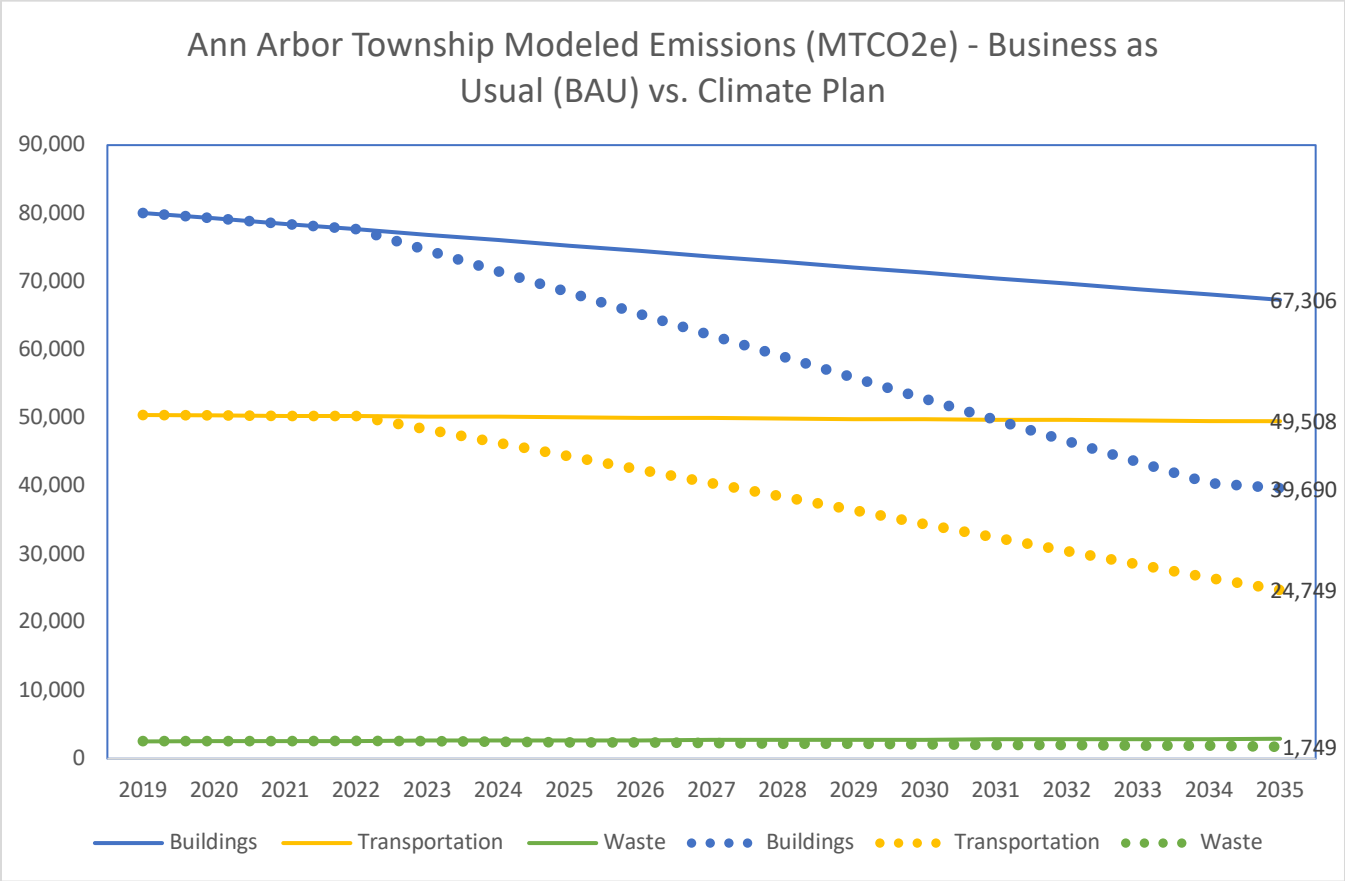
- 20% increase in fuel economy from purchases of more fuel-efficient vehicles than the BAU
- 30% of electric vehicle miles traveled powered by on-site renewable energy at households and commercial and industrial businesses
- 25% of off-road vehicle emissions reduced through a combination of fuel efficiency, transitioning from gas to electric, and electric vehicle miles being powered by on-site renewable energy
- Document start of year and end of year odometer readings for each vehicle and track fuel/energy purchases for vehicles by fuel type (e.g., gas vs. diesel vs. electric).

Township-wide Net zero Analysis

Using the assumptions noted above, the net zero analysis shows most of the Township-wide emission reductions coming from:

- Grid Renewable Energy - 44,648 MTCO2e reduction by 2035
- Buildings – 27,617 MTCO2e reduction by 2035
- Transportation – 24,759 MTCO2e reduction by 2035
- Waste – 1,180 MTCO2e reduction by 2035
- Carbon Offsets – 21,500 MTCO2e needed in 2035 under these assumptions to meet Net Zero goal.

Figure 19 - Township Net Zero Analysis



The graph above shows estimated emissions under a Business as Usual Scenario (BAU) with no implementation of climate actions. Some emissions will go down anyway with more efficient appliances, etc. Modeled emission reductions with implementation of climate actions are shown with dotted lines. These actions significantly increase the emission reductions needed to reach Net Zero. By 2030, with full implementation of recommended climate actions, the Township would still be emitting approximately 66,188 MTCO2e. However, outside of the Township's control, there will be more renewable energy added to the to the electricity grid and this "greening of the grid" will reduce Building and Fleet emissions by 44,648 MTCO2e by 2035. Together, these Climate Actions and a greener grid help to bring modeled emissions in 2035 to 21,540 MTCO2e. These emissions would need to be offset to reach net zero in 2035.

Renewable Energy Certificates and Carbon Offsets

Achieving carbon neutrality (net zero GHG emissions), will require the purchase of renewable energy certificates (RECs) and/or carbon offsets. A renewable energy certificate – REC What is a REC? (pronounced: rĕk) is a tradeable, market-based instrument that represents the legal property rights to the "renewable-ness"—or non-power (i.e., environmental) attributes—of renewable electricity generation. A REC is created for every megawatt hour (MWh) of electricity generated and delivered to the grid from a renewable energy resource. Electricity cannot be considered renewable without a REC to substantiate

its renewable-ness[8]. "Carbon offsets are tradable "rights" or certificates linked to activities that lower the amount of carbon dioxide (CO2) in the atmosphere." (MIT Climate Project). Many rightfully view carbon offsets with skepticism, as the environmental benefits of many carbon offset projects is unverifiable. Any investment in carbon offsets should be done in conjunction with the development of a Washtenaw County-based program with measurable results. Nevertheless, it is not realistic to achieve net zero emissions by 2035 without the use of offsets.

One way the Township could utilize offsets but keep the benefits of those offset local is to purchase property interests in natural areas either in the Township, further away in the County, or a bit more regionally within the Huron watershed. This would benefit the Township twice over by helping to meet its neutrality goals as well providing climate resilience and the other ecosystem services mentioned at the beginning of this report. Natural lands protected in the Huron watershed will also help protect the cleanliness of the Huron River, which provides drinking water to most of the Township's residents.

[8] USEPA Offsets and RECs: What's the Difference – February 2018

CLIMATE ACTION PLAN FOR A NET ZERO TOWNSHIP

The following section summarizes the recommended Climate Actions.

Recommended Climate Actions

Each of these actions is described in more detail in the following section.

