Warrington Township Energy Transition & Efficiency Action Plan

Local actions to transition to clean energy, become more energy efficient and independent

Credits and Acknowledgments

Local Government Officials

- Fred Gaines, Chair Warrington Township Board Of Supervisors (BOS)
- Eileen Albillar, Vice Chair
- Ruth Schemm, Member
- Michael J. Diorka, Member
- Vanessa Maurer, Member

External Agencies and Partners

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- Kathryn Perrone, Student Intern Temple University
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1. Executive Summary

Our vision is to make Warrington Township a leader in using clean energy that comes from the sun, wind, or other innovative renewable technologies and to transform Warrington into a community where people walk, bike, take mass transit or carpool in a safe accessible and affordable transportation network.

The Mission is to transition to 100% clean and renewable energy in the electricity sector by 2035 and in all energy sectors, including heat and transportation by 2050. The Goals and Actions outlined for the Township when fully implemented will complement the State's Climate Action Plan. The Warrington Township Energy Transition and Efficiency Action Plan (The Plan) was developed to establish a pathway to achieve Warrington Township's Resolution 2021 R-39 titled "A Resolution Setting Forth the Goals of Warrington Township to Use 100% Clean Renewable Energy for All Purposes No Later Than 2050." Goals and actions in this plan create the roadmap to reduce air pollution by transitioning to clean energy and becoming more energy efficient. **The proposed actions in this plan are voluntary.** The Plan is specific to two areas of responsibility within the township:

Municipal Jurisdiction and **Community-wide Stewardship**

Warrington Township recognizes a growing need to address its own response to seasonal climate variations and catastrophic natural disasters which are becoming more intense and frequent; and that absent local GHG reductions will produce worsening conditions as well as adapt to the impacts that will occur and be exacerbated. The Plan includes an inventory of Warrington Township's Greenhouse Gas (GHG) emissions from municipal and community-wide activities, establishes emissions reduction targets and outlines feasible actions to achieve planned targets. In addition, The Plan identifies ways in which GHG reduction actions can further Warrington Township's ability to adapt to the impacts of hazardous weather. While this plan is not focused on adaptation, it ensures that GHG measures are not counteractive to Warrington Township's future resilience and will hopefully be a catalyst for developing a robust strategy towards that end. The Plan seeks to implement many of the recommendations outlined in the Commonwealth of Pennsylvania's 2021 Climate Action Plan.

In 2019 Warrington Township's-GHG emissions for municipal operations was approximately 1300 (metric tons of carbon dioxide equivalent) (MTCO2e) and left unchecked is projected to decrease to only 1100 MTCO2e by 2050. Warrington Township's 2019 GHG emissions on a community-wide basis is approximately 200,000 MTCO2e and left unchecked is projected to decrease to 175,000 MTCo2e by 2050. Both these drops in GHG emissions are primarily due to an increase in Corporate Average Fuel Economy (CAFE) standards. GHG emissions for Warrington Township on an overall Community-wide basis were obtained from a 2015 report published by the Delaware Valley Regional Planning Commission, updated with 2019 electric and natural gas usage from PECO Energy Company. GHG

emissions for the Municipal Jurisdictional energy use was obtained from a detailed review of 2021 energy invoices and a report prepared by Johnson Controls on street and parking lot lighting. These reports are listed in the reference section.

Goals and actions in this Plan are categorized separately between municipality and community further defined within the following Sectors:

Municipal Jurisdiction	**Community-wide Stewardship**
Buildings	Buildings
Energy Production	Transportation
Waste, Composting & Recycling	Open Space & Sequestration
Transportation	
Open Space & Sequestration	

Warrington's municipal jurisdictional operations emissions will be reduced from the current level of 1300 MTCO2e to zero in 2050 by achieving the goals through the implementation of the actions identified in The Plan. Warrington's Community-wide emissions will be reduced from the current level of 200,000 MTCO2e to 71,000 MTCO2e in 2050 by achieving the goals through the implementation of the actions identified in The Plan.

The Plan was developed by the Township's Technical Workgroup (TWG). The TWG was responsible for collecting information, receiving training, coordinating technical support from a Temple University Intern, the Pennsylvania Department of Environmental Protection (PADEP) and the International Council for Local Environmental Initiatives (ICLEI), along with conducting out-reach and drafting The Plan. The TWG was composed of the following Warrington Township agencies; Environmental Advisory Council, Planning Commission, Open Space and Land Preservation Committee, representatives from the Public and Township professional staff.

Beginning in August 2021 the TWG met weekly and presented updates to the Warrington Township Board of Supervisors and to all pertinent Township committees. Additional community engagement occurred throughout the process including posts to Facebook, articles published in the monthly township's electronic media newsletter, the E-Link and quarterly published and distributed newsletter, the *Link. The* TWG prepared and electronically circulated a questionnaire. The results of the survey are reflected in the goals and actions. The TWG estimates that the amount of time members spent developing the draft plan from mid-August 2021 thru mid-July 2022 exceeded 1000 hours of volunteer, staff and contractor support time and saved the Township in excess of $30,000. A considerable savings to the taxpayers.

2. Introduction

Climate change is the greatest environmental challenge of the 21st century, with overwhelming evidence in the past decade. It poses a serious threat not just to Warrington Township's natural resources, but also to our jobs and our health. Climate action also presents huge opportunities for creating a healthier, safer, and more equitable zero-carbon world. Warrington Township has an unparalleled opportunity to make changes in ways that create jobs and benefit all residents. Scientists expect that with the current trends in fossil fuel use, Americans may see more intense heat waves, droughts, rainstorms, floods, wildfires and landslides in the future. These impacts could drag down our economy, stress our natural resources and worsen inequities facing many Americans. Action is required at all levels, and local governments have a unique role to play in building low-carbon communities. In Pennsylvania, temperatures are expected to increase approximately 5.9°F by 2050 from the baseline period (1971-2000). Similarly, average annual precipitation in Pennsylvania has increased by 8 percent, particularly in winter and spring (PA DEP, 2021).

These impacts are caused by the accumulation of greenhouse gas (GHG) such as carbon dioxide (CO_2) and methane (CH_4) in the atmosphere, primarily resulting from burning fossil fuels and land use changes. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. Carbon emissions from human activities have continued to rise in recent decades, reaching the highest rates in human history between 2000 and 2010 (Intergovernmental Panel on Climate Change (IPCC), 2014). About half of all carbon dioxide emitted between 1750 and 2010 occurred in the last 40 years. The energy, industry and transportation sectors have dominated the rise in emissions. In Pennsylvania, the sectors responsible for the most GHG emissions are industrial at 32%, electricity production at 27%, and transportation at 24% (PA DEP, 2021). With the current trajectory of population growth, urbanization, and reliance on personal vehicles, emissions will only continue to rise. Given the critical impacts of climate change on humanity, the time to act to reduce GHG and our carbon footprint is now.

In addition to national and state efforts to make systemic changes that will reduce global emissions, local governments can play a powerful role in addressing climate change. The design of American communities—how we use our land, how we design our buildings, how we get around—greatly impacts the amount of energy we use and the volume of GHG emissions we produce. It is critical that communities like Warrington Township demonstrate that it is possible to dramatically reduce GHG emissions while creating more vibrant and prosperous places to live and do business.

Statewide Climate Action

In 2008, the Pennsylvania Climate Change Act was passed, and requires the Department of Environmental Protection (DEP) to (1) develop an inventory of GHG emissions and update it annually; (2) administer a Climate Change Advisory Committee; (3) set up a voluntary registry of GHG emissions; and (4) prepare a Climate Change Action Plan and Climate Impacts Assessment, both to be updated once every three years. The most recent Climate Impacts Assessment, Greenhouse Gas Inventory, and Climate Action Plan were released in 2021. These documents offer information and guidance for local climate action planning in the Commonwealth. The Climate Impacts Assessment provides a scientific basis for potential statewide impacts of global climate change, which can be used alongside available local data to inform community adaptation efforts. The Climate Action Plan summarizes statewide greenhouse gas emissions, sets an emissions reduction target, and describes potential mitigation and adaptation actions for residents and businesses, as well as local and state governments. The reduction targets are 26% by 2025 and 80% by 2050 from 2005 levels, consistent with Executive Order 2019-01 signed by Governor Wolf in 2019 (PA DEP, 2021).

This Action Plan outlines actions to achieve 100% reduction of municipal GHG emissions and over 50% of Community-wide GHG emissions but currently does not meet the reduction target outlined in the Commonwealth of Pennsylvania's 2021 Climate Action Plan. It is our intent to amend this plan as new technologies and or incentives become available so as to achieve the Statewide goals.

Local and Regional Climate Policy

DVRPC's long-range plan supports a goal to reduce regional greenhouse gas emissions by 60% by 2040, which will put our region on track to achieve the latest scientific recommendation of an 80% reduction in greenhouse gas emissions by 2050, a reduction necessary to keep the impacts of global climate change within an acceptable range**.**

Purpose and Scope of the Action Plan

Warrington Township is joining an increasing number of local governments committed to reducing GHG emissions at the local level.

Warrington Township recognizes the risk that climate change poses to its residents and businesses and is acting now to reduce the GHG emissions of both its government operations and the community at-large through the innovative programs laid out in The Plan. Furthermore, it is recognized that Warrington Township needs to address existing climate risks such as flooding and high winds/tornados and adapt its systems and infrastructure to new conditions. The Plan takes advantage of common-sense approaches and cutting-edge policies that our local government is uniquely positioned to implement – actions that can reduce energy use and waste, create local jobs, improve air quality, preserve our local landscape and history, reduce risk to people and property, and in many other ways benefit Warrington Township for years to come.

Purpose

By creating a clear course of action so that everyone has a role in creating and achieving our GHG reduction and sustainability goals, The Plan drives and coordinates local efforts toward a reduction in GHG emissions of 2019/2020 levels by 2035 and 2050.

The Plan is a framework for the development and implementation of actions that reduce Warrington Township's GHG emissions. The Plan provides guiding objectives and actions to realize Warrington Township's GHG reduction goal.

In addition to addressing mitigation concerns, The Plan considers the vulnerability of Warrington Township to hazards that are and will continue to be exacerbated by climate change. The Plan prioritizes GHG reduction measures that support climate adaptation and does not propose any actions that are maladaptive to foreseen climate impacts.

Scope

This Plan covers objectives and actions for reducing GHG emissions resulting from local government and community-wide activities within Warrington Township. It addresses the major sources of emissions in Warrington Township and sets forth objectives and actions in the following 7 sectors that both Warrington Township and community members can implement together to reduce greenhouse gas emissions:

Modify accordingly.

- Municipal Buildings
- Commercial Buildings
- Residential Buildings
- Energy Production
- Waste Management
- Transportation
- Other (Open Space and CO2 Sequestration)

The Plan creates a framework to document, coordinate, measure, and adapt efforts moving forward. In addition to listing actions, The Plan discusses how each action will be implemented via timelines, financing, and assignment of responsibilities to departments, staff, or community partners where known.

Planning Process

Framework

While Warrington has already begun to reduce greenhouse gas emissions and climate risk through a variety of actions, this plan is a critical component of a comprehensive approach to reduce Warrington's emissions and increase resilience. The two frameworks below, developed by ICLEI – Local Governments for Sustainability, USA (ICLEI), are known as the Five Milestones for Climate Mitigation and Adaptation.

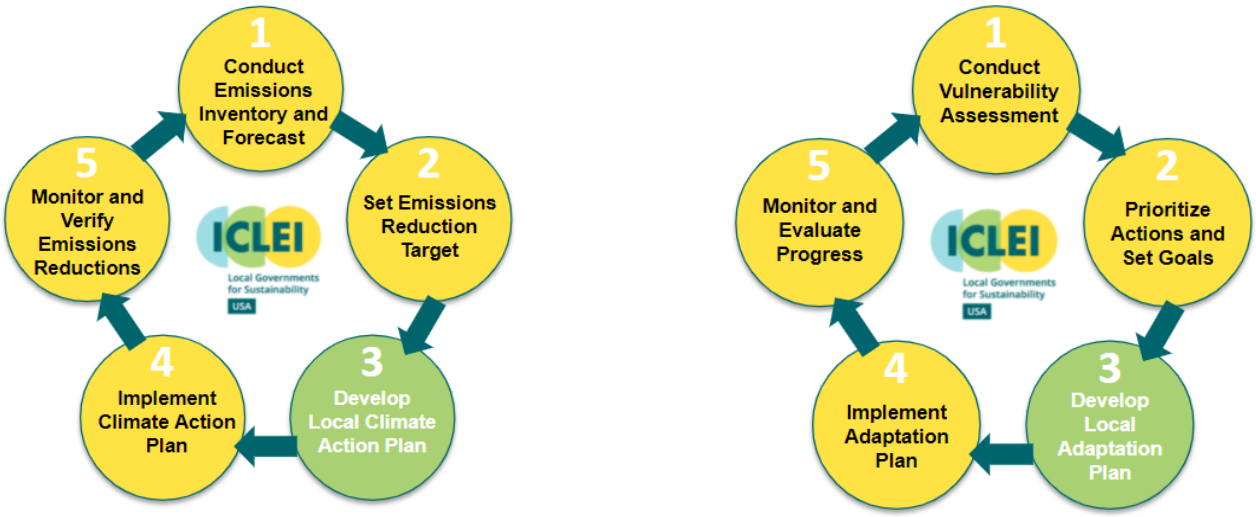


Figure 1

As indicated by the figures above, climate action planning is a continuing cycle and does not stop with the development of this document. However, The Plan represents Warrington Township's first planning cycle, including the completion of the first three milestones for mitigation and partial completion of the first milestone for adaptation:

Milestone 1: Chapter 4 summarizes the emissions inventory and forecast; Chapter 6 describes potential risks from climate change.

