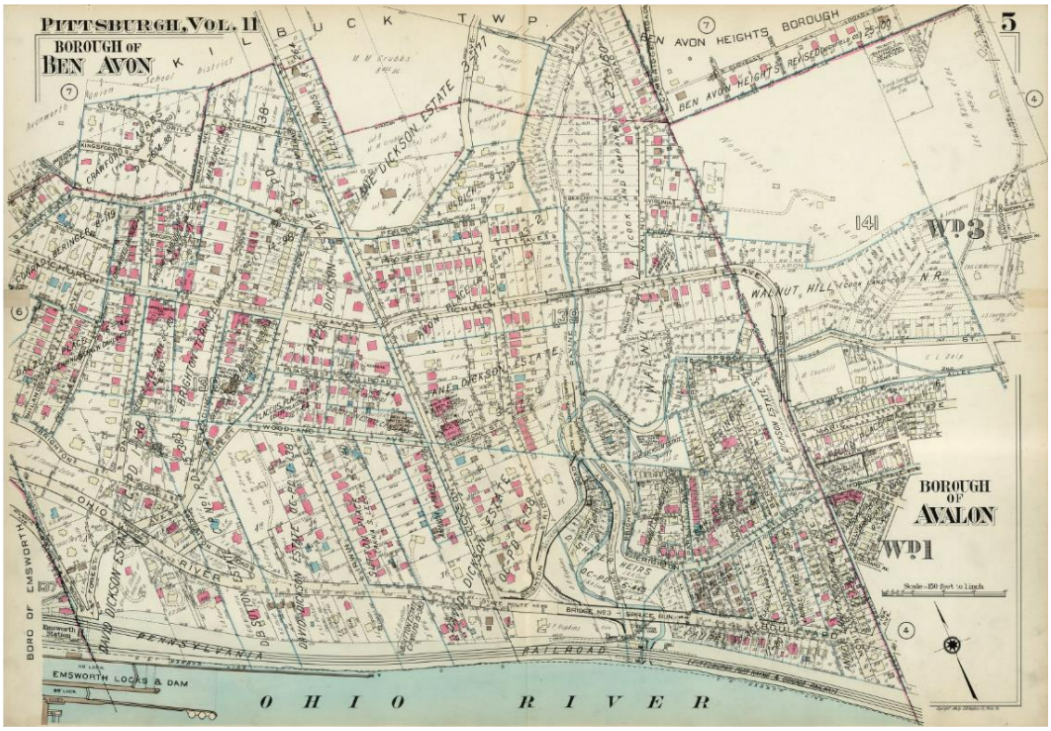
Ben Avon Borough

Climate Action Plan



Local Actions and Policies to Reduce Ben Avon Borough's Greenhouse Gas Emissions

November 2021

BOROUGH OF BEN AVON
ALLEGHENY COUNTY, PENNSYLVANIA

RESOLUTION NO. 2021-08

A RESOLUTION OF THE BOROUGH OF BEN AVON, ALLEGHENY COUNTY, PENNSYLVANIA, ADOPTING A CLIMATE ACTION PLAN FOR THE BOROUGH OF BEN AVON

WHEREAS, the Ben Avon Borough Council recognizes that climate change is a significant global issue, posing threats to public health and safety, infrastructure, quality of life, and the economy for communities across the globe including our own; and

WHEREAS, actions to address climate change and reduce greenhouse gas emissions can provide benefits to Borough residents and businesses by mitigating extreme weather events, improving air quality, reducing energy costs, creating jobs, and maintaining our community's character and quality of life; and

WHEREAS, the Joint Comprehensive Plan adopted by the Borough supports implementing policies that will reduce our community's greenhouse gas emissions and vulnerability to extreme weather events; and

WHEREAS, Ben Avon Borough Council members and a working group of residents have prepared a Climate Action Plan with technical assistance from the Pennsylvania Department of Environmental Protection and with input from community stakeholders; and

WHEREAS, Ben Avon's Climate Action Plan includes an inventory of greenhouse gas emissions from community-wide activities; establishes reduction targets, and outlines feasible actions to achieve those targets;

NOW, THEREFORE, be it resolved that the Council of the Borough of Ben Avon hereby adopts the Climate Action Plan attached hereto as Exhibit 'A'.

APPROVED AND ADOPTED THIS 14th DAY OF DECEMBER, 2021

ATTEST:

Terrie Patsch, Borough Secretary

Jennifer Bett, President
Ben Avon Borough Council

Credits and Acknowledgments

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Executive Summary

Purpose of the Climate Action Plan

As part of a program offered by the Pennsylvania Department of Environmental Protection, Ben Avon Borough has developed a greenhouse gas inventory and Climate Action Plan. Ben Avon's Climate Action Plan was developed to help the Borough understand the sources of greenhouse gas emissions in our community and develop strategies to minimize our carbon footprint, improve our community's resilience, and preserve our quality of life. According to the Commonwealth of Pennsylvania's Climate Action Plan and the Fourth National Climate Assessment (2018), in the coming decades our region is expected to experience higher temperatures, changes in precipitation, and more frequent extreme weather events as compared to historical averages. Ben Avon Borough recognizes a growing need to address its own contribution to climate change, as well as adapt to future impacts of a warming climate. The Climate Action Plan includes an inventory of Ben Avon Borough's greenhouse gas emissions (GHGs) from community-wide activities, establishes an emissions reduction target, and outlines feasible actions to achieve that target.

Greenhouse Gas Inventory

With technical assistance from the PA Department of Environmental Protection, Ben Avon prepared an inventory identifying sources of greenhouse gas emissions from our community. Using the Clearpath modeling tool and data from local utilities, our annual greenhouse gas emissions in 2018 were estimated at 11,234 metric tons. Most greenhouse gas emissions (85%) are from residential energy use (methane gas and electricity). GHG emissions related to commercial energy use, solid waste disposal, water and wastewater treatment, and transportation were also inventoried. Sources of emissions such as air travel, goods consumption, diet, land use, etc. are more difficult to quantify and therefore were not modeled.

Community Input and Engagement

It is important that the Climate Action Plan reflect the priorities of the Ben Avon community as well as presenting an effective roadmap for reducing emissions. A working group composed of Ben Avon residents and community leaders was formed in early 2021 to guide the development of the Plan. One of the first tasks of the working group was to develop a community survey on climate action. Ben Avon residents and businesses were invited to respond to the survey throughout the month of March 2021. The Draft Climate Action plan was posted on the Borough's website for public comment, and public outreach regarding the Climate Action Plan, including a newsletter article and tabling at the Ben Avon Fall Festival, occurred in Fall 2021.

Vision

Ben Avon Borough will maintain its character and quality of life while achieving the following vision:

- Ben Avon's homes, businesses, and government buildings will run on clean, carbon free energy.
- Ben Avon will reduce fossil fuel related pollution in order to improve our air quality.
- Ben Avon will join regional efforts to make our transportation and waste management systems cleaner and more sustainable.
- Ben Avon will prepare for the effects of climate change, such as extreme weather.
- Ben Avon will consider and engage vulnerable populations in our community when preparing for and addressing climate change.

Emissions Reduction Targets

Ben Avon's greenhouse gas emissions reduction targets meet or exceed the targets in Pennsylvania's 2018 Climate Action Plan. We also considered the emissions thresholds identified by the U.N. International Panel on Climate Change (IPCC) as necessary to avoid catastrophic climate change. Ben Avon aims to reduce community greenhouse gas emissions from our 2018 baseline as follows:

- 26% reduction by 2025
- 50% reduction by 2030
- 90% reduction by 2050

Strategies to Reduce Greenhouse Gas Emissions and Adapt to Climate Change

Ben Avon used the ClearPath tool to analyze which strategies would be most effective in meeting our emissions reductions targets. Community-wide strategies described in the Climate Action Plan include:

- Maximizing energy efficiency and conservation measures in residential and commercial buildings
- Obtaining grid electricity from carbon-free sources (via Pennsylvania's electric choice program)
- Increasing local production of clean energy (e.g. rooftop solar panels)
- Preserving existing mature trees and planting new trees
- Replacing direct burning of fossil fuels with alternatives that can run on clean energy (e.g. replace internal combusion cars with electric versions, replace gas furnaces with heat pumps)
- Improving recycling and composting options for residents
- Preparing for extreme weather

Ben Avon Borough seeks to lead by example by implementing these strategies within our municipal operations. Meeting these targets community-wide will require private individuals and businesses to transition away from fossil fuel use on an unprecedented scale. Therefore, community outreach and education are an essential element of Ben Avon's Climate Action Plan.

1. Introduction

The Impacts of Climate Change

"Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. The impacts of global climate change are already being felt in the United States and are projected to intensify in the future—but the severity of future impacts will depend largely on actions taken to reduce greenhouse gas emissions and to adapt to the changes that will occur."
- Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II, 2018.

Climate change is one of the greatest environmental challenges of the 21st century. Scientists expect that with the current trends in fossil fuel use, Americans will see more intense heat waves, droughts, rainstorms, floods, wildfires and landslides in the future. In Pennsylvania, temperatures have increased by more than 1.8°F since the early 20th century and are expected to increase by an additional 5.4°F by 2050. Similarly, annual precipitation in Pennsylvania has increased by approximately 10% since the early 20th century and is expected to increase by another 8% by 2050, with a 14% increase during the winter season (Shortle et al. 2015).

These impacts are caused by the accumulation of greenhouse gas (GHG) such as carbon dioxide (CO2) and methane (CH4) 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). In Pennsylvania, the sectors responsible for the most GHG emissions are industrial (31%), electricity production (30%), and transportation (23%) (Pennsylvania Department of Environmental Protection (PA DEP), 2019).

The Fourth National Climate Assessment (2018) warned that if we do not curb greenhouse gas emissions and start to adapt, climate change could seriously disrupt the U.S. economy. Warmer temperatures, sea level rise and extreme weather will damage property and critical infrastructure, impact human health and productivity, and negatively affect sectors such as agriculture, forestry, fisheries and tourism. Damage to other countries around the globe will also affect U.S. business through disruption in trade and supply chains. With continued growth in emissions at historic rates, annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century—more than the current gross domestic product (GDP) of many U.S. states. On a local level, Ben Avon could see more flooding and landslides, increased heat-related illnesses, strain on our electric grid during heat waves, and exacerbated air pollution.

Action to reduce carbon emissions is needed at every level, and 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 greenhouse gas emissions we produce. Communities like Ben Avon Borough can demonstrate that it is possible to dramatically reduce carbon emissions while remaining a vibrant and prosperous place to live.

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 greenhouse gas emissions and update it annually; (2) administer a Climate Change Advisory Committee; (3) set up a voluntary registry of greenhouse gas 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 was updated in 2015, and the most recent Climate Action Plan, as well as greenhouse gas inventory, were released in 2019. 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 PA 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 government. The reduction targets are 26% by 2025 and 80% by 2050 from 2005 levels, consistent with an executive order signed by Governor Wolf in 2019 (PA DEP, 2019). To ensure consistency with the PA Climate Action Plan, Ben Avon Borough's reduction targets meet and exceed the statewide targets.

Local and Regional Climate Policy

Ben Avon Borough is joining an increasing number of local governments committed to addressing climate change at the local level. Ben Avon is among several communities in Western Pennsylvania to develop a Climate Action Plan through the Pennsylvania Department of Environmental Protection's Local Climate Action Program. Participating municipalities in Allegheny County since the program's inception in 2019 include the Boroughs of Etna, Forest Hills, Millvale, Munhall, Sharpsburg, West Homestead, and Elizabeth Township, as well as CONNECT (the Congress of Neighboring Communities) which is an organization of 36 municipalities (Aspinall, Baldwin, Bellevue, Brentwood, Carnegie, Castle Shannon, Churchill, Clairton, Collier, Crafton, Dormont, Duquesne, Edgewood, Etna, Forest Hills, Fox Chapel, Green Tree, Homestead, Ingram, Jefferson Hills, McKees Rocks, Millvale, Mount Lebanon, Munhall, Oakmont, the City of Pittsburgh, Reserve, Ross Shaler, Sharpsburg, Swissvale, West Homestead, West Mifflin, West View), and Allegheny County. The City of Pittsburgh adopted its first Climate Action Plan in 2008, with updates in 2012 and 2018.

Purpose and Scope of the Climate Action Plan

Ben Avon Borough recognizes the risk that climate change poses to its residents and businesses and plans to reduce the greenhouse gas emissions of both its government operations and the community at-large through the strategies laid out in this Climate Action Plan. The Borough also recognizes the wisdom of preparing for changing climate conditions.

Purpose

Ben Avon's greenhouse gas emissions reduction targets meet or exceed the targets set by the Commonwealth of Pennsylvania's 2018 Climate Action Plan. We also considered the reduction targets set by other agencies and groups, such as the U.N. International Panel on Climate Change (IPCC), who reported in 2018 that in order to avoid catastrophic temperature increases, global emissions need to be cut by 45% by 2030 (compared to 2010 levels) and reach net zero by 2050. Our goal is to achieve:

- 26% reduction in greenhouse gas emissions by 2025
- 50% reduction in greenhouse gas emissions by 2030
- 90% reduction in greenhouse gas emissions by 2050

The Climate Action Plan is a framework for the development and implementation of actions that reduce Ben Avon Borough's GHG emissions. The Plan provides guiding objectives and actions to realize Ben Avon Borough's GHG reduction goal. In addition to addressing mitigation concerns, the Climate Action Plan considers the vulnerability of Ben Avon Borough to hazards exacerbated by climate change.

