Meadville Climate Action Plan 2022

MEADVILLE
Pennsylvania

Local Actions and Policies to Reduce Meadville's Greenhouse Gas Emissions

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Executive Summary

Seasonal variations, extreme weather events, catastrophic natural disasters, and climate-related health impacts are becoming more intense and frequent as climate change threatens the health, safety, and overall well-being of communities across the globe. The Commonwealth of Pennsylvania and the City of Meadville are no exception. The coming decades are expected to bring record flooding and heat waves across Pennsylvania. Unless action is taken, Meadville is projected to endure at least forty 90+ degree days annually by 2050. Globally and locally, we must try to mitigate and adapt to our changing climate. This will require reducing carbon emissions and anticipating the effects of extreme weather.

Now is our chance to make these decisions as a community in order to protect public health and reduce energy use. This plan (or "CAP") has been written by citizens of Meadville for the Meadville community, with the goals of empowering local organizations to identify resources, engage residents and ensure equitable implementation.

Major findings from the Meadville City greenhouse gas inventory:

A greenhouse gas inventory was conducted from base year 2018 across multiple sectors within the City of Meadville. This included emissions from transportation and mobile sources, solid waste, water, wastewater, commercial energy, industrial energy, residential energy, and process and fugitive emissions. All greenhouse gas emissions were converted into their carbon dioxide equivalent (CO2e) to accurately account for the multitude of gases released that contribute to climate change. In summary, approximately 194,039 MT of CO2e are generated from city sources annually. Because of the city's stable population, this amount is projected to remain the same for the foreseeable future.

A primary CAP goal was to determine which neighborhoods and populations are most vulnerable or at risk from extreme weather. GIS mapping software was utilized to track income, food access, blighted areas, flooding impacts and other climate related vulnerabilities in Meadville. As is often the case, those most vulnerable to severe weather occupy the most financially challenged neighborhoods. The plan aims to ensure the prioritization of these areas in combating climate change.

Our Vision

The City of Meadville is committed to promoting environmental integrity, economic vitality, and quality design standards to maintain the health, safety, and welfare of those within our community. The utilization of

long-range planning techniques, plan implementation, and developmental review practices are active measures to aid the City in accomplishing its vision. These are encapsulated in the 4 E's (Education, Engagement, Equity, Economy), defined below:

Education: We want to inspire and motivate by ensuring that all residents understand the dire impact of climate change on their lives, as well as expounding and promoting the concepts of mitigation and adaptation.

Engagement: For actions to have a sufficient impact, as many residents as possible should be involved. Everyone has a role to play; everyone can make a difference and work for a livable community.

Equity: Programming must be done in an equitable manner, considering the disproportionate impacts experienced by low-income and other marginalized populations.

Economy: Whenever possible, we want to implement programs that are cost-effective, generate local income and support entrepreneurship.

Ensuring Community Benefits From Climate Action Planning

Planning ahead for extreme weather events benefits residents, home owners, businesses and students. Housing energy efficiency benefits everyone. Installing stormwater infrastructure decreases damage caused by flooding. Expanding trail systems and bike infrastructure improve safety, health and tourism. Implementing this plan will demand community-wide effort. It will require that we work as a community while investing in our own neighborhoods. This will be of enormous benefit for each of us and for our city as a whole.

An Ambitious But Necessary Goal

The CAP is recommending that Meadville strive for "Net Zero Emissions" by the year 2050. Given the increasing concern over extreme weather, many communities nationally and globally have already made this commitment. It will require that the City significantly reduce energy use and greatly expand local generating capacity, i.e.rooftop solar, so as to eliminate carbon generation.

Project Highlights by Section

1. **Business & Industry:** Develop an education program to assist small businesses in energy efficient practices and funding opportunities. Enlist a program such as Pennsylvania Solar Center of Pittsburgh to develop solar projects for local commercial and non-profit entities as well as city buildings.

2. **Housing:** Expand weatherization programs that offer free retrofits. Coordinate a city housing roundtable to bring together relevant agencies and stakeholders to address issues, such as upgrading city rental regulations to include energy standards.

3. **Energy Production:** Create educational opportunities in renewable energy along the lines of community development and job training. Use model renewable energy units as training sites.

4. **Waste Reduction:** Develop a commercial compost program that collects from businesses and redistributes to local gardeners, farmers, and researchers. Organize a "Fix it First" industry that utilizes skills of local residents/students to offer repair services for items that would otherwise need to be replaced.

5. **Transportation:** Support existing groups and programs to expand and upgrade city biking and walking infrastructure. Access state funds to install electric vehicle infrastructure and close the EV gap on I-79, generating increased tourism.

6. **Green Spaces:** Develop a master plan for Meadville's development that considers stormwater management, permeable pavement (for sidewalk & road repairs), tree planting, community gardening and park maintenance in a more cost efficient way.

7. **Food:** Assist local food vendors and county farmers in identifying subsidies and tools to boost the supply of affordable, fresh produce offered in Meadville. Initiate a farming incubator for residents to access larger plots of land and agricultural training/experimentation.

