**BOROUGH OF MUNHALL RESOLUTION 2020-2**

**A RESOLUTION OF THE COUNCIL OF THE BOROUGH OF MUNHALL, ALLEGHENY COUNTY, PENNSYLVANIA, ADOPTING A CLIMATE ACTION PLAN FOR THE BOROUGH OF MUNHALL.**

**WHEREAS**, a climate action plan designed for the Borough of Munhall was created through an agreement between ICLEI – Local Governments for Sustainability and the PA Department of Environmental Protection, which was funded by the U.S. Department of Energy State Energy Program; and

**WHEREAS**, with seasonal variations and catastrophic natural disasters becoming more intense and frequent, climate change threatens the health, safety and overall well-being of communities across the globe including the Borough of Munhall; and

**WHEREAS**, Munhall Borough Council recognizes a growing need to address its own contribution to climate change, as well as adapt to the impacts that will occur and be exacerbated, absent local greenhouse gas reduction; and

**WHEREAS**, the climate action plan includes an inventory of Munhall's greenhouse gas emissions from community-wide activities, establishes an emissions reduction target, and outlines feasible actions to achieve that target; and

**WHEREAS**, the Council of the Borough of Munhall has determined that the adoption of a climate action plan is in the best interest of the health, safety and welfare of the residents of the Borough of Munhall.

**NOW THEREFORE BE IT RESOLVED**:

1. The Council of the Borough of Munhall does hereby adopt the climate action plan designed for the Borough of Munhall and attached hereto as Exhibit "A".

RESOLVED AND ADOPTED this 18 day of OCTOBER, 2020.

ATTEST:

Borough Manager

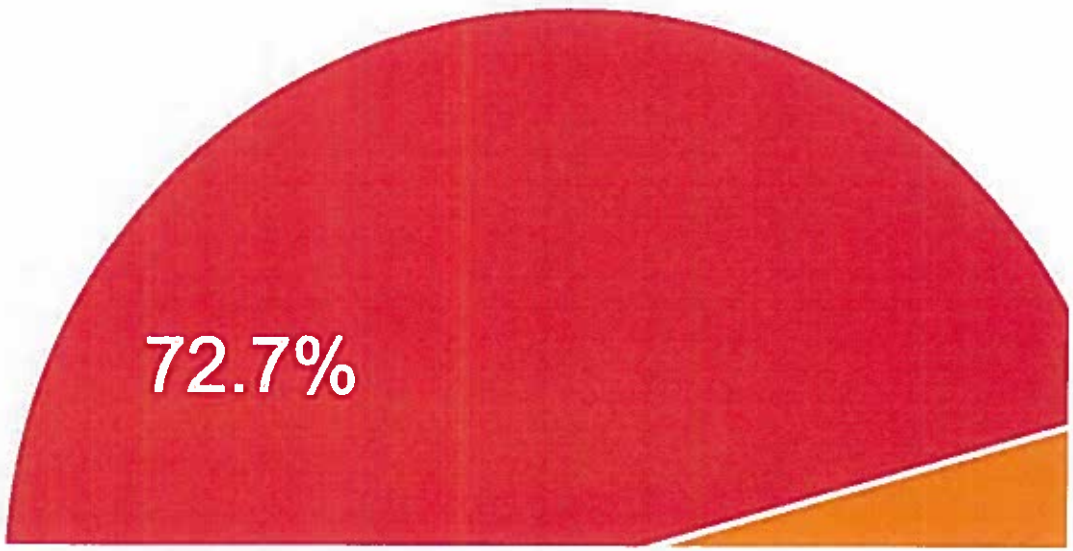
BOROUGH OF MUNHALL

Council President

# Munhall Climate Action Plan Summary

# Do you or someone in your household hav

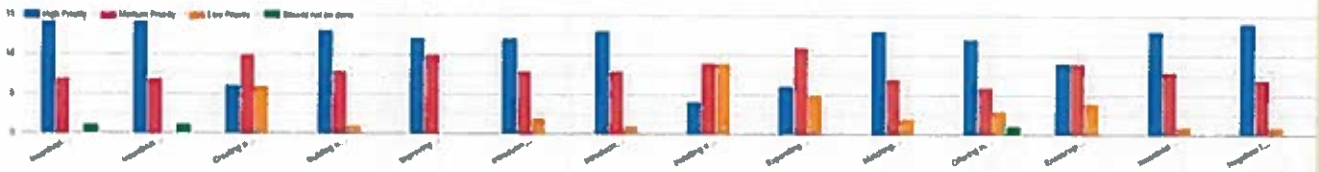
22 responses



# Munhall Survey Results (continued)

How concerned are you about our region's poor air quality?
22 responses


Please rank the following possible mitigation efforts in terms of how much of a priority they should be LOCALLY.



# Munhall Resident Comments

If yes, describe the flooding and its impacts on you, your house/belongings, and your household/family. Also describe if you've noticed any change over time in the ways flooding is impacting your home.

8 responses

Exterior ground adjacent to building structure will gather 4 to 6 inches of water during every rainfall. Water seeps through walls and is collected by sump pump

My appliances in the basement are up on pallets to reduce the chance of them being ruined.

Heavy rains ponded outside and seeped into basement. Also had sewers back up after heavy rains. Damage to flooring (tile and carpet) and anything that was on floor in basement

I have a corner lot at an intersection of two streets. I get run off from both streets.

More water rushes down hill, changes in yard receding.

Please share any other ideas you have for reducing our greenhouse gas emissions and improving our environmental impact across the community. No idea is too big or too small!

9 responses

More electric cars at a reasonable price.

Eliminate single use plastics.

Borough should transition to electric vehicles for police, waste, etc.

[redacted]

A program for raising chickens and rabbits locally to provide meat for local residents. Factory meat production is among the worst things contributing to climate change, and incentivizing sourcing our meat locally can help. Even if this is just incentivizing individual residents who have the space to do so...

Anything else you'd like us to know?