Scope

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

- Residential Buildings
- Commercial Buildings
- Transportation
- Waste, Recycling, and Composting
- Land Use & Infrastructure

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

The planning process was based on the following overarching framework, developed by ICLEI – Local Governments for Sustainability, USA (ICLEI), and known as the Five Milestones for Climate Mitigation.

Figure 1: Five Milestones for Climate Mitigation

As indicated by the figure above, climate action planning is a continuing cycle and does not stop with the development of this document. However, this Climate Action Plan represents Ben Avon Borough's first planning cycle, including the completion of the first three milestones:

Milestone 1: Chapter 2 summarizes the emissions inventory and forecast
Milestone 2: Chapter 3 sets reduction targets
Milestone 3: Chapters 4-8 outline objectives and actions
Milestone 4: Chapter 10 also describes the initial steps of milestones 4 and 5, monitoring and implementation.

Community Input and Engagement

It is important that the Climate Action Plan reflect the priorities of the Ben Avon community as well as presenting an effective roadmap for reducing emissions. Community engagement efforts are under way, with methods that have been adapted for public safety during the covid-19 pandemic. Community outreach for the Climate Action Plan began in early 2021, when covid-19 case counts were high and public gatherings were restricted.

A Climate Working Group composed of Ben Avon residents and community leaders was formed in early 2021 to guide the development of the Plan. The working group met approximately every six weeks to work on the Climate Action Plan. Periodic updates were provided to the Borough Council during regular monthly voting meetings and working sessions.

One of the first tasks of the working group was to develop an online community survey on climate action using Google Forms. Ben Avon residents and businesses were invited to respond to the survey throughout the month of March 2021. It was publicized on the Borough website as well as on social media (Facebook and Next Door) and via e-mails from climate working group members. The survey asked respondents to rate the importance of climate action in general as well as giving input on particular actions, both as an individual household or business and community-wide. The full survey results are provided in Appendix II and are posted on the Borough's website. Since the survey was not conducted using statistical sampling methods, the results should not be viewed as a scientifically representative sample of the community. Participants may have self-selected based on an interest (either positive or negative) in climate action. Because the survey was conducted online it also likely reached people who are relatively computer-savvy. With those caveats in mind the results are still potentially useful in understanding the opinions of those who did respond.

51 residents participated in the survey. Most respondents are concerned about climate change (90%) and think it is important to take action (88%). Most respondents have already done many of the low cost and easy ways of reducing their household energy use (e.g. installing LED lightbulbs, choosing energy-efficient appliances) and are interested in doing more. Respondents said that the biggest barriers to reducing their carbon footprint were inconvenience or difficulty, highlighting the need for incentives, education, and technical assistance on topics such as energy efficiency.

When asked what the Borough Council should do to address climate change (assuming no tax increase or additional cost to residents), the top responses were:

- Improve recycling and compost services
- Improve infrastructure for alternative transportation such as bike lanes and bus routes
- Protect existing trees and plant new trees
- Source the Borough's electricity from a renewable energy supplier
- Help connect property owners with businesses, organizations, or programs that provide solar panels, energy audits or efficiency services
- Make energy efficiency upgrades in Borough-owned buildings

Community engagement efforts are ongoing and will continue through 2021. The Draft Climate Action plan is posted on the Borough's website for public comment and public outreach regarding the Climate Action Plan occurred during Fall 2021.

Vision Statements

Ben Avon Borough will maintain its character and quality of life while achieving the following vision for our community's future:

- Ben Avon's homes, businesses, and government buildings will run on carbon free energy.
- Ben Avon will reduce fossil fuel related pollution and improve our air quality.
- Ben Avon will join regional efforts to make our transportation and waste management systems cleaner and more sustainable.
- Ben Avon will prepare for the effects of climate change, such as extreme weather.
- Ben Avon will consider and engage vulnerable populations in our community when preparing for and addressing climate change.

Objectives

The following objectives were analyzed using the Clearpath tool to make sure the reduction targets would be met. Most land in the Borough is residential, so home energy use is the greatest source of greenhouse gas emissions. Accordingly, the most impactful objectives focus on reducing energy and fossil fuel use in homes. All reductions are as compared to the 2018 baseline.

By 2025

- 30% of Ben Avon residents will choose an electricity supplier that provides 100% renewable energy.
- Energy use in homes will be reduced by 15% through energy efficiency measures.
- Ben Avon homeowners will install 48 kW of rooftop solar panels (approximately 3 new installations per year).
- The Borough will get its municipal electricity from 100% renewable sources.
- The Borough will reduce its energy use by 10%.
- The Borough will participate in regional efforts to improve the sustainability of our transportation infrastructure.
- The Borough will continue to provide recycling services for residents and will explore expanded recycling options.

By 2030

- 80% of Ben Avon residents will choose an electricity supplier that provides 100% renewable energy.
- Energy use in homes will be reduced by 30% through energy efficiency measures.
- 10% of homeowners will decommission their gas furnaces and boilers and switch to heat pumps for home heating and cooling.
- Ben Avon homeowners will install an additional 60 kW of rooftop solar panels (approximately 3 new installations per year).
- The Borough will reduce its energy use by 30%.

- Commercial buildings in Ben Avon will reduce energy use by 30% through energy efficiency measures.
- 25% of commercial buildings will switch their electricity supplier to renewable energy
- 25% of residents who own cars will drive electric vehicles.
- Our community will continue to preserve our existing trees and plant new trees where appropriate.
- Ben Avon will prepare for extreme weather.
- The Borough will advocate for electric bus adoption by organizations serving our community, including Avonworth school buses and Port Authority transit buses.
- The Borough will encourage responsible composting.
- The Borough will implement measures to reduce local air pollution from internal combustion engines including diesel engines and gas appliances.

By 2050

- 100% of homeowners and businesses will switch to heat pumps for home heating and cooling.
- All homeowners and businesses will source their electricity from 100% renewable sources.
- The Borough will reduce its energy use by 40%.
- Ben Avon homeowners will install an additional 240 kW of rooftop solar panels (approximately 3 new installations per year).
- Energy use in homes will be reduced by 40% through energy efficiency measures.
- 100% of residents who own cars will drive electric vehicles.
- The Borough will replace internal combustion vehicles in its fleet with electric vehicles by 2040.

Co-Benefits of Climate Action

Greenhouse gas reduction and climate resilience are not the only beneficial outcomes of climate action plans. Reducing fossil fuel use and energy use can have the following additional benefits:

- Reduced household and government energy costs due to better energy efficiency. Certain improvements that reduce fossil fuel use also have lower maintenance requirements, for example LEDs need to be replaced less often than alternative bulbs; electric vehicles do not require oil changes.
- Reduced air pollution from gas burning vehicles and appliances, and a corresponding reduction in associated illnesses such as cancer, asthma, and cardiovascular disease.
- Reduced road maintenance due to less vehicle traffic.
- Improved property and resale values for homes with energy efficiency features and mature trees
- Creation of jobs in our region to implement improvements to existing buildings, build electric vehicles, and install renewable energy projects.

2. Greenhouse Gas Inventory

Since the early 1990s, U.S. cities have developed community-wide and local government operations greenhouse gas (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 provide consistency in quantifying greenhouse gas emissions among 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 footprints.

Ben Avon Borough used the *Community Protocol* for our the inventory, meaning that we tallied the emissions from sources throughout our community, not just from government operations. Community-wide emissions represent the sum total of emissions produced within Ben Avon Borough limits as well as emissions resulting from electricity use within the jurisdiction, even if that electricity is generated elsewhere. In this way, the community-wide figures represent all emissions for which the community is responsible.

Ben Avon Borough Community-Wide Greenhouse Gas Emissions

Data used to create the Greenhouse Gas Inventory was requested from local utilities and agencies for the year 2018, as follows:

- Electricity – Duquesne Light Company
- Natural Gas – Columbia Gas of Pennsylvania and Peoples Gas
- Water – West View Water Authority
- Wastewater – ALCOSAN
- Solid Waste – Waste Management
- Transportation – Southwestern Pennsylvania Commission

Sector	Co2 equivalent (metric tons), 2018	Percent of Total
Residential energy	9,576	85.2%
Commercial Energy	799	7.1%
Solid Waste	485	4.3%
Transportation	282	2.5%
Water & Wastewater	92	0.8%
Total	11,234	100%

Note that emissions from the Borough's operations are embedded within the community-wide totals. For example, emissions from government buildings are included in the "Commercial" sector and emissions from

Ben Avon Borough fleet vehicles are included in the "Transportation" figure above. Sources of emissions such as air travel, goods consumption, diet, land use, etc. are more difficult to quantify and therefore were not modeled.

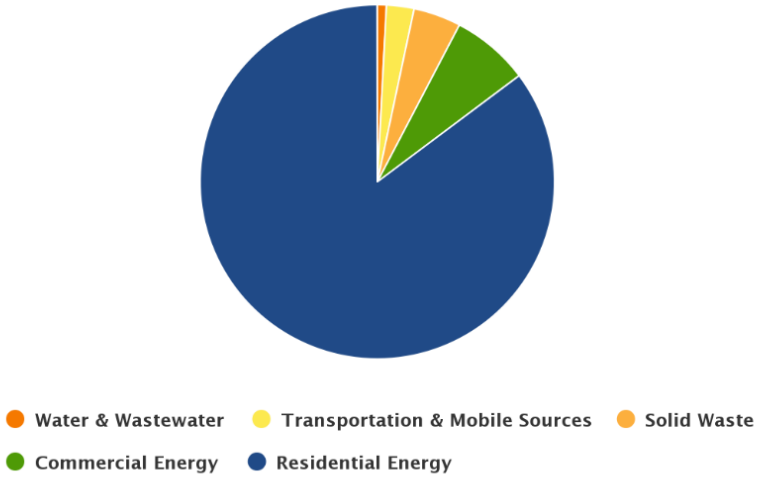

Figure 2: Ben Avon Borough Community-Wide GHG Emissions (Co2e)

Forecasting Ben Avon Borough's Greenhouse Gas Emissions

Ben Avon Borough has also completed an emissions forecast based on projections of current data and expected future trends. This emissions forecast is also known as a "Business As Usual" forecast, a scenario estimating future emissions levels if no further local action were to take place. The forecast indicates that, if we do not take action, GHG emissions will stay about the same or decrease slightly from 2018 to 2050. The starting emissions value is 11,234 metric tons of CO2e (2018) and the ending value is 11,114 metric tons of CO2e (2050). Since Ben Avon does not project significant population change during this period, the only change in emissions is based on predicted future more stringent CAFE standards, which would reduce vehicle emissions. For complete information regarding the emissions inventory and forecast, including methodology and supporting data, please reference Appendix I.

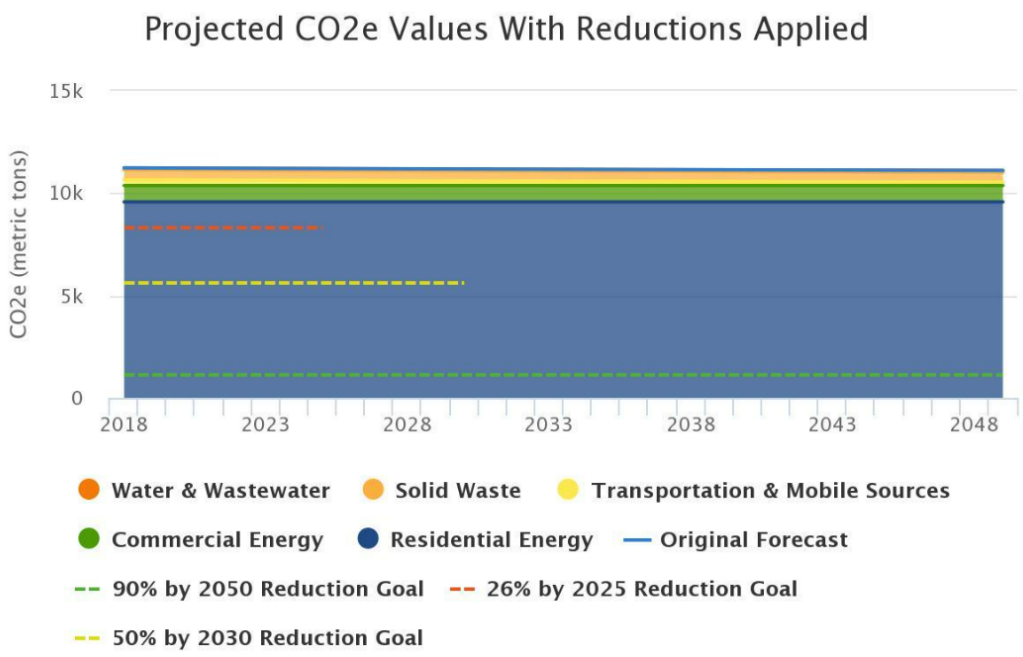

Figure 3: Projected Change in GHG Emissions from 2018 to 2050

Ben Avon Borough's Greenhouse Gas Reduction Target

Ben Avon Borough has set targets to reduce its emissions from 2018 levels by 26 percent by 2025, 50% by 2030, and 90% by 2050. Figure 4 shows the Projected Change in Greenhouse Gas Emissions if the recommendations of this Climate Action Plan are implemented, according to the Clearpath model.