8. **Water:** Coordinate partners and funding resources to assist homeowners in constructing stormwater management and reuse infrastructure. Coordinate citizen science and reporting initiatives for education, recreation and monitoring the French Creek watershed.

Alignment with the Commonwealth of Pennsylvania's 2018 Climate Action Plan

This Climate Action Plan intends to exceed the reduction target outlined in the Commonwealth of Pennsylvania's 2018 Climate Action Plan of 26% by 2030 and 80% by 2050. The Meadville Climate Action Plan advocates for Net Zero emissions by the year 2050 through annual reductions of at least 3.5%.

1. Introduction

Scientific findings are clear -- maintaining our current reliance on fossil fuels will result in more intense heat waves, droughts, rainstorms, floods, wildfires, landslides, and extreme storm events. Northwestern Pennsylvania is one of the most rapidly warming areas in the United States. Meadville residents are already feel impacts from increasing daily temperatures on a daily basis. 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. In the same time period annual precipitation in Pennsylvania has increased by approximately 10% since the early 20th century and is expected to increase by an additional 8% by 2050 (Shortle et al. 2015). In the near future these impacts will harm the economy, further stress natural resources, while worsening the inequities facing many Americans, including Meadville residents. Action is required at all levels to address these problems and their cause. Local governments will play a unique role in building low-carbon communities.

The impacts highlighted above are caused by the accumulation of greenhouse gases (GHGs) like carbon dioxide (CO_2) and methane (CH_4) in the atmosphere, primarily resulting from burning fossil fuels and land use changes such as deforestation, which reduces the capacity of forests to serve as carbon sinks and further releases their stored carbon into the atmosphere. Although the natural greenhouse effect is needed to keep the earth's atmosphere in balance and the planet habitable, this process is thrown out of balance as the rapid accumulation of GHGs in the atmosphere from human activity leads to the trapping of more and more heat on the planet.

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). If the temperature rises beyond 2 degrees above preindustrial levels, entire ecosystems upon which agriculture and habitable living space, for example, depend will get out of balance. That includes, among other, the jet stream losing its essential fluctuation, ice shields melting & rising sea levels, coral reefs & other maritime ecosystems collapsing, among others).

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). Continued reliance on fossil fuels and the current trajectory of population growth, urbanization, reliance on personal vehicles, and land degradation, ensures that emissions will continue to rise. The time to act to reduce GHG emissions and our collective 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 the climate crisis. 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 Meadville understand the potential 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. This bill 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 2021, 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 governments. In keeping with an executive order by Governor Wolf in 2019 (PA DEP, 2019) are the reduction targets established by the plan: 26% by 2025 and 80% by 2050, as compared with 2005 levels. Through striving for "Net Zero" development, the Meadville Climate Action Plan will exceed the goals of the Pennsylvania plan.

Purpose and Scope of the Climate Action Plan

The City of Meadville is joining over twenty local governments throughout the Commonwealth committed to addressing climate change at the local level (DEP 2021). Climate change planning is not required by municipal bodies in Pennsylvania, yet Meadville joins numerous other cities across the state to voluntarily engage in this work, as it is in the best interest of our city and its future.

Meadville recognizes the risk climate change poses to its residents, businesses, and natural treasures. The City is acting now to reduce the GHG emissions of both our government operations and the community at-large, through the innovative programs laid out in this Climate Action Plan. Furthermore, we recognize that Meadville needs to address existing climate risks such as the increase in impacts associated with rising temperatures, changes to historic precipitation patterns, and flooding in the city, and to adapt its systems and infrastructure to better cope with 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 will 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 the City of Meadville for years to come.

Purpose

By creating a clear course of action so that everyone can play a role in creating and achieving climate and sustainability goals, our Climate Action Plan (CAP) drives and coordinates local efforts toward a reduction in GHG emissions by 3.5% per year, leading to Net Zero Emissions (NZE) by 2050.

Currently, many aspects of the daily life of a Meadville resident are tied to different systems, such as inefficient heating and cooling in our homes, resulting in the production of high levels of greenhouse gas emissions. Simple changes to these systems can lower GHG emissions while increasing cost-savings and convenience and improving the quality of life for members of our community. The Meadville Climate Action Plan is designed with these goals in mind. The CAP is a framework for the development and implementation of actions that reduce Meadville's GHG emissions and improve the lives of Meadville residents while doing so.

In addition to addressing mitigation concerns (i.e. reducing GHG emissions), the Climate Action Plan considers the vulnerability of Meadville residents to hazards that are now, and will continue to be, exacerbated by the negative impacts of climate change on the northwestern Pennsylvania region. Adapting to the impacts of climate change will reduce vulnerability in a community while making it more resilient in the face of future floods and heat waves. This plan also recognizes the need for climate adaptation and proposes measures consistent with reducing vulnerability and improving community resilience.