4 responses

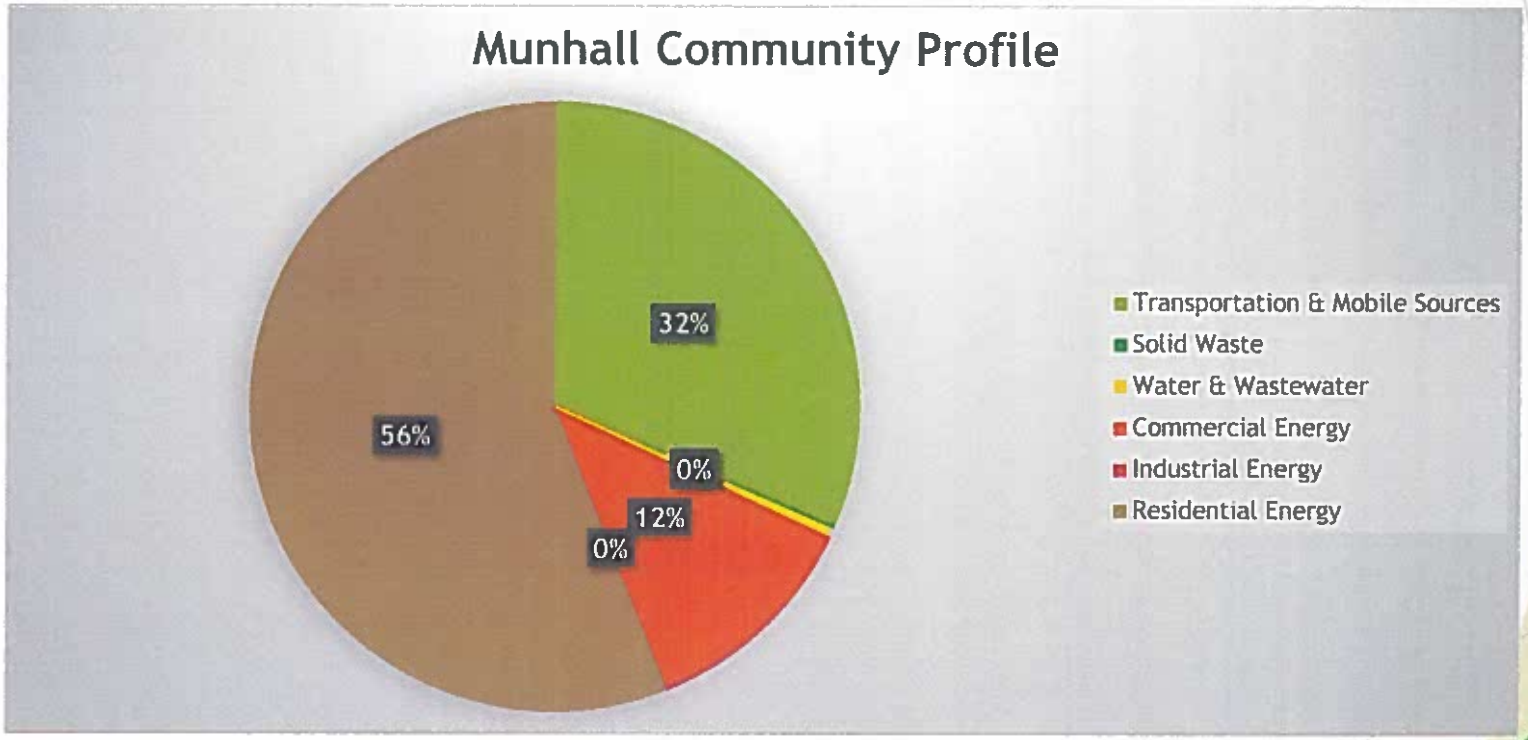
All planets are warming natural occurrence

I don't feel that sidewalks are in any way related to climate.

Fixing the sidewalks is extremely important to us. We love walking through Main Street and it would be nice to have better sidewalks on the off shoot roads.

I love that this survey was sent out and look forward to working together to fight climate change. This is something I really think will strengthen our community

# Munhall Climate Action Plan: Community GHG Emissions



# Munhall, PA
# Climate Action Plan

## Local Actions and Policies to Reduce Munhall's Greenhouse Gas Emissions

Through partnership with ICLEI – Local Government for Sustainability (ICLEI)

# Credits and Acknowledgments

## Local Government Officials and Staff

- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]

## External Agencies and Partners

- J. Tosan Adoki, University of Pittsburgh Graduate School of Public and International Affairs
- Heidi Kunka, Pennsylvania Department of Environmental Protection
- Calyn Hart, ICLEI – Local Governments for Sustainability USA
- Jesse Carpentier, ICLEI– Local Governments for Sustainability USA
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]

## Community Stakeholders

- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]

## Plan Contributors

- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]
- [Acknowledgement – Name and Title]

This Climate Action Plan was made possible through a grant agreement between ICLEI – Local Governments for Sustainability and the PA Department of Environmental Protection, which was funded by the US Department of Energy State Energy Program. The template was developed by ICLEI – Local Governments for Sustainability, USA and was originally published in April 2018. It was later edited by PA Department of Environmental Protection in December 2019.

# Table of Contents

# Executive Summary

With seasonal variations and catastrophic natural disasters becoming more intense and frequent, climate change threatens the health, safety, and overall well-being of communities across the globe. The Commonwealth of Pennsylvania and Munhall are no exception. Munhall Borough recognizes a growing need to address its own contribution to climate change, as well as adapt to the impacts that will occur and be exacerbated, absent local greenhouse gas reduction. This Climate Action Plan includes an inventory of Munhall's greenhouse gas emissions (GHGs) from community-wide activities, establishes an emissions reduction target, and outlines feasible actions to achieve that target. In addition, the Plan identifies ways in which GHG reduction actions can further Munhall's ability to adapt to climate change impacts. While this plan is not focused on adaptation, it ensures that GHG measures are not counteractive to Munhall's future resilience and will hopefully be a catalyst for developing a robust strategy towards that end.

A summary of major findings is provided below.

**MAJOR FINDINGS**

- **The largest sectors for GHG emissions in descending order are residential energy, transportation and mobile sources, and commerical energy**
    - **Residential energy accounted for 56% of all community-driven GHG emissions. Transportation and mobile sources accounted for 31% and commercial energy accounted for 12%.**
- **Munhall's GHG reduction strategies focus on the residential and commercial sectors primarily**

This Climate Action Plan meets the reduction target outlined in the Commonwealth of Pennsylvania's 2018 Climate Action Plan.

# 1. Introduction

Climate change is the greatest environmental challenge of the 21st century, with overwhelming evidence in the past decade. It poses a serious threat not just to Munhall's natural resources, but also to our jobs and our health. Climate action also presents huge opportunities for creating a healthier, safer, and more equitable zero-carbon world. Munhall has an unparalleled opportunity to make changes in ways that create jobs and benefit all residents. Scientists expect that with the current trends in fossil fuel use, Americans may see more intense heat waves, droughts, rainstorms, floods, wildfires and landslides in the future. These impacts could drag down our economy, stress our natural resources and worsen inequities facing many Americans. Action is required at all levels, and local governments have a unique role to play in building low-carbon communities. In Pennsylvania, temperatures have increased by more than 1.8°F since the early 20$^{th}$ 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 20$^{th}$ 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 ($CO_2$) and methane ($CH_4$) in the atmosphere, primarily resulting from burning fossil fuels and land use changes. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. Carbon emissions from human activities have continued to rise in recent decades, reaching the highest rates in human history between 2000 and 2010 ( Intergovernmental Panel on Climate Change (IPCC), 2014). About half of all carbon dioxide emitted between 1750 and 2010 occurred in the last 40 years. The energy, industry and transportation sectors have dominated the rise in emissions. In Pennsylvania, the sectors responsible for the most GHG emissions are industrial at 31%, electricity production at 30%, and transportation at 23% (Pennsylvania Department of Environmental Protection (PA DEP), 2019). With the current trajectory of population growth, urbanization, and reliance on personal vehicles, emissions will only continue to rise. Given the critical impacts of climate change on humanity, the time to act to reduce GHG and our carbon footprint is now.