Township Priority	Scope	Climate Action	GHG Benefit (MTCO2e)	Township Government Investment
1	TW	On-going Climate Education and Public Engagement	High (9,866)	$150,000/yr
2	TW	Home Energy Advisor Program		
3	TW	Residential & Commercial Weatherization and Energy Efficiency		
4	TW	Community Bulk Buy for Solar and Building Electrification		
5	TW	Join the Regional Resilience Authority	Support	TBD
6	TW	Carbon Pricing in Decision Making	Support	
7	TW	100% Renewable Energy Options for Everyone	High (44,648)	Lobbyist
8	TW	Enabling Legislation for Township Energy Programs		Lobbyist
9	TW	Improve Transit Access in the Township	Low (201)	TBD
10	TW	Expand the Active Transportation Network	Medium (1,250)	TBD
11	TW	Update Stormwater Regulations	Adaptation	Existing Investment
12	TW	Natural Area Preservation	Adaptation/Sequestration	Existing Investment
13	TW	Farmland Preservation	Adaptation/Sequestration	Existing Investment

Township Priority	Scope	Climate Action	GHG Benefit (MTCO2e)	Township Government Investment
14	TW	Provide Comment on Infrastructure Agency Planning Projects	Adaptation	Existing Investment
15	TW	Time of Marketing Energy Rating Disclosure	Support	Adopt Model Ordinance
16	TW	Expand Rain Garden Program	Adaptation	Existing Investment
17	TW	Expand Electric Mobility Options	High (18,308)	Community Investment
18	TW	Emissions Accounting Mechanism	Support	TBD
19	TW	Prioritize Capital Projects that Reduce Emissions and Prepare for Extreme Weather	Adaptation	Existing Investment
20	TW	Develop a Township Organics/Compost Program	Low (342)	Community Investment
21	TW	Reduce Vehicle Miles Traveled (VMTs)		Community/Grant/Township Investment
22	TW	Support and Grow the Washtenaw Regional Resource Management Authority (WRRMA)	Support	Existing Investment
23	TO	100% Renewable Energy for Township Operations	Low (83)	Township Investment
24	TW	Create Resilience Hub	Adaptation	Township Investment/Grant Opportunity
25	TW	Maintain and Expand Township Tree Canopy	Adaptation/Sequestration	Community Investment
26	TW	Stormwater Basin Inspection and Retrofit	Adaptation	Existing Investment
27	TW	Materials Management Program	Low (838)	Community Investment
28	TW	Incentivize Local Food Production	Support	Existing Investment
29	TO	Township Fleet Electrification	Low (25)	TBD

The following table lists recommended metrics that the Township can use to measure progress in achieving the mitigation and adaptation goals identified in the plan. Many of these metrics use data that are available but are not being tracked systematically. Some metrics are not being measured and the Township will need to develop baselines and regular tracking mechanisms.

Metrics

Area	Inventory Category	Metric
Circular Economy	Waste	Township Diversion Rate (e.g., Landfill, Recycling, Compost, Food Waste Prevention)
Circular Economy	Resilience/ Sequestration	Food Production in the Township (volume and type)
Circular Economy	Resilience/ Sequestration/ Transportation	Food Production staying in the County (volume and type)
Energy	Building Energy	# Buildings with Time of Sale Energy Disclosure annually
Energy	All	Education - $ invested - number of residents reached
Energy	Building Energy	Township Residents participating in Energy Concierge/Home Energy Advisor
Energy	Building Energy	New Construction all electric (no methane)
Energy	All	Carbon Offsets purchased/Carbon Offsets purchased within the County
Energy	Building Energy	Permits - Installed Solar - MWh
Energy	Building Energy	Permits - Installed Heat Pumps
Energy	Building Energy	Permits - Installed Methane Appliances
Energy	Building Energy	Permits - Installed Heat Pump or Electric Hot Water Heaters
Energy	Building Energy	Permits - Installed EV chargers
Energy	Building Energy	Renewable Energy Options Available at or Below Current Cost of Electricity
Energy	Building Energy	Renewable Energy from Local Sources
Energy	Building Energy	Percent Renewable Energy available to Township Residents
Energy	Building Energy	Township Residents participating in Solarize
Energy	Building Energy	Percent Renewable Energy used in Township Operations
Mobility	Transportation	# of New residential units on parcels served by transit (e.g., #housing units, $invested)
Mobility	Transportation	Number of lane miles of bicycle and pedestrian facilities
Mobility	Transportation	Number of miles of designated natural beauty roads within the Township
Mobility	Transportation	Private and public connections from residential and commercial areas to the Border-to-Border Trail.

Mobility	Transportation	Linear miles of non-motorized facilities (e.g., bicycles, pedestrian, protected, on street off street)
Mobility	Transportation	Non-motorized facilities connected to B2B trail
Mobility	Transportation	Township Transit Ridership
Mobility	Transportation	Township Transit Investment
Mobility	Transportation	Township VMT
Mobility	Transportation	VMT and associated emissions and changes due to road expansions (and/or lane reductions) and new developments in the Township
Mobility	Transportation	Use VMT calculations to consider carbon price as a part of all road projects and proposed developments.
Preserve Land	Resilience/ Sequestration	Township Tree Canopy Diversity
Preserve Land	Resilience/ Sequestration	Agricultural Land Preserved - Acres - Carbon Sequestration estimate - Ecosystem Services
Preserve Land	Resilience/ Sequestration	Natural Land Preserved - Acres - Carbon Sequestration estimate - Ecosystem Services

CLIMATE ADAPTATION RECOMMENDATIONS

Utility and Grid Reliability

- The Township should begin inviting residents to volunteer information including the frequency of power outages, flooding, heat, or air quality related health emergencies so that these can be measured over time. This can be measured by creating and maintaining a database and map with this information.
- The Township should work with DTE to track and build a database of electrical outages to better monitor the reliability of the DTE grid within the Township and Township islands. This can be measured by creating and maintaining a database and map with this information.
- The Township should explore creating resilience hubs that may provide heating and cooling centers particularly during power outages, serve as information and food/water distribution centers.
    - The Township should explore Resilience Hub partnership opportunities with other municipal governments and private property owners.

Transportation Infrastructure Resilience

- As road design and construction techniques evolve to better address the impacts of climate change, the Township and Washtenaw County Road Commission will need to continue to incorporate new construction and maintenance approaches.
- Tracking community progress in building resilience. The Road Committee is tracking the location and frequency of road maintenance and major replacement projects.
- Document start of year and end of year odometer readings for each vehicle and track fuel/energy purchases for vehicles by fuel type (e.g., gas vs. diesel vs. electric).

Drinking Water and Sewer Infrastructure Resilience

- The Township should share data with the City of Ann Arbor to track water and sewer disruptions (e.g., main breaks, major leaks or blockages, pipe failures, pump station failures etc.) in the Township. While many of the issues may not be attributable to climate change, it will be important to collect and track this data to properly analyze the increased impacts of climate change on water and sanitary sewer systems.
- The Township should begin dialogue with EGLE and the WCWRC and WCDPH to discuss potential monitoring of groundwater levels and water quality.
    - Disseminate results to Township residents, perhaps through the creation of a dashboard on either the Township or EGLE website. It may be necessary to partner with the County for a drinking well groundwater study to determine what use limits may be.
    - Map groundwater recharge areas and develop zoning standards that restrict impervious surfaces within important aquifer recharge zones.
    -

Stormwater Infrastructure Resilience

- The Township can measure progress by tracking the inventory and condition of both County drains and privately owned impoundment basins and stormwater systems and further tracking maintenance performed to those systems.
- The Township and private homeowner associations need to work closely with the office of the Washtenaw County Water Resource Commission (WCWRC) to insure proper maintenance of these private stormwater systems.
- Modify Township land development standards and zoning requirements to require increased stormwater infiltration and use of Green Stormwater Infrastructure (GSI) where possible.
- Modify land development standards to require vegetated roofs (green roofs) on all non-residential buildings that are or will not be using solar panels.
- The Township and WCWRC should establish regular meetings to share information about these systems beginning in 2024.
- Modify land development and zoning standards to require green stormwater management, trees, and landscaping in new or improved surface parking lots.
- The Township should modify existing zoning and land development regulations to limit building in the 500-year flood plain.

Natural and Working Lands Resilience

- Convene regular meetings with the farming community to discuss ongoing issues (climate, development). Work with farmers and Washtenaw County staff to develop a database tracking agricultural flows (e.g., food crops sent outside the County or remaining in the County).
- In the long-term, the Township and partners may conduct flora inventories on preserved lands and track the numbers and health of these species to better understand the impact of climate change on the Township's flora and fauna.
- The Township should encourage residents to plant native landscape species and decrease the amount of turfgrass lawn.

Renewable Energy Resilience

- The Township Building Official should compile and maintain a database of installed solar panels based on building permits issued.
- Using the solar installation database, the Township should establish a goal of increasing solar panel installation within the Township by 10% in 2024.
- The Township should establish goals for solar installation and renewable energy generation based on the real-time permit data. This information should be reported to the Township Board monthly and provided on a public facing dashboard.