Scope

This Plan proposes objectives and actions for reducing GHG emissions that result from local government and community-wide activities within Meadville. It sets forth actions in the following sectors that local government and community members can implement together to reduce greenhouse gas emissions:

- Commercial and Industrial Buildings
- Residential Buildings
- Energy Production
- Waste Generation
- Transportation
- Ecosystems

The Plan creates a framework to document, coordinate, measure, and adapt climate action efforts. In addition to listing actions, the Plan discusses how each action will be implemented in accordance with benchmark timelines, financing requirements and options, along with assignment of responsibilities to pertinent city entities and community partners.

Planning Process

While Meadville has already begun taking steps to reduce greenhouse gas emissions and climate risks, this plan is a critical component of any comprehensive approach to addressing climate change. 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.

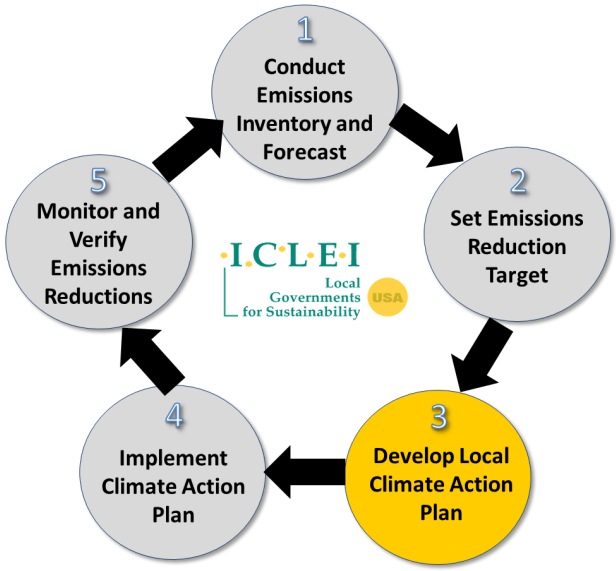

Figure 1: Five Milestones for Climate Mitigation

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 Meadville'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.

Planning Team and Stakeholders

The Planning team for the Meadville Climate Action Plan consists of:

- Autumn Vogel, Meadville City Council
- Guy McUmber, Meadville Planning Commission
- Matt Bethurem, Assistant Professor of Environmental Science and Sustainability at Allegheny College
- Delia Byrnes, Visiting Assistant Professor of Environmental Science and Sustainability at Allegheny College
- George Ackerman, Allegheny College
- Julia Ludewig, Assistant Professor of German at Allegheny College
- David Miller, Professor Emeritus of English at Allegheny College
- Michalene Morelli, local resident, Environmental Justice Expert
- Robert Concilus, local resident, Solar PV Expert
- Jason Ramsey, Library and Information Technology Services at Allegheny College

- The primary stakeholders for the CAP consist of:
  - Residents of Meadville
  - Meadville City Council and Mayor
  - Local business owners
  - Stakeholders specifically interviewed for this plan were:
    - Brenda Costa, Director French Creek Valley Conservancy
    - Tim Geibel, Crawford Area Transportation Authority Director
    - Zach Norwood, Crawford County Planning Director
    - Mitch Hohmann, Blooming Valley Landscaping and Chair, Meadville Planning Commission and
    - Jason Nesbitt, Executive Director, Center for Family Services

- Eric Pallant, Professor, Department of Environmental Science and Sustainability, Allegheny College
- Maria Rosado-Husband, Project HOPE Coordinator
- Sharon Pillar, DIrector, Pennsylvania Solar Center
- Calvin Ernst, Ernst Seeds
- Dave Ferlin, Northwest Weatherization
- Gary Johnson, Meadville Interim City Manager
- Katie Wickert, Assistant City Clerk
- Maryann Menanno, City Manager
- Geoff Bristow, Regional Energy Manager, PADEP
- Emil Emig, Emig's Bike Shop
- Joyce Klasen, Creating Landscapes for Families
- Dave Ferlin, Northwest Weatherization
- Gretchen Meyers, Meadville City Councilwoman
- Bob Harrington, Meadville Area Water Authority
- Danuta Majchrowitz, Meadville Master Gardeners
- Michael Reed, French Creek Coffee and Tea
- Lindsey Duncan, Meadville Resident
- Rob Stevens, Lincoln Avenue Grocery

The planning team met via Zoom on a weekly basis beginning in February 2021. Biweekly meetings were initiated in July 2021. Stakeholder meetings were conducted on an ongoing basis since March 2021. The team has also established a repository of plan information and a website.

Social Equity

Climate equity has been a core component of the planning process and will continue to be so through implementation. Climate equity ensures the fair and just distribution of the benefits of climate protection efforts and alleviates unequal burdens created or exacerbated by climate change. Implementation of this

concept requires intentional policies and projects that simultaneously address the effects of climate change and the systems that perpetuate both climate change and inequity.