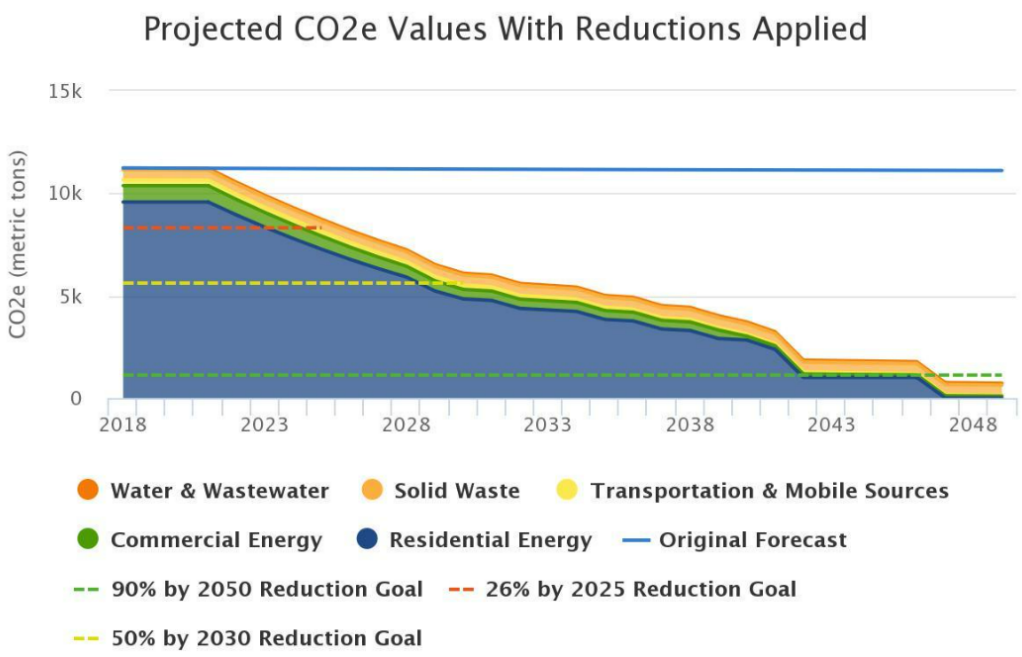

Figure 4: GHG Reduction Target

3. Taking Action

In the following chapters, 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.

Emissions Reduction Potential

Calculating expected emissions reductions for each objective and action requires making assumptions about 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:

Symbol	GHG Reduction (Metric Tons)
	0-500 CO2e
	500-1000 CO2e
	1000-3000 CO2e
	3000+ CO2e

The greenhouse gas reduction estimates are based on the results from the Clearpath forecasting tool. Specific implementation assumptions and GHG reduction estimates are listed in the Appendix.

New and Existing Actions

This Climate Action Plan includes a combination of existing policies and programs as well as new ideas based on best practices from around the country. Whether an action is new or existing is noted in the action heading.

Consistency with Statewide Climate Action Plan

The Commonwealth of Pennsylvania's 2018 Climate Action Plan includes many actions that are meant to be implemented by local governments as well as on the state-level. This Climate Action Plan incorporates as many of those actions as possible and appropriate. The tables in the following chapters will indicate whether an action is adapted from the statewide plan.

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.

Lead Actor

Implementation of the Climate Action Plan will require leadership at multiple levels. Establishment of a Climate Working Group or Environmental Committee (the latter was identified as a key action in the 2017 Joint Comprehensive Plan adopted by Ben Avon, Ben Avon Heights, Avalon, and Bellevue) would help supplement the work of the existing Borough Council Committees such as Administration, Communications, Public Works, etc. Participation from other groups or entities such as the Joint Planning Commission is also indicated where appropriate.

4. Commercial Buildings

Energy consumed in commercial buildings accounts for 7.1% of Ben Avon Borough's total greenhouse gas emissions. Although Ben Avon has much fewer commercial buildings than residential buildings, the commercial sector includes significant institutions such as churches and municipal government, as well as buildings in our business district. Although the Borough government's operations are a small fraction of our community's overall climate footprint, the Borough has an opportunity to lead by example and "walk the talk" by addressing energy efficiency and fossil fuel use in our own buildings. This chapter focuses on opportunities to retrofit existing commercial buildings to achieve our community's climate protection goals.

Objective	Reduction Potential
CB1 – Borough Electricity: The Borough will get its municipal electricity from 100% renewable sources by 2025.	
CB2 – Borough energy efficiency: The Borough will reduce its energy use by 10% by 2025; 30% by 2030; and 40% by 2050.	
CB3 – Commercial Renewable Energy 25% of commercial buildings will switch their electricity supplier to renewable energy by 2030; 100% by 2050.	
CB4 – Commercial energy efficiency: Commercial buildings in Ben Avon will reduce energy use by 30% through energy efficiency measures by 2030.	
CB5 – Commercial heat pumps: 100% of commercial buildings will use heat pumps for heating and cooling by 2050.	

Objective CB 1 – Borough Electricity

The Borough will get its municipal electricity from 100% renewable sources by 2025.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
CB-1A	The Borough will obtain quotes for renewable electricity.	E	Y	N	Climate Group, Administration	Quotes Obtained
CB-1B	The Borough will investigate purchasing locally generated renewable electricity.	E	Y	N	Climate Group, Administration	Research completed
CB-1C	The Borough will switch its electricity supplier to 100% renewable.	E	Y	N	Climate Group, Administration	Switch completed

Objective CB 2 – Borough Energy Efficiency

The Borough will reduce its energy use by 10% by 2025; 30% by 2030; and 40% by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
CB-2A	The Borough will obtain energy audits for all Borough owned buildings.	N	Y	N	Climate Group, Administration	Audits Completed
CB-2B	The Borough will track energy use in its buildings using Energy Star Portfolio manager.	E	Y	N	Climate Group, Administration	Records entered and annually updated
CB-2C	When equipment needs to be replaced, the Borough will choose a high performing model	N	Y	N	Administration, Public Works	Equipment Replaced

	(e.g. Energy Star certified or similar) as a replacement					

Objective CB 3 – Commercial Renewable Energy						
25% of commercial buildings will switch their electricity supplier to renewable energy by 2030; 100% by 2050.						
Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
CB-3A	Provide information to businesses about how to switch to a renewable energy supplier through our website and newsletter	N	Y	N	Climate Group, Communications	Number of articles
CB-2B	Implement a recognition program (e.g. window signs) for businesses who switch to renewable energy.	N	Y	N	Climate Group, Communications	Program Implemented/ Number of Participants

Objective CB 4 – Commercial Energy Efficiency

Commercial buildings in Ben Avon will reduce energy use by 30% through energy efficiency measures by 2030.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
CB-4A	Provide information to businesses about obtaining energy audits and other energy efficiency services and products for their homes through our website and newsletter	N	Y	Y	Climate Group, Communications	Number of articles and programs
CB-4B	Explore partnerships with Green Building Alliance or other local organizations to provide outreach to local businesses regarding building sustainability programs such as the 2030 District.	N	Y	Y	Climate Group, Administration	Program Implemented/ Number of Participants

Objective CB 5 – Commercial Heat Pumps

Commercial heat pumps: 100% of commercial buildings will use heat pumps for heating and cooling by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
CB-5A	Provide information to businesses about heat pump retrofits through our website and newsletter	N	Y	Y	Climate Group, Communications	Number of articles and programs

5. Residential Buildings

Energy consumed in residential buildings accounts for 85.2% of Ben Avon Borough's total greenhouse gas emissions. Improving the efficiency of Ben Avon's homes will contribute significantly to achieving our greenhouse gas reduction targets, while potentially saving residents money on utility bills and reducing indoor air pollution. This chapter focuses on opportunities to retrofit Ben Avon's existing residential buildings, many of which are decades or even a century old and may need significant upgrades. Since these homes are privately owned, the success of these actions depends on homeowners choosing to make upgrades. Technology is changing rapidly and researching potential green home improvements can be overwhelming. The Borough can play a role in connecting homeowners with information and resources on the topics of clean energy and energy efficiency.

Small local governments such as Ben Avon have no influence on the composition of the electric grid, and limited resources to incentivize the types of systemic change that are needed to combat climate change. Ben Avon's climate objectives would be much easier to achieve with State and Federal policies that increase the amount of carbon free energy delivered to the grid, and that provide resources for improving energy efficiency and electrification of existing buildings.

Objective	Reduction Potential
RB 1 – Renewable electricity: 30% of Ben Avon residents will choose an electricity supplier that provides 100% renewable energy by 2025; 80% by 2030; 100% by 2050	
RB 2 – Energy efficiency: Energy use in homes will be reduced by 15% (from 2018 levels) through energy efficiency measures by 2025; 30% by 2030; 40% by 2050.	
RB3 – Rooftop Solar: Ben Avon homeowners will install 48 kW of rooftop solar panels by 2025; 100kW by 2030; 340 kW by 2050; (approximately 3 new installations per year)	
RB4 – Heat Pumps: 10% of homeowners will decommission their gas furnaces and boilers and switch to heat pumps for home heating and cooling by 2030; 100% by 2050	

Objective RB 1 – Renewable Electricity						
30% of Ben Avon residents will choose an electricity supplier that provides 100% renewable energy by 2025; 80% by 2030; 100% by 2050						
Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
RB-1A	Obtain information on how many Duquesne Light customers in the Borough currently have a renewable electricity supplier, if that information is publicly available, and update annually.	N	Y	N	Climate Group, Administration	Information obtained & Updated
RB-1B	Provide information to residents about how to switch to a renewable energy supplier through our website and newsletter	N	Y	N	Climate Group, Communications	Number of articles
RB-1C	Include renewable energy vendors at the Fall Festival and other public events.	N	Y	N	Climate Group, Avon Club	Vendors at Fall Festival
RB-1D	The Borough will create a "how-to" video for residents on switching to a clean energy supplier.	N	Y	N	Climate Group, Communications	Video posted
RB-1E	Implement a recognition program (e.g. yard signs) for residents who switch to renewable energy.	N	Y	N	Climate Group, Communications	Program Implemented/ Number of Participants

Objective RB 2 – Energy Efficiency						
Energy use in homes will be reduced by 15% (from 2018 levels) through energy efficiency measures by 2025; 30% by 2030; 40% by 2050.						
Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
RB-2A	Provide information to residents about obtaining energy audits and other energy efficiency services and products for their homes through our website and newsletter	N	Y	Y	Climate Group, Communications	Number of articles and programs
RB-2B	Include energy efficiency services vendors at the Fall Festival and other public events.	N	Y	Y	Climate Group, Avon Club	Vendors at Fall Festival
RB-2C	Explore partnerships with Duquesne Light or other local organizations to provide rebates and energy audits for homeowners at reduced cost.	N	Y	Y	Climate Group, Administration	Incentives established
RB-2D	Connect low income residents with free or reduced cost energy efficiency and weatherization programs available through local organizations and utilities.	N	Y	Y	Climate Group, Communications	Number of homes retrofitted
RB-2E	Explore how Borough building code enforcement could help to promote compliance with the adopted state residential energy code.	N	Y	Y	Climate Group, Public Safety	Information on energy code enforcement obtained

Objective RB 3 – Rooftop Solar

Ben Avon homeowners will install 48 kW of rooftop solar panels by 2025; 100kW by 2030; 340 kW by 2050; (approximately 3 new installations per year)

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
RB-3A	Provide information to residents about obtaining solar panels through our website and newsletter	N	Y	Y	Climate Group, Communications	Number of articles and programs
RB-3B	Include solar vendors at the Fall Festival and other public events.	N	Y	Y	Climate Group, Avon Club	Vendors at Fall Festival
RB-3C	Reach out to local organizations such as Solar United Neighbors to find out if there is technical assistance available for residents	N	Y	Y	Climate Group, Administration	kW of panels installed

Objective RB 4 – Heat Pumps

Heat Pumps: 10% of homeowners will decommission their gas furnaces and boilers and switch to heat pumps for home heating and cooling by 2030; 100% by 2050

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
RB-4A	Provide information to residents about heat pump retrofits through our website and newsletter	N	Y	Y	Climate Group, Communications	Number of articles and programs
RB-4B	Include heat pump vendors at the Fall Festival and other public events.	N	Y	Y	Climate Group, Avon Club	Vendors at Fall Festival

6. Transportation

Transportation accounts for 2.5% of Ben Avon Borough's total greenhouse gas emissions and is also a contributor to air pollution in our community. Ben Avon prides itself on being a walkable community. Our proximity to the City of Pittsburgh may contribute to the relatively small contribution of transportation to Ben Avon's overall carbon footprint.