In addition to national and state efforts to make systemic changes that will reduce global emissions, local governments can play a powerful role in addressing climate change. The design of American communities—

how we use our land, how we design our buildings, how we get around—greatly impacts the amount of energy we use and the volume of GHG emissions we produce. It is critical that communities like Munhall demonstrate that it is possible to dramatically reduce GHG emissions while creating more vibrant and prosperous places to live and do business.

## Statewide Climate Action

In 2008, the Pennsylvania Climate Change Act was passed, and requires the Department of Environmental Protection (DEP) to (1) develop an inventory of GHG emissions and update it annually; (2) administer a Climate Change Advisory Committee; (3) set up a voluntary registry of GHG emissions; and (4) prepare a Climate Change Action Plan and Climate Impacts Assessment, both to be updated once every three years. The most recent Climate Impacts Assessment 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, Munhall reduction targets meet the statewide targets. In addition, many of the statewide actions were incorporated into this plan, which is described further in Chapter 4: *Taking Action*.

## Purpose and Scope of the Climate Action Plan

Munhall is joining an increasing number of local governments committed to addressing climate change at the local level. Along with a cohort of 19 other jurisdictions in the Commonwealth of Pennsylvania, Munhall began the climate action planning process in 2019. College students were matched with staff from each jurisdiction and were trained by ICLEI USA on each component of the climate action planning process. They worked together to develop individual climate action plans. ICLEI's technical guidance was enabled via a grant from US Department of Energy State Energy Program through the PA Department of Environmental Protection.

Munhall recognizes the risk that climate change poses to its residents and businesses, and is acting now to reduce the GHG emissions of both its government operations and the community at-large through the innovative programs laid out in this Climate Action Plan. Furthermore, it is recognized that Munhall needs to

address existing climate risks such as flooding and an increase in energy usage due to warmer weather and adapt its systems and infrastructure to new conditions. This Climate Action Plan takes advantage of common sense approaches and cutting-edge policies that our local government is uniquely positioned to implement – actions that can reduce energy use and waste, create local jobs, improve air quality, preserve our local landscape and history, reduce risk to people and property, and in many other ways benefit Munhall for years to come.

## Purpose

By creating a clear course of action so that everyone has a role in creating and achieving climate and sustainability goals, our Climate Action Plan drives and coordinates local efforts toward a reduction in GHG emissions of 2016 levels by 2025 and 80 percent below 2016 emission levels by 2050.

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

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

## Scope

This Plan covers objectives and actions for reducing GHG emissions resulting from local government and community-wide activities within Munhall. It addresses the major sources of emissions in Munhall and sets forth objectives and actions in the following 6 sectors that both Munhall and community members can implement together to reduce greenhouse gas emissions:

- Commercial Buildings
- Residential Buildings
- Energy Production
- Waste Management
- Water & Wastewater Management
- Transportation

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 Munhall's first planning cycle, including the completion of the first three milestones:

**Milestone 1:** Chapter 3 summarizes the emissions inventory and forecast

**Milestone 2:** Chapter 4 sets reduction targets

**Milestone 3:** Chapters 5-12 outline objectives and actions

Chapter 13 also describes the initial steps of milestones 4 and 5, monitoring and implementation.

### Social Equity

Climate equity was a core component of the planning process and will continue to be through implementation. Climate Equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. Implementation of this concept requires intentional policies and projects

that simultaneously address the effects of and the systems that perpetuate both climate change and inequity. Under the status quo, however, not everyone is given the opportunity to participate and benefit.

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

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

To ensure an equitable climate action plan, Munhall attempted to have a community-driven process, which is described in the following section. Due to the COVID-19 pandemic, community-led planning was limited.

### Community-Driven Planning Process

In identifying which specific populations should be included in a community driven process, Munhall consulted:

- Local community groups or processes

Munhall's community-driven process included the following steps:

- Produced a survey gauging the viability of a variety of different GHG reduction strategies

#### Engagement Activities and Implications

- Due to the ongoing COVID-19 pandemic, community enagement was limited. The process of gathering information about the Munhall community's interest as well as discussion of community feedback on addressing climate change will continue to occur.

## Objectives

The Climate Action Plan offers a robust set of objectives and actions that will address the climate hazard vulnerabilities and aim for an 80% reduction in GHG emissions by 2050. Due to the COVID-19 pandemic, engagement of the community on strategies to reduce GHG emissions was limited. The hope is going forward that the actions proposed in this plan can be reviewed by a group of stakeholders, considering technology

limitations, funding constraints, public support, feasibility of implementation, environmental justice considerations, and other barriers.

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

**MITIGATION OBJECTIVES**

## By 2050

- Promote facility-scale energy improvements to residential and commercial buildings as well as the adoption of energy efficient equipment and renewable energy generation to reduce GHG emissions
- Expand pedestrian and bicycling infrastructure and incorporate revised land use code in order to facilitate smart growth and reduce the impact of vehicular travel on GHG emissions

# 2. Co-Benefits of Climate Action

Greenhouse gas reduction and climate resilience are not the only beneficial outcomes of climate action plans. The following outcomes are referred to as "co-benefits," and they illustrate how taking action on climate change results in a more prosperous community.

## 1. Improving Public Health

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

## 2. Saving Money and Reducing Risk

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

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

## 3. Enhancing Resource Security

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

Many of the actions identified here to mitigate GHG emissions will also help Munhall's government, businesses, and residents to adapt to a changing climate. For example, extreme and prolonged heat waves can

put considerable strain on the reliability of energy delivery in peak periods, possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across Munhall, such service disruptions are less likely and Munhall will be able to better cope with those situations. Similarly, climate actions can secure food and water sources and prevent damage and service disruptions to these systems from climate hazards such as flooding.

## 4. Creating Jobs

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

## 5. Fostering Social Equity

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

# 3. Munhall's GHG Emissions

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 created a credible and defensible methodology which accelerated the number of inventories created and provides consistency within and across U.S. communities. In 2014, ICLEI partnered with the World Resources Institute and C40 Climate Leadership Group to create the Global Protocol for Community Scale GHG Emissions, which allows communities around the world to compare their emissions footprint.

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

## Munhall Community-Wide GHG Emissions

The following figure breaks down community-wide emissions in Munhall. Note that emissions from Munhall's operations are embedded within the community-wide totals. For example, emissions from government buildings are included in the "Commercial" sector and emissions from Munhall fleet vehicles are included in the "Transportation" figure above. Government operations are therefore a subset of total community emissions.