These inequities primarily stem from ongoing institutional class and racial bias and historical discriminatory practices that have resulted in the inequitable distribution of resources and limited access to opportunities. Even before the economic hardship of the COVID-19 pandemic, nearly 20% of Meadville's population was living below the poverty line, with many more residents living in near poverty conditions. 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 people, outdoor workers, people with disabilities, the very young, and the elderly, will disproportionately bear the burdens of climate change impacts. For example, studies by EPA scientists published in *The American Journal of Public Health* have found that communities living below the poverty line bear a 35% higher burden from particulate matter emissions than the general population, while African American communities have a 54% higher burden than the overall population (Mikati et al. 2018). In addition, the many economic and health benefits of carbon reduction investments are not shared equitably across the city, especially among BIPOC and low-income communities.

To ensure an equitable climate action plan that solicits and incorporates input from people across the city, Meadville has adopted a community-driven approach to developing the CAP that includes outreach efforts aimed at learning about the concerns of community stakeholders in various neighborhoods through a lengthy public comment and outreach period from July 2021 to December 2021. The public comment period gave residents the opportunity to examine the full draft of the CAP and provide input for the plan's final draft. This process is described in further detail in the following section.

Community-Driven Planning Process

In identifying which specific populations should be included in a community-driven process, the Meadville CAP Task Force consulted:

- The Pennsylvania Department of Environmental Protection's Environmental Justice Viewer
- The Meadville City Planning commission
- The Crawford County Planning Commission

- Project HOPE, a neighborhood group representing Meadville's Fifth Ward
- Residents of low-income areas in the city that are most at risk from climate-related impacts and/or most historically marginalized in local decision-making

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

- Forming a CAP Task Force of local residents
- Engaging in direct outreach and discussion with numerous stakeholders, including residents from across the city (with specific focus on neighborhoods directly impacted by flooding, lack of access to transportation, and lack of access to affordable and healthy food), local business owners, local nonprofit groups, and members of Meadville city government.
    - One-on-one conversations with members of the community
    - A series of virtual outreach and education events designed to give the public insight into the work that the CAP Task Force had done in the Fall of 2020 and through the Spring of 2021.
- Ensuring that climate equity was a core element of both the vision statement for the CAP and the specific objectives of the CAP
- Conducting multiple CAP draft rollout and public comment sessions throughout the community throughout the fall of 2021

Engagement Activities (All held virtually except June 12 Tabling)

1. February 2, 2021 - Presentation to Meadville City Council on Meadville CAP
2. March 22, 2021 - Introduction to the Meadville CAP
3. April 20, 2021 - What should Meadville's goals be in becoming a climate-friendly community?
4. May 11, 2021 - How should Meadville expand energy efficiency and clean energy development?
5. June 1, 2021 - What alternative transportation programs should Meadville have?
6. June 12, 2021 - Table at Meadville Second Saturday Event
7. June 15, 2021 - The Proposed Meadville CAP - Making Meadville a more climate-friendly community

Following these activities, a draft CAP was developed and a series of rollout/comment sessions were held during Fall 2021.

2. Vision Statement

The City of Meadville recognizes that climate change will impact our community and we must plan a response. Preserving the character of our city in the 21st century will require understanding the significant effects that climate change will have on the environment, public health, and economic and social conditions.

Even though we are a small city, we will need to prepare for climate effects and take measures to mitigate the worst of them to the greatest extent possible. Every person, business, organization and institution contributes to greenhouse gas emissions and we all have a role to play in mitigating climate change effects. We can all benefit from these actions, especially those of us most vulnerable to extreme weather.

We have developed this document building on the goals of two prior city-wide efforts: the 2016 Comprehensive City Plan and the 2019 My Meadville Community Action Plan. In the spirit of the former, we aim to spur community development through improved housing, expanded multimodal transportation and greener growth. In response to the latter, we will promote community calls for a healthier environment and respect for the social value of equity, fairness, and inclusivity in the process of meeting our challenges.

Through this Plan, it is our intent to make Meadville a leader in addressing climate change through implementing smart and responsible actions. Our plan can be summarized in the 4E's: Education, Equity, Economy and Engagement. We do this to make our city more resilient to climate impacts and help provide a better world for our children and all those who come after us.

This Climate Action Plan therefore offers a robust set of actions that will address climate hazard vulnerabilities and aim for Net Zero GHG emissions by 2050. Each sector action was created and reviewed by Task Force Members who considered technological limitations, funding constraints, public support, feasibility of implementation, environmental justice considerations, and other barriers.

Meadville established this important and ambitious Net Zero Emissions target to maintain a vibrant, healthy, and safe community for future generations while improving the quality of life for those who live here today.

3. Co-Benefits of Climate Action

Greenhouse gas reduction and climate resilience are not the only beneficial outcomes of climate action plans. Additional outcomes are referred to as “co-benefits,” and they illustrate how taking action on climate change results in a more prosperous community. The plan to lower greenhouse gas emissions in Meadville will result in a number of collateral, or “co”, benefits relating to:

- public health
- economic prosperity
- efficiency of government and taxes
- quality of housing (especially low-cost housing)
- routinization of fund-raising for improvement projects
- more effective infrastructure, in particular around transportation

In the long run, this work will tangibly impact and be impacted by the quality of education (both public and grassroots) in our community, fostering increased social equity and solidarity, cooperation and collaboration. Indeed, we look to nothing less than an energy-infusion into our local civic life along with a sharpening and foregrounding of civil discourse toward a new sense of purpose: taking our part in saving the planet.