APPENDIX A – TOWNSHIP FLEET DATA

Vehicle Year	Make/Model	Department	Annual Average Miles/HRs	Total Mileage/Hours		Gas/ Diesel	Notes
~~1940~~	~~General Fire Truck~~	~~Fire~~	~~N/A~~	~~N/A~~		~~G~~	~~In Storage~~
2005	Spartan/Tanker	Fire	1,693	28,783.00	Miles	D	
2007	Spartan/Aerial 207	Fire	1,334	20,011.00	Miles	D	
2009	Ford/F550	Fire	5,495	71,439.00	Miles	D	
~~2009~~	~~Ford/F550~~	~~Fire~~	~~N/A~~	~~N/A~~		~~D~~	~~Sold~~
2011	Spartan/Legend Pumper	Fire	6,174	67,912.00	Miles	D	
2011	Spartan/Legend Pumper	Fire	7,119	78,305.00	Miles	D	
2015	Ford/F150	Building	4550	31,848.00	Miles	G	
2016	Ford/F550	Utility	5107	30,643.00	Miles	D	
2016	Toyota/Tundra	Fire	12869	77,216.00	Miles	G	
2018	Ford/F150	Utility	12,156	48,622.00	Miles	G	
`	Ford/Ranger	Building	3416	10,248.00	Miles	G	
2019	Ford/F250	Fire	4235	12,706.00	Miles	G	
2020	Ford/F350	Utility	11505mi	23,011.00	Miles	G	
2020	Rosenbauer	Fire	831mi	1,663.00	Miles	D	
2020	Rosenbauer	Fire	705mi	1,410.00	Miles	D	
2019	Ranger/ATV	Fire	40mi	118.00	Miles	G	
2011	Kubota/ATV	Utility	96hrs	1,058.00	Hours	D	
2012	Skid Steer	Utility	69hrs	691.00	Hours	D	
2004	Ford/Tractor	Farm	174hrs	3,124.00	Hours	D	

APPENDIX B – TOWNSHIP OPERATIONS ENERGY DATA

Description	Address	2020 Natural Gas Usage (CCF)	2021 Natural Gas Usage (CCF)	2020 Electricity Usage (KWH)	2021 Electricity Usage (KWH)
Main Office/Station 1	3792 Pontiac Trl.	4,145	4,147	57,600	58,560
Fire Station 2	4319 Gross Rd.	3,764	3,779	54,240	54,880
Utility Building	1343 Stark Strasse	125	122	10,039	10,364
Utility Building	1947 N Dixboro Rd.	69	90	25,360	27,440
Utility Building	4620 E Huron River Dr.	97	157	3,585	2,226
Utility Building	3695 Washtenaw	544	221	3,145	4,765
Utility Building	3701 Plymouth Rd.	-	-	249	241
Utility Building	1300 Earhart Rd.	-	-	1,030	1,186
Tilian Farm	4400 Pontiac Trl.	-	-	4,529	13,883
Utility Building	4231 Whitehall	-	-	82,320	84,080
Total				**242,097**	**257,625**

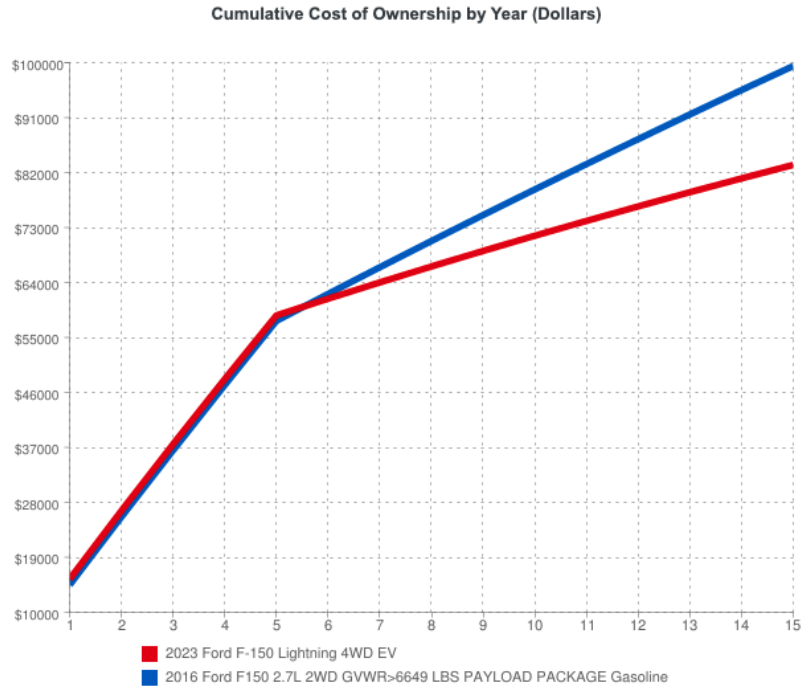
APPENDIX C – EV REPLACEMENT ANALYSIS

The analysis below assumes 12,250 Miles per year (10% highway) based on the higher use of the one of the F-150s. This assumes the Township can take advantage of the available tax breaks.

https://afdc.energy.gov/calc/

Results

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2016 Ford F150 2.7L 2WD GVWR>6649 LBS PAYLOAD PACKAGE Gasoline	664 gal	0 kWh	$2,448	$4,724	$0.39	15,925
2023 Ford F-150 Lightning 4WD EV	0 gal	5,487 kWh	$962	$3,080	$0.25	6,723
	Graph	Graph	Graph	Graph	Graph	Graph



This graph shows the cumulative cost of ownership by year for each vehicle, including fuel, tires, maintenance, registration, license, insurance, and loan payment. The tool assumes a five-year loan with a 10% down payment. Year one on the graph represents the 10 percent down payment plus the first year's total operating costs. For more information on this graph and other calculations, see the assumptions page.

ANN ARBOR
Charter Township

CLIMATE ACTIONS

Final Draft November 20, 2023

Township Priority	Resilient Washtenaw Action	Scope	Climate Action	GHG Benefit	Priority	Timeframe	Township Government Investment	Partners	Approvals Required	Action Type
1	1.01	TW	On-going Climate Education and Public Engagement	Support	High	Ongoing	$150,000/yr	OSI, WC, HRWC	TB; Interlocal Agreement	Supporting
2	2.02	TW	Home Energy Advisor Program	High (9,866)	High	Ongoing		OSI	TB; Interlocal Agreement	Mitigation
3	2.04	TW	Residential & Commercial Weatherization and Energy Efficiency	Support	High	2024-2035		OSI	TB; Interlocal Agreement	Supporting
4	2.03	TW	Community Bulk Buy for Solar and Building Electrification	Support	High	2024-2035		OSI	TB; Interlocal Agreement	Supporting
5	1.02	TW	Join the Regional Resilience Authority	Support	High	By 2025	TBD	OSI	TB	Supporting
6	1.03	TW	Carbon Pricing in Decision Making	Support	High	2024	N/A	OSI	TB	Supporting
7	2.01	TW	100% Renewable Energy Options for Everyone	High (44,648)	High	Ongoing	Lobbyist Cost	City of Ann Arbor, Pittsfield & Scio Townships, Washtenaw County	TB	Mitigation
8	2.01A	TW	Enabling Legislation for Township Energy Programs			2023-2033	Lobbyist Cost	Michigan Township Association, Washtenaw County, City of Ann Arbor, Michigan Municipal League	TB	Supporting
9	4.02	TW	Improve Transit Access in the Township	Low (201)	High	ongoing	TBD	AAATA, University of Michigan, private employers		Mitigation
10	4.03	TW	Expand the Active Transportation Network	Medium (1,250)	High	ongoing	TBD	WCPRC, WCRC	TB	Mitigation
11	7.06	TW	Update Stormwater Regulations	Adaptation	Medium	2024	Existing Investment	WCWRC	TB	Adaptation
12	6.01	TW	Natural Area Preservation	Adaptation/Sequestration	Medium	ongoing	Existing Investment	WCPRC	TB, City of Ann Arbor, WC	Adaptation
13	6.02	TW	Farmland Preservation	Adaptation/Sequestration	Medium	ongoing	Existing Investment	City of Ann Arbor, WCPRC	TB, City of Ann Arbor, WC	Resilience
14	7.01	TW	Provide Comment on Infrastructure Agency Planning Projects	Adaptation	Medium	ongoing	Existing Investment		TB	Supporting
15	2.06	TW	Time of Marketing Energy Rating Disclosure	Support	Medium	2024	Adopt Model Ordinance	WC	TB, WCBoT	Supporting