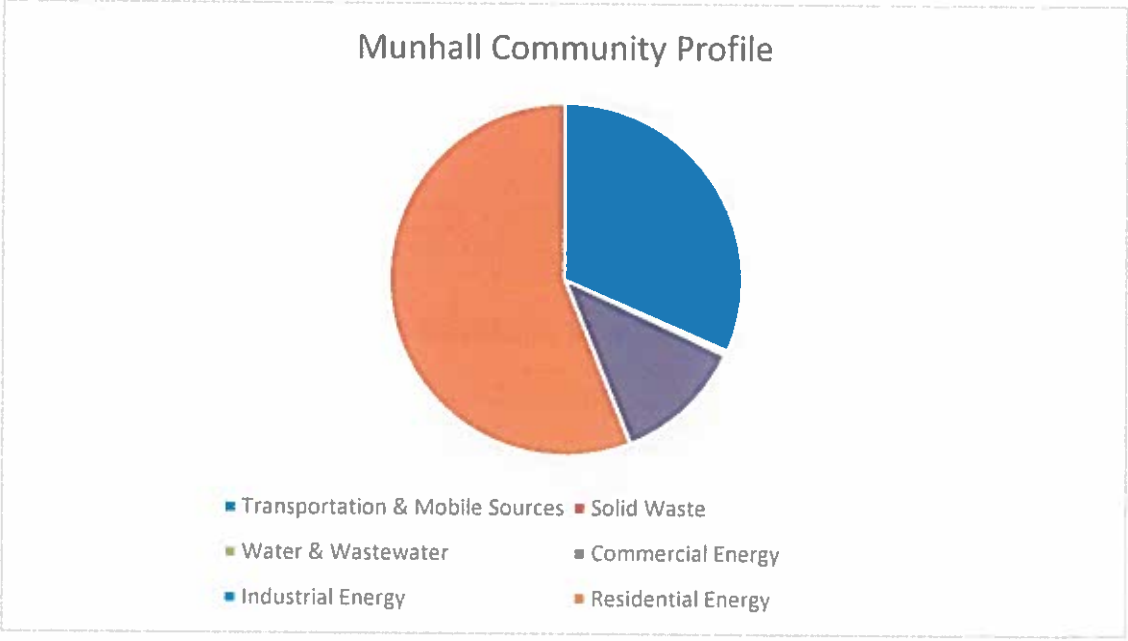



**Figure 2: Munhall Community-Wide GHG Emissions**

## Forecasting Munhall's GHG Emissions

Munhall has also completed an emissions forecast based on projections of current data and expected future trends. This emissions forecast is the "Original" forecast (also known as a "Business As Usual" forecast), a scenario estimating future emissions levels if no further local action (i.e. projects within this Climate Action Plan) were to take place. The forecast indicates that, if we do not take action, GHG emissions will continue to increase.

### Projected Growth in GHG Emissions

Figure 3 shows the projected growth in GHG emissions in Munhall from 2016 to 2050. For complete information regarding the emissions inventory and forecast, including methodology and supporting data, please reference Appendix I.

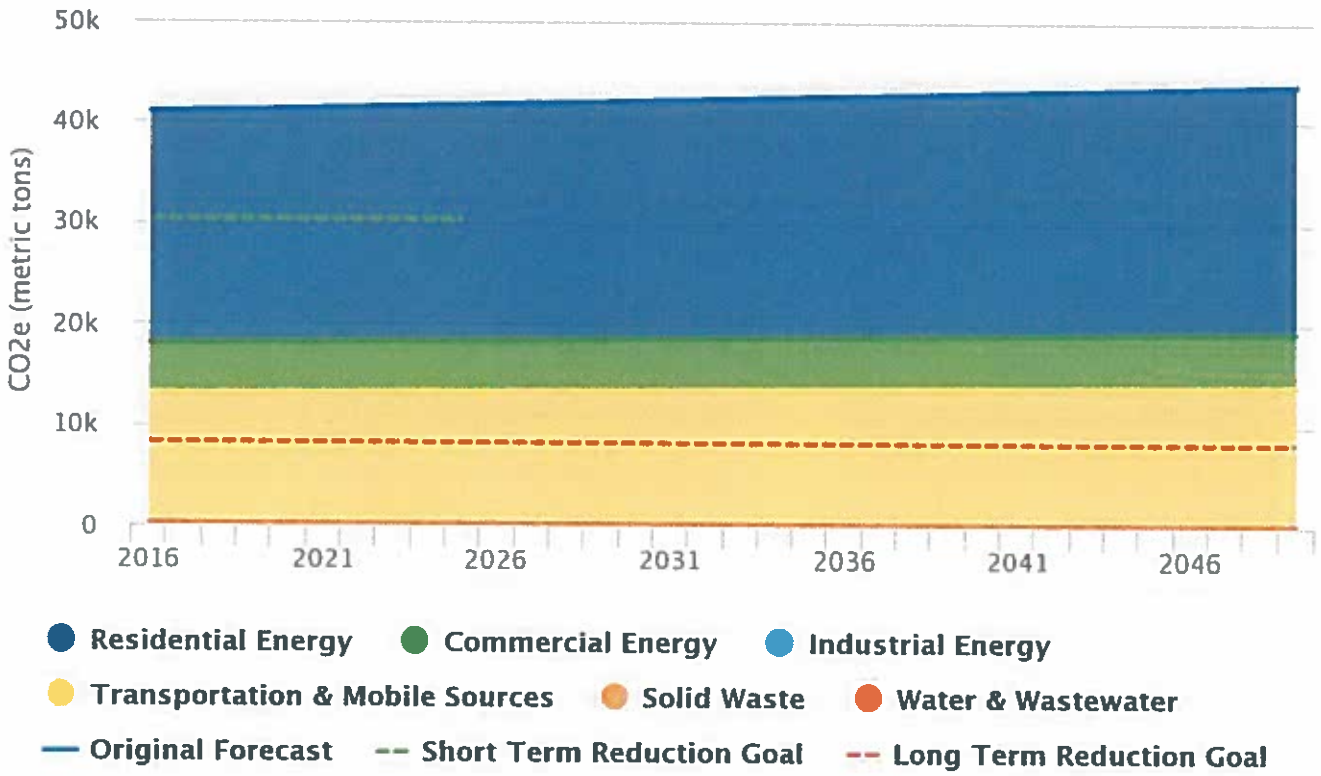



**Figure 3: Projected Growth in GHG Emissions from 2016 to 2050**

## Munhall's GHG Reduction Target

Munhall has set targets to reduce its emissions to 80 percent below 2016 levels by 2050. Figure 4 compares the reduction target with the business-as-usual forecast. The combination of measures that Munhall has already implemented, are currently planned, and are presented through this Climate Action Plan are designed to achieve the 2050 targets. Reductions in 2050 rely on the best information currently available pertaining to population forecasts along with other information.