At the same time, such work depends on initiating a broad-based process of appraising the public of the nature and significance of climate change and of ways to combat it. In addition, we need to think about ways to understand the overall impact of addressing this existential threat that will help citizens perceive how confronting it can lead to a revitalization of our community as a whole, especially along the lines of certain key issues and concerns.

In order to understand how the overall revitalization of our already lively and engaged community can take place through energy-saving, it is crucial to envision how the metaphoric connection between economy

and ecology might be actualized in policy and practice. The two terms share a common etymological root, having to do with proper household management.

Take as an example the effort to improve low-income housing through community solar facilities. Weatherizing homes, especially in low-income neighborhoods, with renewable solar energy subsidized by available community solar funding and using the savings to make improvements in insulation as well as crucial amenities like bathrooms and kitchens not only improves the standard of living for members of marginalized communities. It can actually jumpstart neighborhood and local economies by creating jobs, therefore bringing tax-money into the community and leading to more positive attitudes among its members about the future, including better tenant-landlord relations. With regard to job prospects, the Clean Energy Employment Report released by Governor Wolf's administration in 2020 showed that while the statewide average for job growth between 2017 and 2019 was approximately 1.8%, clean-energy jobs grew by 8.7% across the Commonwealth, demonstrating the robust employment opportunities presented by the renewable energy sector.

The amelioration of living conditions ultimately generates community pride as well as collective action. Along similar lines, providing public transit options for people with few or no cars naturally increases work prospects beyond the neighborhood. Moreover, encouraging walking and biking as alternative forms of transportation to school and social services provided by the City requires creating safe paths and thoroughfares to get around town. Providing such opportunities for healthy exercise in turn improves health in the short run, just as environmental preservation and the lowering of carbon emissions leads in the long run to less suffering from climate-related ills like asthma and obesity which beset low-income neighborhoods. In other words, thinking in terms of systems theory—the human counterpart of natural ecology—in illuminating the interconnected nature of life enables us to discern the wider interdependent benefits of climate action in a community.

4. Meadville's GHG Emissions

Since the early 1990s, U.S. cities have developed greenhouse gas (GHG) inventories for both community-wide activities and local government operations, based on accounting protocols created by ICLEI. Known respectively 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 over the last 30 years and provided consistency 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. Meadville used the 2018 Protocol for the GHG inventory presented in this plan in order to match the output of the inventory with the most recent data that was available at the time it was conducted.

Through the completion of a local emissions study, or "greenhouse gas inventory," emission levels for the Meadville community have been determined and are presented below. Community-wide emissions represent the sum total of emissions produced within Meadville city limits, including emissions resulting from electricity use within the jurisdiction, even if such electricity is generated elsewhere. In this way, the community-wide figures represent all emissions for which the community is responsible and identifies those sectors within which GHG emissions can be reduced by efforts within the city.