ANN ARBOR Charter Township

Township Priority	Resilient Washtenaw Action	Scope	Climate Action	GHG Benefit	Priority	Timeframe	Township Government Investment	Partners	Approvals Required	Action Type
16	7.05	TW	Expand Rain Garden Program	Adaptation	Medium	ongoing	Existing Investment	WCWRC	N/A	Resilience
17	4.01	TW	Expand Electric Mobility Options	High (18,308)	Medium	2024-2035	Community Investment	WCC, U of M, Private employers	Zoning Changes	Mitigation
18	3.03	TW	Emissions Accounting Mechanism	Support	Medium	2025	TBD		Township Policy	Supporting
19	7.02	TW	Prioritize Capital Projects that Reduce Emissions and Prepare for Extreme Weather	Adaptation	Medium	ongoing	Existing Investment		Township Policy	Resilience
20	8.02	TW	Develop a Township Organics/Compost Program	Low (342)	Medium	2025	Community Investment	WRRMA	TB, WRRMA	Mitigation
21	4.04	TW	Reduce Vehicle Miles Traveled (VMTs)		Low	2024/25	Community Investment	Private employers, AAATA, WCPRC, WCRC	NA	Mitigation
22	8.03	TW	Support and Grow the Washtenaw Regional Resource Management Authority (WRRMA)	Support	Low	2024	Existing Investment	WRRMA	TB	Supporting
23	2.07	TO	100% Renewable Energy for Township Operations	Low (83)	Low	2024-2035	Township Investment	County Resilience Authority, DTE	TB	Mitigation
24	5.02	TW	Create Resilience Hub	Adaptation	Low	2025	Township Investment/Grant Opportunity		TB	Adaptation
25	5.04	TW	Maintain Township Tree Canopy	Adaptation/Sequestration	Low	Ongoing	Community Investment		TB, WCRC	Adaptation
26	7.04	TW	Stormwater Basin Inspection and Retrofit	Adaptation	Low	2024-2025	Existing Investment	WCWRC		Adaptation
27	8.01	TW	Materials Management Program	Low (838)	Low	2025	Community Investment		TB	Mitigation
28	8.04	TW	Incentivize Local Food Production	Support	Low	ongoing	Existing Investment		TB	Supporting
29	4.04	TO	Township Fleet Electrification	Low (25)	Low	ongoing	TBD		TB	Mitigation

ANN ARBOR Charter Township

ACTION #

STRATEGY

PRIORITY: LOW TO HIGH
TIMELINE: SHORT TO LONG

IMPACT: LOW TO HIGH
DIFFICULTY: EASY TO HARD

Action Title

Action Description

What am I looking at? These are draft actions. Each action starts with a slide like this that identifies some key information about what the action is, why it's important, and who should be involved in planning, funding, and implementation. If there is a lot more to explain, a second slide is added to capture that information.

Township Implementation
Who is leading from the Township?

Community Partners
Who from the community should be involved?

Funding
Where could funding come from?

Staffing
Where will staff or contractors be and how many will we need? Where can the township leverage other staff?

Approval(s)
Which governing bodies will need to approve?

Goals and Evaluation Metrics:

- What goals should we have?
- What metrics should we use to evaluate achieving our goals?

Supporting actions costs are included in Overarching Actions and Actions with direct GHG Impacts

Some actions are Over-arching, Supportive of GHG reductions Resilience and Adaptation actions do not reduce GHGs

Relevant Principles are Highlighted

- What is the Budget, Cost or Return on Investment?
- When do we start? For how long?
- What level of GHGs (mTCO2e) can this reduce?
- Does this apply to The Township, Community or Region
- What mechanism is used to enable this?

RELEVANT PRINCIPLES

- Racial Equity & Environmental Justice
- Just Transition
- Health
- Resilient Economy
- Community Partnership
- Sustained Communications

Description of Methodology

PRIORITY: LOW-MEDIUM-HIGH

Prioritization is determined by a number of factors including positive impact on County residents, potential state and federal funding sources, partnerships, ease of implementation, or foundational nature of the action which enables additional actions.

IMPACT: LOW-MEDIUM-HIGH

Impact is determined by examining the actions impacts on emissions reductions, ROI, and principles

DIFFICULTY: EASY-MEDIUM-HARD

Difficulty is determined using a subjective lens. Actions requiring significant behavioral or political changes are considered hard. Actions requiring a Township Board of Trustees resolution, for example, are considered easy.

TIMELINE: SHORT-MID-AND LONG-TERM

This illustrates when an action starts and completes. A short-term timeline is an action that can happen within 1-3 years. Mid-term is 3-5 years. Long term is 5-13 years. All actions have been assigned timelines based on the Goal of achieving County-wide carbon neutrality by 2035.

Description of Methodology

ACTION IMPACTS

Action Impact estimates are meant to show an economy of scale based on a set of reasonable assumptions around GHG Impact, Government Investment, Net Returns to the Community, and the Social Cost of Carbon. As programs to implement actions are designed and funded at different scales and time periods, the specific impacts of those programs can be more fully outlined and estimated.

GOVERNMENT INVESTMENT:

Government Investment is the amount of funding The Township, Cities, Villages, Townships, School Districts, etc., will need to direct towards climate action. This funding could come through the existing funding resources that local units of government can raise, but could also come from state, federal, philanthropic and public-private partnerships.

NET RETURN TO COMMUNITY:

Net Return to Community measures the total return on investments made towards climate action. These returns may be direct returns, like spending money on an electric vehicle and having an overall lower lifecycle cost compared to driving a gas-powered vehicle, or indirect returns like lowered healthcare costs due to mode shifting to bicycling more often and improving your personal health. This does not measure the economic impacts (jobs) created through investments, which will be quite significant with the level of investment from Government and the community.

SOCIAL COST OF CARBON

The social cost of carbon is a critical metric that measures the economic damages, in dollars, that result from the emission of one additional ton of carbon dioxide into the atmosphere. A high social cost of carbon can motivate more stringent climate policies, as it increases the estimated benefits of reducing greenhouse gases. We utilize the most updated estimate of the average social cost of carbon - $185/MTCO2e

RETURN ON INVESTMENT (ROI/MTCO2E):

ROI/MTCO2e evaluates the net return on investment from an action over the amount of greenhouse gases it reduces. The number combines the Government Investment, the Net Return to Community, and the Social Cost of Carbon and then divides by the total MTCO2e reduced by that action. However, it differs from traditional definitions of ROI in that it evaluates a net return to the community, overall. For example:

- It could be direct, such as The Township investing in solar on its facilities and receiving a ROI on an investment of their capital.
- Or, it could be indirect, such as The Township investing money into a program that helps the community get solar at a lower price and each member of the community that participates has a higher ROI on the investment of their capital.

ANN ARBOR Charter Township

IMPLEMENTATION

1

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: HARD

On-going Climate Education and Public Engagement

Currently, the Township has limited options to reach residents with important climate information and opportunities. The Township should partner with the Regional Resilience Authority or Ann Arbor Office of Sustainability and Innovation (OSI) to provide on-going climate education.

Direct outreach is essential to identify community organization partners, identify participants (particularly for home weatherization and electrification projects) and to assist in continuing climate education to assist residents and businesses in making educated investments in their properties.

Implementation/Lead Dept.
Township Supervisor

Community Partners
Regional Resilience Authority, City of Ann Arbor OSI, Community Organizations, Farmers, Non-profits and Advocacy Groups, Labor

Funding
General Fund

Staffing
Regional Resilience Authority, City of Ann Arbor OSI

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Increase the number of climate-specific communications distributed to township residents annually
- Track participation in and increase the number of township residents participating in home energy advisor or solarize programs
- Measure the number of residents engaged annually

TOWNSHIP EXPENSE
$150,000/yr

ONGOING

ALL INVENTORY SECTORS

TOWNSHIP

NONE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

IMPLEMENTATION

2

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: HARD

Home Energy Advisor

The Ann Arbor Office of Sustainability and Innovation offers a concierge-style program that functions as a one-stop-shop for all community members and institutions, and tailors its services to needs of different groups, such as: **Residents including Vulnerable and Resource-limited Residents –** inform residents and businesses of all available services, financing, and incentives to transition to 100% clean and affordable energy. Provide evaluation and connect residents most in need to all available programs to improve their housing, lower their energy burden, access clean and affordable energy, and understand opportunities to work in the clean energy industry; **Businesses including Disadvantaged Business Enterprises (DBEs) –** provide evaluation and connect businesses to all available programs to lower their energy burden and access clean and affordable energy. For DBEs in the trades, help connect them to programs and opportunities in the clean energy economy; and **Township Government –** provide evaluation and expert consultation on ways to transition away from fossil fuels and access 100% clean and affordable energy,

Implementation/Lead Dept.
Township Supervisor

Community Partners
Regional Resilience Authority, City of Ann Arbor OSI,

Funding
General Fund

Staffing
Regional Resilience Authority, City of Ann Arbor OSI

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Increase the number of community investments in Energy efficiency and renewable energy
- Track participation in and increase the number of township residents participating in home energy advisor or solarize programs
- Measure the number of permits for energy efficient appliances and renewable energy installations

TOWNSHIP EXPENSE (Included in Action 1 Investment)

ONGOING

ALL INVENTORY SECTORS

TOWNSHIP

NONE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

3

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: MEDIUM

Residential & Commercial Energy Efficiency and Weatherization

Building emissions are responsible for two-thirds of emissions in Washtenaw County. Ann Arbor Township should partner with Washtenaw County and the City of Ann Arbor Office of Sustainability and Innovations (OSI) to provide information for residents, so it is easier for individuals to identify weatherization needs and find reputable contractors to perform the work.