This chapter focuses on programs and policies to reduce emissions from transportation and internal combustion engines and promote alternate modes such as walking, biking, or public transportation. However, the plan also recognizes that the Borough can only control its own streets, and that developing robust bicycle and transit infrastructure will require regional cooperation and funding, and participation of neighboring communities and entities such as PennDOT and the Allegheny County Port Authority. The transportation objectives of Ben Avon's Climate Action Plan are aligned with the goals and recommendations of the 2017 Joint Comprehensive Plan adopted by Ben Avon, Ben Avon Heights, Avalon, and Bellevue.

Objective	Reduction Potential
T1 – Electric vehicles: 25% of residents will drive electric vehicles by 2030; 100% by 2050.	
T2 – Alternative transportation: The Borough will participate in multi-municipal and regional efforts to improve the sustainability of our transportation infrastructure, with the goal of reducing vehicle miles traveled and greenhouse gas emissions.	
T3 – Borough Electric Fleet: The Borough will replace internal combustion vehicles and other engines in its fleet with electric versions by 2040.	
T4 – Regional Electric Fleet: The Borough will advocate for electric bus adoption by organizations serving our community, including Avonworth school buses and Port Authority transit buses.	
T5 – Internal Combustion Engines: The Borough will implement measures to reduce local air pollution from internal combustion engines including diesel engines and gas appliances by 2030.	

Objective T1 – Electric vehicles

25% of residents will drive electric vehicles by 2030; 100% by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
T-1A	Provide information to residents about electric vehicle incentives (e.g. federal and state tax incentives), case studies, and electric vehicle events through our newsletter and website.	N	Y	N	Climate Group, Communications	Number of articles
T-1B	Install a public electric vehicle charging station (fee based).	N	Y	N	Climate Group, Public Works	Charging station installed
T-1C	Meet with Duquesne Light to discuss electrification goals for homes and vehicles and plans for grid upgrades to support additional demand	N	Y	N	Climate Group, Public Works	Meeting occurs

Objective T2– Alternative transportation

The Borough will participate in regional and multi-municipal efforts to improve the sustainability of our transportation infrastructure, with the goal of reducing vehicle miles traveled and greenhouse gas emissions.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
T-2A	Participate in implementation and follow up on the Route 65 Corridor Study (concluded in March 2021).	E	N	N	QVCOG Liaison, Public Works	Implementation of study recommendations

T-2B	Work with neighboring communities to implement the objectives of the 2017 Joint Comprehensive Plan to improve pedestrian and bicycle transportation networks.	E	Y	N	Joint Planning Commission	Bike and/or pedestrian routes established
T-2C	Re-paint the "share the road" arrows on Church Avenue indicating the regional bike route, "N3," designated in Active Allegheny, Allegheny County's Active Transportation Plan and as recommended in the 2017 Joint Comprehensive Plan.	E	Y	N	Public Works	Sharrows painted
T-2D	Consider joining CONNECT in order to participate in broader regional collaboration on topics such as transportation.	N	N	N	Administration	Decision made to join or not join CONNECT
T-2E	Conduct a "Walk your City" campaign to raise awareness of walkable destinations and routes within the Borough and neighboring communities and encourage more walking and biking and support local businesses. https://walkyourcity.org/	N	Y	N	Communications, Public Works, Joint Planning Commission	Signs installed
T-2F	Develop program(s) to encourage replacement and repairs of deficient sidewalks, for example a shared purchase program by which several homeowners can join together to get bids.	N	N	N	Administration, Public Works	Percent of deficient sidewalk corrected

T-2G	Inventory deficiencies in sidewalks throughout the Borough, and issue notices to owners, in order to improve accessibility throughout the Borough.	Y	N	N	Administration, Public Works	Inventory completed

Objective T3 – Borough Electric Fleet

The Borough will replace internal combustion vehicles and other engines in its fleet with electric versions by 2040.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
T-3A	When considering replacement equipment purchases (e.g. lawnmowers, string trimmers, leaf blowers, etc.), the Borough will determine whether an electric version is available and will purchase the electric version unless financially prohibitive.	N	Y	N	Finance, Public Works	Percent of existing gas equipment replaced with electric
T-3B	When considering replacement vehicle purchases (e.g. pickup truck, backhoe), the Borough will purchase the least polluting model available, with preference for electric vehicles when available and financially feasible.	N	Y	N	Finance, Public Works	Percent of vehicles replaced with efficient or electric models.
T-3C	The Borough will install electric vehicle charging station(s) in	N	Y	N	Finance, Public Works	Charging stations installed

	the Borough maintenance garage area in order to support charging of the Borough electric fleet.					

Objective T4 – Regional Electric Fleet

Regional Electric Fleet: The Borough will advocate for electric bus adoption by organizations serving our community, including Avonworth school buses and Port Authority transit buses.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
T-4A	Reach out to bus operators serving our community to find out the status of plans and advocate for transitioning the fleet to electric vehicles.	N	Y	N	Climate Group, Administration	Organizations contacted

Objective T5 – Internal Combustion Engines

The Borough will implement measures to reduce local air pollution from internal combustion engines including diesel engines and gas appliances by 2030.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
T-5A	Replace 100% of gas small appliances such as lawn mowers and leaf blowers with electric versions by 2030 via ordinance, incentive or outreach.	N	Y	Y	Climate Group, Administration	Gas Appliances Replaced

7. Waste, Recycling, and Composting

Ben Avon Borough's solid waste that is not recycled is disposed of at Waste Management's landfill in Washington County, PA. Emissions from decaying organic material contribute 4.3% of our total greenhouse gas emissions and contribute to emissions in the Transportation sector via hauling of waste to and from facilities. Additionally, embodied energy within the items that we throw away might be harnessed through reuse and recycling of materials. Our carbon footprint could be reduced by reducing waste at its source, expanding recycling facilities, reducing food waste, and enabling re-use of materials. Community survey respondents were particularly interested in expanding recycling and composting options.

Objective	Reduction Potential
W1 – Recycling: The Borough will continue to provide recycling services for residents and will explore expanded recycling options.	
W2 – Composting: The Borough will encourage responsible composting.	

Objective W1 – Recycling						
The Borough will continue to provide recycling services for residents and will explore expanded recycling options.						
Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
W-1A	Work with the Pennsylvania Resources Council and other local partners to provide pop up recycling for materials that are not collected curbside, such as glass and electronics.	E	Y	N	Administration, QVCOG Liaison	Number of different types of materials recycled
W-1B	Participate in developing an updated RFP for waste and recycling services through the Quaker Valley Council of Governments with options for enhanced recycling collection.	E	Y	N	Administration, QVCOG Liaison	Number of different types of materials recycled, % of waste diverted from landfill
W-1C	Provide information to residents about recycling options and events on our website and newsletter.	E	Y	N	Communication, QVCOG Liaison	Number of resources provided

Objective W2 – Composting						
The Borough will encourage responsible composting.						
Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
W-2A	Research municipal composting services to collect residential organic waste. Consider emissions from the vehicles hauling the compost, collection logistics, cost.	N	Y	N	Climate Group, Public Works	Number of different types of materials recycled
W-2B	Provide information to residents about home composting techniques on our website and newsletter.	N	Y	N	Climate Group, Communications	Number of articles
W-3B	Research the best way to dispose of and process municipal leaf waste to reduce methane emissions and produce usable compost for landscaping.	N	Y	N	Climate Group, Public Works	Research completed

8. Land Management & Infrastructure

Although not directly modeled in our Greenhouse Gas Inventory, certain aspects of land management are relevant to our carbon footprint and are also important to the character and well-being of our community. For example, Ben Avon is known for our many large, mature specimen trees, which are also excellent at removing carbon from the atmosphere. This chapter also provides objectives and actions related to climate preparedness, although it was beyond the scope of this study to do a detailed risk assessment.

Objective	Reduction Potential
L1 – Trees: Our community will preserve our existing trees and plant new trees where appropriate.	
L2 – Green Spaces: Our community will manage our existing green spaces to improve their carbon sequestration potential	
L3 – Climate Risks: Ben Avon will prepare for extreme weather	

Objective L1 – Trees

Our community will preserve our existing trees and plant new trees where appropriate.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
L-1A	Plant additional trees at Avon Park and other Borough-managed properties.	E	Y	Y	Climate Group, Administration, Public Works, TreeVitalize	Number of trees planted
L-1B	Develop an updated Shade Tree Ordinance	E	Y	Y	Administration, Joint Planning Commission	Ordinance written and passed by Council
L-1C	The Borough will work with local organizations to develop and distribute a tree resource guide for homeowners (e.g. with info about tree protection, tree care and new tree planting).	N	Y	Y	Communications, Public Works, TreeVitalize	Tree Resource guide published

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Objective L2 – Green Spaces

Our community will manage our existing green spaces to improve their carbon sequestration potential.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
L-2A	Consider using organic matter from the leaf dump as compost to topdress lawns and planting	E	Y	N	Public Works	Tons of compost used

	areas in Avon Park, to increase carbon sequestration in the soil.					
L-2B	Plant additional trees at Avon Park and other Borough-managed properties.	E	Y	Y	Climate Group, Administration, Public Works, TreeVitalize	Number of trees planted
L-2C	The Borough will specify lower carbon concrete (e.g. with fly ash content) in its construction projects where appropriate.	N	Y	N	Climate Group, Public Works, Municipal Engineer	Standard concrete specification revised

Objective L3 – Climate Risk

Ben Avon will prepare for extreme weather.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Lead Actor	Metric
L-3A	The Borough will work with the municipal engineer to review updated flood maps and determine strategies for reducing flood vulnerability in low lying areas if necessary.	E	Y	Y	Public Works	Flood risk assessment completed
L-3B	The Borough will continue to inspect and upgrade storm and sanitary sewers in consultation with ALCOSAN and the municipal engineer.	E	Y	Y	Public Works	Percent of sewers inspected and repaired.

L-3C	The Borough will assess the vulnerability of Borough buildings and assets to extreme weather (e.g. potential to serve as a warming or cooling center need for backup power during emergencies, etc.)	N	Y	Y	Public Works
L-3D	The Borough will investigate installing green infrastructure stormwater solutions to reduce the impacts of climate related precipitation increases, in accordance with the recommendations of the Joint Comprehensive Plan.	Y	Y	Y	Public works

9. 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 Ben Avon Borough does not currently have the capacity to complete a more robust climate vulnerability assessment and adaptation action, the following analysis starts to identify potential local impacts and inform future risk assessment 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 greenhouse gas emissions. Under this scenario, Pennsylvania will be about 5.4°F warmer than it was at the end of the 20th century, and the annual precipitation will increase about 8%. While the likelihood of meteorological drought is projected to decrease, months with above-average precipitation will continue to rise. 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 (Shortle et al. 2015).

As average temperatures and precipitation rise, Ben Avon Borough is likely to experience climate impacts such as landslides, flooding, extreme heat events, and worsening air pollution. Ben Avon Borough used The Climate Explorer (https://crt-climate-explorer.nemac.org/) to identify likely changes from today through 2100. The following sections discuss the top climate hazards according to those projections. For more information about the science behind climate change, see Appendix II: Climate Change Science.

Rising Temperatures & Heat

Rising temperatures in Ben Avon can lead to an increased demand for air conditioning, resulting in higher energy use and higher costs. Some houses in Ben Avon do not have central air conditioning. Stronger heat events can also worsen air pollution, create more severe pollen seasons, change vector borne disease pathways, and lead to an increase in heat-related illnesses or deaths. Certain populations are particularly vulnerable to heat related illnesses, including children, the elderly, people with disabilities, people with asthma or lung conditions, and people with limited resources to pay for additional cooling.

The following graph from the Climate Explorer indicates that average daily temperatures in Ben Avon have been increasing and will continue to rise through 2100, which could impact energy costs, infrastructure, public health, and other sectors of the community. The red line represents a scenario where emissions continue in a "business as usual" style, in accordance with the RCP 8.5 model developed by the U.N. International Panel on Climate Change (IPCC). The blue line represents RCP 4.5, an emissions scenario suggesting emissions are stabilized by 2040 and then dramatically reduced. RCP means Representative Concentration Pathway, a greenhouse gas concentration trajectory adopted by the IPCC. The pathways

describe different climate futures, all of which are considered possible depending on the volume of greenhouse gases (GHG) emitted in the years to come.