Meadville Community-Wide GHG Emissions

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

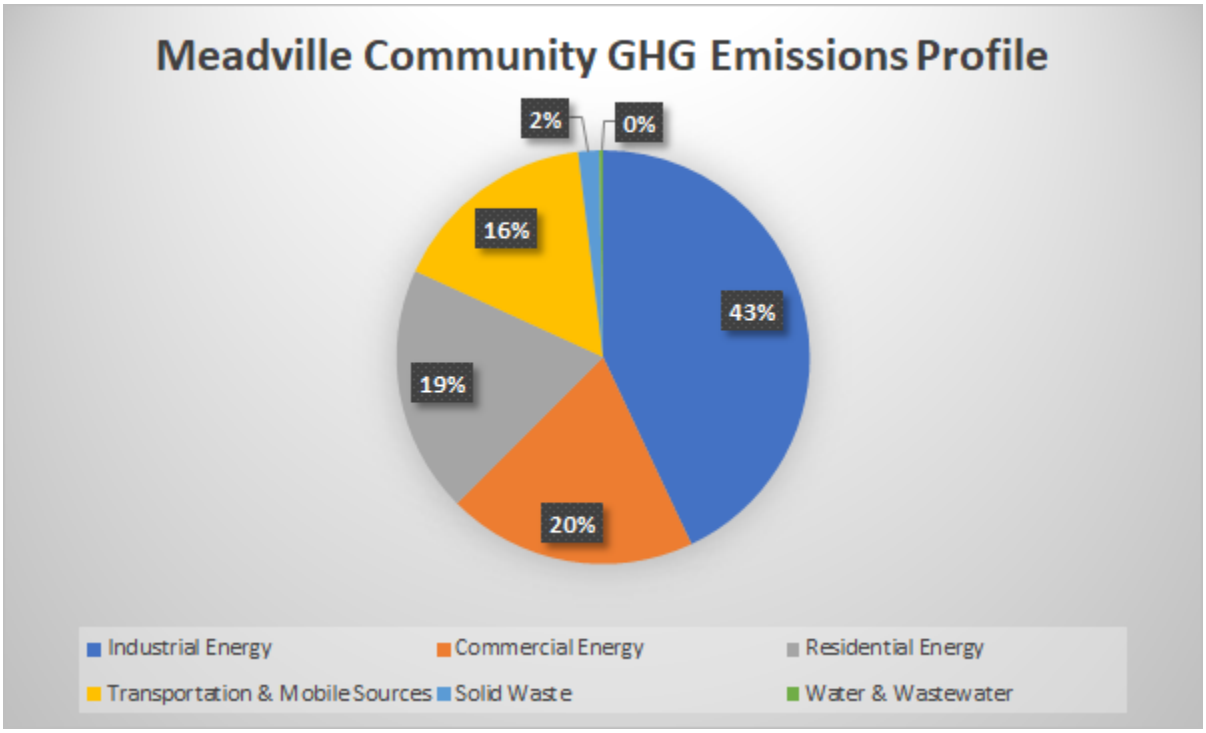

Figure 2: Meadville Community-Wide GHG Emissions

Government emissions include all sources for which the local government exercises direct operational control, such as water supply and wastewater treatment. Each of the sectors represented in the figure above harbor potential for changes that can substantially reduce the GHG emissions produced in Meadville. As explained later in this document, the actions recommended to address climate change in this plan are not only simple, often low-cost measures to implement, but they will also result in important co-benefits for individuals, businesses, and the entire community (as detailed below).

Forecasting Meadville's GHG Emissions

Meadville 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), which is 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, Meadville will not see any meaningful reduction in GHG emissions from the broad sectors responsible for the emissions in the city. The size of Meadville's population is currently projected to exhibit a slight decline over the course of the next ten years, which equates to relatively little change in GHG emissions associated with the activities of individuals in terms of residential electricity use, solid waste production, and water use and wastewater production. This affords Meadville the opportunity to reduce overall emissions more easily than many cities and towns across the US that are faced with projected population growth.

Projected Changes in GHG Emissions

Figure 3 shows the projected change in Meadville's GHG emissions from sectors, between 2018 to 2050.[1]

Another factor taken into account when determining future GHG projections is a pledge by First Energy, the electric utility provider for Meadville, to reduce GHG emissions associated with their electricity generation. They have set a goal of 30% reduction in emissions by 2030 (compared to a 2019 baseline) and full carbon neutrality by the year 2050. The 30% emissions reduction goal has been incorporated into the forecasts presented here, but the longer-term carbon neutrality pledge has not been accounted for in the current forecasts, as First Energy's pledge does not yet include specific details for achieving carbon

[1] For complete information regarding the emissions inventory and forecast, including methodology and supporting data, please reference Appendix I.

neutrality.[2] Meadville is thus already projected to be on a pathway to see an overall reduction in GHG emissions by 2050.

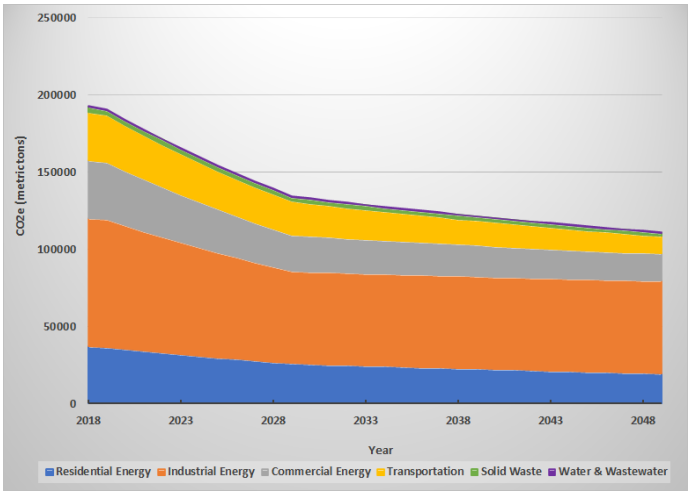

Figure 3: Projected Changes in Meadville GHG Emissions from 2018 to 2050

[2] When the details of that goal are available, any additional emissions reductions will be incorporated into the updated forecasts for future Meadville emissions scenarios.

Meadville's GHG Reduction Target

Meadville will reduce its emissions to net zero by 2050, with an interim goal of 30% emissions reductions by 2030. Figure 4 compares the reduction target with the business-as-usual forecast. This CAP aims to fill the gap between already implemented GHG reduction measures and what remains to be done to meet these goals. Reductions in 2050 rely on the best information currently available pertaining to population forecasts, future changes to building codes, the pledge by First Energy to reduce the emissions tied to the production of electricity, and vehicle fuel efficiency standards.