Ann Arbor Township will explore a partnership with the City of Ann Arbor Office of Sustainability and Innovation to expand the home energy advisor services to Township residents and businesses, using its extensive outreach and education programs to support all citizens, especially vulnerable residents, lower-income households, and disadvantaged businesses in their energy transition. Estimated investments by the community include $15.9 (residential) $11.3M (commercial).

Implementation/Lead Dept:
Township Board of Trustees, Administration

Community Partners
City of Ann Arbor Office of Sustainability and Innovation, Contractors/Manufacturers, Labor

Funding
CDBG, Federal Programs, General Fund

Staffing
Ann Arbor OSI and Regional Resilience Authority

Approval
Township Board of Trustees

Goals and Evaluation Metrics:

- Enter into contract or interlocal agreement with City of Ann Arbor by March 2024
- Develop outreach and marketing materials by March 2024
- Work with OSI to develop database of service providers, contractors, and product types - including information on whether these are union or non-union service providers or contractors, and whether a living wage is paid by non-union service providers or contractors - by March 2024

TOWNSHIP EXPENSE (Included in Action 1 Investment)

2023-2035

9,886 MTCO2e BUILDING ENERGY INVENTORY

TOWNSHIP, COMMUNITY & CITY OF ANN ARBOR

INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

ENERGY TRANSITION

4

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: MEDIUM

Community Bulk Buy for Solar and Building Electrification

Partner with the City of Ann Arbor Office of Sustainability & Innovation (OSI) to expand on successful the Solarize program to create bulk buy programs to bring solar installation, heat pumps, geothermal systems, and electric appliances to residents and businesses across The Township. Target multi-family and commercial properties in addition to single- and two-family homes and businesses.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
City of Ann Arbor Office of Sustainability and Innovation (OSI), Labor, Michigan Saves, MEECA, Michigan Minority Contractors Association, and Washtenaw Contractors Association

Funding
Federal Funds, General Fund

Staffing
Regional Resilience Authority

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Enter into contract or interlocal agreement with City of Ann Arbor by March 2024
- Conduct at least one group-buy annually targeted specifically to Ann Arbor Township residents and businesses.
- Expand Network of Approved Contractors and Vendors to Include more Disadvantaged Business Enterprises

TOWNSHIP EXPENSE (Included in Action 1 Investment)

2023-2035

BUILDING ENERGY INVENTORY

TOWNSHIP

TOWNSHIP

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

IMPLEMENTATION

5

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: HARD

Join the Regional Resilience Authority

The Township should join the planned Regional Resilience Authority or become a contract partner with OSI to explore collaborative solutions that scale significant carbon reduction projects and leverage funds across partners to reduce implementation costs and staff burden.

Implementation/Lead Dept.
Township Board of Trustees

Funding
Membership Fees/Contract

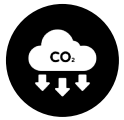
Staffing
Township membership fees will support Regional Resilience Authority staff. If agreement is reached with OSI, contract fees will support dedicated staff for Ann Arbor Charter Township

Goals and Evaluation Metrics:

- Ann Arbor Township will support and join the Regional Resilience Authority by 2024 or, if the County fails to create the RRA, become a contract partner with OSI by 2024.


TBD


2024



ALL INVENTORY SECTORS


TOWNSHIP


INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES


Racial Equity & Environmental Justice


Just Transition


Health


Resilient Economy


Community Partnership


Sustained Communications

6

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: MEDIUM

Carbon Pricing in Decision Making

The transition to a low carbon economy includes significant trade-offs. Setting an internal price on carbon enables units of government to address the risks they face, ensure they choose a productive path for long-term, sustainable success. Using a carefully selected cost of carbon enables acceleration toward the transition to a zero-carbon, sustainable world.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
OSI, Washtenaw County

Funding
None Needed

Staffing
Finance

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Set a Social Cost of Carbon that The Township Utilizes for Decision Making for both Internal and Community Projects
- Adopt The Township's Social Cost of Carbon in Decision Making
- Adopt a Township Internal Carbon price that mirrors the County's and create a Township Decarbonization Revolving Fund
- Establish an Internal Carbon Tax so Projects Realize their Carbon Impacts and the Tax Funds an Internal Decarbonization Revolving Fund

TBD

2023-2035

ALL INVENTORY SECTORS

TOWNSHIP

INTERNAL POLICIES

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

Carbon Pricing in Decision Making

Social Cost of Carbon - The social cost of carbon is an estimate of the economic costs, or damages, of emitting one additional ton of carbon dioxide into the atmosphere, and thus the benefits of reducing emissions. This cost can be factored into cost-benefit analyses in decision making so both internal capital planning and approval of external development projects realize their full impact on the community. Cost of carbon factors could include public health impacts, species loss, property damage/loss, agricultural productivity loss, increased food prices, eco-system service damage, and social/international conflict.

Internal Carbon Tax - Washtenaw County will explore an internal carbon tax that clearly signals to staff the full cost of carbon and generate a pool of funds that will be used within and across departments to support The Township carbon neutrality goals. The Township will share this method with other interested . The tax can:

- De-risk Public Investments
- Provide Transparency to Citizens and Stakeholders
- Provide Common Metrics to Track and Measure Success
- Create Finance Mechanisms to Reduce Emissions

ENERGY TRANSITION

7

TOWNSHIP PRIORITY: HIGH
TIMELINE: LONG TERM

IMPACT: HIGH
DIFFICULTY: HARD

100% Renewable Energy Options for Everyone

To fully decarbonize the energy system, residents and businesses must have equitable access to 100% renewable energy options from the grid. There are multiple pathways to achieve this (Community Choice Aggregation (CCA) which requires a change in state law and Sustainable Energy Utilities (SEU). The Township does not have the ability to be an SEU, under current law, so CCA or other strategies may need to be evaluated. Estimated Community investment is $6.09M.

Implementation/Lead Dept.
Township Board of Trustees, Regional Resilience Authority

Community Partners
Utilities, Businesses, Residents

Funding
TBD

Staffing
TBD

Approval(s)
Township Board of Trustees, Michigan Public Services Commission

Goals and Evaluation Metrics:

- 100% Renewable Energy Options Available to All Residents, Businesses, and Government Buildings by 2027
- Renewable Energy Options Available at or Below Current Cost of Electricity
- Renewable Energy comes from Local Sources
- Lobby state lawmakers to change the definition of "municipality" in the Foote Act to include townships
- Lobby to enable CCA and SEU for Townships under state law

Lobbyist Cost

2027

44,648 MTCO2e ALL INVENTORY SECTORS

TOWNSHIP & COMMUNITY

TOWNSHIP RESOLUTION TO JOIN INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

100% Renewable Energy Options for Everyone

There are multiple pathways to achieve 100% renewable energy options for everyone, including:

Community Choice Aggregation (CCA) – ***CCA requires legislation at the state level*** to enable communities to aggregate into Joint Power Authorities (JPAs). JPAs become the default purchaser of electricity supply for their community, allowing them to offer 100% renewable energy as an alternative to the grid mix of their utility.

Sustainable Energy Utilities (SEUs) – Municipalities can create SEUs to provide a hyper-local alternative to grid-supplied energy via distributed energy, district energy, and community microgrids. ***Currently, this is allowed by state law for only cities and villages. Efforts should be made to expand the definition of municipality in the Foote Act.***

Community Solar (CS) – CS allows residents and businesses to buy into a large solar project in their community and receive credits on their utility bill for the energy production. CS is allowed by state law, but at the discretion of the utilities***. Legislation is required to enable communities to demand community solar.***

Utility Green Pricing Programs (GPPs) – Utilities currently offer GPPs, but the cost of green pricing has only recently come down in cost to be equal to the kWh cost of fossil fuel-generated electricity. To achieve equitable access to clean energy, GPPs should be offered at the same or ideally lower price than energy derived from fossil fuels.

8

TOWNSHIP PRIORITY: HIGH
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: MEDIUM

Enabling Legislation for Township Energy Programs

The Township will need to have state law changed to allow for Townships to have a Sustainable Energy Utility (SEU) and/or a Community Choice Aggregation program.