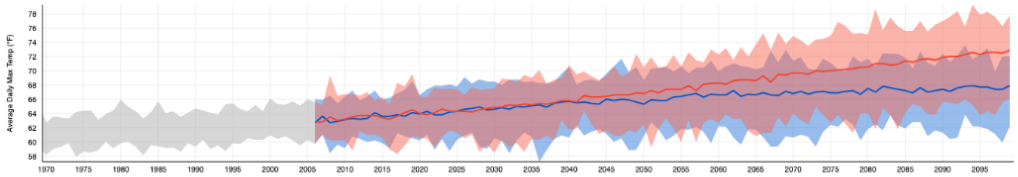
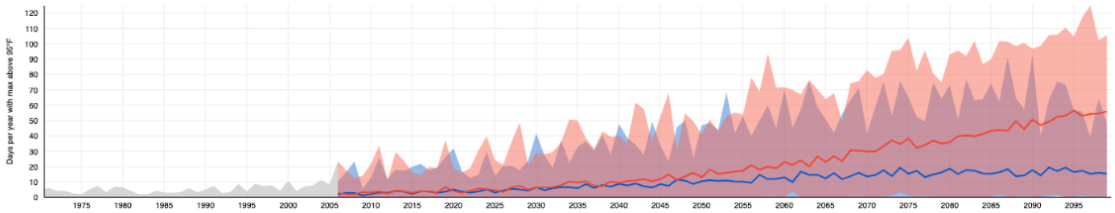


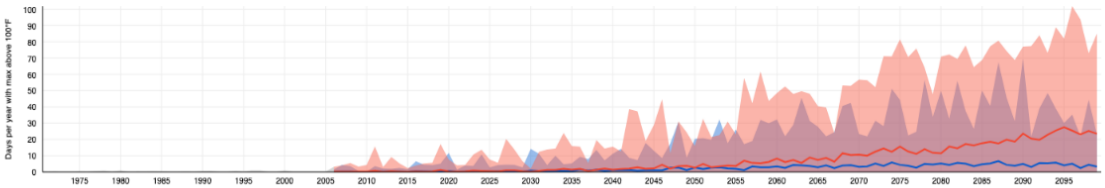
Figure 5: Average Daily Temperature Between 1970-2100

These next following graphs represent that number of days that Ben Avon will experience temperatures greater than 95, 100, and 105 degrees Fahrenheit respectively.

Days with Max> 95 (1970 – 2100)



Days with Max > 100 (1970 – 2100)



Days with Max> 105 (1970 – 2100)

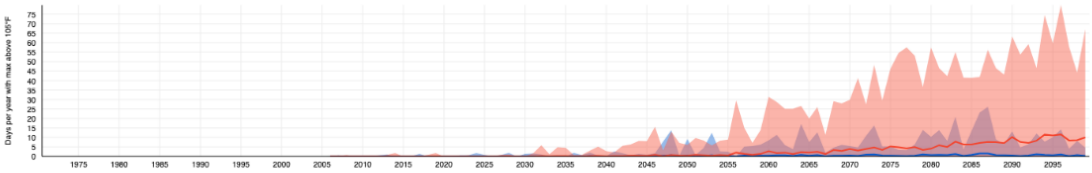


Figure 6: Average Daily Max Temperatures

Air pollution is another major concern for Ben Avon Borough. Allegheny County ranks in the top 2% of counties in the U.S. for cancer risk from air pollution and the city of Pittsburgh ranks as one of the top 10 most polluted cities in the nation in regard to year-round particle pollution (PM2.5). Air pollution already has a significant impact on health. Some health impacts of air pollution include:

- Increased risk of heart and lung disease, asthma, diabetes, cancer and premature death.
- Cardiovascular disease and stroke
- Neurodevelopmental disorders (autism spectral) and neurodegenerative disorders (Parkinson's, ALS, Alzheimer's)
- Low birth weight and developmental effects in babies
- Increased risk of pregnancy and birth complications

Higher temperatures worsen the effects of air pollution and the impact it may have on respiratory health. An increase in average temperature could lead to an increase in ground-level ozone and particulate matter, create more inversion effects, and more intense pollen seasons.

Additionally, Ben Avon is directly adjacted to Neville Island, a source of air pollutants. One of the worst polluters, the Shenango Coke Works, shut down in 2016, improving the local air quality. However, there are still many industrial facilities on Neville Island that contribute to air pollution in Ben Avon. For example, the Metallico car scrapping operation has had several fires in its scrap pile, including one in 2021 that caused residents of Emsworth to evacuate. Other sources of air pollution in the Borough include the railroad line adjacent to the Ohio River and Route 65. The following maps from the U.S. Department of Environmental Protection's EJ Screen map tool show Ben Avon is in the 80-90 Percentile for Traffic Proximity and the 90-100 Percentile for Cancer Risk due to Air Pollution.

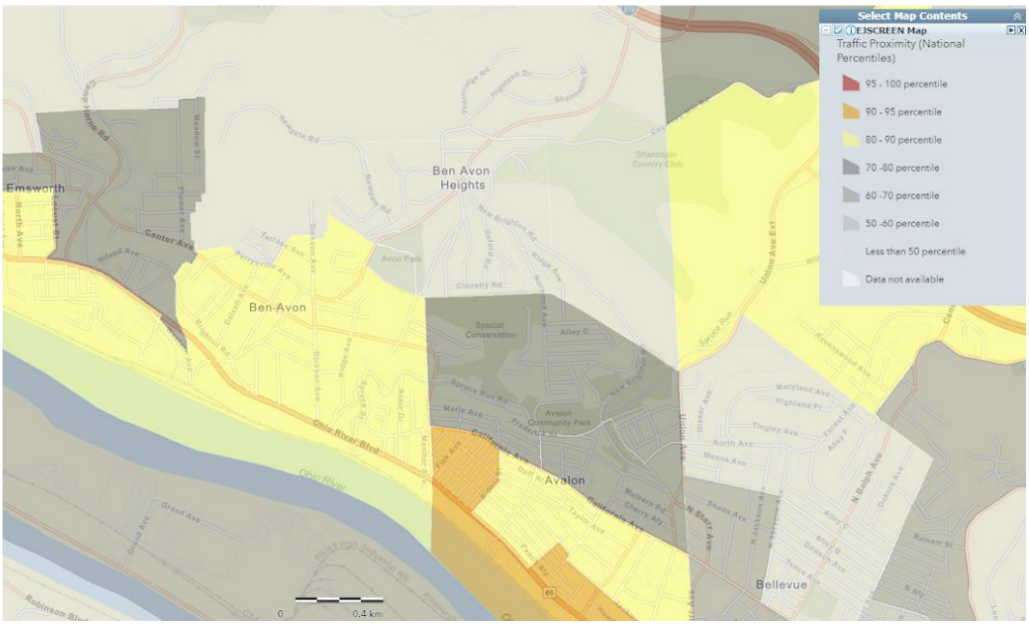


Figure 6: EPA EJ Screen - Traffic Proximity

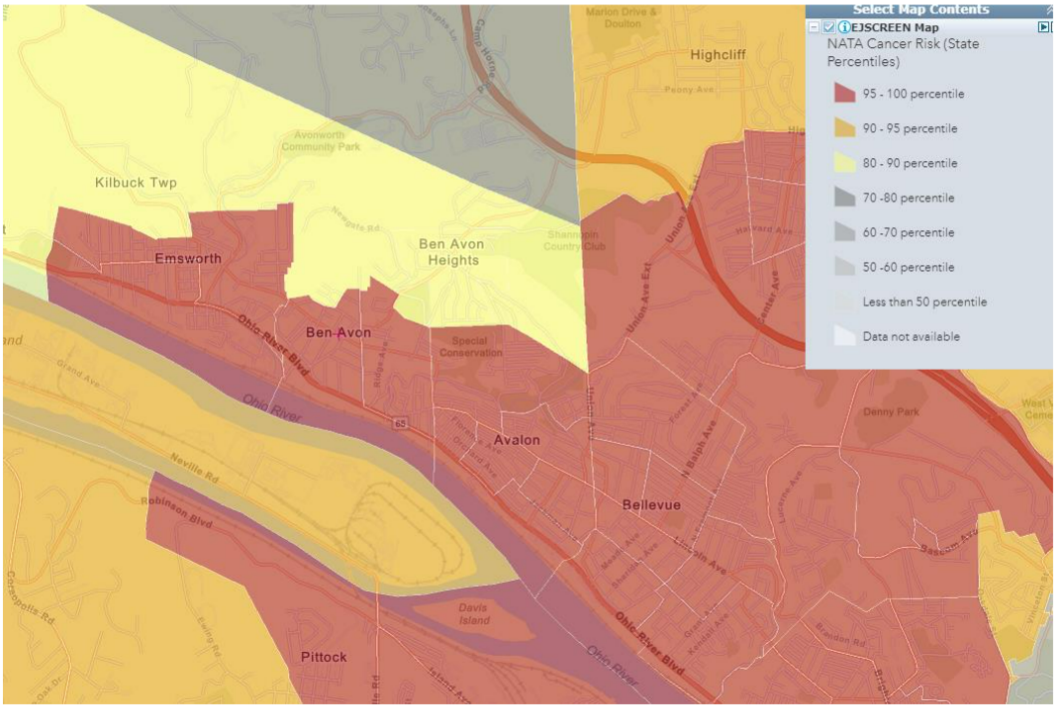
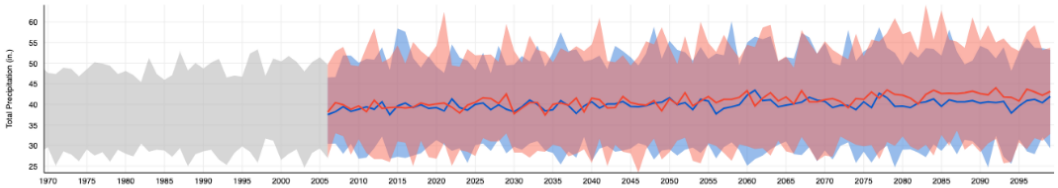


Figure 7: EPA EJ Screen – NATA Cancer Risk

Increase in Precipitation

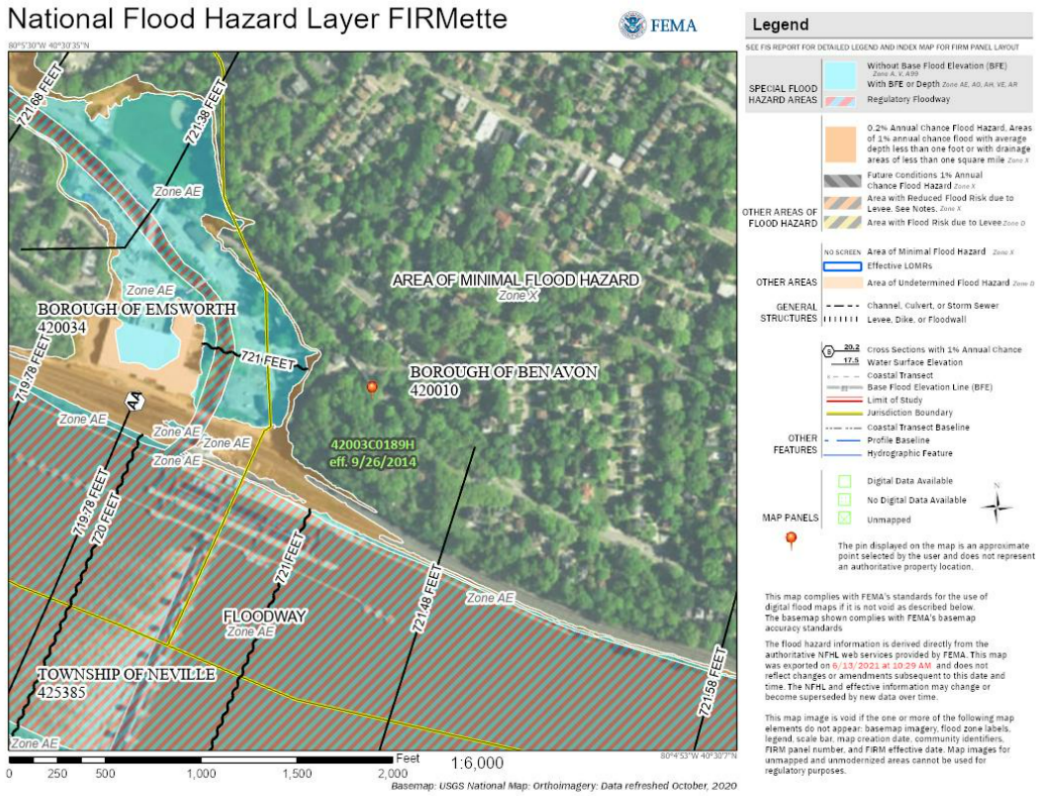
An increase in precipitation in Ben Avon can lead to an increase in flooding, landslides, wet basements, and mold, as well as impact water quality to local streams and damage property and infrastructure.

The following graph indicates that total precipitation in Ben Avon has been increasing and will continue to rise through 2100. The red line represents RCP 8.5, a scenario based off emissions continuing in a "business as usual" style. The blue line represents RCP 4.5, and emissions scenario suggesting emissions are stabilized by 2040 and then dramatically reduced.