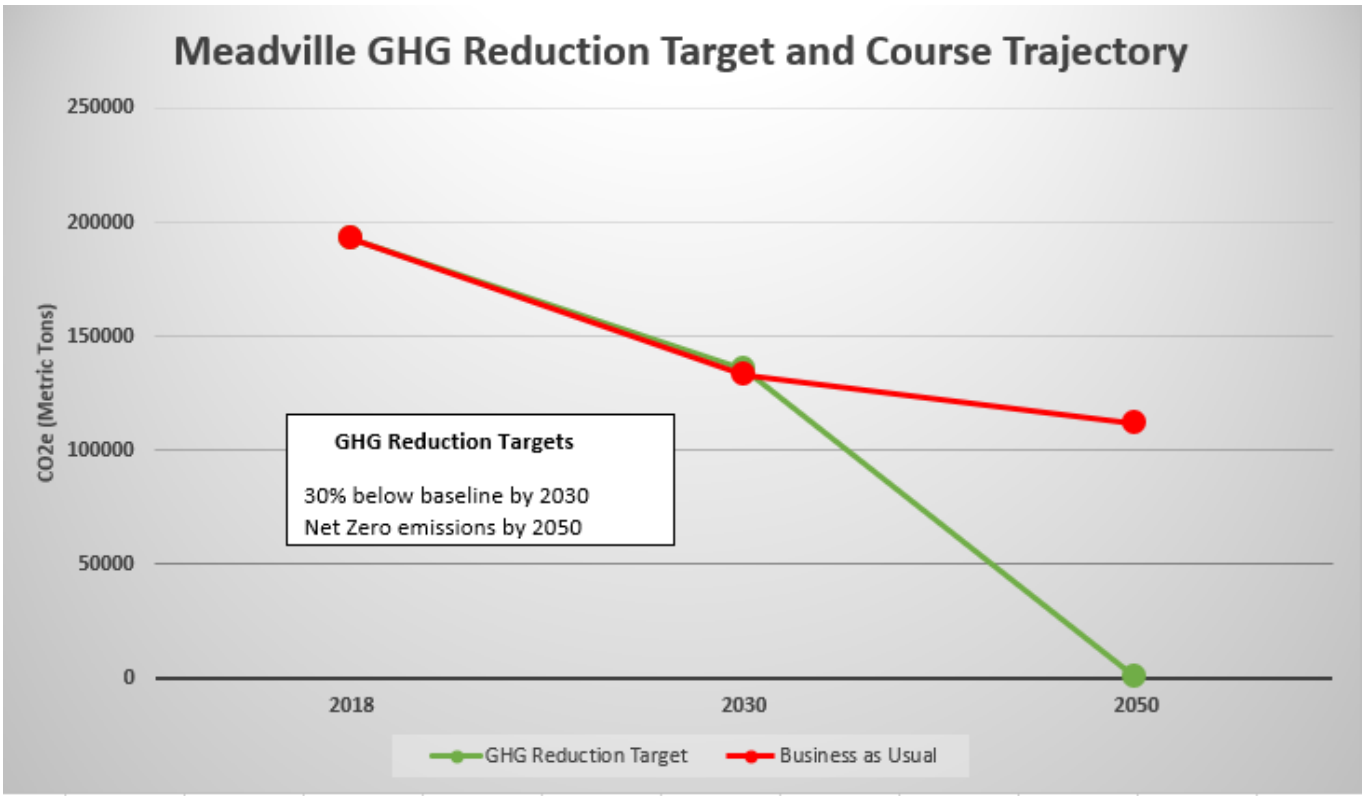

Figure 4: GHG Reduction Target

Meadville's reduction target is consistent with the statewide Pennsylvania target of 26% reduction by 2025 and 80% by 2050 from 2005 levels, but goes beyond the state-level goals in striving for achieving Net Zero emissions by 2050 (see Appendix I for these calculations). Meadville is in an excellent position to reduce emissions beyond what the State of Pennsylvania has targeted for the entirety of the Commonwealth.

The Meadville Climate Action Plan

The summary table on the following page identifies the sectors within the Meadville 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 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 Meadville for the impacts of climate change. In addition, Meadville will assist residents and businesses in their endeavors to reduce emissions through programs explained in this Plan. The citizens of Meadville can not only do its part toward achieving a stable and livable climate, thereby reaping 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.

Meadville Climate Action Plan Summary Table – Sectors

Sector	Description	Number of Distinct Actions	Anticipated MTCO2e Reduction by 2050	Percentage of Total Reduction at 2050
Commercial & Industrial Buildings	Policies and programs to reduce commercial, municipal, and industrial sector energy use.	6	126,000	63%
Residential Buildings	Policies and programs to reduce residential sector energy use.	7	38,000	19%
Energy Production	Policies and programs to promote local renewables.	7	NA	NA
Waste Generation	Policies and programs to reduce solid waste generation.	8	2,000	1%
Transportation	Policies and programs to reduce on-road vehicle miles traveled and promote electric or low emission vehicles.	4	32,000	16%
Ecosystems	Programs to reduce water usage, promote local food systems and protect local watershed resources.	4	2,000	1%

*MTCO2e (Metric tons of CO_2 equivalent)

5. Taking Action

In the following chapters, a series of Action Steps are provided for each emissions sector. These steps detail specific programs to support each sector's emissions reduction. In keeping with the plan's goals of equitable, educational, social and economic action, each step is defined in these terms. "Partners" are also identified to list support organizations and build upon any existing programs. In addition, each action also has a "deadline" or target date for full implementation. "Next Steps" outlines initial activities for each action to jumpstart program development.