SEU - a community-owned energy utility that provides electricity from local solar and battery storage systems installed on homes and businesses throughout the community. The SEU provides 100% clean, reliable, locally built, and affordable electricity; built by the community, for the community.

CCA - also known as municipal aggregation—programs allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission and distribution service from their existing utility provider.

Implementation/Lead Dept:
Township Board of Trustees, Administration

Community Partners
City of Ann Arbor Office of Sustainability and Innovation, Contractors/Manufacturers, Labor

Funding
CDBG, Federal Programs, General Fund

Staffing
Ann Arbor OSI and Regional Resilience Authority

Approval
Township Board of Trustees

Goals and Evaluation Metrics:

- Partner with Michigan Township Association (MTA) or likeminded townships to engage lobbyists to support these legislative amendments.

LOBBYIST COST

2023-2035

ALL INVENTORY SECTORS

TOWNSHIPS

LEGISLATION

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

9

TOWNSHIP PRIORITY: HIGH
TIMELINE: LONG TERM

IMPACT: Low
DIFFICULTY: HARD

Improve Transit Access in the Township

Explore opportunities to partner with The Ride (AAATA), Regional Transit Authority (RTA), University of Michigan, bikeshare providers and bordering Cities, Villages, and Townships to provide more frequent and consistent transit service on principal commuting corridors between population centers.

The Township can prioritize redevelopment along or near existing transit routes to increase potential ridership which will help to increase frequency and types of transportation options offered within and through the Township while prioritizing connection to employment, commerce, education and health care centers in its jurisdiction. Convenient and frequent regional transit options (and an expanded non-motorized network are foundational for reducing VMTs.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
AAATA, RTA, U-M, Michigan Medicine, Bikeshare Providers, Local businesses

Funding
Federal Grants, State Grants, Local Philanthropy, Transit Millage

Staffing
Community Partners, specifically AAATA, U-M

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Explore millage support for AAATA expansion into Ann Arbor Township
- Expand service to include stops at the East Ann Arbor Michigan Medicine Campus and Dominos Farms complexes
- Expand service to include a route along N. Dixboro Rd. between Plymouth Rd. and Washtenaw Ave.
- Create fully connected and protected bike lanes along major corridors

TBD

2030

201 MTCO2e
TRANSPORTATION INVENTORY

TOWNSHIP

TOWNSHIP RESOLUTION TO JOIN INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

10

TOWNSHIP PRIORITY: HIGH
TIMELINE: MEDIUM TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Expand the Active Transportation Network

Explore opportunities to create connected paths (both on-road facilities and off-road paths) and support the use of active transportation routes as commuting corridors between population centers.

Working together with its partners (particularly the WCRC), the Township should study how an interconnected system of on-road and off-road non-motorized facilities can provide bicyclists, pedestrians, and wheelchair users with safe access to all destinations accessible by car.

TBD

ONGOING

1,250 MTCO2e TRANSPORTATION INVENTORY

TOWNSHIP, COUNTY, PARTNERS

TOWNSHIP AND COUNTY

Implementation/Lead Dept.
WCPRC, WCRC

Community Partners
WCRC, WCPRC, MDOT, MDNR

Funding
Multiple Sources – Federal, State and Local; Private Foundations, Non-Profits, and Advocacy Groups

Staffing
WCPRC

Approval(s)
Township Board of Trustees, WCPRC, WCRC

Goals and Evaluation Metrics:

- Connect 75% of neighborhoods to the Border-to-Border trail (or equivalent system/trail) by 2035.
- 100% of WCRC projects include active transportation improvements by 2025. Prioritize active transportation improvements on N. Dixboro Rd.
- Double the number of linear miles of marked and/or protected bicycle lanes or separated paths by 2030.
- Incentivize or require developers to include non-motorized features in new housing stock.

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

INFRASTRUCTURE

11

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Update Stormwater Regulations

Work with the Water Resources Trustees to develop new stormwater regulations (for new development), based on a 500-year flood with a buffer that assumes more precipitation and more extreme storms. Explore more stringent stormwater upgrade requirements for existing development renovations. All Township projects and infrastructure agency projects (WCRC, MDOT) should meet or exceed County stormwater requirements.

Implementation/Lead Dept.
Township

Community Partners
WCWRC

Funding
WCWRC

Staffing
WCWRC, Township Engineer/Planner

Approval(s)
WCWRC, Township Board of Trustees

Goals and Evaluation Metrics:

- Revised Stormwater Regulations adopted by 2024.
- Explore ordinance revisions prohibiting new development within the 500-year floodplain.
- Explore additional Township regulation regarding floodplain, wetland, and riparian buffer requirements.

EXISTING INVESTMENT

2026

RESILIENCE/ ADAPTATION

COUNTY &

ORDINANCE AMENDMENTS

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

12

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Natural Area Preservation

Continue to preserve sensitive and ecologically significant natural areas including wetlands and water bodies, riparian corridors, floodplains, native forests and forest fragments, sensitive ecosystems, and key aquifer recharge areas. Continue to be a major provider of ecosystem services for the region.

Implementation/Lead Dept.
Township and NAPP

Community Partners
Legacy Land Conservancy, SE Michigan Land Conservancy, TNC, Huron River Watershed Council, City of Ann Arbor Greenbelt Program

Funding
NAPP, Township preservation millage, Regional Conservation Partnership Program (RCPP)

Staffing
Township land preservation consultant

Approval(s)
Township Board

Goals and Evaluation Metrics:

- Continue natural area acquisition via existing channels - the Township and County Natural Areas Preservation Program and the Ann Arbor Greenbelt program.
- Work with landowners to incorporate best conservation practices.
- Encourage landowners to participate in the USDA conservation programs.

EXISTING INVESTMENT

2023-2035

RESILIENCE/ ADAPTATION

TOWNSHIP

ORDINANCE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

13

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Farmland Preservation

Preserve high-quality farmland for active agricultural production with an emphasis on local food production and distribution. Work with the state to authorize a County-wide purchase/transfer of development rights program within Washtenaw County. Work with farmers to begin tracking the volume and type of agricultural products being sold within Washtenaw County. Discourage development of farmland as large-lot, low density detached single family residential lots.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
City of Ann Arbor Greenbelt Program, Legacy Land Trust, MDARD, MSU Extension, USDA, Farm Bureau

Funding
USDA, State, Township

Staffing
Township land preservation consultant, Ann Arbor Greenbelt program manager

Approval(s)
Township Board of Trustees, Ann Arbor City Council (for Greenbelt projects)

Goals and Evaluation Metrics:

- Quantity/Inventory of active working agricultural lands by 2024.
- Develop agricultural products database to track the types and volumes being sold for processing of consumption in Washtenaw County and southeast Michigan.
- Strengthen "Buy-Local" networks connecting farmers to local markets and food distribution networks.
- Increase participation in the State Farmland and Open Space Preservation Program by 20% by 2030.
- Encourage 25% of agricultural land to be engaged in regenerative agriculture by 2030.
- Develop zoning language that discourages the conversion of active farmland to large lot single family residential housing
- Develop zoning language to allow for agrovoltaics in the Agricultural District

EXISTING INVESTMENT

2023-2035

RESILIENCE/ ADAPTATION
TRANSPORTATION INVENTORY

TOWNSHIP + COMMUNITY

ORDINANCE AMENDMENTS

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

INFRASTRUCTURE

14

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: SHORT TERM

IMPACT: MEDIUM
DIFFICULTY: LOW

Provide Comment on Infrastructure Agency Planning Projects

The Township should provide official comment on all infrastructure agency (WCRC, MDOT, WATS, SEMCOG) projects. Incorporate climate change scenarios in all infrastructure and building projects. Incorporate emissions from building materials and induced demand in project models

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
Resilience Authority, Institutional Landowners

Funding
Township General Fund

Staffing
Township Planner/Engineer

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Utilize evaluation model to identify emissions impacts of projects and building materials developed by the Regional Resilience Authority and/or OSI.
- Incorporate climate change scenarios (increased precipitation, extreme temperatures, population) into review of and planning for all infrastructure projects.
- Increase the use of Green Stormwater Infrastructure (GSI) in all public projects.

EXISTING INVESTMENT

ONGOING

RESILIENCE/ ADAPTATION

RESILIENCE AUTHORITY

POLICY

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

ENERGY TRANSITION

15

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: SHORT TERM

IMPACT: MEDIUM
DIFFICULTY: HARD

Time of Marketing Energy Rating Disclosure

Ann Arbor Township will continue its legacy of waste prevention and right-to-know leadership through a time of marketing energy rating disclosure program for homes and businesses. For potential homebuyers, this information is necessary so that financing energy improvements can be included in mortgages.