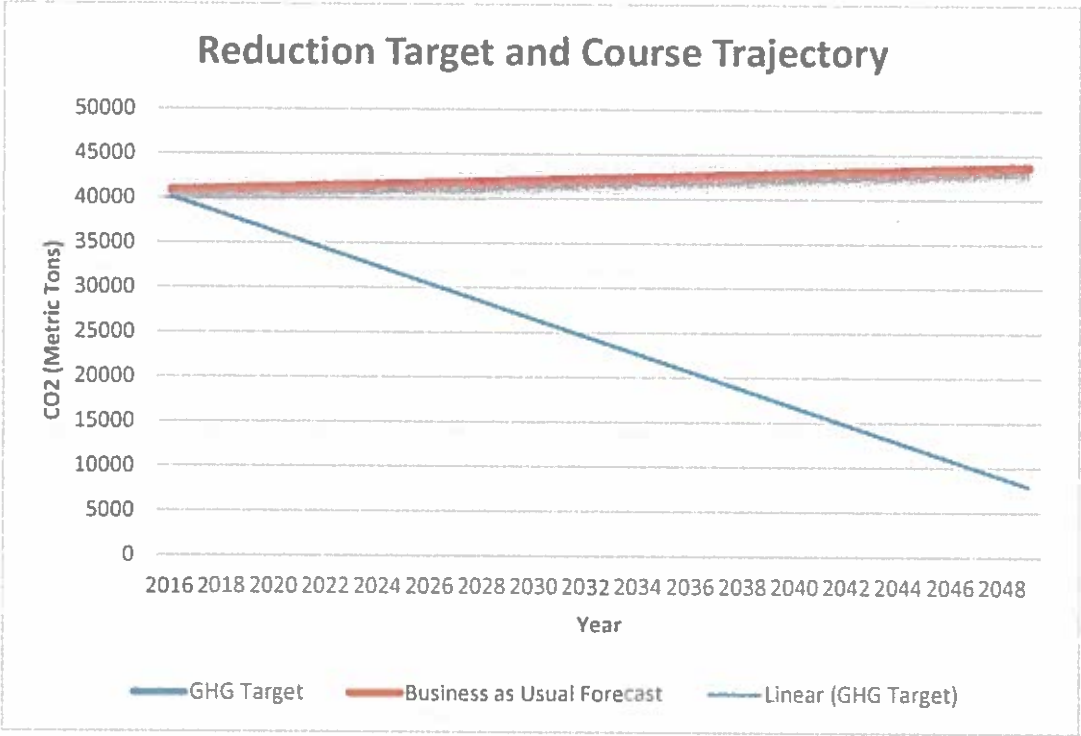



**Figure 4: GHG Reduction Target**

Munhall's reduction target is consistent with the statewide target of 26% reduction by 2025 and 80% by 2050 from 2005 levels, as it exceeds its local percentage of the total emissions reduction needed in order to achieve that target (see Appendix I for these calculations).

## The Munhall Climate Action Plan

The summary table below identifies the sectors within the Munhall Climate Action Plan, the number of actions within each sector, and the contribution of each sector toward the GHG reduction goal. Each sector has a dedicated section within this document where objectives and specific actions (both new and those already employed) are described.

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

### Munhall Climate Action Plan Summary Table – Sectors

| Sector | Description | Number of Distinct Actions |
|---|---|---|
| **Commercial & Industrial Buildings** | Policies and programs to reduce commercial, municipal, and industrial sector energy use. | 9 |
| **Residential Buildings** | Policies and programs to reduce residential sector energy use. | 9 |
| **Transportation** | Policies and programs to reduce on-road vehicle miles traveled and promote electric or low emission vehicles. | 3 |

## The Impact on Emissions

The figure below depicts historic GHG emissions, forecasted growth in emissions, and target emissions from 2000 to 2020. The color wedges represent the projected reductions in emissions based on state and local programs.

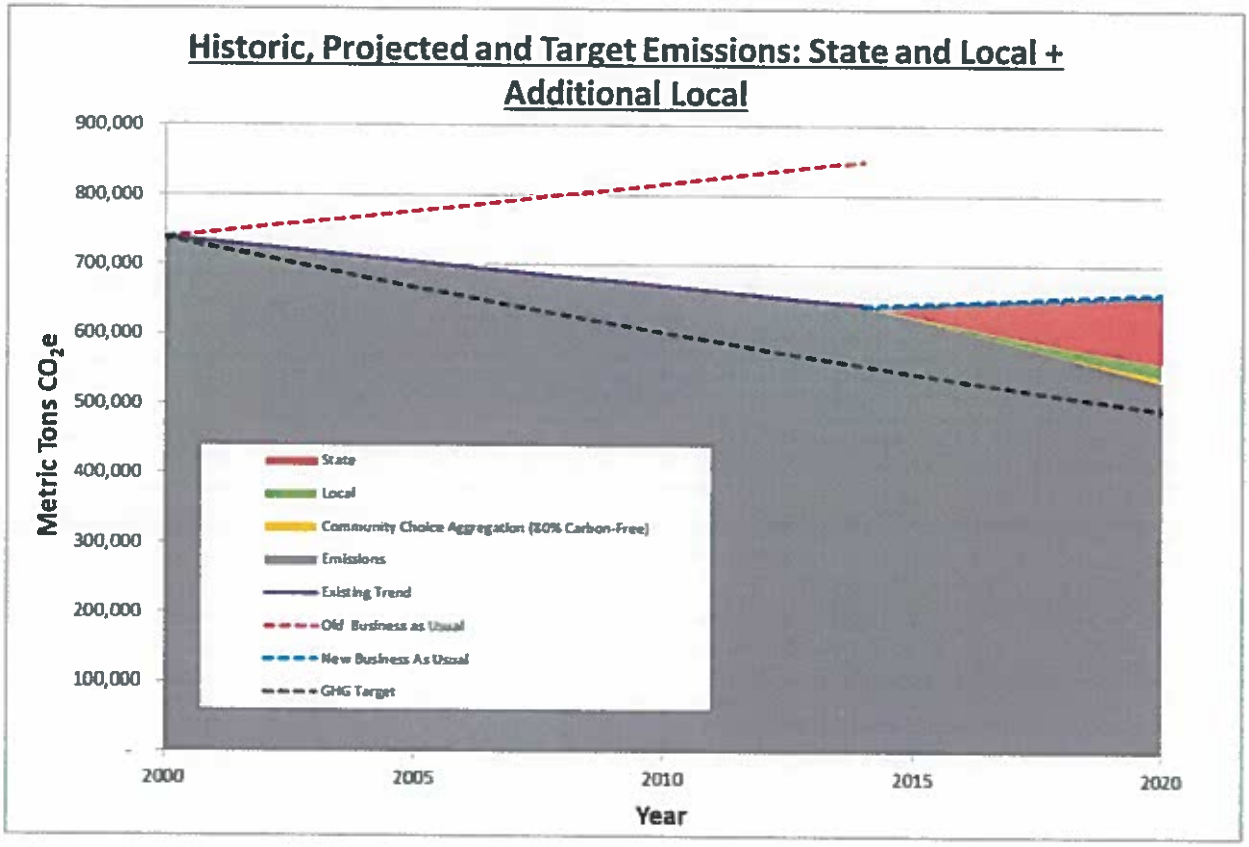



Figure 5: Visualizing GHG Reductions

# 4. 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.

## Evaluating Co-Benefits

In addition to measuring the GHG reduction potential, each objective and action is also evaluated for other benefits such as public health, equity and justice, jobs and prosperity, and environmental conservation. The symbols below will indicate which co-benefits a measure will generate.