Milestone 2: Chapters 2 and 4 sets reduction targets.

Milestone 3: Chapters 5 outline objectives and actions for GHG reduction and adaptation.

Milestone 5: Chapter 7 describes the initial steps of milestones 4 and 5, monitoring and implementation.

Timeline

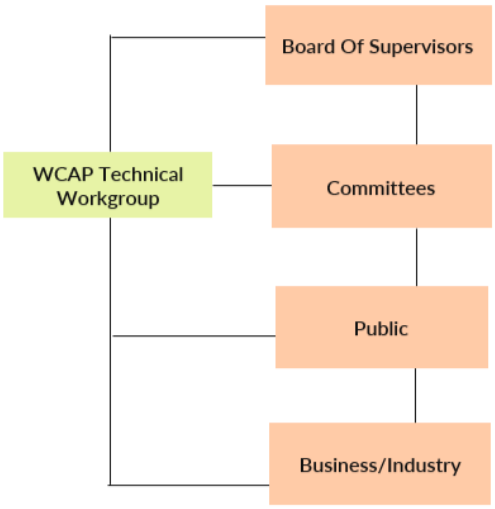
To develop this Plan, Warrington began with forming the TWG in August 2021. The workgroup met weekly to participate in planning sessions hosted by ICLEI, to gather data and discuss elements of the planning process. Members of the TWG provided regular updates to the Board of Supervisors, Planning Commission, Open Space and Land Preservation Committee and Environmental Advisory Council all of which are all public meetings. In addition, regular articles have been written in the Township's monthly E-link and Quarterly Link newsletters which are distributed to all households.

See Appendix to view documentation of task force and community engagement activities.

Planning Team and Stakeholders

The key to developing and successfully implementing The Plan is to obtain buy-in from all stakeholders. Buy-in is achieved when all stakeholders are given the opportunity to participate in the planning development process where the final plan reflects stakeholder input.

The following flow chart reflects the flow of information. Note that no arrows appear, information will flow in all directions and will be synthesized by the TWG for the final plan.



The WTG was responsible for collecting information, receiving training, coordinating technical support from the Temple University Intern, PADEP, and ICLEI, conducting out-reach and drafting the CAP.
The TWG is composed of the Environmental Advisory Council, Planning Commission, Open Space and Land Preservation Committee and Township professional staff.

The process included regular updates to the Board of Supervisors and to all pertinent Township committees. Community engagement occurred throughout the process (schema shown below), via in-person/virtual workshops, virtual meetings, and online surveys. Outreach occurred to the following groups:

Board of Supervisors, Bike and Hike Committee, Environmental Advisory Council, Historic Commission, Open Space and Land Preservation Committee, Park and Recreation Board, Planning Commission, General Public, Homeowner Associations, Business/Industry/Organizations, Rotary Club, Lions Club, and Natural Lands.

Social Equity

Climate equity was a core component of the planning process and will continue to be through implementation. Climate Equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. Implementation of this concept requires intentional policies and projects that simultaneously address the effects of and the systems that perpetuate both climate change and inequity. Under the status quo, however, not everyone is given the opportunity to participate and benefit.

Communities of color and low-income populations have historically been under-served by programs and investments and under-represented in decision-making, including for the development and implementation of climate policy. These exclusionary processes maintain or exacerbate disparities in public health; food, energy, and housing security; air and water quality; economic prosperity, and overall quality of life. These inequities primarily stem from ongoing institutional racial bias and historical discriminatory practices that have resulted in the inequitable distribution of resources and limited access to opportunities.

Climate change is likely to amplify the impacts of these existing inequities. Residents of frontline communities which often include lower income neighborhoods, communities of color, immigrants, unhoused, outdoor workers, the very young, and the elderly will disproportionately bear the burdens of climate change impacts. In addition, the many economic and health benefits of carbon reduction investments are not shared equitably across the jurisdiction, especially among people of color and low-income communities.

To ensure an equitable Plan, a number of resources and best practices were considered in the development of The Plan. These include the following:

- The Pennsylvania Department of Environmental Protection's Environmental Justice Viewer:
- The County Planning Commission
- Community-Driven Climate Resilience Planning: A Framework from the National Association of Climate Resilience Planners

Vision Statement and Objectives

The development of Warrington Township's Energy Transition and Efficiency Action Plan was based on these underlying themes:

- Transform Warrington into a community where people walk, bike, take mass transit, or carpool in a safe, accessible, and affordable transportation network.
- Make Warrington a leader in clean and local energy that comes from the sun, wind, or other innovative renewable technologies.
- Ensure the benefits of climate action are equitably distributed and empower historically underserved populations to participate in the process of transitioning to a carbon-free community.
- Aggressively transition toward a clean, carbon-free transportation system that improves health and livability for the Warrington community.
- Become a leader in sustainable, smart transportation through innovative partnerships, policies, programs, and technology.
- Understand potential climate-related risks and mitigate these risks while preparing our community for chronic and extreme weather events.
- The Plan offers a robust set of objectives and actions that will address the climate hazard vulnerabilities and aim for a 100% reduction in GHG emissions for all municipal operations and approximately a 50% reduction from all Community-wide emissions by 2050. Each action and objective were created and reviewed by a group of stakeholders who considered technology limitations, funding constraints, public support, feasibility of implementation, environmental justice considerations, and other barriers.

Warrington established the following targets to maintain a vibrant, healthy, and safe community for future generations, while improving the quality of life for those who live here today:

MUNICIPAL JURISDICTION - GOALS BY YEAR						
GOALS	2025	2030	2035	2040	2045	2050
1. Reduction in mowing and/or switch to carbon-free fuel	10%	15%	20%	25%	35%	50%
2. Reduce energy use in from township buildings	5%	10%	15%	20%	25%	30%
3. Switch to a carbon free municipal fleet	5%	20%	40%	60%	80%	100%
4. Develop a public education program to inform community about different ways they can take climate action	100%					
5. Develop strategy to implement expanded bikeway, trail, and pedestrian facilities	100%					
6. Township electricity comes from renewable energy	25%	50%	100%			
7. Township will encourage and/or incentivize Leadership in Energy & Environmental Design (LEED) certification or equivalent program for new buildings		100%				
8. Increase annual number of households reached by low/moderate-income weatherization programs	10%	20%	30%			
9. Township's existing buildings will complete energy-efficiency improvements						80%
10. Increase township tree canopy	200	400	800	1000	1200	1400
11. Waste elimination and curtailment at a rate of 10 tons per year or 280 tons total by 2050	10%	20%	25%	30%	35%	40%
12. Increase the amount of Recycling and Composting	10%	20%	25%	30%	35%	40%

COMMUNITY-WIDE - GOALS BY YEAR						
GOALS	2025	2030	2035	2040	2045	2050
A. Reduction in mowing and/or switch to carbon-free fuel		10%	15%	20%		25%
B. Township commuters will carpool, bike or walk to work, or use public transit		10%	10%	15%		20%
C. Township commuters will telecommute		15%	15%	20%		20%
D. Light-duty vehicles will use carbon-free fuels		15%	25%	50%		90%
E. Increase annual number of households, including low/mod income, participating in weatherization programs		30%				
F. Commercial & Residential Bldgs. use carbon-free electric energy (at least half of this is solar)			10%	15%		50%
G. Heating derived from fossil-fuels (oil, nat. gas and propane) switched to a low carbon fuel source &/or electric			10%	25%		50%
H. Reduction of vehicle miles traveled in the township			5%	15%		30%
I. Township households and businesses will participate in smart grid meter programs and practices				25%		70%
J. Township's tenants will participate in a green lease program						50%
K. Public transportation will be carbon-free						100%
L. Increase township tree canopy	200	400	800	1000	1200	1400
M. Existing buildings will complete energy-efficiency improvements		10%	20%	30%	40%	50%

3. Co-Benefits of Climate Action

Climate change mitigation activities, particularly those related to transportation, help to clean the air by reducing vehicle emissions, thereby improving public health. Mitigation activities help to engender a greater degree of choice for Warrington Township residents. More transit options combined with transit-oriented development practices make for a more vibrant, livable community with shorter commute times and more opportunities for active transport. This creates more connected and resilient neighborhoods.

Saving Money and Reducing Risk

In addition to addressing climate change, measures taken to reduce GHG emissions have other important benefits. The most obvious of these is the potential for significant cost savings. Many of the measures in The Plan pay for themselves quickly by reducing direct costs, such as fuel or energy used, and also indirect costs such as maintenance. For instance, a "right-sized" vehicle fleet is less expensive to purchase and fuel, while also being less costly to maintain. Encouraging energy efficiency, public transit use, building improvements, and other measures will also result in lower energy and water bills for residents and employers, as well.

In January 2018 Warrington Township's installation of Street lighting and Municipal Parking Lot lighting was certified as complete with the replacement of a total of 1,477 street lighting fixtures. The Municipal Building Parking and King Field Parking benefitted from 45 exterior lighting upgrades. Over the three-year evaluation period, a total of $219,493 in cost avoidance have been realized; this includes the one-time benefit of $71,333 from Act 129 rebates from PECO. Annually this savings amounts to over $22,600 because of a reduction in energy use of over 536,000 Kwh of energy use.

In May 2022, The TWG presented a proposal to the Board of Supervisors to have solar energy installed that would supply 100% of Township's municipal energy needs. Several purchase options were proposed. If the Township issued a municipal bond, the system would break-even in approximately 15 years and approximately a $1.4 million savings over 30 years.

Acting now will also save on runaway costs on climate change, especially in the longer term. These costs range from infrastructure damage in extreme storms and agricultural pest control to industry losses, particularly for industries that depend on environmental conditions.

Enhancing Resource Security

A key strategic side benefit of climate change mitigation activities is enhanced energy security through reduction in total demand. This will put less strain on the energy system, as a whole, as we transition to clean renewable energy. Similarly, demand shifts can help with improving water and food security as well.

Many of the actions identified here to mitigate GHG emissions will also help Warrington Township's government, businesses, and residents to adapt to a changing climate. For example, extreme and prolonged heat waves can put considerable strain on the reliability of energy delivery in peak periods,

possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across the Warrington Township, such service disruptions are less likely, and the Warrington Township will be able to better cope with those situations. Similarly, climate actions can secure food and water sources and prevent damage and service disruptions to these systems from flooding and tornados.

Creating Jobs

Renewable energy is a growing sector. The U.S. Department of Energy reports that sustainable tourism, green construction, and urban agriculture can provide job opportunities that didn't exist in the past. These climate protection measures can spur business and job growth during the design, manufacture, and installation of energy efficient technologies, which presents a particular opportunity to reinvest in the local economy and generate green jobs within Warrington Township.

Fostering Social Equity

Social equity and justice are major concerns for addressing climate change, and thus were established as core values behind this plan. Equity is when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential. Environmental justice ensures fair treatment and meaningful involvement in the development of laws, policies and regulations and the identification of issues impacting vulnerable communities. As discussed in Chapter 1, Warrington Township's planning process was intended to generate solutions that will both address climate change and ensure a better quality of life for communities of color and low-income communities.

4. Warrington Township GHG Emissions

Since the early 1990s, U.S. cities have developed community-wide and local government operations and GHG inventories based on accounting protocols created by ICLEI. Known as the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and the Local Government Operations Protocol, these standards created a credible and defensible methodology which accelerated the number of inventories created and provides consistency within and across U.S. communities. In 2014, ICLEI partnered with the World Resources Institute and C40 Climate Leadership Group to create the Global Protocol for Community Scale GHG Emissions, which allows communities around the world to compare their emissions footprint.

Warrington Township used the ICLEI Local Governments for Sustainability USA Clear Path Community-Scale Track for the inventory.

Through the completion of a local emissions study, or "greenhouse gas inventory," Warrington Township has determined emissions levels for the community, as a whole. Community-wide emissions represent the sum total of emissions produced within Warrington Township limits as well as emissions resulting from electricity use within the jurisdiction, even if said electricity is generated elsewhere. In this way, the community-wide figures represent all emissions for which the community is responsible.

Warrington Township Community-Wide GHG Emissions

The following figure breaks down community-wide GHG emissions in Warrington. Note that emissions from Warrington Township's operations are included within the community-wide totals. For example, emissions from government buildings are included in the "Commercial" sector and emissions from Warrington Township fleet vehicles are included in the "Transportation" figure above. Government operations are therefore a subset of total community emissions. However, a separate figure has been developed for municipal jurisdictional energy use.