The Township will also explore a rental housing energy disclosure program so renters know the full cost of housing and energy, and a time of marketing electrification prescription program so new home buyers know the costs and benefits of low carbon investments.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
REALTORS, Washtenaw County

Funding
General Fund

Staffing
Building Department

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- 100% of homes and commercial buildings marketed for sale or lease provide and energy rating as a part of the real estate listing by 2027
- Increase the number of new home buyers utilizing Green Mortgages to retrofit their homes by 50% by 2030
- Rental Licenses to require an energy disclosure to tenants before signing a lease
- REALTORS include energy rating on all property listings by 2027

ADOPT MODEL ORDINANCE

2024

BUILDING ENERGY INVENTORY

COUNTY & TOWNSHIP

ORDINANCE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

INFRASTRUCTURE

16

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: SHORT TERM

IMPACT: LOW
DIFFICULTY: EASY

Expand Rain Garden Program

Work with the County to expand rain garden program. Work with the County to coordinate rain garden development with Food Security and Pollinators Conservancy programs to provide additional opportunities to expand green stormwater and local food production on both public and private properties.

Implementation/Lead Dept.
WCWRC

Community Partners
Neighborhood/Homeowner Associations, Institutional Landowners

Funding
WCWRC

Staffing
WCWRC

Approval(s)
WCWRC

Goals and Evaluation Metrics:

- Increase rain garden stormwater storage capability Township-wide by 500% by 2035.
- Improve water quality by capturing contaminants.
- Expand rain garden program to coordinate installation of plants and vegetation that provide pollinator habitat and/or local food growing capabilities.
- Explore creating additional zoning language requiring the installation of rain gardens and/or other green stormwater infrastructure.

EXISTING INVESTMENT

2024-2035

RESILIENCE/ ADAPTATION

WCWRC

NONE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

Expand Electric Mobility Options

Evaluate how the Township can contribute to County-wide electric mobility options through the development of charging stations, electrification of fleet vehicles, and incentives for commuting, commercial fleets, and off-road purposes (e.g., farming, construction, recreation).

Provide information to all residential and commercial property owners on opportunities to establish onsite renewable energy powered charging stations.

Implementation/Lead Dept.
Regional Resilience Authority and/or Energy Concierge

Community Partners
OSI, Dealerships, Fleet Owners, WATS, DTE

Funding
Federal Grants, State Grants, Local Philanthropy

Staffing
Regional Resilience Authority or OSI

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Increase share of vehicle miles travelled with electric mobility options by 10% annually
- Increase availability of electric vehicle charging stations throughout the Township
- Increase share of electric mobility options powered by onsite renewable electricity
- Track and report on EV ownership/use in the Township by the end of 2024

COMMUNITY INVESTMENT

2024-2035

18,308 MTCO2e TRANSPORTATION INVENTORY

TOWNSHIP & COUNTY

TOWNSHIP RESOLUTION TO JOIN INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

Emissions Accounting Mechanism

Require that any housing which must be built outside of existing service boundaries (existing water, sewer, transit service) plan for and report the emissions and climate impact from the construction of buildings and associated infrastructure.

These projects should provide preliminary estimates of transportation, construction, and building emissions and report the GHG impact of the loss of natural areas, wetlands and trees and the cost of the carbon emissions should be considered by municipal agencies.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
Labor, Resilience Authority, OSI

Funding
Township General Fund, Development Fees

Staffing
Township Planner, Building Official

Approval(s)
Township

Goals and Evaluation Metrics:

- Create an emissions formula for new developments to calculate emissions to be used by the Township and for evaluating the emissions of all new development by 2024
- Formula integrated into review process for new housing developments

COMMUNITY INVESTMENT

2024

ALL INVENTORY SECTORS

TOWNSHIP

ZONING AMENDMENTS

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

INFRASTRUCTURE

19

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: HARD

Prioritize Capital Projects that Reduce Emissions and Prepare for Extreme Weather

Capital improvement planning should prioritize capital projects that reduce fossil fuel use, emissions, and also help to prepare Ann Arbor Charter Township for more extreme weather events. The projects should optimize renewable energy generation, utilize green infrastructure, and contribute to community-wide emission reductions and/or community resilience. change.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
Resiliency Authority/OSI

Funding
General Fund

Staffing
Township Engineer

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Incorporate fossil fuel use, projected emissions, and emissions of building materials into capital project scoring and budgeting by 2024.
- Develop a baseline that capital projects be designed to withstand weather impact of climate change (precipitation, temperature, storms).

EXISTING INVESTMENT

ONGOING

RESILIENCE/ ADAPTATION

RESILIENCE AUTHORITY

INTERNAL POLICY

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

CIRCULAR ECONOMY

20

TOWNSHIP PRIORITY: MEDIUM
TIMELINE: SHORT TERM

IMPACT: LOW
DIFFICULTY: MEDIUM

Develop a Township Organics/Compost Program

Recovery of organic material through digestion (aerobic or anaerobic) produces soil amendments and conditioners that divert methane producing materials from organics and sequester carbon in the soil after use. This "double-win" makes composting a critical component of a circular economy initiative.

Implementation/Lead Dept.
WRRMA

Community Partners
WRRMA, RAA, Private haulers

Funding
Rates

Staffing
No New Township Staff

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Expand curbside/drop-off organic collection to the entire Township by 2030.
- Leverage existing yard waste collection programs for co-collection of residential food waste.

COMMUNITY INVESTMENT

2024 - 2030

342 MTCO2e WASTE INVENTORY

TOWNSHIP, WRRMA, RAA

INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

Reduce Vehicle Miles Traveled (VMTs)

Identify other areas for rezoning to prioritize transit-oriented development along major corridors to concentrate transportation into easily serviceable corridors.

Track and report the number of VMTs that are produced by road expansions and new residential development outside of the urbanized zone.

Track and report the number of VMTs by sector to better calculate the emissions and develop strategy to reduce residential, commercial, industrial, and agricultural emissions. Calculate the emissions and consider a carbon price be assigned to all road expansion, commercial and housing development projects. Encourage a culture of reducing vehicle trips to essential trips and provide more safe non-motorized transportation routes and choices.

Implementation/Lead Dept.
Township Board of Trustees, Planning Commission

Community Partners
Washtenaw Area Transportation Study (WATS), WCRC

Funding
WATS, WCRC, SEMCOG

Staffing

Planning Consultant; WATS, OSI or RRA for tracking and reporting VMTs

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Reduce total Township wide VMTs by 50% by 2035.
- Adopt form-based zoning in the water & sewer area of the Township to allow for higher density and mixed-use development
- Establish a database for VMTs and associated emissions and changes due to road expansions (and/or lane reductions) and new development by 2024.
- Use VMT calculations to consider carbon price as a part of all road projects and proposed developments.

COMMUNITY INVESTMENT

ONGOING

TRANSPORTATION INVENTORY

TOWNSHIP & COUNTY

INTERNAL POLICY

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

22

TOWNSHIP PRIORITY: LOW
TIMELINE: SHORT TERM

IMPACT: LOW
DIFFICULTY: UNDERWAY

Support and Grow the Washtenaw Regional Resource Management Authority (WRRMA)

Washtenaw County formed a resource management authority in 2019. While organization efforts have moved forward and include a significant majority of County-wide population and geography, this effort needs to accelerate and grow its capabilities as a key part of the Township sustainability effort. WRRMA can perform a key role in identifying contractors, assisting the coordination of programs, and facilitating agreements for single hauler services (garbage, recycling and organics), often achieving economies of scale.

Implementation/Lead Dept.
Township Supervisor

Community Partners
WRRMA

Funding
General Fund

Staffing
No New Township Staff

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Set and achieve a goal of 45% diversion of waste by 2030 and 60% by 2050
- Explore WRRMA support for single hauler contract to reduce truck traffic from multiple haulers for landfill and recycling services.
- Support local HHW events and drop off station to reduce hazardous materials entering the environment from extreme storms

EXISTING INVESTMENT

2024 - 2035

WASTE INVENTORY

TOWNSHIP AND WRRMA

INTERLOCAL AGREEMENT, CONTRACTS

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

100% Renewable Energy for Township Operations

Ann Arbor Charter Township will build efficiency and renewable energy investments into capital budgets and other facility planning with a goal of 100% of Township energy use from renewable sources by 2030. The Township will support The Township Carbon Neutrality goal by electrifying all new and existing buildings as well as build fleet electrification into the Township budget, capital planning, and asset management programs. Facilities staff will identify Township locations with grid and panel capacity for new charging and where panel upgrades may be necessary. Co-locating new EV charging with new renewable energy installations will be a priority.