| Symbol | Co-Benefit |
|---|---|
|  | Supports jobs and economic prosperity |
|  | Advances social equity |
|  | Fosters resource security |
|  | Improves public health and local environmental quality |

## Supporting Actions

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

## 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. This Plan does not propose any actions that would foreseeably increase the community's risk to climate hazards, but some actions are more directly supportive of climate adaptation than others. The "Climate Adaptation" chapter describes climate hazards and related actions in more detail.

As discussed briefly, Munhall is at risk of having increased flooding within the area as well as rising energy use due to warmer weather. These issues will primarily affect residents, but also effect commercial enterprises.

# 5. Commercial Buildings

Energy consumed in commercial buildings and industrial processes account for 12% of Munhall's total GHG emissions. Improving the efficiency of our commercial building stock and reducing the energy intensity of the local industrial sector will contribute significantly to achieving Munhall's greenhouse gas reduction target. This chapter focuses on opportunities to retrofit existing commercial and industrial buildings and to ensure that future activities in these sectors are compatible with our community's climate protection goals.

The following are various reduction strategies to help reduce GHG emissions within the commercial energy sector:

- Promote utility companies commercial and residential energy code requirements, guided by an aim to reduce emissions.
- Adopt energy efficiency retrofits of existing facilities.
- Efficient lighting retrofits in buildings
- Install occupancy sensors
- Efficient lighting retrofits in buildings
- Purchase ENERGY STAR equipment
- High efficiency water heaters, boilers, and chillers
- HVAC maintenance tune-ups
- Switch electric heat to natural gas

| Objective | Supporting Actions | Co-Benefits |
|---|---|---|
| **CB 1 – Retrofit existing commercial and industrial buildings** | RB 1, EP 1 |  |
| **CB 2 – Ensure new commercial and industrial construction is built to maximize energy efficiency** | CB 1, RB 2 |  |

# 6. Residential Buildings

Energy consumed in residential buildings accounts for 56% of Munhall's total GHG emissions. Improving the efficiency of our residential building stock will contribute significantly to achieving Munhall's greenhouse gas reduction target, while saving residents money on utility bills and reducing the need for new infrastructure. This chapter focuses on opportunities to retrofit existing residential buildings, increase the quality of new construction, and to ensure that future activities in these sectors are compatible with our community's climate protection goals.

The following are various reduction strategies to help reduce GHG emissions within the residential energy sector:

- Promote utility companies commercial and residential energy code requirements, guided by an aim to reduce emissions.
- Adopt energy efficiency retrofits of existing facilities.
- Efficient lighting retrofits in buildings
- Install occupancy sensors
- Efficient lighting retrofits in buildings
- Purchase ENERGY STAR equipment
- High efficiency water heaters, boilers, and chillers
- HVAC maintenance tune-ups
- Switch electric heat to natural gas

| Objective | Benefits |
|---|---|
| **RB 1 – Retrofit existing residential buildings and homes to achieve a** |  |
| **RB 2 – Ensure new residential buildings and homes are built to maximize energy efficiency** |  |

# 7. Transportation

Emissions from transportation is a common sight to nearly everyone in Munhall. Besides emitting greenhouse gases, transportation fossil fuels also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting our health. Transportation accounts for 12% of Munhall's total GHG emissions. This chapter focuses on programs and policies to reduce emissions from transportation and includes design-oriented approaches as well as expansion of alternate modes such as walking, biking, or public transportation to and from the most common destinations in Munhall.

The following are various reduction strategies to help reduce GHG emissions within the residential energy sector:

- Construct electric vehicle recharging facilities in new parking facilities
- Expand pedestrian and bicycling infrastructure
- Revise land use code to promote smart growth

| Objective | Benefits |
| --- | --- |
| **TR 1 – Promotion of environmentally conscious alternative transit-oriented development** |  |

# 8. Monitoring Plan

**Munhall is taking steps towards integrating community feedback as well as engaging with other local municipalities in order to best address the issues of increasing GHG emissions, allowing the borough to be better positioned to monitor and enact the various actions described in this plan. The goal is to move forward with engaging regional partners, in order to best maximize the success in combatting climate change. Going forward, as more community engagement is incorporated into the climate action plan, a more defined timeline will emerge for how Munhall goes forward. Within the next year, a more comprehensive plan will form with regional as well as local stakeholders.**

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

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.