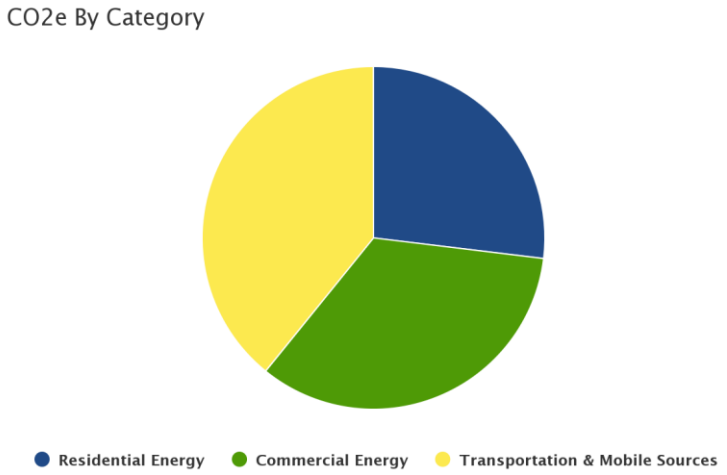


Figure 2: Warrington Township Community-Wide GHG Emissions

An inventory of emissions associated with the Township's government operations was also completed. Government emissions include all sources for which the local government exercises direct operational control including public facilities, streetlights, traffic signals, and emergency and non-emergency vehicles, to name a few. Steps to reduce emissions produced by the Township have been underway for several years, including a transition to LED lighting, the adoption of hybrid and electric fleet vehicles, and the utilization of solar energy.

These charts are expressing values in Metric tons of carbon dioxide equivalent (MTCO2e). MTCo2e is a metric measure used to compare the emissions from different greenhouse gasses based upon their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by its associated GWP. Total emissions are expressed as MTCO2 that is calculated by adding the metric tons of carbon dioxide emissions with the metric ton carbon dioxide equivalents for methane and nitrous oxide. Total Emissions (MTCO2) = Emissions MTCO2+ CH4 Emissions (MTCO2e) + N2O Emissions (MTCO2e).

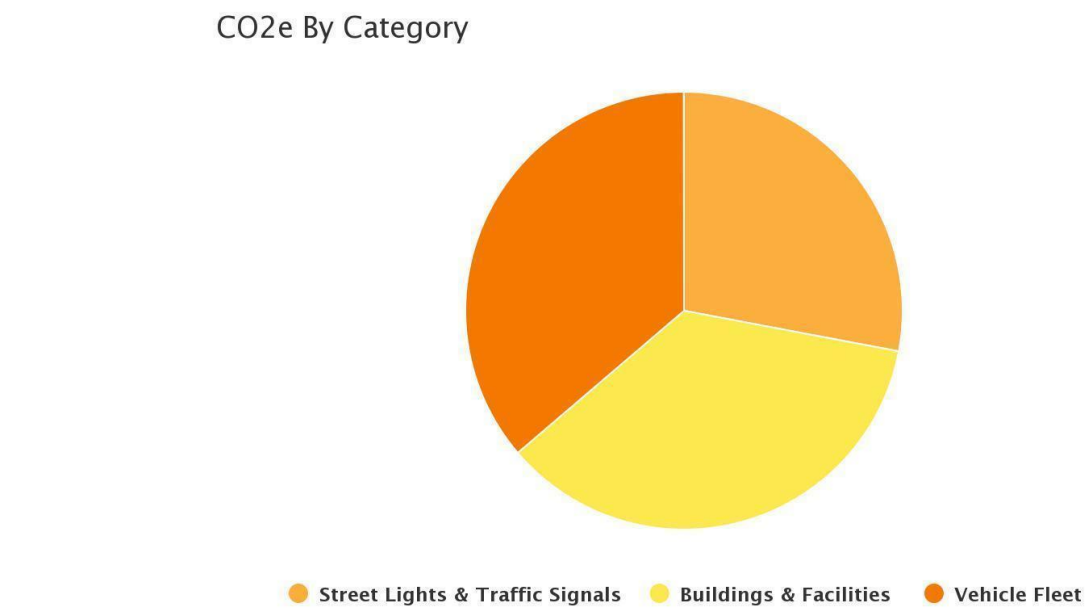


Figure 3: Warrington Township Municipal GHG Emissions

Forecasting Warrington Township's GHG Emissions

Warrington Township has also completed an emissions forecast based on projections of current data and expected future trends. This emissions forecast is the "Original" forecast (also known as a "Business as Usual" forecast), a scenario estimating future emissions levels if no further local action (i.e., projects within The Plan) were to take place.

Projected Growth in GHG Emissions

Figures 4 and 5 show the projected growth in GHG emissions in Warrington from 2019 to 2050. For complete information regarding the emissions inventory and forecast, including methodology and supporting data, please reference Appendix I. Warrington Township's 2019 GHG emissions for municipal jurisdictional operations is approximately 1300 MTCO2e (metric tons of carbon dioxide equivalent) and left unchecked is projected to decrease to 1100 MTCO2e by 2050. This drop in GHG emissions is primarily due to an increase in Corporate Average Fuel Economy (CAFE) standards. Warrington Township's 2019 GHG emissions on a community-wide basis is approximately 200,000 MTCO2e and left unchecked is projected to decrease to 175,000 MTCo2e by 2050. This drop in GHG emissions is primarily due to an increase in Corporate Average Fuel Economy (CAFE) standards.

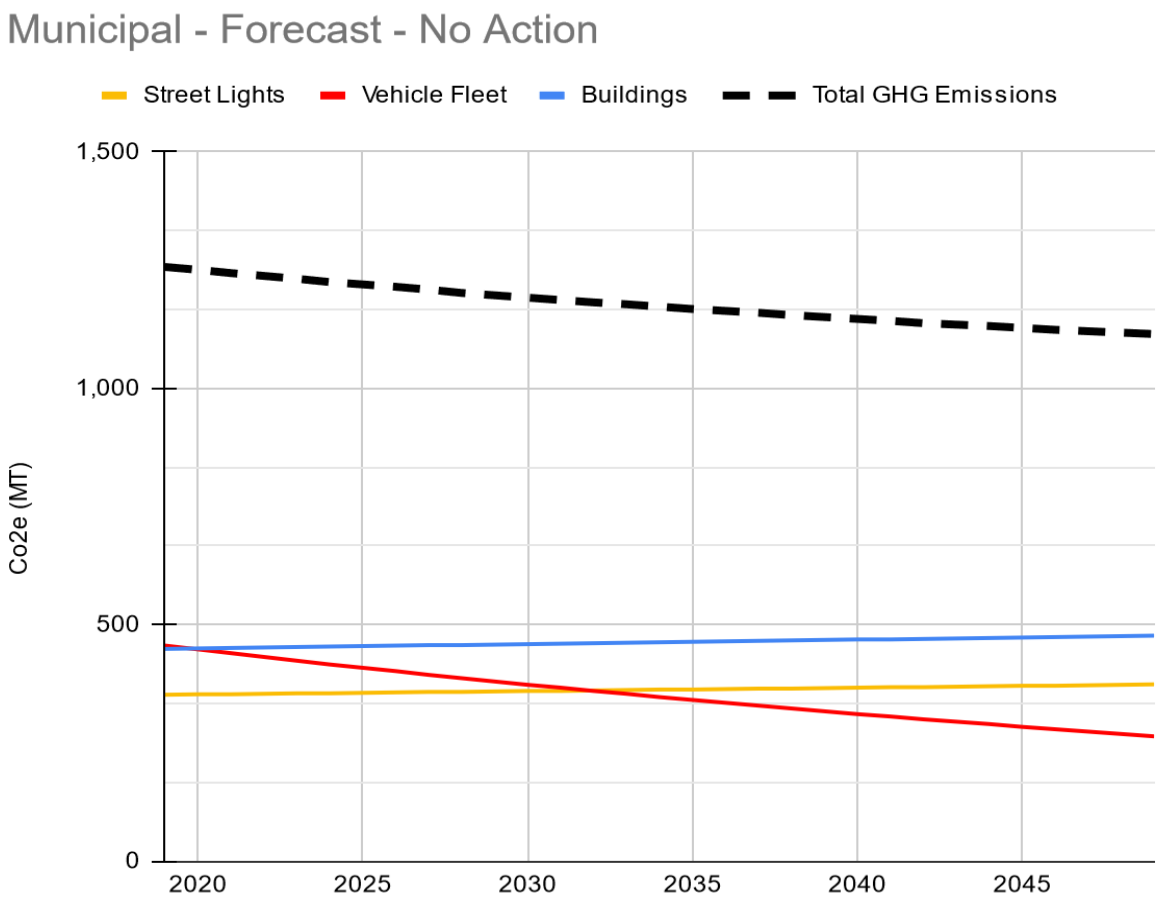


Figure 4: Municipal Jurisdiction Projected Growth in GHG Emissions from 2019 to 2050

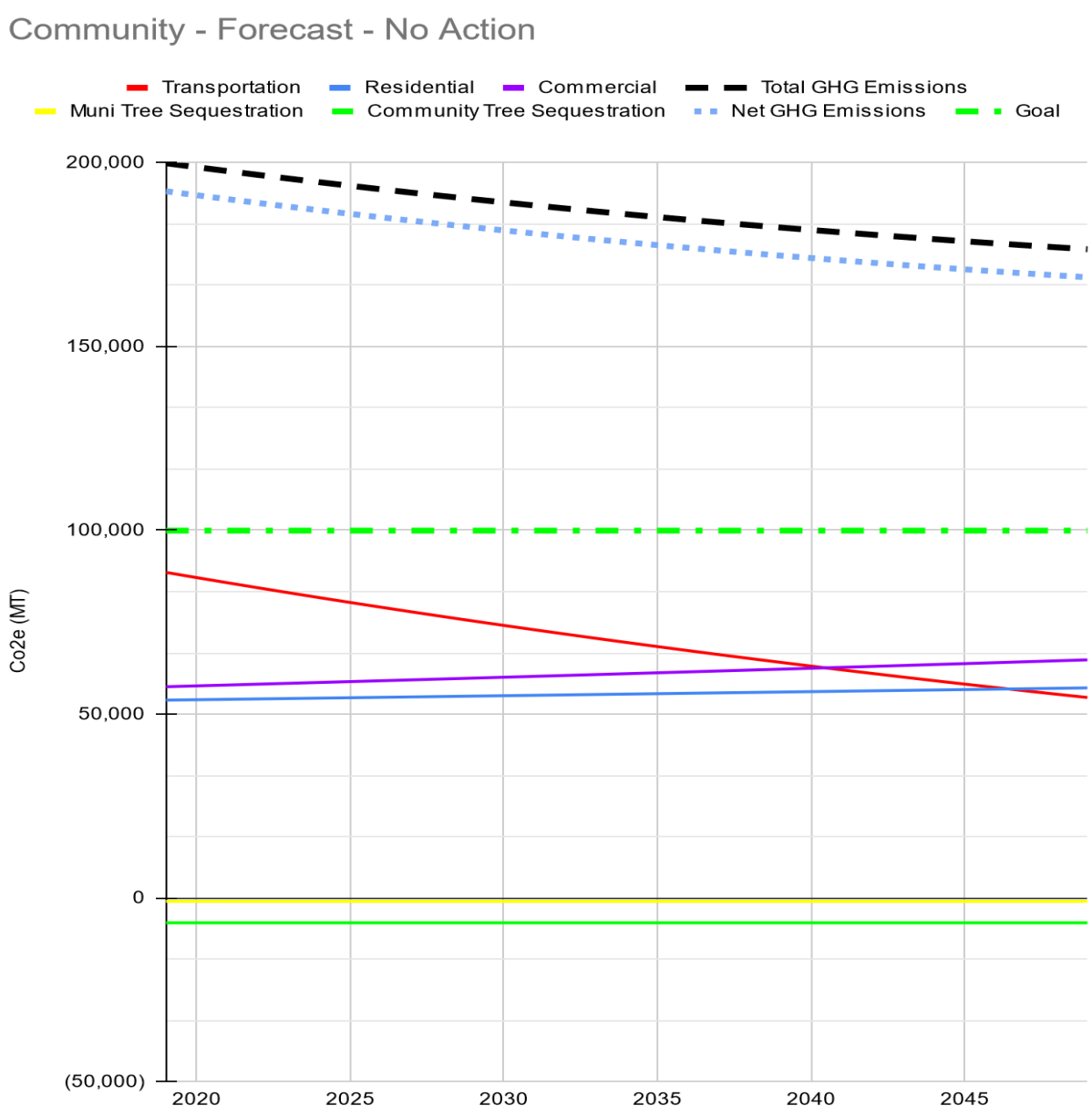


Figure 5: Community-Wide Projected Growth in GHG Emissions from 2019 to 2050

Warrington Township's GHG Reduction Targets

Warrington Township has established two GHG reduction targets, one for municipal operations and one for the community. The municipal operations goal is to transition to 100% clean and renewable energy, and set goals to complete this transition in the electricity sector by 2035 and in all energy sectors, including heat and transportation, by 2050. The community-wide goal is similar to the Pennsylvania Climate Action Plan of being 80 percent lower by 2050, but has a less aggressive target of 50 percent lower by 2050.

Figures 6 and 7 compare the reduction targets with the business-as-usual forecast. The combination of measures that Warrington has already implemented, are currently planned, and are presented through The Plan are designed to achieve the 2035 and 2050 targets. Reductions in 2035 and 2050 rely on the best information currently available pertaining to population forecasts, future changes to building codes, and vehicle fuel efficiency standards among other information.