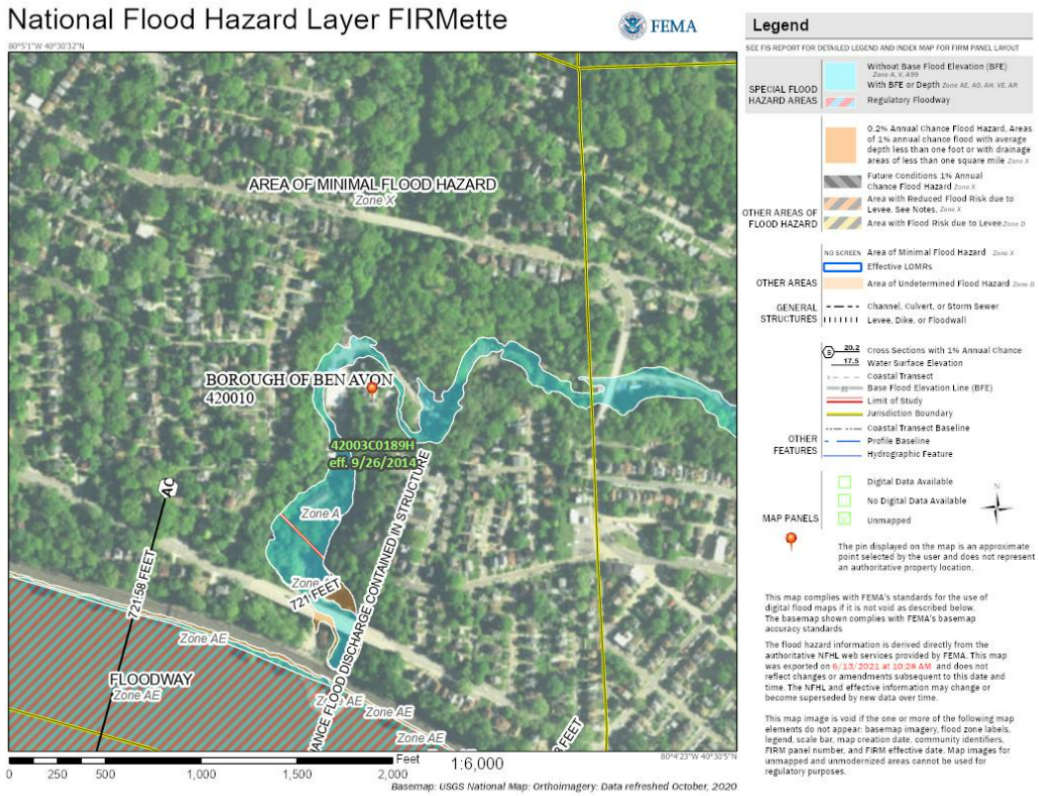


Ben Avon Borough is susceptible to landslides and flooding events in the case of increasing precipitation. As a result of these events, there could be damage to infrastructure and property and an increased need for

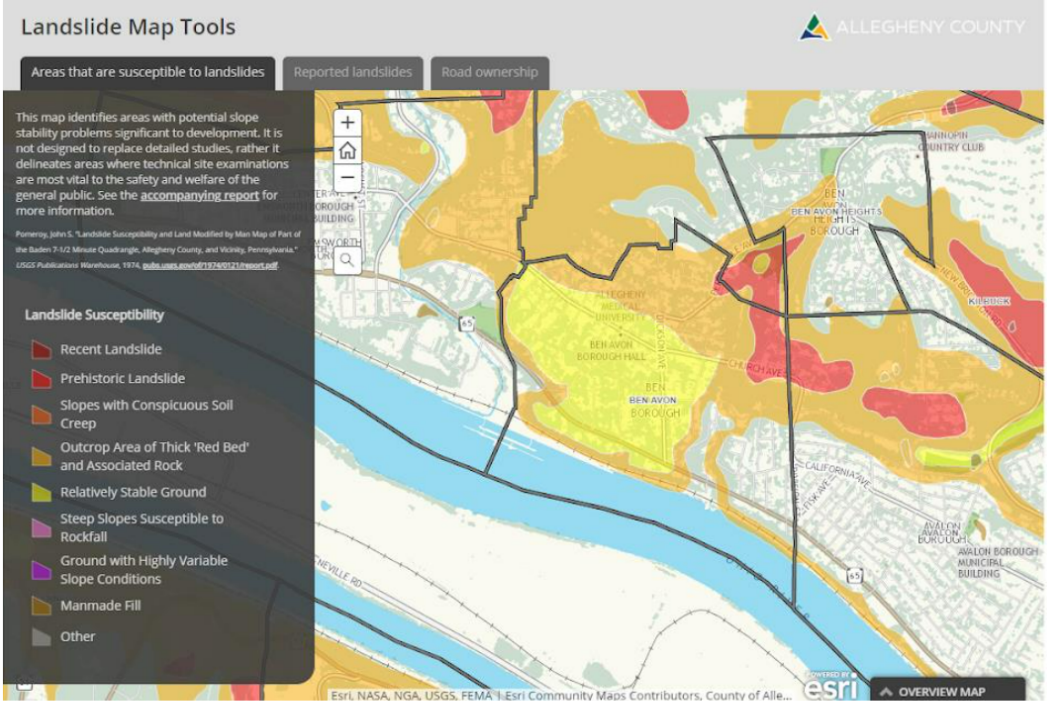
emergency services. The maps below display FEMA's National Flood Hazard and Ben Avon's vulnerability to landslides. FEMA's map indicates that Lower Spruce Run and Western Ave. are vulnerable to flooding, as well as showing the Borough's maintenance garage and public works equipment are in the 1% flood risk zone. The landslide map shows that the majority of Ben Avon soils are "relatively stable" however, some areas have landslide prone soils and/or have experienced a landslide in the past. The Joint Comprehensive Plan developed in 2017 showed some land area in the Borough as having both steep slopes and "red bed" soils that are prone to landslides.



FEMA Flood Hazard Map, Lowries Run, obtained June 2021. Areas shown in blue have a 1% annual chance of flooding.



FEMA Flood Hazard Map, Spruce Run, obtained June 2021. Areas shown in blue have a 1% annual chance of flooding.



Adaptive Greenhouse Gas Reduction Measures

Some greenhouse gas 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)
    - 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

- 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

10. Monitoring Plan

Starting in 2022, Ben Avon Borough will begin Plan implementation.

Establishing a monitoring process enables Ben Avon Borough to track the impacts of the actions included in the plan and compare estimated impacts to actual achievements in terms of energy savings, renewable energy production, and greenhouse 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.

The table below describes the components of the monitoring reports. Action reports are to occur every two years and will only include status updates on the overall action, the mitigation action plan, and the adaptation action plan. The full monitoring report will occur every 10 years and in addition to the components in the action report, will include an updated community and municipal greenhouse gas inventory. This will help Ben Avon Borough track its greenhouse gas emissions reduction progress. With the approval of this Climate Action Plan in 2021, the first monitoring action report will be due in 2023 and the first full monitoring report with the updated greenhouse gas inventories will be due in 2031.

Monitoring Report Component	Action Reporting	Full Reporting
Overall Action: Reporting any changes to initial action as well as updated information on human and financial resources	Yes	Yes
GHG Emissions Inventories: Provide updated energy consumption and GHG emissions data for the reporting year	No	Yes
Climate Action Measures: Report the implementation status (completed, in progress, on hold) of key actions and update their impacts	Yes	Yes

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Appendix I: Methodology

The greenhouse gas inventory and emissions reductions forecasts were developed using the Clearpath Tool from ICLEI USA. For more information on the Clearpath tool, please visit https://icleiusa.org/clearpath/.

The following data was used as the basis for the greenhouse gas inventory:

Emissions from Grid Electricity, Residential (2018)		
Record Name	Electricity Used	Units
Duquesne Light	7,460,076	kWh

Emissions from Grid Electricity, Commercial (2018)		
Record Name	Electricity Used	Units
Duquesne Light	670,608	kWh

Emissions from Stationary Fuel Combustion - Natural Gas, Residential (2018)			
Record name	Fuel Type	Fuel Use	Units
Peoples Gas	Natural Gas	44,561	therms
Columbia Gas	Natural Gas	1,009,114	therms

Emissions from Stationary Fuel Combustion - Natural Gas, Commercial (2018)			
Record name	Fuel Type	Fuel Use	Units
Peoples Gas	Natural Gas	2620	therms
Columbia Gas	Natural Gas	80499	therms

Vehicle Miles Traveled. Source: Southwestern Pennsylvania Commission (2018)								
Record Name	VMT Location	Travel Type	Type of VMT or Emissions Data (if applicable)	Fuel Type	Annual VMT	Fuel Use	CH4 emission factor (g/mile)	N2O emission factor (g/mile)
Medium/Heavy Trucks (Both End in BA)	In-Boundary	Freight	In Boundary	Diesel	146	933.3003	0.0051	0.0048

Cars/Light Trucks (Both End in BA)	In-Boundary	Passenger	In Boundary	Gasoline	15877.5	335372.6	0.01935	0.013
Medium/Heavy Trucks (One end in BA)	In-Boundary	Freight	Origin-Destination	Diesel	18998.25	121445.7	0.0051	0.0048
Cars/Light Trucks (One End in BA)	In-Boundary	Passenger	Origin-Destination	Gasoline	559818.75	11824774	0.01935	0.013

Waste Generation (2018)		
Facility Name or Waste Group	Tons of Waste Landfilled	Does the receiving landfill have methane collection?
Waste Management	1,061.8	Yes

Water Supply (2018)				
Record Name	Electricity Usage		Natural Gas Usage	
	Usage	Units (e.g. kWh)	Usage	Units (e.g. MMBtu)
West View Water	9,919	kWh	1.1	MMBtu

Wastewater Treatment (2018)						
Record Name	System population	Community population	Percent allocated to community	System Energy	Community energy	Units
Alcosan	824,000	1,732	0.21	81,730,840	171,635	kWh
Alcosan	824,000	1,732	0.21	102,146,000	214,507	Standard cubic feet

Appendix II: Survey Results

Survey Participants

- 51 total respondents
- Responses collected March 1-31 via online survey (Google Forms)
- Advertised via Ben Avon website, Ben Avon Facebook page, Next Door, at a Council meeting, and via e-mail outreach from climate working group members, and Council members

Section 1 of 3

Ben Avon Community Climate Survey

As part of a free program offered by the Commonwealth of Pennsylvania, Ben Avon Borough is developing a greenhouse gas inventory and Climate Action Plan. The Climate Action Plan will help us 1) understand the sources of greenhouse gas emissions in our community 2) develop strategies to minimize our carbon footprint, and 3) improve our community's resilience and preserve our quality of life.

We are asking for your help to guide the Climate Action Plan and the actions that we as a Borough should take.

Your participation in this survey is an important part of this process and we appreciate your response. The information collected will not be shared or used for any purpose other than the Climate Action Plan. This survey should take about 10 minutes to complete.

Email address *

Valid email address

This form is collecting email addresses. Change settings

Are you a resident or owner of a business in Ben Avon Borough? *

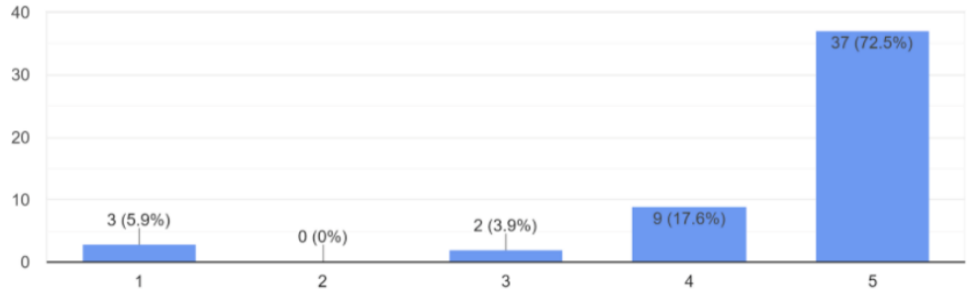
- Resident
- Business Owner
- Other...

Community Survey Results Summary

- Majority of respondents are very concerned about climate change and very interested in taking action
- Most respondents have already done many of the "easy" ways to reduce their household energy use (LED lightbulbs, efficient appliances) and are very interested in doing more.
- Respondents said that the biggest barrier to reducing their residential energy use was inconvenience or difficulty.
- When asked what the Borough Council should do to address climate change, the top responses were:
  - Improve recycling and compost services
  - Improve infrastructure for alternative transportation such as bike lanes and bus routes
  - Protect existing trees and plant new trees
  - Source the Borough's electricity from a renewable energy supplier
  - Help connect property owners with businesses, organizations, or programs that provide solar panels, energy audits or efficiency services
  - Make energy efficiency upgrades in Borough-owned buildings

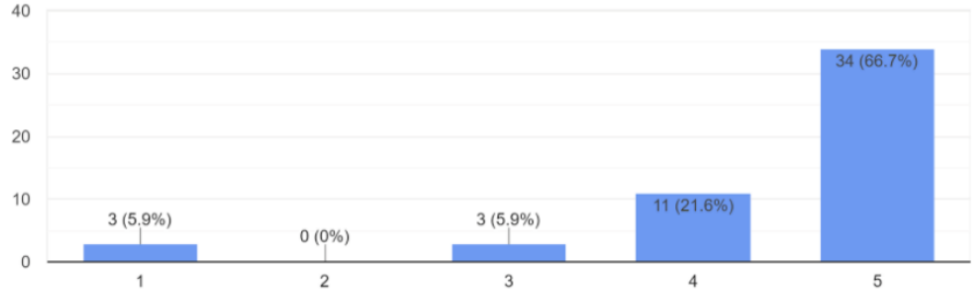
How concerned are you about the potential effects of climate change?

51 responses



How important is taking action on climate change to you?