| 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 |

# 9. References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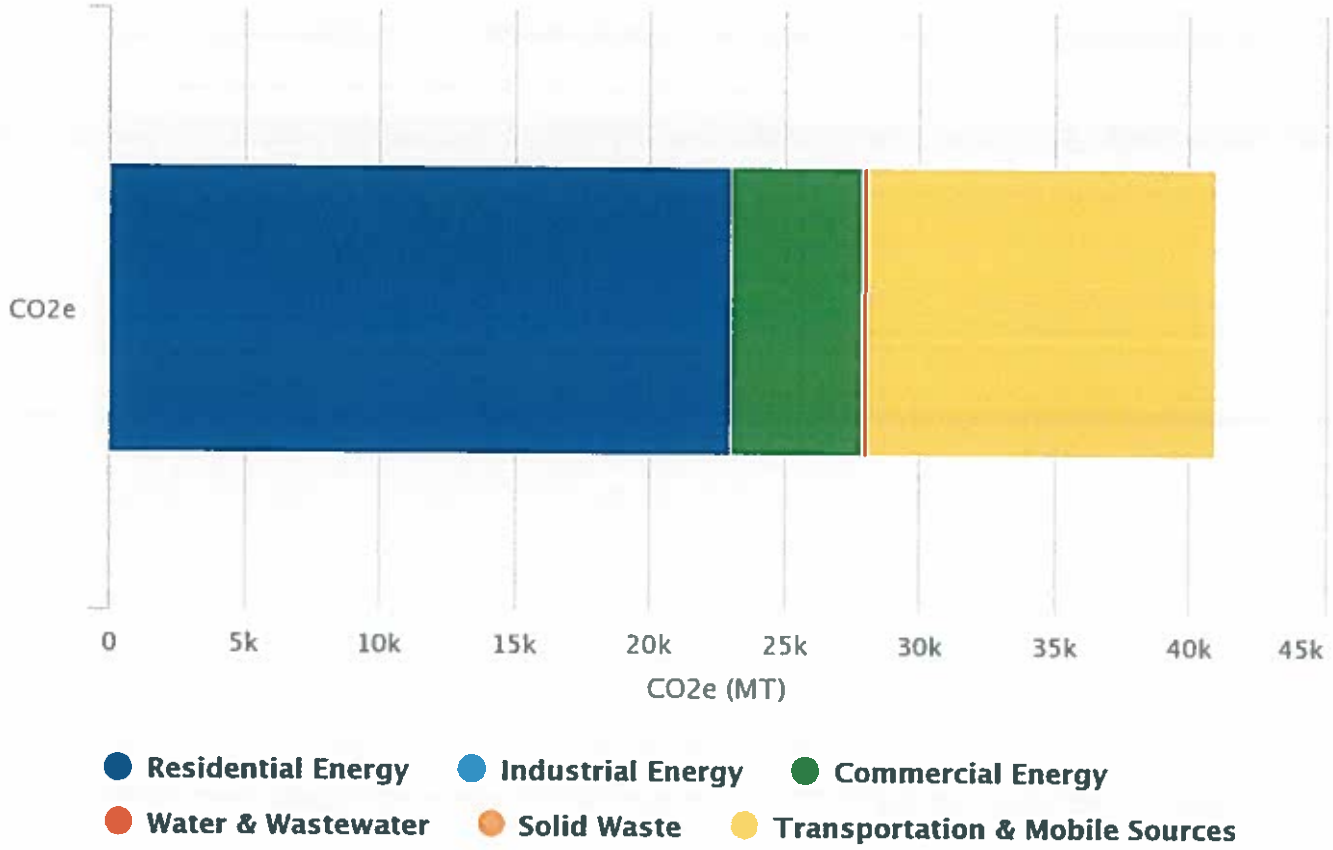
# Appendix I: Methodology