Warrington's municipal jurisdictional operations emissions will be reduced from the current level of 1300 MTCO2e (metric tons of carbon dioxide equivalent) to zero in 2050 by achieving the goals through the implementation of the actions identified in The Plan.

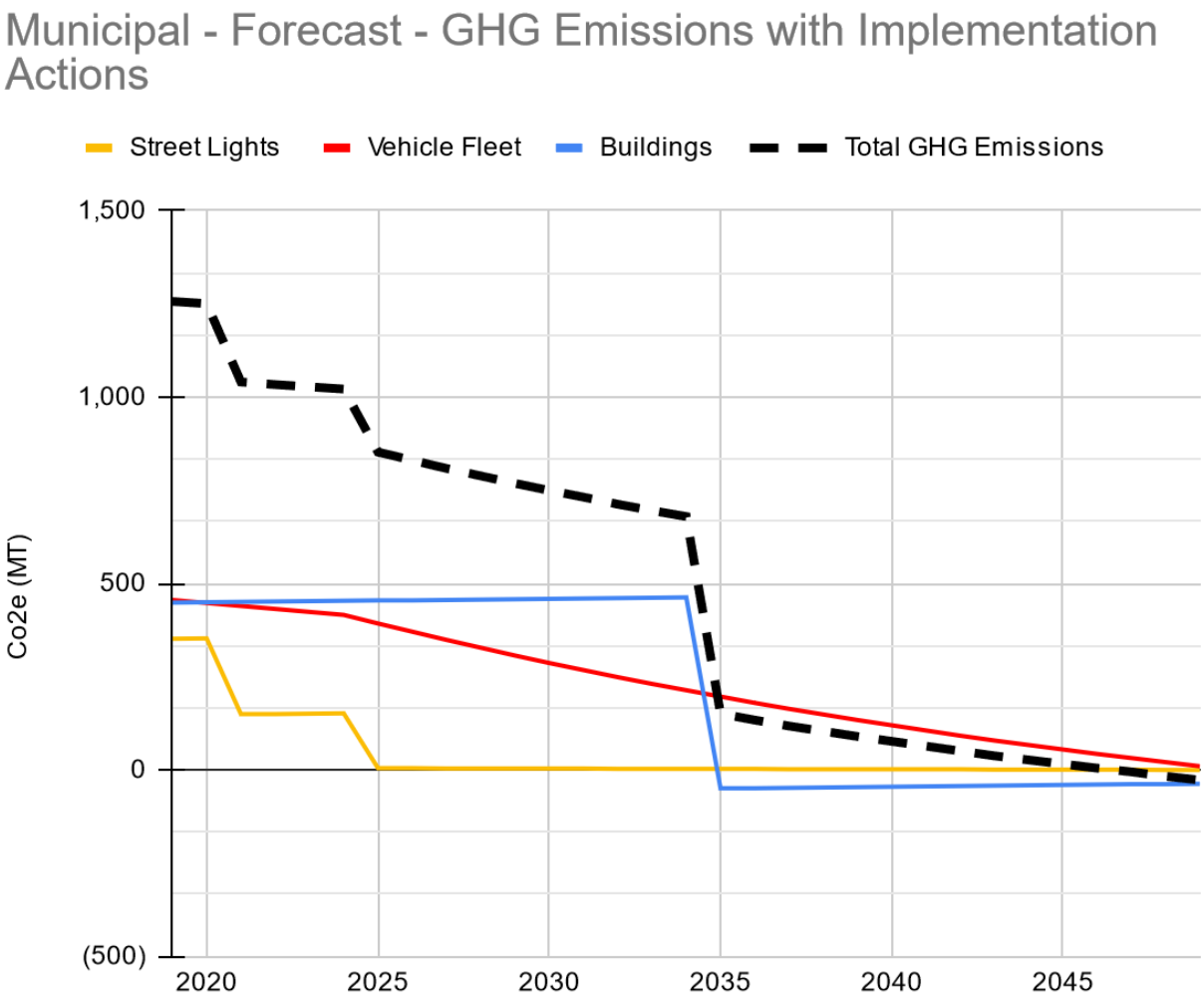


Figure 6: Municipal GHG Reduction Targets

Warrington's Community-wide emissions will be reduced from the current level of 200,000 MTCO2e (metric tons of carbon dioxide equivalent) to 71,000 in 2050 by achieving the goals through the implementation of the actions identified in The Plan.

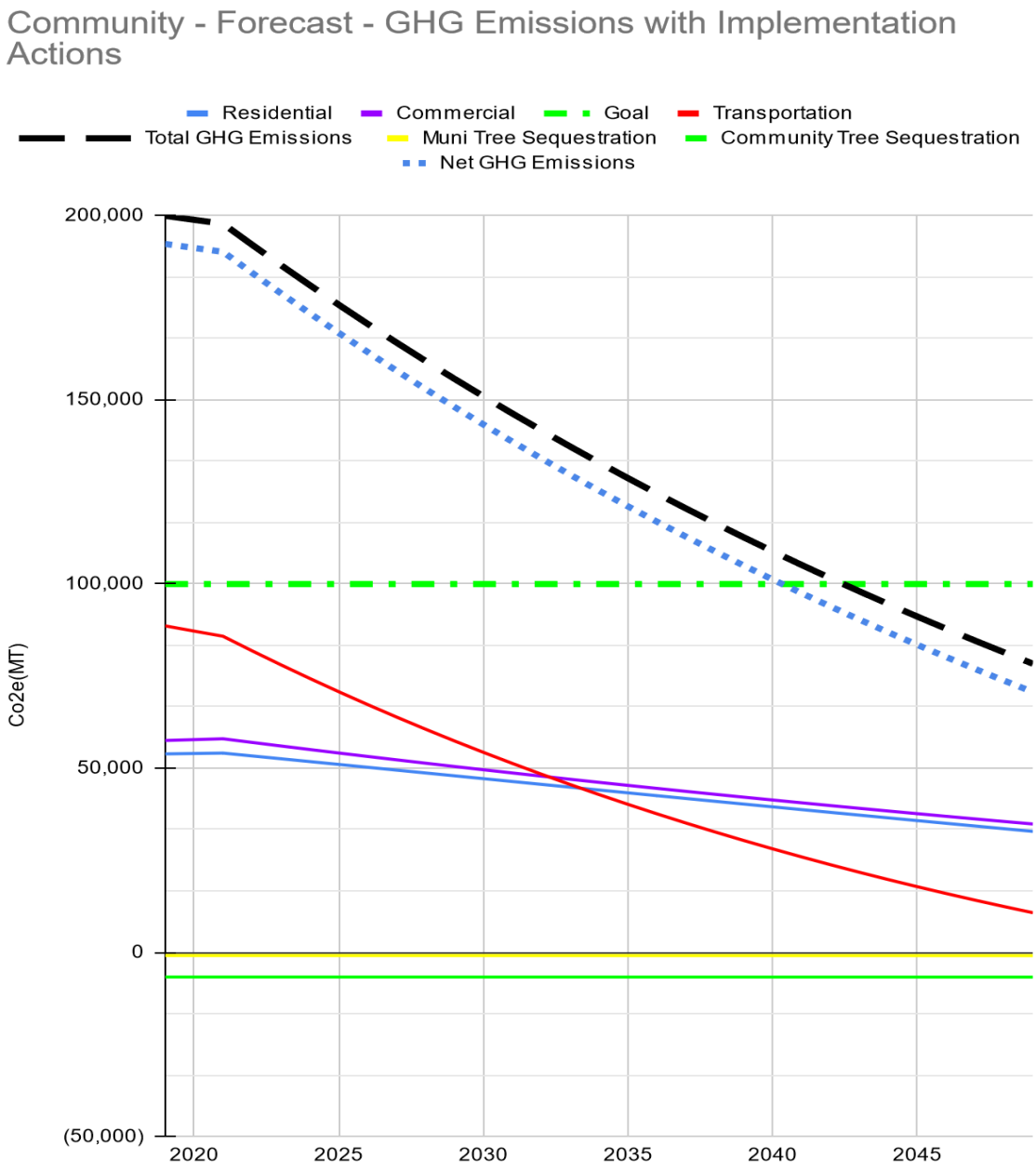


Figure 7. Community-wide GHG Reduction Targets

5. Taking Action

Our Energy Transition and Efficiency Action Plan

While local government cannot address air pollution by itself, government policies and practices can dramatically reduce GHG emissions from a range of sources and help prepare Warrington Township for the anticipated impacts of climate change. In addition, Warrington Township will assist residents and businesses in their endeavors to reduce emissions through programs explained in The Plan. By working together, Warrington Township can not only do its part toward achieving a stable climate - but we can also reap the benefits of healthier air, lower costs for utilities and services, improved transportation and accessibility, a more vibrant local economy, and many other positive side effects of reducing our carbon footprint.

In this chapter, a series of objectives with supporting actions are explored for each emissions sector. An "Objective" is a goal, end result, or target, and an "Action" is a means of realizing the objective. Each sector draws on the actions of the local government, residents, and businesses, although some areas may be largely one or the other.

MUNICIPAL JURISDICTION GOALS & ACTIONS

NOTE: Those actions that are in red colored text indicate those actions that require legislative, enforcement or administrative actions by the Township.

Sector:	Municipal Buildings
Goals:	Actions:
Reduction in mowing and/or switch to carbon-free fuels	1. Upgrade mowing equipment to carbon-free fuel (Incorporate into Contract).
	2. Create a plan with incentives and/or ordinance to convert 10% of existing township grass areas to meadows.
	3. Review other township contracts that may also impact GHG emissions.
Reduce energy use/GHG in/from Township buildings	1. Change from builder's grade to a better grade of insulation in the building codes.
	2. All materials should be recyclable, where possible.
	3. Use Energy Star/LEED systems.
	4. Pass an alternative energy ordinance, as needed, to accomplish the goals of the 2021 BOS Resolution.
Towwnship will incentivize Leadership in Energy & Environmental Design (LEED) certification or equivalent program for new buildings	1. Engage with commercial sector to ensure business owners are aware of energy savings programs.
	2. Recognize businesses excelling in emissions mitigation.
	3. Revise permit fee schedule to provide lower fees for sustainable projects.
Township existing buildings complete energy efficiency improvements	1. When making upgrades in existing buildings, seek to use energy saving materials.
	2. Encourage builders of new homes/businesses to use energy efficient windows/insulation/weatherization.

Sector:	Commercial & Industrial Buildings
Goals:	Actions:
Reduction in mowing and/or switch to carbon-free fuels	1. Modify lawn height ordinance to allow for the establishment of meadows that are properly maintained.

Develop a public education program to inform community about different ways they can take climate action	1. Develop and distribute educational materials on the benefits of reduced mowing and carbon free mowing.
	2. Develop and distribute educational materials on the benefits of integrating meadows.
	3. Communicate to businesses the benefits of turning off (or sleep mode) all computer equipment when closed.
	4. Develop leaflet for tenants on green lease options.
Township will incentivize Leadership in Energy & Environmental Design (LEED) certification or equivalent program for new buildings	1. Adopt ordinance to mandate building ready wiring for future solar and EV adoption.
	2. Upgrade ordinances, building codes and permitting to conform to new commercially available practices and technologies.
	3. Change from builder's grade to a better grade of insulation in the building codes.
	4. Encourage use of as much energy savings materials and weatherization practices as available.
	5. Encourage and/or incentivize solar and any technologies that are carbon-free or reduce GHG.

Sector:	**Residential Buildings**
Goals:	**Actions:**
Reduction in mowing and/or switch to carbon-free fuels	1. Modify lawn height ordinance to allow for the establishment of meadows that are properly maintained.
Develop a public education program to inform community about different ways they can take climate action	1. Develop a communication strategy and routinely communicate materials/information.
	2. Develop an ongoing series of workshops to educate the community about increasing energy efficiency in their homes.
	3. Develop and distribute educational materials on the benefits switching to clean energy.

Township will incentivize Leadership in Energy & Environmental Design (LEED) certification or equivalent program for new buildings	1. Establish a residential Property Assessed Clean Energy (PACE) program.
	2. Encourage replacement of insulation using sustainable effective options.
	3. Upgrade ordinances, building codes and permitting to conform to new commercially available practices and technologies.
	4. Encourage use of as much energy savings materials and weatherization practices as available.
	5. Encourage and/or incentivize solar and any technologies that are carbon-free or reduce GHG.
Increase annual number of households reached by low/moderate-income weatherization programs	1. Encourage builders of new homes and businesses to use energy efficient windows and/or insulation/weatherization.
	2. Incentivize existing home or building owners to use energy efficient window and/or insulation/weatherization.

Sector:	**Energy Production**
Goals:	**Actions:**
Township electricity comes from renewable energy	1. Prepare report on solar energy purchase options and present to the BOS.
	2. Work with Township energy consultant and prepare a report on switching electric supplier to clean energy and present to the BOS.