51 responses



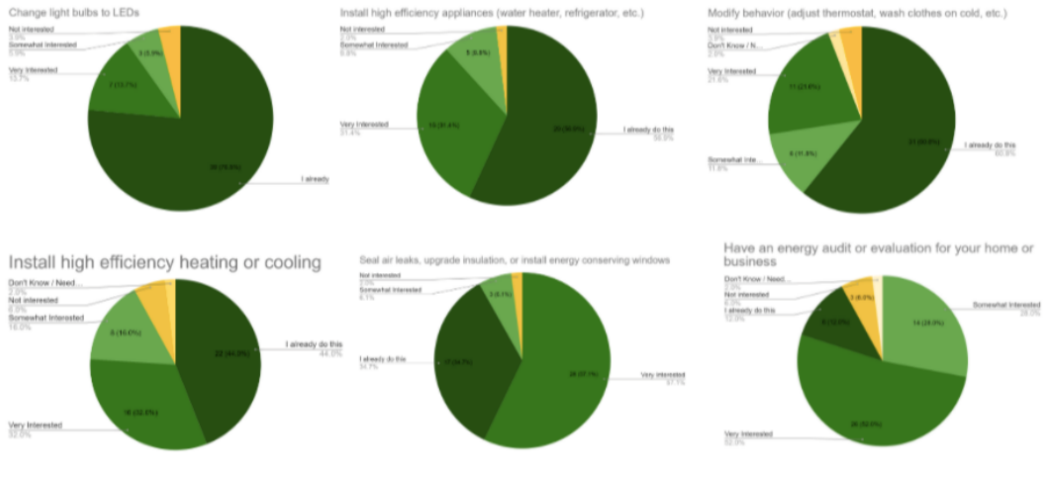
Please list any specific concerns you have related to climate change and our community (part 1).

- Would love to have more accessible public transportation access to downtown and other sections of the City and County.
- Train noise and pollution, Neville Island pollution, Ohio River Blvd car pollution, these all contribute to climate change. High energy bills, extreme heat and cold, Our power grid needs updated. Climate change causes more severe storms which knock out our power.
- Train noise/pollution
- Air quality and temperature
- residential energy use - particularly heating
- Some people who are too lazy to rake their leaves decide to cut their trees down or don't replace them when they die. More trees, more grass = nicer neighborhood.
- Almost exclusively the efficiency of Neville Island power consumption (I have no visibility), I am not currently aware of any irresponsible power usage i the Borough itself, other than general home efficiency.
- Decarbonization will be disruptive and painful, but we need to do it. I want more forceful action against polluters.
- I would like to see the Borough look into improving our curbside recycling program (perhaps through another provider) and expanding curbside service to include compostables collection.
- Wish we had more comprehensive recycling options
- Dealing with increased storm water/erosion
- My concerns are mainly on a global/system level, but every bit helps!
- Air quality
- Air quality due to factories, reliance on non-renewable sources
- Air quality, water quality

Please list any specific concerns you have related to climate change and our community (part 2).

- Just concerned about climate change in the long haul
- I don't like how many big trucks drive through our town.
- Waste management does not support rigorous recycling programs
- Ability of our aging infrastructure to withstand impacts from catastrophic storms (eg increased precipitation resulting in flooding in spruce run and landslides)
- Utility Costs and quality of life
- Long term impacts on changing weather patterns
- Proper recycling including glass
- Our proximity to the industrial businesses and facilities along Neville Island that emit harmful chemicals and materials, and their greater effect on the air & water quality
- Fossil fuels !
- Water supply and security of supply and air quality
- I think all small boroughs should budget for electric vehicle charging stations in their business districts, encouraging EV adoption among those who primarily take local trips.
- Overuse of plastics and electronics in daily living. Throw-away culture - we need more repurpose /reuse strategies. Host a bi-annual waste and recycling event for the neighborhood https://prc.org/programs/collection-events/
- Pollutants in the air and water, odors, lawn and garden chemicals getting into the water supply
- Your concern is overblown.
- Air and Water quality
- Severe storm damage

Energy use in buildings is the largest source of carbon emissions in Ben Avon. Please indicate how interested you are in each of the following climate action strategies for your home or business related to energy (assume non-pandemic conditions).



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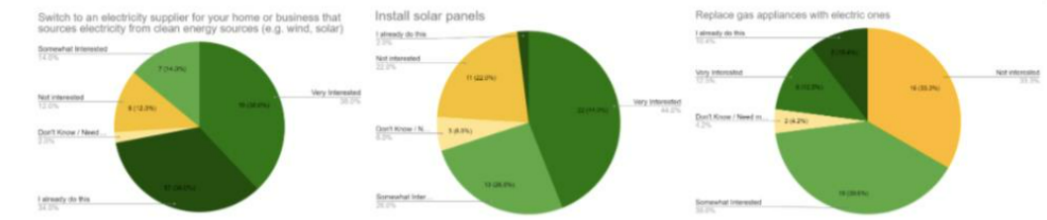
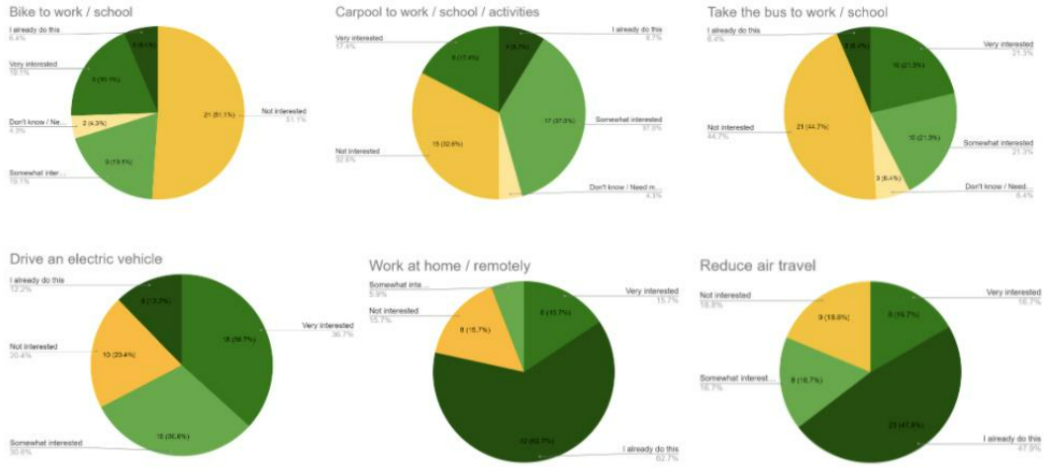


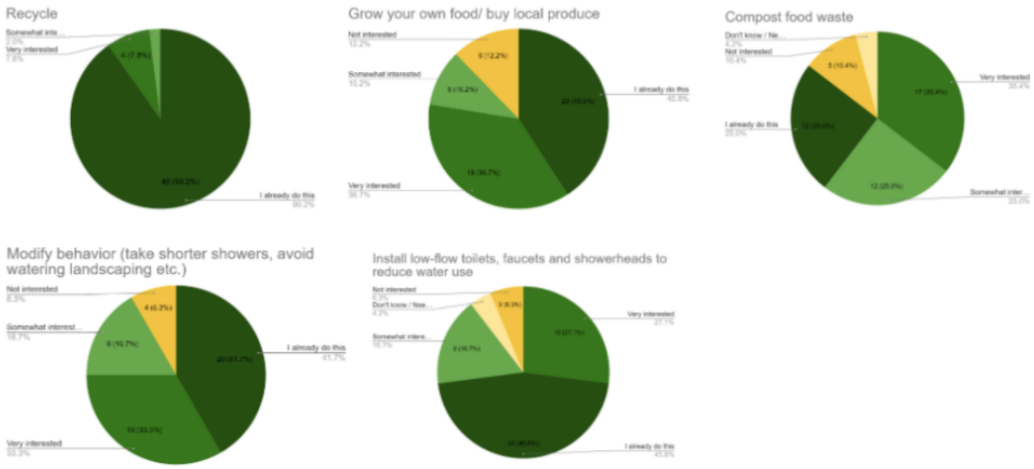
Anything else you would like the Borough to know about your thoughts on energy use?

- Update power grid
- To realize that the cost in materials to build a windmill seem like it's pretty high given how much energy the windmill will actually produce. So, we get into a lot of needless political issues instead of doing simple stuff like planting trees. Then, even worse, our neighbors in Emsworth and Avalon cut everything down. To have a successful community, you need: Good schools, trees, trash/liter picked up off the street, well-maintained houses...it's pretty simple. The best thing we could do is get Emsworth and Avalon to do these things.
- We have a big house w a big carbon footprint. I can't reduce to size of the house, but I want to green it up as much as I can. Guidance is very welcome.
- It would be great if we can make this a non-partisan issue to the extent possible! Starts with neighbors.
- Walkable destinations for eating and entertainment
- I don't know what the borough's policy is on solar panels, but I'd love to explore the feasibility of them in our area. Too cloudy? I don't know.
- Since I rent don't have most of the above options
- Offering assistance for home EV charging installations and public EV charging stations
- We focus on cost effectiveness.
- Can we get group discounts on solar installations?
- I would like to make some of the changes, like new windows and higher efficiency appliances, but I just don't have the money.
- Use common sense, no government mandates.
- How do we control air and water quality?

Energy use from transportation, water treatment, and waste management also contribute to Ben Avon's carbon footprint. Please indicate your interest in the following climate action strategies (assume non-pandemic conditions):

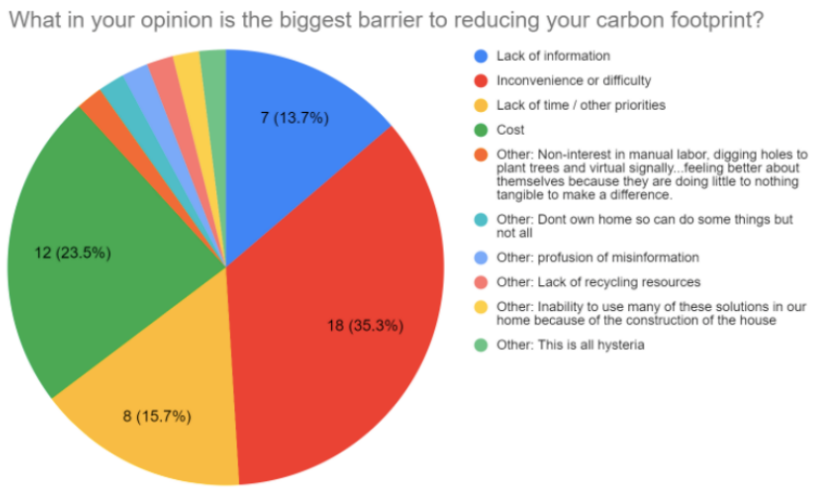


Energy use from transportation, water treatment, and waste management also contribute to Ben Avon's carbon footprint. Please indicate your interest in the following climate action strategies (assume non-pandemic conditions):



Anything else you would like the Borough to know about your thoughts on transportation, waste management, or water use?

- Greater access to public transportation to get to Downtown and other parts of the City/County. Work with other boroughs to establish a composting co-op?
- If borough supplied compost supplies/reciprocals that would be excellent.
- Provide compost bins
- I think you should take a tour of Waste Management's facility on Neville Island to see what recycling is really about. Most of what goes into our recycling bins is NOT recycled and ends up with the rest of the trash. The PA law is that recycling must be picked up separately from regular trash, but what's done with it after that is up to hauler. I think folks would be horrified if they realized what a total waste of time our recycling program is.
- Curbside compostable pickup would be nice. Someone that would take glass bottles for recycling would also be helpful.
- Glass recycling is a known issue I am sure. Would like to see public transit into the city maintained. Encourage grass-alternative lawns for water use in addition to the strategies above - find people who know how to do it really well and have them share knowledge.
- It would be nice to have a safe place to walk or bike on either camp Horne road or up perrysville road. Also public transportation options around the north hills are very minimal
- It would be really great if the borough could come up with a community solution to glass recycling!
- Extend Three Rivers heritage trail
- Once covid is under control, I'd consider taking the bus.
- Extension of light rail train into Ben Avon would be great!
- I am very concerned about the chemicals that Alcosan is using in their water treatment methods. I have had two new-ish copper pipes spring leaks in the past year. This is apparently quite widespread in Ben Avon, having something to do with there Ben Avon is located in terms of the Alcosan plant.
- Understand what is the real impact of recycling from WM - reality vs hype
- I am retired, so some of the questions above are not appropriate, so answered with "not interested."



Assuming no tax increase or additional cost to residents, how should the Borough Council prioritize various strategies to reduce greenhouse gas emissions and adapt to climate change?