**GHG Inventory by Sector**



# Appendix II: 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).

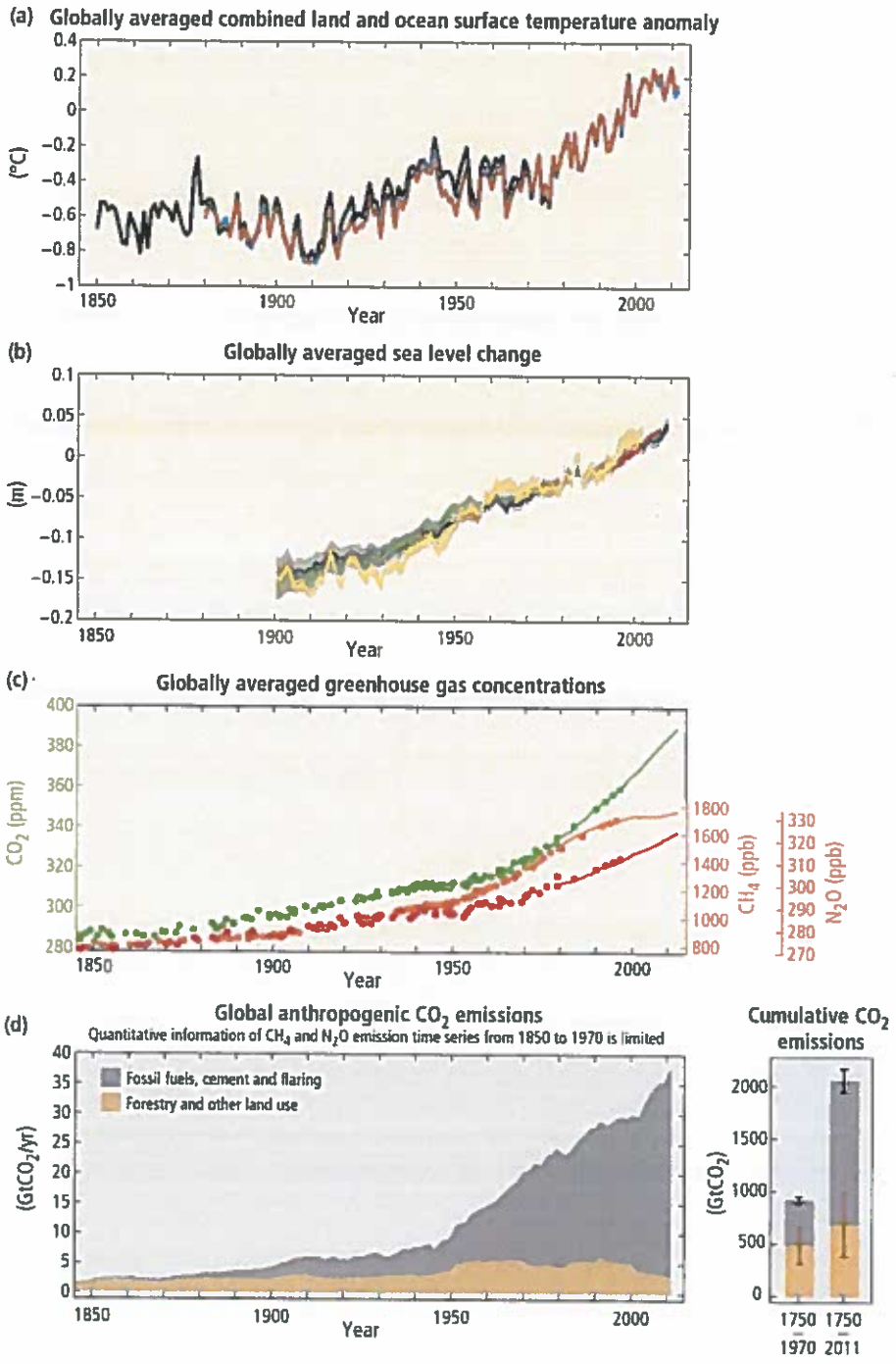



**Figure 1 Observations and other indicators of a changing global climate system**

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

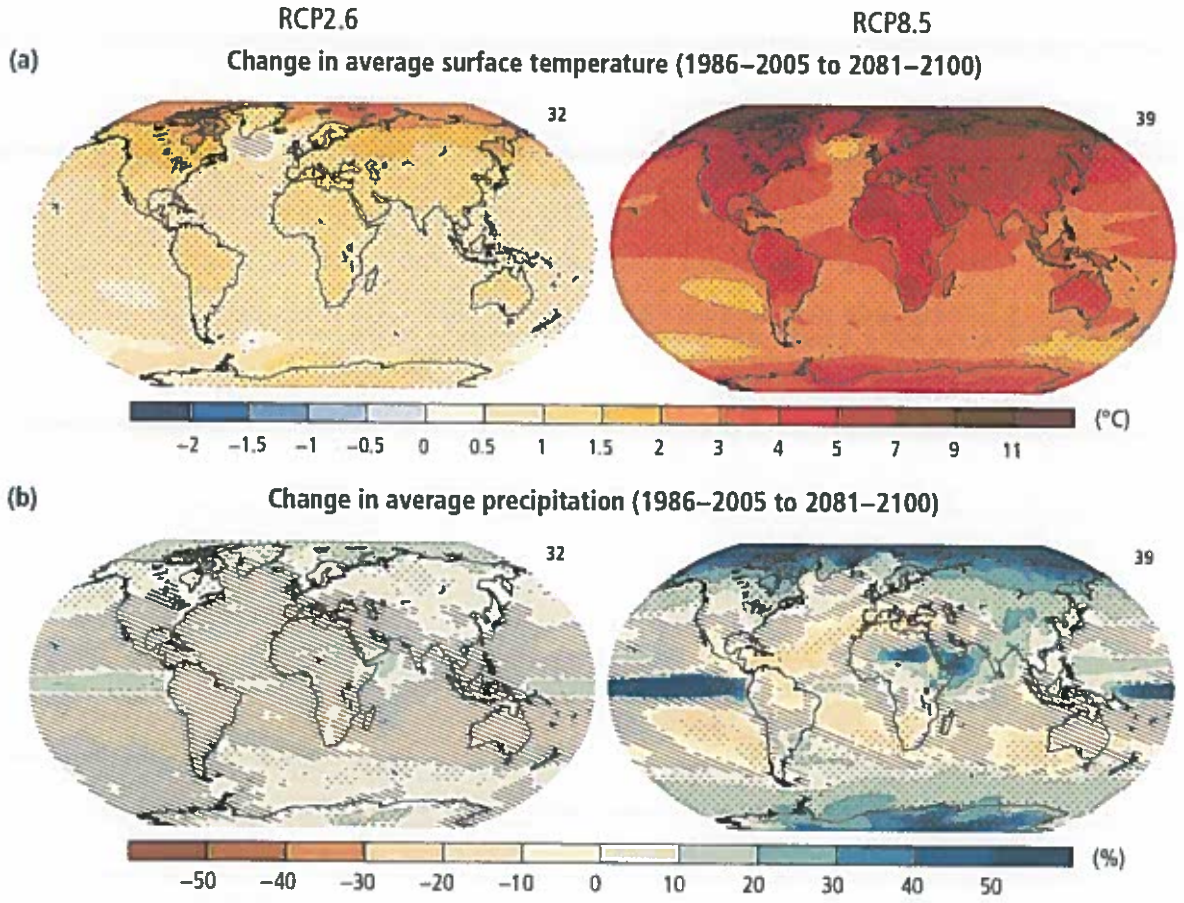



**Figure 2 Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios.**

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

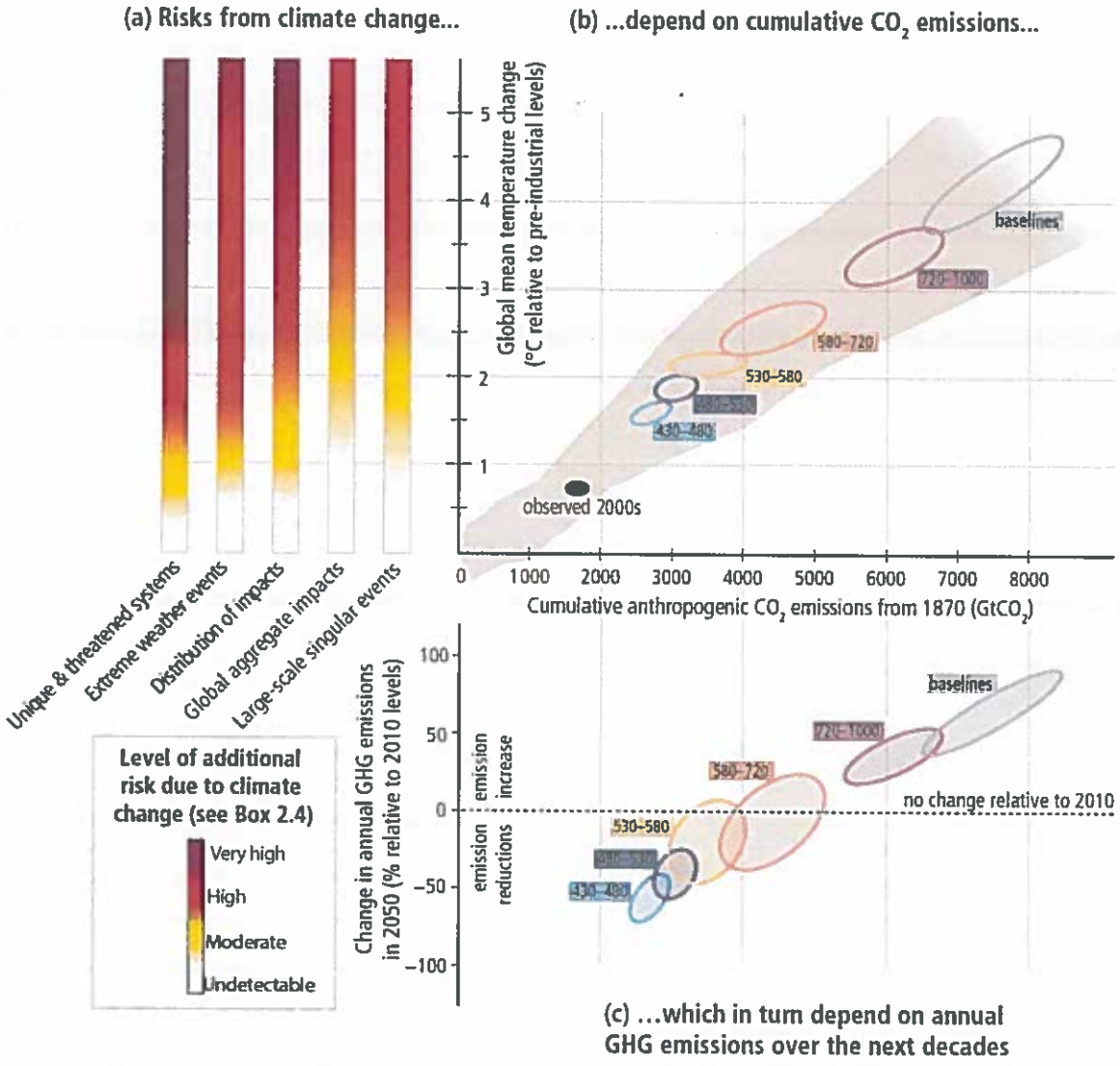



**Figure 3 The relationship between risks from climate change, temperature change, cumulative carbon dioxide (CO2) emissions and changes in annual greenhouse gas (GHG) emissions by 2050.**

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.