Sector:	**Waste, Composting & Recycling**
Goals:	**Actions:**
Waste elimination and curtailment at a rate of 10 tons per year or 280 tons total by 2050	1. Incorporate eco-centric program offerings with Parks & Rec that dissuade wasteful behavior. Consider using recyclable materials e.g., Eco-friendly when building recreational structures (facilities).
	2. Identify a building materials reuse warehouse, including community household goods, or any serviceable items, for community construction

	and demolition use that supports transition to sustainable programs.
	3. Evaluate and work with waste management contractors to implement changes to limit the amount of trash throughout township.
Increase the amount of Recycling and Composting	1. Publicize and promote neighbor to neighbor reuse and repurpose through free online yard sale sites.
	2. Partner with local grocers and retail businesses to eliminate or reduce the use of single use plastics and Styrofoam.
	3. Distribute more recycle and regular trash cans in recreational areas, parks and trails and other areas of high use.
	4. Explore the possibility of creating a composting program to divert organic materials from solid waste stream.
	5. Implement changes in Township's recycling management program so as to increase the amount of recycling by doing things such as expanding recycling opportunities at multifamily residential developments.
	6. Review contract for recycling in township parks.

Sector:	**Transportation**
Goals:	**Actions:**
Switch to a carbon free municipal fleet	1. Establish process & timeline replacing fleet with electric (or other carbon free fuels).
	2. Publish plan and begin purchasing by end of 2025.
	3. Replace 15 to 20% of fleet every 5 years until 100% is achieved.
Develop a public education program to inform community (Note-The point of this is to generate interest in the community about purchasing low carbon vehicles themselves)	1. Publish articles in Link and E-Link after the first municipal vehicles are delivered.
	2. Informational sessions or showcasing EV's at events to make people aware of green vehicle choices, charging or alternative fueling options etc.

	3. Have a booth at Warrington Day to share information / make the community aware.
Develop a strategy to implement expanded bikeway, trail, and pedestrian facilities.	1. Complete the Township-wide plan being developed to expand bikeway, trail, and pedestrian facilities.
	2. Endeavor to obtain grants to help with funding.
	3. Advertise the purpose of these methods of alternative transportation and recreation extensively in the community.
	4. Encourage community employers to encourage bicycle commuting by providing racks under a shelter covering for safe storage of bicycles and shower facilities.
	5. Miles of bike lane per resident to be equitable community-wide.

Sector:	**Open Space and Sequestration**
Goals:	**Actions:**
Reduction in mowing and/or switch to carbon-free fuels	1. Meet with Bucks County Parks Department and develop a mowing plan to reduce the frequency of mowing on County property adjacent to Bradford Dam.
	2. Meet with Township Parks and Recreation Department and develop a mowing plan to reduce the frequency of mowing on Township property.
Increase Township tree canopy	1. Update Township Development Ordinance to require additional tree replacements or contribution to the tree fund when trees are removed.
	2. Plant 200 trees in each 5-year interval.

COMMUNITY-WIDE GOALS & ACTIONS

Sector:	Commercial & Industrial Buildings
Goals:	Actions:
Reduction in mowing and/or switch to carbon-free fuels	1. Utilize township educational materials to reduce mowing and/or increase carbon free mowing.
	2. Utilize educational materials to integrate meadows into landscaping.
Commercial buildings use carbon-free electric energy (at least half of this is solar)	1. Utilize solar and any new technologies that are carbon-free or reduce GHG.
	2. For buildings only with more than 50 parking spaces adhere to the ordinance that requires EV charging stations for 5% of the number of parking spaces.
	3. Make use of energy efficient appliances/HVAC, upgraded/smart thermostats for heating and cooling.
Heating derived from fossil-fuels (oil, nat. gas and propane) switched to a low carbon fuel source &/or electric	1. Adherence to any ordinance mandating Energy Star/Leeds compliance and voluntary participation based on educational materials shared by township.
	2. Participate in any weatherization programs made available by the township, utilities, or other entities.
	3. Utilize solar power where possible based on township or other educational material.
Township buildings participate in smart grid meter programs and practices	1. Businesses turn off (or sleep mode) all computer equipment when closed.
	2. Employers should continue hybrid "Work at Home" rotations where possible.
	3. Switch to time-of-day pricing based on educational materials distributed on the benefits of doing so.
Township tenants participate in green lease program	1. During annual rental inspection consider green lease options presented by township inspector.

Existing buildings will complete energy-efficiency improvements	1. Building owners to make upgrades to incorporate Energy Star and similar programs presented by Township's educational materials.
	2. Perform energy audits through PECO or others to encourage energy efficiency improvements.

Sector:	**Residential Buildings**
Goals:	**Actions:**
Reduction in mowing and/or switch to carbon-free fuels	1. Utilize township educational materials to reduce mowing and/or increase carbon free mowing.
	2. Utilize educational materials to integrate natural landscaping and meadows into landscaping.
Increase annual number of households, including low/moderate income, participating in weatherization programs	1. Homeowners have energy audits conducted, facilitated by township education or other sources of information.
	2. Homeowners seek out energy programs from their electrical providers, facilitated by Township education or other sources of information.
	3. Change from builder's grade to a more efficient grade of insulation.
Residential (including apartment buildings) use carbon-free electric energy (at least half of this is solar)	1. Utilize solar and any new technologies that are carbon-free or reduce GHG.
	2. For buildings only with more than 50 parking spaces adhere to ordinance that requires EV charging stations for 5% of the number of parking spaces.
	3. Make use of energy efficient appliances/HVAC, upgraded/smart thermostats for heating and cooling.
Heating (including in apartment buildings) derived from fossil-fuels (oil, nat. gas and propane) switched to a low carbon fuel source &/or electric	1. Based on educational materials on the benefits of switching to clean energy, building owners make this switch.

Township residential buildings (including apartments) participate in smart grid meter programs and practices	1. Homeowners participate in smart grid meter programs based on information provided via zoom or workshop media.
	2. Switch to time-of-day pricing based on educational materials distributed on the benefits of doing so
Township tenants participate in green lease program	1. During annual rental inspection consider green lease options presented by township inspector.

Sector:	**Transportation**
Goals:	**Actions:**
Township commuters carpool, bike, walk to work, or use public transit	1. Utilize bike and walking trails that have been created to enable this.
	2. Local employers incentivize carpooling, via mechanisms such as tax credits at the local and state level.
	3. Community employers encourage bicycle commuting by providing racks under a shelter covering for safe storage of bicycles and shower facilities.
Township commuters will telecommute	1. Local employers offer hybrid and remote working arrangements based on educational material provided including studies on employer benefits of doing so.
Light-duty vehicles will use carbon-free fuels	1. These will be purchased as prices come down and people are influenced by educational material.
	2. Successful implementation of the Township's fleet will be a visible example of what is possible for the public.
Reduction of vehicle miles traveled in Township	1. This is a natural by-product of increased biking and walking, carpooling and use of public transportation.
Public transportation will be carbon-free	1. Making this transition will be driven primarily at the state and county levels, so provide them with usage data and other support to enable these changes.

Sector:	Open Space and Sequestration
Goals:	Actions:
Reduction in mowing and/or switch to carbon-free fuels	1. Utilize township educational materials to reduce mowing and/or increase carbon free mowing.
	2. Utilize educational materials to integrate meadows into landscaping.
Increase Township tree canopy	1. Net increase of 200 trees planted in each 5-year interval

Emissions Reduction Potential

Calculating expected emissions reductions for each objective and action requires making assumptions about the degree of implementation, technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or action. To address this uncertainty and provide a simple but useful reference for reduction potential, a series of symbols and percentage ranges has been devised to represent the emission reductions associated with each objective and its actions:

Specific implementation assumptions and GHG reduction estimates are listed in the Appendix.

Evaluating Co-Benefits

In addition to measuring the GHG reduction potential, each objective and action is also evaluated for other benefits such as public health, equity and justice, jobs and prosperity, and environmental conservation. Supporting Actions

Certain actions might be supportive of more than one objective within the same or another sector. These cross-cutting actions will be indicated in the “Supporting Actions” column for each objective.

Consistency with Statewide Climate Action Plan

The Commonwealth of Pennsylvania’s 2021 Climate Action Plan includes many actions that are meant to be implemented by local governments as well as on the state-level. This Action Plan incorporates as many of those actions as possible and appropriate. Climate Adaptation

Some of the proposed actions reduce risk to climate hazards as well as greenhouse gas emissions, which is explicitly identified in the “Reduces Climate Risks” column. This Plan does not propose any actions that would foreseeably increase the community’s risk to climate hazards, but some actions are more directly supportive of climate adaptation than others. The “Climate Adaptation” chapter describes climate hazards and related actions in more detail.

6. Climate Adaptation

This section provides a high-level assessment of potential climate impacts and highlights those greenhouse gas reduction actions that support adaptation for each type of hazard. While Warrington Township does not currently have the capacity to complete a more robust climate vulnerability assessment and adaptation plan, the following analysis was completed to educate the public on local impacts and inform future efforts.

Anticipated Climate Impacts

Over the last 110 years, the Commonwealth of Pennsylvania has experienced a long-term warming of more than 1.8°F, as well as an increasing number of wet months. The warming and wetting trend is expected to continue at an accelerated rate, especially if the world continues on its current path of GHG emissions. As compared to a 1977-2000 baseline, the average annual statewide temperature will likely increase 5.9°F by mid-century and 9.4°F by end-of-century. Compared to the same baseline, average precipitation will likely increase about 8% by mid-century and 12% by end-of-century. Furthermore, the Commonwealth is likely to see an increase in the frequency and intensity of extreme heat events and extreme rainfall events. The extent of drought conditions is less predictable at this time, but higher overall temperatures will increase evaporative demand and reduce water availability. These changes will have a variety of ecological, economic, and social impacts on the Commonwealth, particularly related to agriculture, energy, forests, human health, outdoor recreation, water, wetlands and aquatic ecosystems, and coastal resources (PA DEP, 2021). See more details about statewide climate projections and risks in the Pennsylvania Climate Impacts Assessment, updated in 2021.

Bucks County residents will face increasingly severe weather- and climate-related hazards, such as heat waves, flooding, and storm surge. As the frequency and intensity of local hazards change, it is important for all of us to protect communities and local habitats. Using the best available evidence, scientists can project how climate (long-term averages in daily weather) will change in the future, and the effects this will have on local communities.

As temperatures warm, land ice melts and seawater expand causing sea levels to rise around the world and water levels to rise in the tidal Delaware and Schuylkill Rivers. Between 1950 and 2019, water levels near Bucks County rose roughly 0.8 feet leading to more frequent and severe flooding. Water levels will rise 0.8 to 1.7 feet above the 2000-2004 average in the next 30 years (by the 2050s), submerging property, damaging infrastructure, and pushing the salt line upriver.

FLOODING: Rising sea levels allow tides, waves, and severe flooding to push further upriver. This causes more frequent high tide flooding and increases the impacts of storm surge, putting low-lying housing, commercial property, and infrastructure at risk.

SALTWATER INTRUSION: As saltwater from sea level rise pushes further upstream, it threatens drinking water and stormwater infrastructure. Saltwater intrusion can force municipalities to abandon sources of drinking water and reduces the lifespan and performance of stormwater infrastructure.

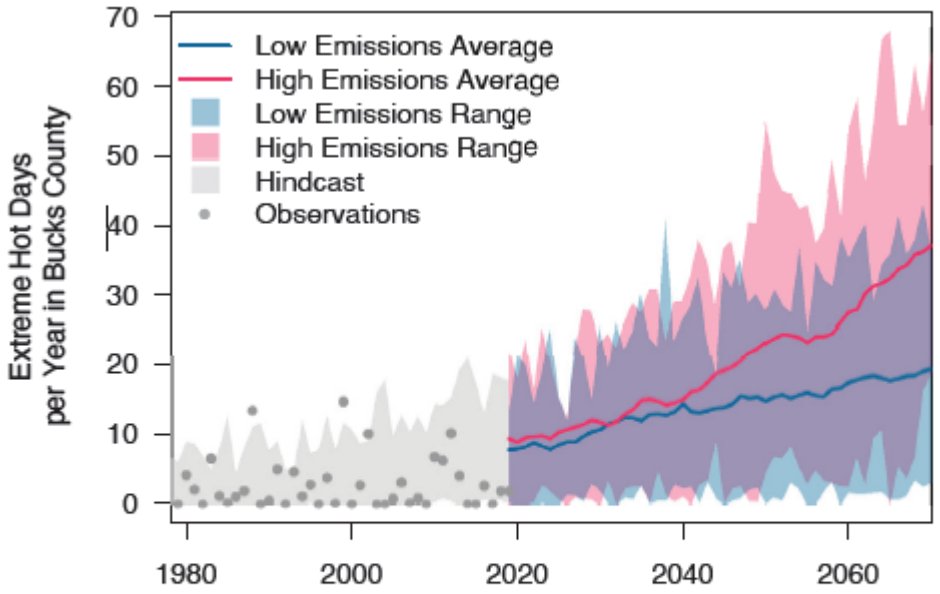
Human health and infrastructure are all threatened by higher temperatures. At 95°F, it is hard to keep indoor areas and our bodies cool. Bucks County's summers are getting hotter and this is intensified by the Heat Island effect[3]. On average, Bucks County sees 3 days per year with temperatures above 95°F (1990-2019 average). Within the next 50 years (by 2070), Bucks County can expect a yearly average of 19 to 37 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses.

HEAT-RELATED ILLNESSES: Heatwaves can kill people and pets. In Pennsylvania, more than 80 people have died from extreme heat between 2010 and 2019. Individuals at higher risk include children, pregnant women, older adults, outdoor workers, and lower-income residents.