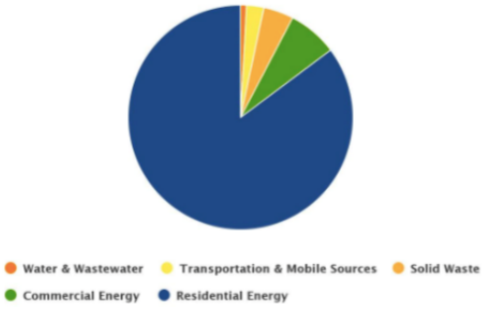
Strategy	Priority		
	High	Medium	Low
Provide better recycling and/or composting services (e.g. glass recycling, bigger bins, local dropoff stations, compost pickup service, etc.)	86%	10%	4%
Work with neighboring boroughs and regional partners to improve alternative transportation infrastructure (e.g. bike lanes, bus routes)	65%	22%	14%
Protect existing trees and plant new trees in Avon Park or other Borough-controlled property.	65%	33%	2%
Switch the Borough's electricity supplier to one that provides energy from 100% renewable sources such as wind and solar.	62%	30%	8%
Help connect property owners with businesses, organizations, or programs that provide solar panels, energy audits or efficiency services	57%	31%	12%
Make energy efficiency upgrades in Borough-owned buildings	56%	38%	6%
Provide incentives or assistance for property owners to plant new trees and to preserve existing shade trees.	55%	41%	4%
Improve accessibility and walkability in the Borough e.g. through a sidewalk repair program.	56%	30%	14%
Upgrade infrastructure to reduce the impact of extreme weather events	53%	39%	7%
Provide financial assistance or incentives for residents or business owners to reduce their energy use and greenhouse gas emissions, for example a tax rebate for solar panels	50%	34%	16%
Install solar panels on on a Borough-owned building or property if feasible	48%	36%	16%
Facilitate workshops for residents on energy efficiency or sustainability topics such as insulation or home electrification	47%	35%	18%
Install electric vehicle charging station(s) in the Borough for public use (for a fee)	42%	34%	24%
Provide public recognition or a certification program for residents who significantly reduce the carbon emissions of their home or business.	44%	40%	16%

Please share your ideas of how Ben Avon Borough government, residents, or businesses can reduce greenhouse gas emissions and prepare for the effects of climate change. (no idea is too big or too small!)

- Help promote train noise and pollution prevention. New power grid is essential. tax rebates for lowering your household carbon footprint.
- Publicize residential programs like https://www.rtpittsburgh.org/programs; Pledge the Borough buildings to the Pittsburgh 2030 District (Chris Cieslak is the point of contact)
- Once again. Plant a tree in your yard, today.
- Investment in solar or wind for borough building. Consider electric vehicles. Organize recycling events. Provide bike/ walkways
- Somehow we have to get people to encourage their neighbors, I think that will work better than any official activity. How...sorry, not sure.
- A program to help older residents recycle
- create a local dropoff point for glass recycling
- Incentivize homeowners to upgrade home systems to more energy efficient ones - our older homes probably take a lot of effort to heat and cool and keep water flowing
- Incorporate street tree plantings into road repair projects. Provide financial assistance for homeowners needing major infrastructure repairs on their properties that benefit the public (like retaining walls, street tree maintenance / removal, sidewalks, stairways).
- Share resources with local neighboring communities (Equipment, Storage, Office Space, Fire Equipment...) Maybe we don't need all of these Fire Departments, Borough Buildings, trucks and equipment if we can coordinate with our neighboring communities.
- Everyone is to remain free to mind their own business, property use, improvement, and maintenance.
- Regularly emptied/maintained receptacles for dog wastes.
- Would love to see a proactive tree program that allows residents to get ahead of problematic trees - trim and /or remove and introduce more sustainable plantings ie - no Bradford Pear

Greenhouse Gas Inventory

- Overall emissions: 11,234 metric tons CO2e / year (2018)
- Modeled using the ClearPath tool from ICLEI USA, using 2018 data from the utilities that serve our community
- Areas modeled - electricity (Duquesne Light), gas (Columbia Gas, Peoples Gas), wastewater treatment (Alcosan), water treatment (West View Water), vehicular transportation (Southwestern PA Commission), solid waste (Waste Management)
    - Not modeled - travel, goods consumption, diet, land use, trees, etc.



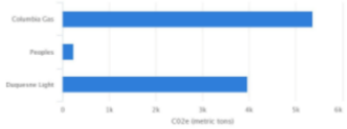
Emissions from Residential Energy

- Most properties in Ben Avon are residential
- Residential Energy Use (electricity & natural gas) is the biggest source of CO2 emissions in our community
  - 85% of total emissions
- Electricity use - 41% of total residential
- Natural gas - 59% of total residential

Co2e by Source:

Sector	CO2e
Transportation & Mobile Sources	282
Solid Waste	485
Water & Wastewater	92
Commercial Energy	799
Residential Energy	9,576

Residential Energy Breakdown:



Appendix III: Climate Change Science

The Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report affirms that "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (IPCC, 2014, p. 151). 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 (IPCC, 2014). These refinements expand upon the findings of previous IPCC Assessments – today, observational evidence from all continents and most oceans shows that "regional changes in temperature have had discernible impacts on physical and biological systems" (IPCC, 2014, p. 151).

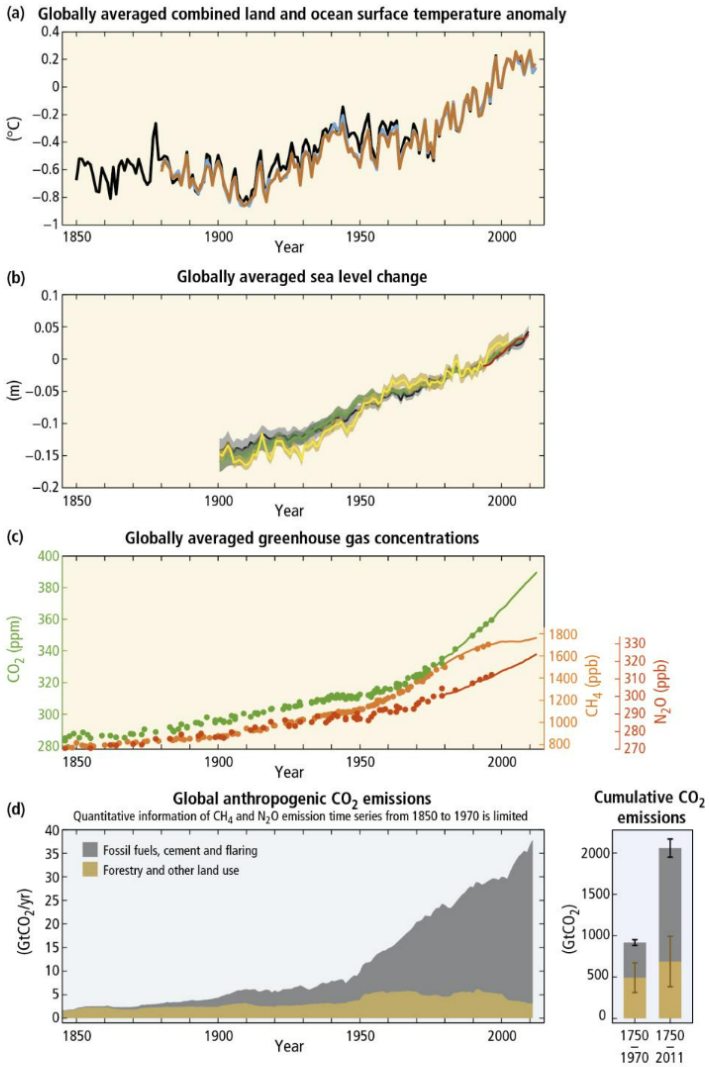


Figure 1 Observations and other indicators of a changing global climate system

The Fifth Assessment also asserts that "it is *extremely likely* that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together. Globally, economic and population growth continued to be the most important drivers of increases in CO2 emissions from fossil fuel combustion. 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" (IPCC, 2014, p. 151).
In short, the Earth is already responding to climate change drivers introduced by mankind.

Temperatures and Extreme Events are Increasing Globally

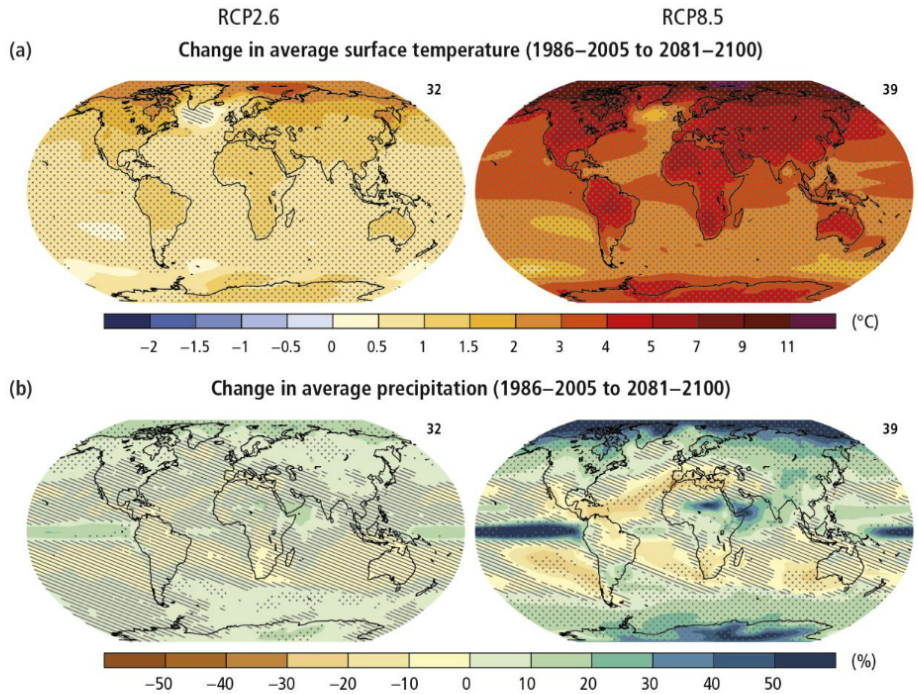


Figure 2 Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios.

Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. 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 (IPCC, 2014).

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 (IPCC, 2014).

Greenhouse Gas Emissions Must be Reduced

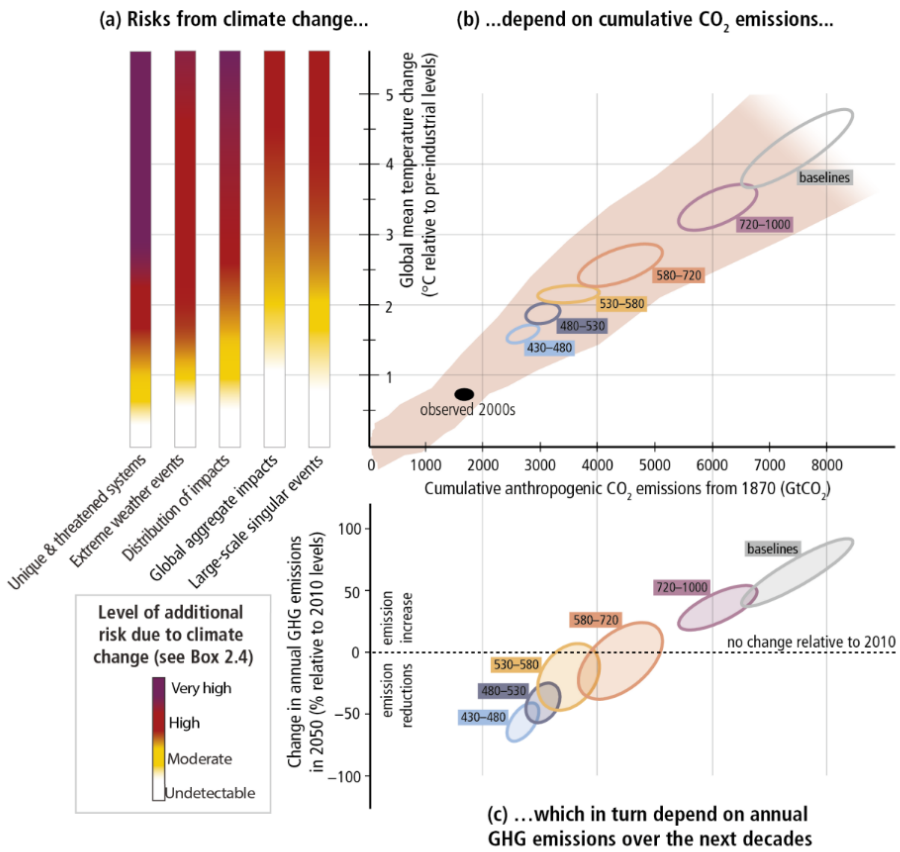


Figure 3 The relationship between risks from climate change, temperature change, cumulative carbon dioxide (CO2) emissions and changes in annual greenhouse gas (GHG) emissions by 2050.

Limiting risks across Reasons For Concern (a) would imply a limit for cumulative emissions of CO2 (b) which would constrain annual GHG emissions over the next few decades (c). Panel A reproduces the five Reasons For Concern. Panel b links temperature changes to cumulative CO2 emissions (in GtCO2) from 1870. They are based on Coupled Model Intercomparison Project Phase 5 simulations (pink plume) and on a simple climate model (median climate response in 2100), for the baselines and five mitigation scenario categories (six ellipses). Panel C shows the relationship between the cumulative CO2 emissions (in GtCO2) of the scenario categories and their associated change in annual GHG emissions by 2050, expressed in percentage change (in percent GtCO2-eq per year) relative to 2010. The ellipses correspond to the same scenario categories as in Panel B, and are built with a similar method (IPCC, 2014).

The recent and massive buildup of greenhouse gases in our atmosphere is conceivably even 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. From 2000 to 2010 emissions were the highest in history. Historical emissions have driven atmospheric concentrations of carbon dioxide, methane and nitrous oxide to levels that are unprecedented in at least the last 800,000 years, leading to an uptake of energy by the climate system (IPCC, 2014).

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.