Implementation/ Lead Dept.
Township Supervisor

Community Partners
DTE; Regional Resilience Authority

Funding
Federal Sources, State Energy Office, Capital Providers

Staffing
Department heads and Consultants

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Electrified buildings will improve indoor air quality for employees and customers
- Ann Arbor Township will recognize the co-benefits of fleet electrification including resilience, emission and particulate reductions, maintenance savings, and operator comfort.
- 100% of all new construction is all-electric, renewable energy-ready, energy storage-ready, and EV-ready starting with projects planned in 2024
- 100% renewable energy for all municipal operations by 2030
- Procure 100% Renewable Energy for all Electric Needs by 2030
- Electrify 100% of light-duty Township vehicles by 2030
- Convert all existing buildings to all-electric, renewable energy-ready, energy storage-ready, and EV-ready by 2030
- Maximize onsite solar development on Township properties
- Track and explore opportunities to cost-effectively replace heavy-duty vehicles with EVs by 2035

TOWNSHIP INVESTMENT

2024-2030

83 MTCO2e BUILDING ENERGY INVENTORY

TOWNSHIP

INTERNAL POLICY

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

HEALTH

24

TOWNSHIP PRIORITY: LOW
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Create Resilience Hub

Resilience hubs are multi-purpose community-serving facilities designed to support residents, distribute resources (food, information, heating, cooling), reduce carbon emissions, and to help coordinate emergency response. Resilience hubs can be staged in community centers, recreation centers, government buildings, or other trusted community spaces. These hubs provide access to electricity, heating and cooling; food, water, tools, and sometimes shelter; communications; logistical support for community partners; and access to basic health and medical supplies.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
County, Faith-based Organizations, Community-based Organizations, School Districts, Public-Private Partnerships, Labor

Funding
General Fund, Federal and State Funds

Staffing
Consultant, County Emergency Management

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Develop a resilience hub at Township Hall or with a partner organization (WCC, FGR School, University of Michigan) by end of 2024.
- Develop Resilience Hub implementation plan targeting vulnerable populations/neighborhoods by 2025.
- Evaluate potential sites for energy efficiency, renewable energy, backup storage, and internet and communications access by 2025.
- Expand network of resilience hubs in vulnerable communities to be within 2 miles of all households in urbanized areas and within 5 miles of rural areas by 2035.

TOWNSHIP INVESTMENT/ GRANT OPPORTUNITY

2024-2026

RESILIENCE/ ADAPTATION

COUNTY, COMMUNITY

INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

HEALTH

25

TOWNSHIP PRIORITY: LOW
TIMELINE: LONG TERM

IMPACT: MEDIUM
DIFFICULTY: MEDIUM

Maintain and Expand Township Tree Canopy

Tree canopy is an essential tool to reduce vulnerability to extreme heat, particularly in urban areas. The Township will need to understand the diversity of the existing tree canopy and ensure that new plantings increase the canopy species diversity.

With the increasing volume and intensity of storms, the Township should strategize on how to best maintain and expand the significant tree canopy that exists. The responsibility for this maintenance rests with residents, businesses and the Township.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
County Soil Conservation District, Michigan State University Extension, Private Foundations, Labor

Funding
General Fund, Foundations, Federal and State Grants

Staffing
Regional Resilience Authority/OSI

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Work with a forestry consultant to identify native and non-invasive species that will thrive in the current climate as well as in warming conditions by 2025.
- Create inventory of township tree canopies.
- Participate in county efforts to develop tree planting initiatives in public right of way.
- Develop public-facing materials detailing the importance of trees and tree canopy for residents and businesses by 2024.

COMMUNITY INVESTMENT

ONGOING

RESILIENCE/ ADAPTATION

TOWNSHIP

NONE

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

INFRASTRUCTURE

26

TOWNSHIP PRIORITY: LOW
TIMELINE: SHORT TERM

IMPACT: HIGH
DIFFICULTY: HARD

Stormwater Basin Inspection and Retrofit

The most effective storm resilience program would be accomplished by upgrading existing stormwater basins in combination with increasing the protection of natural areas and wetlands. There over 1,500 stormwater basins associated with developments Countywide and the Township has several public and private stormwater basins that are overseen by WCWRC. Many do not function as intended and a majority may be privately owned. The Township can assist the Water Resources Commissioner in collecting and sharing information. Moving forward, creating a database of these systems/drains and tracking maintenance and improvements is essential for ensuring stormwater infrastructure is prepared for large events. The Township should be an active partner to the WCWRC and should assist with local scale data collection.

Implementation/Lead Dept.
WCWRC

Community Partners
Township Board of Trustees, Institutional Landowners Neighborhood and Homeowners Associations

Funding
WCWRC

Staffing
WCWRC

Approval(s)
WCWRC

Goals and Evaluation Metrics:

- Work with WCWRC to develop a toolbox of preferred GSI, wetland restoration, tree plantings, and landscaping improvements and retrofits for private basin owners/operators so that the basins can more closely resemble the form and function of naturally occurring green infrastructure by 2024.
- Collaborate with WCWRC to prepare Countywide Basin Inventory and Assessment and Study by 2025.
- Pursue incentive/match funding to implement improvements to private basins by 2027.

EXISTING INVESTMENT

2024-2035

RESILIENCE/ ADAPTATION

WCWRC + TOWNSHIP

INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

CIRCULAR ECONOMY

27

TOWNSHIP PRIORITY: LOW
TIMELINE: LONG TERM

IMPACT: LOW
DIFFICULTY: MEDIUM

Materials Management Program

Manage material streams for their highest and best use to build an equitable, low-carbon, and resilient circular economy. The Township should explore single hauler economies of scale and seek to provide access to recycling to both residential and commercial properties and support regional drop-off centers for hard to recycle materials. Household Hazardous Waste (HHW) collection prevents releases to local creeksheds and groundwater during extreme storms. Climate Action 20 recommends that the Township should explore organics collection where possible to keep organics out of landfills and make clean and local compost and other soil amendments available for township farms.

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
Washtenaw Regional Resource Management Authority (WRRMA), Recycle Ann Arbor (RAA)

Funding
Rates

Staffing
No New Township Staff

Approval
Township Board of Trustees

Goals and Evaluation Metrics:

- Set and achieve a goal of 45% diversion of waste by 2030 and 60% by 2050
- Work with waste haulers to price single service with garbage, recycling, and organic collection.
- Explore contracting options at the Township and to meet diversion goals
- Provide access to recycling to both residential and commercial properties by 2025
- Work with Recycle Ann Arbor (RAA) and WRRMA to develop regional drop-off center(s) within the Township for hard to recycle materials by 2025.

COMMUNITY INVESTMENT

2024 - 2050

838 MTCO2e WASTE INVENTORY

TOWNSHIP, WRRMA

INTERLOCAL AGREEMENT, CONTRACTS

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

CIRCULAR ECONOMY

28

TOWNSHIP PRIORITY: LOW
TIMELINE: ONGOING

IMPACT: LOW
DIFFICULTY: MEDIUM

Incentivize Local Food Production

Expand both the number of farms/producers providing inventory and the overall market for locally-sourced food. This builds resilience into the Township's food systems and increases access to healthy foods for all residents.

Township Implementation/Lead Dept.
Ann Arbor Township Farmland and Open Space Preservation Board

Community Partners
Washtenaw County Farm Council, Farm Bureau, MSU Extension, Labor

Funding
TBD

Staffing
TBD

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Encourage expanded "Buy Local" initiatives to support local food producers.
- Strengthen link between farmers and food pantries to expand availability of food.
- Create local and County incentives for local farmers to produce food crops that remain in the County

EXISTING INVESTMENT

2023-2035

RESILIENCE/ ADAPTATION
Transportation
Inventory

COUNTY, COMMUNITY

INTERLOCAL AGREEMENT

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications

Township Fleet Electrification

Electrify the townships' fleet of light duty vehicles as vehicles are retired and replaced.

TOWNSHIP INVESTMENT

2024-2028

25 MTCO2e
TRANSPORTATION INVENTORY

TOWNSHIP & COUNTY

INTERNAL POLICY

Implementation/Lead Dept.
Township Board of Trustees

Community Partners
N/A

Funding
General Fund

Staffing

None required

Approval(s)
Township Board of Trustees

Goals and Evaluation Metrics:

- Reduce total Township wide VMTs by 50% by 2035.

RELEVANT PRINCIPLES

Racial Equity & Environmental Justice

Just Transition

Health

Resilient Economy

Community Partnership

Sustained Communications