ENERGY USE: Heat islands[3] increase the demand for air conditioning. In the US, electricity demand for cooling will increase by 5-20% for every added degree C. During heatwaves, increased demand can overload systems causing power companies to conduct rolling brownouts or blackouts to avoid system failure.

Climate information can guide decision-making to help us plan and prepare for future weather and climate hazards. It is important that action includes areas with limited resources and people at higher risk. With justice-minded planning and preparation, Bucks County can build a resilient community for all residents and future generations.

FUTURE SCENARIOS[1]: Future climate will depend, in part, on the efforts that we take today to reduce carbon dioxide emissions from the burning of fossil fuels like coal, oil, and methane gas. This fact sheet presents two scenarios[1] of future climate based on a combination of climate models scaled to Bucks County, PA. The first scenario, a higher-emissions scenario (RCP8.5), assumes continued increase of fossil fuel emissions, with no mitigation. The second, a lower-emissions scenario (RCP4.5), is a scenario where we tackle the issue of emissions head-on by responsibly using our natural resources and implementing strategies that begin to reduce global fossil fuel emissions by 2050, stabilizing carbon dioxide concentrations before 2100.



The graph shows the number of days in a year with temperatures above or equal to 95°F. Dots represent observed annual days of extreme temperatures and the gray shading shows the hindcast[2]. Two scenarios[1] of the future are shown as a high-emissions scenario (RCP 8.5) in red and a low-emissions scenario (RCP 4.5) in blue. Data for the future scenarios[1] are retrieved from Multivariate Adaptive Constructed Analogs (MACA), and observed data are from the Gridded Surface Meteorological Dataset (gridMET).

Rising Temperatures & Heat

The following graph indicates that average daily temperatures have been increasing and will continue to rise through 2090, which could impact agriculture, public health, and other sectors of the community.

This graph is from U.S. Climate Explorer.

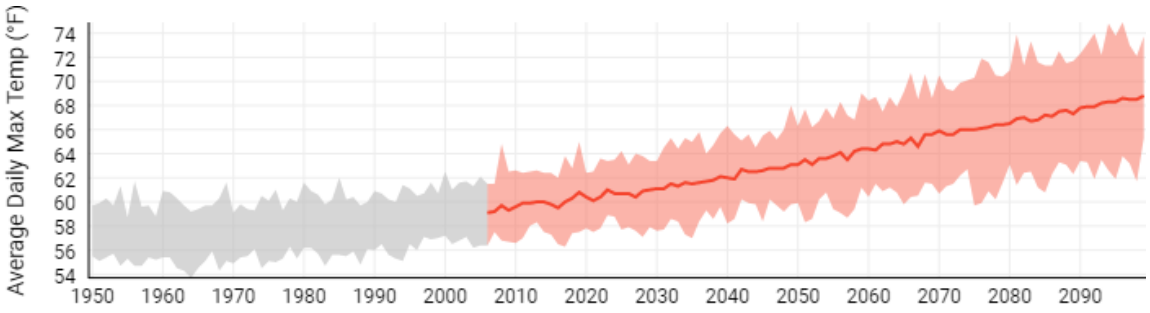
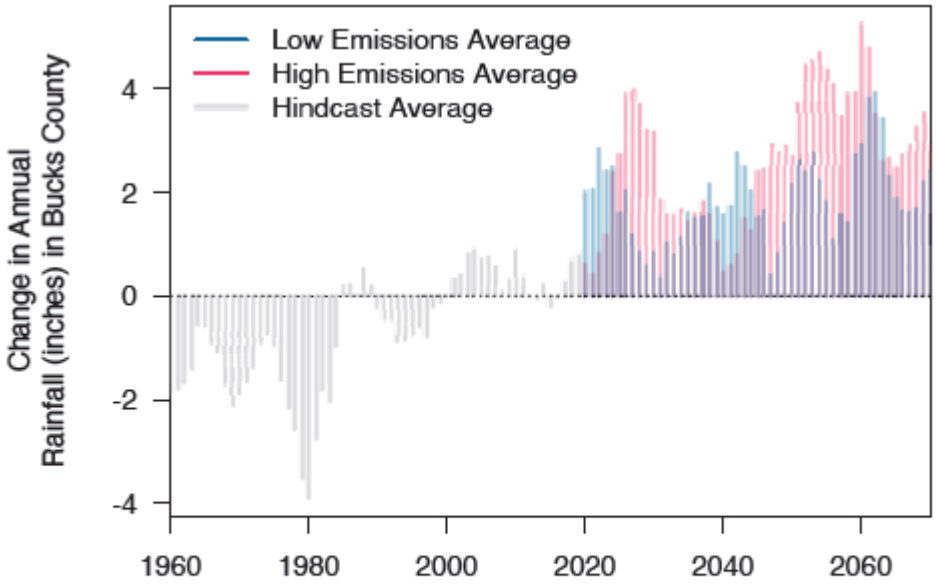


Figure 5: Average Daily Temperature Between 1950-2090

Heavy rainfall in Bucks County is increasing in frequency and intensity, causing flash floods, property damage, septic backups, mold and indoor air quality issues, and impacts to water quality in the Delaware and Schuylkill Rivers. Annual rainfall in Bucks County will likely increase by an average of 2 to 4 inches (2050-2079 average compared to the 1990-2019 average).



The graph shows the change in annual rainfall compared to the average between 1990 and 2019. The gray lines show the hindcast[2]. Two scenarios[1] of the future are shown as a high-emissions scenario (RCP 8.5) in red and a low-emissions scenario (RCP 4.5) in blue. Data for the future scenarios[1] are retrieved from MACA.

FLOODING: High concentrations of pavement and infrastructure intensify flooding because they prevent rainwater from seeping into the ground. Heavy rain can quickly overwhelm infrastructure and drainage systems. It can quickly cover streets causing traffic to slow and become deadly to drivers.

REDUCED HUMAN HEALTH: Changing moisture levels impact the spread of mold and illness, including tick- and mosquito-borne diseases as high humidity promote their reproduction and how far they can travel.

Adaptive Greenhouse Gas Reduction Measures

Some GHG reduction measures also reduce risk to climate hazards. The following are a few of many examples of how these outcomes can be related to one another:

- Actions that improve energy efficiency and distribute renewable energy can (1) reduce pressure on the grid when there is higher energy demand for heating and air conditioning during extreme heat events, and (2) increase energy independence for households and businesses, as opposed to complete reliance on centralized power infrastructure that could fail during a catastrophic event. These types of actions include, but are not limited to:
    - Energy-efficient building design for new construction, and retrofits for existing buildings (e.g., weatherization)
    - Onsite combined heat and power (CHP)
    - Smart grid technologies
    - Microgrids
- Actions that reduce impervious surfaces can reduce the potential for flooding by retaining stormwater in place. These types of actions include, but are not limited to:

    - Expanding or restoring green space
    - Installing green roofs, rain gardens, bioswales, pervious pavers, and other green infrastructure (as well as requiring them for future development)
- Installing green roofs and planting trees adjacent to buildings can regulate indoor temperatures during extreme heat events
- Expanding and protecting alternative transportation routes (bicycle, pedestrian, bus, and rail) provides network redundancies and alternative routes for emergency evacuation
- Water efficiency and conservation actions can (1) reduce pressure on the grid from energy used for pumping, treating, and distributing water, and (2) make the community less vulnerable to drought

The following table identifies specific greenhouse gas reduction actions from the previous chapters that have the potential to reduce risk from climate hazards, and which hazards they address.

7. Implementation & Monitoring

This chapter describes the process Warrington Township will follow to implement The Plan and monitor progress. This section will be developed after the review of this draft version of The Plan.

Implementing The Plan

Municipal Legislative Actions extracted from Goals and Actions Tables in Section 5:

A. Prepare and adopt new ordinance(s) or amend existing ordinances to:
    a. Accomplish the stated goals of the 2021 resolution.
    b. Create a plan with incentives and/or ordinance to convert 10% of existing township grass areas to meadows.
    c. For commercial and industrial buildings, adopt ordinance to mandate building ready wiring for future solar and EV adoption.
    d. Modify lawn height ordinance to allow for the establishment of meadows that are properly maintained for both residential and commercial/industrial building lots.
    e. Update Township Development Ordinance to require additional tree replacements or contribution to the tree fund when trees are removed.
    f. Revise permit fee schedule to provide lower fees for sustainable projects.
B. Review Contracts:
    a. Contract revision - Upgrade mowing equipment being used to carbon-free fuel for Township mowing.
    b. Review other contracts that may also impact GHG emissions.
    c. Contract for recycling in Township parks.

C. Review Building Codes (for both residential and commercial/industrial buildings):
    a. Change from builder's grade to a better grade of insulation in the building codes.
    b. Upgrade ordinances, building codes and permitting to conform to new commercially available practices and technologies.

D. Establish a residential Property Assessed Clean Energy (PACE) program.

E. Planning
    a. Incorporate eco-centric program offerings with Parks & Rec that dissuade wasteful behavior.

b. Complete the Township-wide plan being developed to continue to expand bikeway, trail, and pedestrian facilities.

Monitoring Progress of The Plan

Establishing a monitoring process which will enable Warrington Township to track the impacts of the actions included in The Plan and compare estimated impacts to what is actually achieved in terms of energy savings, renewable energy production, and GHG emissions reduction. Assessing the implementation status of the actions will allow determination of whether the action is performing well and to identify corrective measures. This process is also an opportunity to understand barriers to implementation and identify best practices or new opportunities in moving forward.

Starting in 2025, progress reports are to occur every 5 years and will include status updates on each action within The Plan, including any known metrics of impact (e.g., reduction in residential kWh and the corresponding GHG emissions). Every 5 years, the progress report will also include an updated community GHG inventory to illustrate progress towards the reduction target(s) and allow Warrington Township to evaluate the need for any modification to the original targets, objectives, and/or actions of The Plan.

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Appendix I: GHG Quantification Methodology

Inventory Calculations

The 2019 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the [IPCC 5th Assessment] was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e., kWh or VMT) and emission factor to calculate the final CO_2e emissions.

Transportation Data

On-road Transportation					
	In-Boundary VKT	Inbound VKT	Outbound VKT	Total In-Boundary VKT	Total In-Boundary VMT
AUTOMOBILE	117,057,944.20	157390351.8	157498379.1	274,502,309.65	170,567,774.65

ClearPath Inputs		
Fuel Type	Gas	Diesel
VMT	154125041.2	16442733.48
% Passenger	75.89	3.36
% Light-Duty	21.83	8.07
% Heavy-Duty	1.59	88.57
% Motorcycle	0.69	0
Enter The VMT/Percentages into each On-road Transportation Record (two records total)		

Notes: Taken from Google Environmental Insights Explorer for more information Follow these links

- EIE Methodology
- EIE's Comparative Analysis
- ICLEI's White Paper
- Website

GHG Sequestration and Tree Planting Calculations

This discussion outlines the methodology used to select the baseline acres of tree coverage, GHG sequestered, tree planting goals and potential GHG to be sequestered.

Our Plan development team chose to use the USDA's i-Tree to model the environmental benefits of trees.

i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban and rural forestry analysis and benefits assessment tools.

Since the initial release of the i-Tree Tools in August 2006, thousands of communities, non-profit organizations, consultants, volunteers and students around the world have used i-Tree to report on individual trees, parcels, neighborhoods, cities, and even entire states. By understanding the local ecosystem services that trees provide, i-Tree users can link forest management activities with environmental quality and community livability. Whether your interest is a single tree or an entire forest, i-Tree provides data that you can use to demonstrate value and set priorities for more effective decision-making. We invite you to explore this site to learn more about how i-Tree can make a difference in your community or forest.

Developed by USDA Forest Service and numerous cooperators, i-Tree Tools are freely available. The U.S. Forest Service, Davey Tree Expert Company, The Arbor Day Foundation, Society of Municipal Arborists, International Society of Arboriculture, and Casey Trees have entered into a cooperative partnership to further develop, disseminate and provide technical support for the suite.

We will be using the following specific models:

i-Tree Landscape – Provides US tree canopy and Census information and can Identify priority planting & protection areas for climate and social justice.

i-Tree Design - A full-featured web tool with expanded building interactions and forecasting for estimating the benefits of individual trees.

i-Tree Canopy - Estimate land cover and tree canopy plus benefits using random point sampling on aerial imagery. Use historical imagery in Google Earth to compare two i-Tree Canopy projects, past and present to monitor tree canopy change in your community.

Following is the data generated for Warrington Township community-wide utilizing the iTree Landscape software. The baseline imagery is 2011

Location Information

Forest Details (High Resolution UTC)

	Forest Type Groups	Basal Area by Species (Top 10)	Total Basal Area (ft^2 (square feet))
Selection Total:	• Elm/Ash/Cottonwood (21.93%) • Maple/Beech/Birch (55.77%) • Oak/Hickory (22.31%)	• Fraxinus spp., ash spp. (24566 ft²) • Fraxinus americana, white ash (24566 ft²) • Acer spp., maple spp. (16311 ft²) • Acer rubrum, red maple (13449 ft²) • Prunus spp., cherry and plum spp. (4184 ft²) • Prunus serotina, black cherry (4184 ft²) • Acer negundo, boxelder (2732 ft²) • Carya spp., hickory spp. (2391 ft²) • Carya glabra, pignut hickory (2391 ft²) • Quercus spp., oak spp. (2249 ft²) • ...	111,451.0

Tree Benefits

Carbon and CO_2 (High Resolution UTC)

	Carbon Storage		Carbon Sequestration		CO_2 Equivalent Storage		CO_2 Equivalent Sequestration	
	$	Short Ton	$/yr (year)	t/yr (Short Tons per year)	$	Short Ton	$/yr (year)	t/yr (Short Tons per year)
Selection Total:	18,282,878	107,199.0	389,221	2,282.1	18,282,878	393,063.2	389,221	8,367.9

8,368 short tons per year* .907= 7591 MTCo2e

Date: 05/19/2022

2

2 2

Report - i-Tree Landscape https://landscape.itreetools.org/report/

Version 4.3.1

Report - i-Tree Landscape https://landscape.itreetools.org/report/

5/19/2022, 8:42 PM

Baseline calculations

As described above, results from calculations for Warrington wide community data using iTree landscape yielded 7591 MTCo2e per year. The Township is 8,825 acres, Currently the Township owns approximately 1000 acres, therefore Township owned property amounts to 11.3%. Using this percentage Township owned land sequesters a minimum of 860.17 MTCo2e per year of the total.

The baseline land cover data for the Township Wide calculation is 2011 imagery. Since there is minimal canopy in the initial years It is unlikely that trees planted in 2010 or 2011 would be counted on the 2011 imagery. Therefore, any trees planted beginning in 2010 will be added to these totals utilizing iTree Design or the iTree Planting Calculator.

For the purposes of estimating the GHS reductions, each tree planting that occurred from 2010 thru 2022 was separately modeled using the iTree Design Model or iTree Planting calculator. The spreadsheet showing those modeling results is available from the EAC. Using a 25-year growth and analysis period, the average annual GHG reduction per tree is estimated at 42.4 pounds per year. For consistency and simplicity purposes this is the number that will be used to report the GHS sequestration reductions as we monitor and track implementation of this plan.

Appendix II: Climate Change Science

The Intergovernmental Panel on Climate Change (IPCC)'s Global Warming of 1.5°C Special Report affirms that "temperature rise to date has already resulted in profound alterations to human and natural systems, including increases in droughts, floods, and some other types of extreme weather; sea level rise; and biodiversity loss – these changes are causing unprecedented risks to vulnerable persons and populations."1 Researchers have made progress in their understanding of how the Earth's climate is changing in space and time through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties and a wider variety of measurements.2 These refinements expand upon the findings of previous IPCC Assessments – today, in the IPCC Sixth Assessment Report, observational evidence from all continents and most oceans shows that "with further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers."[3]

[1] Allen, M.R., O.P. Dube, W. Solecki, F. Aragón-Durand, W. Cramer, S. Humphreys, M. Kainuma, J. Kala, N. Mahowald, Y. Mulugetta, R. Perez, M.Wairiu, and K. Zickfeld, 2018: Framing and Context. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. 53 pp.

[2] IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

[3] IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

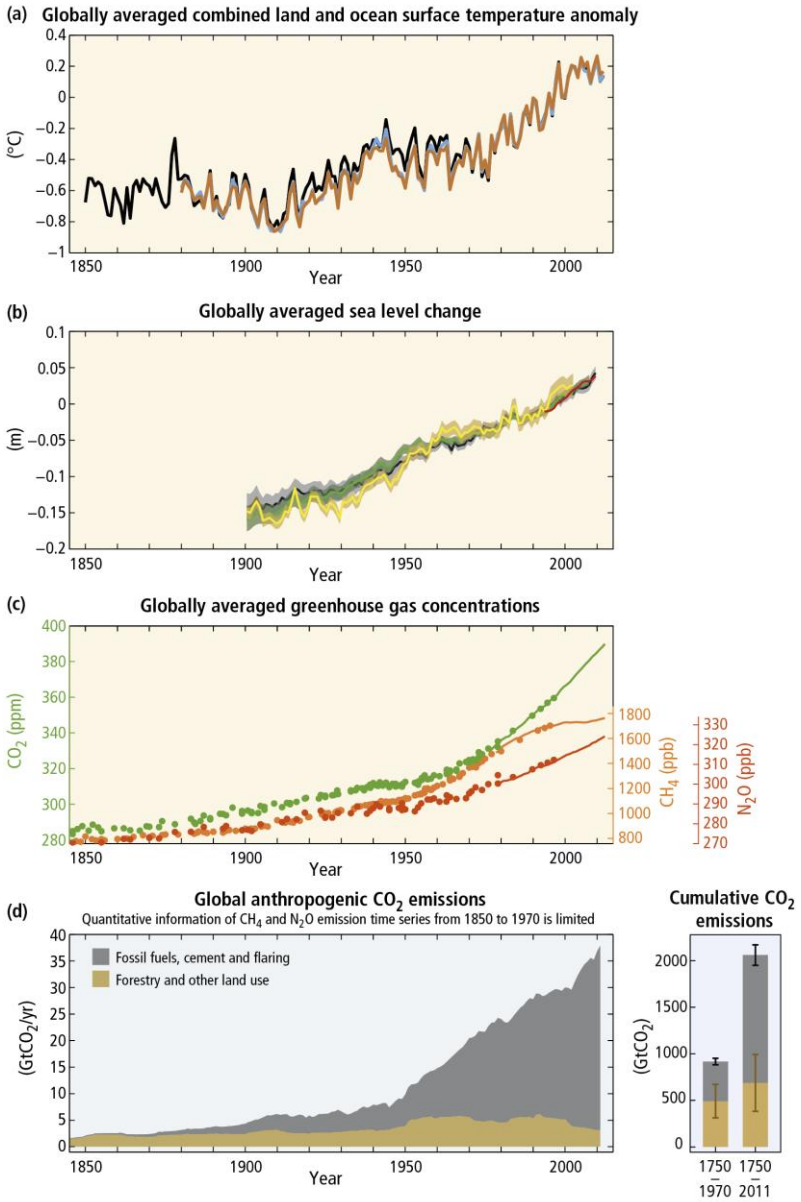


Figure 1: Observations and other indicators of a changing global climate system[4]

The IPCC Sixth Assessment asserts that "each of the last four decades have been successively warmer than any decade that preceded it since 1850. The likely range of total human-caused global surface temperature increase from 1850-1900 to 2010-2019 is 0.8°C to 1.3°C. Human influence is very likely the main driver of the global retreat of glaciers since the 1990s and the decrease in Arctic Sea ice area between 1979–1988 and 2010–2019." Lastly, "human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as

[4] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland, 151 pp

heatwaves, heavy precipitation, droughts, and tropical cyclones, and their attribution to human influence, has strengthened since AR5."[5]

In short, the Earth is already responding to climate change drivers introduced by mankind.

Temperatures and Extreme Events are Increasing Globally

Surface temperature is projected to continue to rise until at least the mid-century under all assessed emission scenarios. Subsequently, increased global warming also includes the frequency and intensity of hot extremes, marine heatwaves, extreme precipitation, agricultural and ecological droughts, tropical cyclones, and the reduction in Arctic Sea ice, snow cover, and permafrost. The ocean will continue to warm and acidify, and global mean sea level to rise. Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions.[6]

[5] IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.
[6] Ibid.

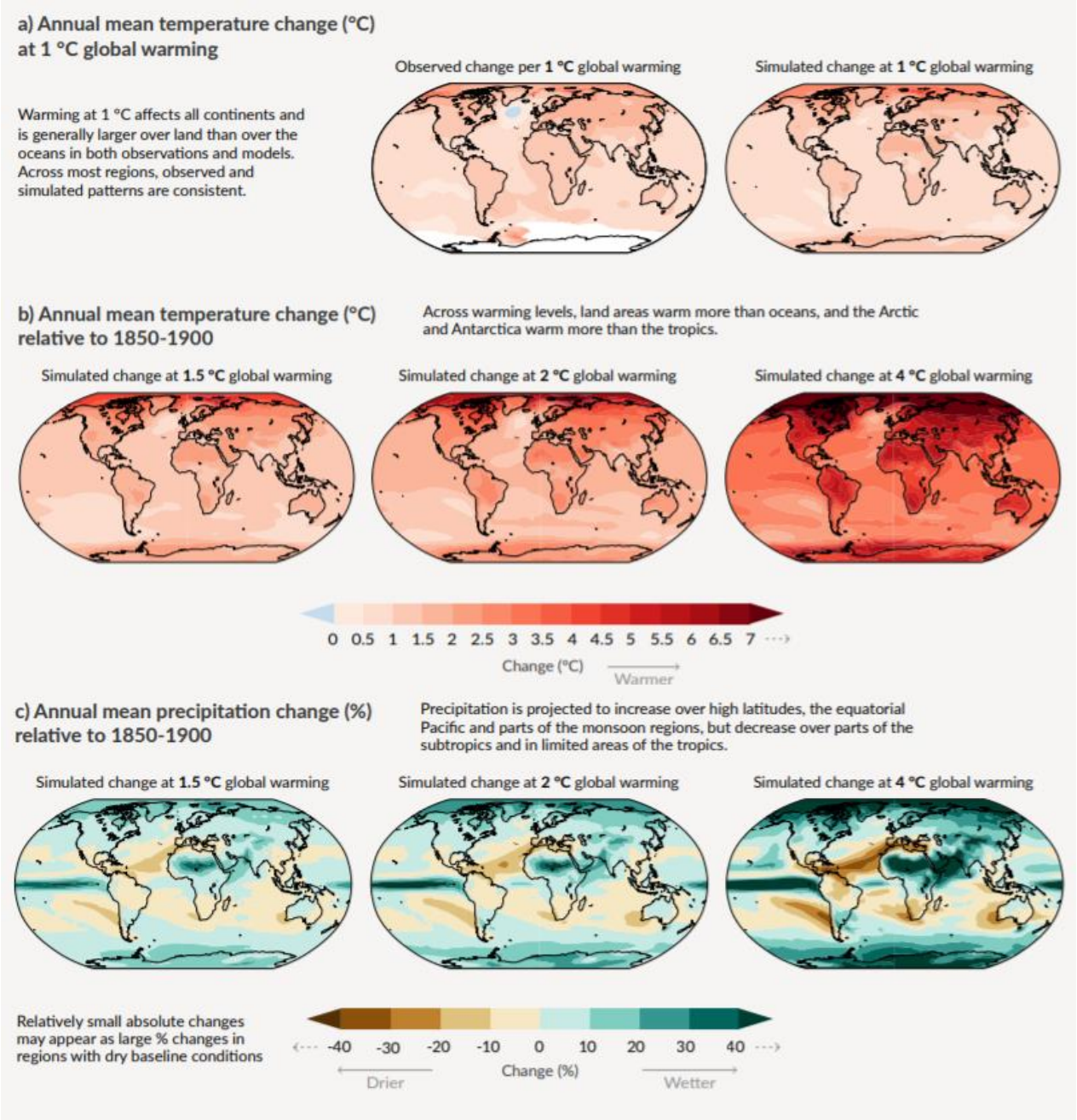


Figure 2: Change in average surface temperature, precipitation and soil moisture. Panel a) shows the comparison between observed and simulated surface temperature at 1°C global warming. Relative to 1850-1900, panel b) highlights simulated surface temperature changes at global warming levels of 1.5°C, 2°C and 4°C, whereas, panel c) shows simulated precipitation changes when global warming levels of 1.5°C, 2°C and 4°C are applied.[7]

[7] IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

Climate Risks

Climate change is projected to undermine food security. Due to projected climate change by the mid-21st century and beyond, global marine species redistribution and marine biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity and other ecosystem services. For wheat, rice and maize in tropical and temperate regions, climate change without adaptation is projected to negatively impact production for local temperature increases of 2°C or more above late 20th century levels, although individual locations may benefit. Global temperature increases of ~4°C or more above late 20th century levels, combined with increasing food demand, would pose large risks to food security globally. Climate change is projected to reduce renewable surface water and groundwater resources in most dry subtropical region, intensifying competition for water among sectors.

Until mid-century, projected climate change will impact human health mainly by exacerbating health problems that already exist. Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions and especially in developing countries with low income, as compared to a baseline without climate change. Health impacts include greater likelihood of injury and death due to more intense heat waves and fires, increased risks from foodborne and waterborne diseases and loss of work capacity and reduced labor productivity in vulnerable populations. Risks of undernutrition in poor regions will increase. Risks from vector-borne diseases are projected to generally increase with warming, due to the extension of the infection area and season, despite reductions in some areas that become too hot for disease vectors.

In urban areas climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges. These risks are amplified for those lacking essential infrastructure and services or living in exposed areas. Rural areas are expected to experience major impacts on water availability and supply, food security, infrastructure and agricultural incomes, including shifts in the production areas of food and non-food crops around the world.

Climate change is projected to increase displacement of people. Populations that lack the resources for planned migration experience higher exposure to extreme weather events, particularly in developing countries with low income. Climate change can indirectly increase risks of violent conflicts by amplifying well-documented drivers of these conflicts such as poverty and economic shocks.[8]

[8] Hoegh-Guldberg, O., D. Jacob, M. Taylor, M. Bindi, S. Brown, I. Camilloni, A. Diedhiou, R. Djalante, K.L. Ebi, F. Engelbrecht, J.Guiot, Y. Hijioka, S. Mehrotra, A. Payne, S.I. Seneviratne, A. Thomas, R. Warren, and G. Zhou, 2018: Impacts of 1.5ºC Global Warming on Natural and Human Systems. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I.Gomis, E. Lonnoy, T.Maycock, M.Tignor, and T. Waterfield (eds.)]. In Press

Regional and Local Impacts

Because the impacts of climate change vary geographically, it is important to know what effects are specifically expected for your corner of the globe.

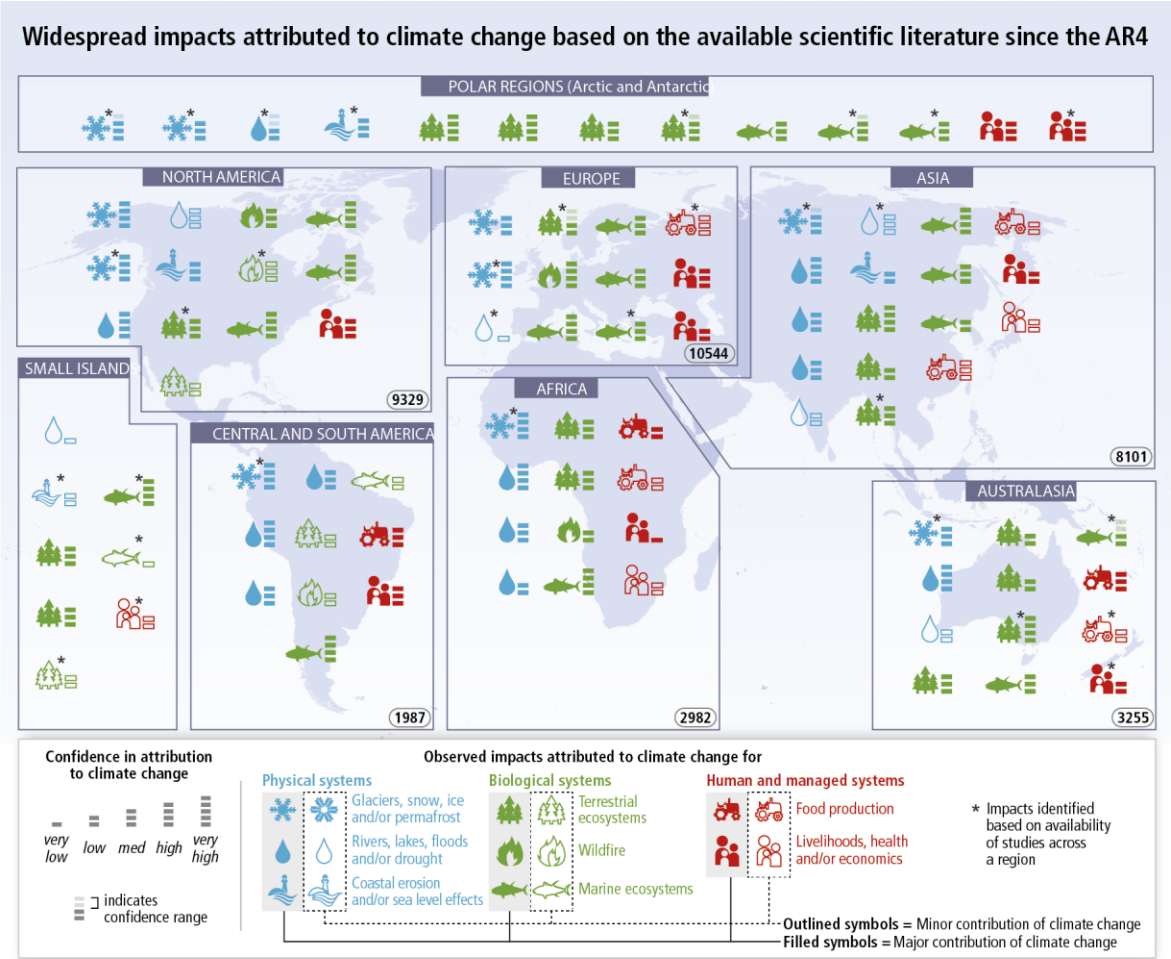


Figure 3: Climate impacts around the world. Symbols indicate categories of attributed impacts, the relative contribution of climate change (major or minor) to the observed impact and confidence in attribution. Numbers in ovals indicate regional totals of climate change publications from 2001 to 2010, based on the Scopus bibliographic database for publications in English with individual countries mentioned in title, abstract or key words (as of July 2011). These numbers provide an overall measure of the available scientific literature on climate change across regions; they do not indicate the number of publications supporting attribution of climate change impacts in each region. Studies for polar regions and small islands are grouped with neighboring continental regions.[9]

[9] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland, 151 pp

Greenhouse Gas Emissions Must be Reduced

The recent and massive buildup of greenhouse gases in our atmosphere is conceivably more extraordinary than changes observed thus far regarding temperature, sea level, and snow cover in the Northern hemisphere in that current levels greatly exceed recorded precedent going back much further than the modern temperature record.

Anthropogenic greenhouse gas emissions have increased since the pre-industrial era driven largely by economic and population growth. In 2019, emissions concentrations were higher than at any time in the last two million years.[10] Historical emissions have increased atmospheric concentrations of carbon dioxide, methane, and nitrous oxide to a rate ten times faster than any sustained rise of CO2 in the last 800,000 years, leading to an uptake of energy by the climate system. [11]

In response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, and waste diversion, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts. While this Plan is designed to reduce overall emissions levels, as the effects of climate change become more common and severe, local government adaptation policies will be fundamental in preserving the welfare of residents and businesses.

[10] Ibid.

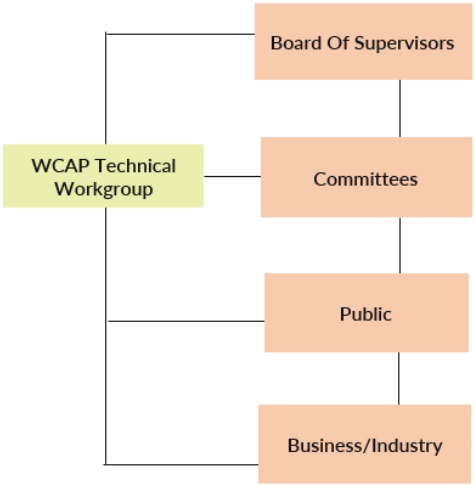
[11] Allen, M.R., O.P. Dube, W. Solecki, F. Aragón-Durand, W. Cramer, S. Humphreys, M. Kainuma, J. Kala, N. Mahowald, Y. Mulugetta, R. Perez, M.Wairiu, and K. Zickfeld, 2018: Framing and Context. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C *above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

Appendix III: Task Force and Community Engagement Activities

Warrington Township Energy Transition & Efficiency Action Plan Communication Strategy

The key to developing and successfully implementing The Plan is to obtain buy-in from all stakeholders. Buy-in is achieved when all stakeholders are given the opportunity to participate in the planning development process, where the final plan reflects stakeholder input.

The following flow chart reflects the flow of information. Note that no arrows appear, information will flow in all directions and will be synthesized by the TWG for the final plan.



The TWG has been responsible for collecting information, receiving training, coordinating technical support from the Temple University Intern, PADEP, and ICLEI, conducting out-reach and drafting the CAP. The TWG is comprised of the Environmental Advisory Council, Planning Commission, Open Space and Land Preservation Committee and Township professional staff.

The process has included regular updates to the Board of Supervisors and to all pertinent Township committees. Community engagement will occur throughout the process (schema shown below), via in-person/virtual workshops, virtual meetings, and online surveys.

List of Groups-

Board of Supervisors:

Fred R. Gaines, Chair, Eileen Albillar, Vice Chair, Ruth Schemm, Mike Diorka and Vanessa Maurer

Committees:

- Bike and Hike CommitteeBuilding Code Appeals Board
- Communications Advisory Board
- Environmental Advisory Council
- Historic Commission
- Mary Barness Community Pool Steering Committee
- Open Space and Land Preservation Committee
- Park and Recreation Board
- Planning Commission

Public:

- General Public
- Homeowner Associations
- Willow Knoll Community
- Business/Industry/Organizations
- Rotary Club
- Lions Club
- Chamber of Commerce
- Scouting Groups
- Natural Lands (Land Trust Conservation Organization)

Outreach Actions

Board of Supervisors: Regular updates directly to the BOS or through the Township Managers Report December 14, 2021. Provide and update to the BOS and approval to survey residents.

Public: Updates through the Link and E-Link; survey through email, social media, and public meetings.

Week of January 10, 2022, survey released to the public on EAC Facebook. Emailed EAC members, other volunteer boards.

Business/Industry/Organizations: Updates through the Link and E-Link; survey thru email, social media, and public meetings

Warrington > Weather, Energy Efficiency and Clean Energy > Questionnaire

A survey was developed to assess the community's interest and understanding of Climate issues, concerns, and interest in implementing actions to address air pollution. Results of the survey would allow the EAC to prioritize actions and seek grant opportunities. The survey was adapted from existing surveys used by other municipalities. The survey was developed in Google Documents and was distributed electronically by posting links on the Township's Website, Township and EAC Facebook pages and other local community group Facebook pages. In addition, articles were published in the Township's quarterly newsletter the "Link" and Township's monthly emailed newsletter the "E-Link". In order to encourage participation, we chose not to require each respondent to provide an email but encouraged them to provide an email if they were interested in winning a prize. Approximately 115 responses were received, approximately 60 unique emails were received. It was pointed out that since we did not require respondents that someone could submit multiple responses and skew the results.

Following is a summary of the results:

- 75% of the respondents said that they either already switched or are somewhat to interested in switching to an electricity supplier that sources electricity from clean energy sources (e.g., wind, solar) 25% of the 75% have already switched.
- 77% of the respondents said that they either already had or are somewhat to interested in getting an energy audit of their home or business. 21% of the 77% already had an audit.
- 90% of the respondents said that they either have, or are somewhat to very interested in installing a high efficiency HVAC. 48% of the 90% already have a high efficiency HVAC.
- 92% of the respondents said that they either have, or are somewhat to very interested in sealing air leaks, upgrading insulation, or installing energy conserving windows. 40% of the 92% already have done this.
- 95% of the respondents said that they either have, or are somewhat to interested in installing LED lighting. 77% of the 95% already have installed LED lighting.
- 92% of the respondents said that they either have, or are somewhat to very interested in installing high efficiency appliances (water heater, refrigerator, etc.) 55% of the 92% already have high efficiency appliances.
- 42% of the respondents said that they either have, or are somewhat to very interested in replacing gas appliances with electric ones. 20% of the 42% already have switched.
- 59% of the respondents said that they either have, or are somewhat to very interested in installing solar. 13% of the 59% already have solar.
- 96% of the respondents said that they either have, or are somewhat to very interested in adjusting thermostat, washing clothes in cold water, etc. 69% of the 96% already do this.

- The majority of respondents that these questions were applicable to, would be interested to Bike, Carpool or Bus to Work.
- 86% of the respondents said that they either have, or are slightly to extremely interested in driving an electric vehicle. 10% of the 86% already do this.
- 83% of the respondents said that they either have, or are slightly to extremely interested in composting. 16% of the 83% already do this.
- 86% of the respondents said that they either have, or are slightly to extremely interested in growing thier own food or purchasing local produce. 28% of the 86% already do this.
- 99% of the respondents said that they either have, or are slightly to extremely interested in recycling. 62% of the 99% already do this.
- 97% of the respondents said that they either have, or are slightly to extremely interested in installing low-flow toilets, faucets and showerheads to reduce water use. 47 % of the 97% already do this.
- 96% of the respondents said that they either have, or are slightly to extremely interested in modifying behavior (take shorter showers, avoid watering, landscaping, etc.) 41% of the 96% already do this.
- 51% said cost, followed by 15% HOA restrictions, time and effort and access to credible info were biggest barriers to adopting additional energy saving practices and reducing their contribution to air pollution.
- 47% of the respondents said that high winds and tornados were the biggest threat to our community followed by 32% saying flooding.
- Township priorities: Acquiring open space, mitigating extreme weather, facilitating workshops for residents on energy efficiency & sustainability and planting trees.
- 77% of respondents are somewhat to very concerned that global climate change will harm us personally at some point in our lifetime.
- 81% of respondents are willing to make some to a lot of changes about how to live and work to help reduce the effects of global climate change.

Plan Development Time

Name	Weeks	Hours Per Week	Weeks	Hours Per Week	Total Hours	Labor Rate	Total Value
Work Grp Scheduled Meeting Hours (*4 members)	44	8	0	0	352	29.95	$10,542.40
Carol	44	1			44	29.95	$1,317.80
Dave	20	2	12	10	160	29.95	$4,792.00
Fred	28	3	16	16	340	29.95	$10,183.00
Ivy	44	1			44	29.95	$1,317.80
Guy					20	29.95	$599.00
ICLEI					8		
other Township Staff					8		
					976		$28,752.00
Weeks: Mid-August 21 thru Mid July 22							
Independent Sector Releases New Value of Volunteer Time of $29.95 Per Hour. (WASHINGTON, April 18, 2022) – Independent Sector, with the Do-Good Institute, announced today that the latest value of a volunteer hour is estimated to be $29.95, which is a 4.9% increase over 2020.							