Emissions Reduction Potential

Calculating expected emissions reductions for each objective and action requires making assumptions about the extent 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 action. However, an estimation of the reduction of each action step is made. In addition, further specific implementation assumptions and GHG reduction estimates are listed in the Appendix.

Climate Adaptation

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

6. Commercial & Industrial Buildings

Energy consumed in commercial buildings and industrial processes account for approximately 63% of Meadville's total GHG emissions. Because of this, the commercial/industrial sector is crucial to helping Meadville achieve the city's net zero goal through actions focusing on building efficiency, reduced commuting and expanded renewable energy use..

Keeping with this plan's priorities of education, engagement, equity and economy, the table below outlines how these actions will achieve these goals with respect to the commercial/industrial sector. Each action has a targeted year for initiation and an identified actor which will be responsible for development. Targeted or "Deadline" years provide priorities for the development of programs, which will be phased in over the next decade. Regarding actors, "City Organization " refers to a city-associated entity, such as an authority,commission or advisory group, versus the city itself.

Actions also indicate their targeted educational group or party and the specific economic and equity impacts from their operation. It should be noted that, regarding equity benefits, "LI" refers to low income entities and "NPO" are non profit organizations.

Also, other acronyms used in this section are PA Department of Environmental Protection (PADEP), Penelec Sustainable Energy Fund (Penelec SEF) and Commercial Property Assessed Clean Energy funding (CPACE).

In addition to reducing carbon emissions, actions relating to this sector will result in considerable economic activity for the local energy workforce and financial savings for city residents, most significantly families.

C1	**Commercial Energy Efficiency Program**[3]				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/ Actor**	**Partners**	**Educated Parties**
2022		Reduce energy costs for businesses, energy sector work	City organization	PADEP, Energy service companies, ICLEI	Commercial focus
Explanation of action step: Education program targeted for all city commercial entities, including city and county buildings.					
Equity Benefit: Program will focus on minority businesses and NPOs serving families					
Implementation considerations: Funding and other incentive programs need identification. Potential funders include Penelec SEF, Act 129 and PACE program.					
Key next steps: Establish coordinators in city organization, program outline and resources.					

[3] It should be noted that this table format will be generally utilized for all sectors, i.e. residential, commercial, etc., to clearly illustrate how each action will address this plan's education, engagement, equity and economy priorities.

C2	Greening City Operations				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2023		Reduced city energy costs, energy sector work	City staff	PADEP, Energy service companies, ICLEI	City, community
Explanation of action step: Program to assess city energy efficiency and other potential greening programs in support of emissions reduction.					
Equity Benefit: Reduced city costs will free funds for equity programs					
Implementation considerations: Funding and other incentive programs need identification.					
Key next steps: Request PADEP Shared Energy Manager program. Identify city staff contact. Benchmark city facilities through the Energy Star program.					

C3	City Commuter Education Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2026		Reduced commuting costs, better health, reduced parking	City Organization	Commercials, PADEP, ICLEI, Chamber, Allegheny College	Commercial focus
Explanation of action step: Program to research company commuting incentives and educate business owners regarding commuting.					
Equity Benefit: Focus will be on commuters, especially those with limited vehicle access					
Implementation considerations: City can avail incentives such as preferential parking and biking infrastructure. Funding possibilities through new					

federal programs should be researched
Key next steps: Investigate new federal programs and develop best practices.

C4	City Energy Codes for Existing and New Buildings				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2028		Reduced energy costs, especially for LI families, Energy sector work	City	PADEP, Landlords, ICLEI	Community
Explanation of action step: Development of codes and regulations to ensure energy efficient city buildings					
Equity Benefit: Reduced costs for LI renters, NPOs and minority businesses					
Implementation considerations: Research needed to determine best management practices					
Key next steps:					

C5	Commercial Solar Development Program				
Deadline	**GHG Emissions Impact**	**Economic and Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Party**
2028		Energy sector work	City Organization	PADEP, ICLEI, Allegheny College, vendors	Commercial
Explanation of action step: Program to develop solar projects on any scale					

for local commercial entities, including the city and the county.
Equity Benefit: Reduced costs for LI renters, NPOs and minority businesses
Implementation considerations: Research needed to determine best management practices nationally. Potential funding sources need identification. Focus on encouraging the industrial sector to consider on-site generation.
Key next steps: Advocacy on state and federal levels to develop specific larger scale commercial financing and incentives.

C6	**Commercial Energy Awards**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
On-Going		Publicize economic benefits of efficiency	City organization	ICLEI, Meadville Tribune, Meadville COC	Commercial, community
Explanation of action step: Program to recognize outstanding commercial energy programs at every level to provide public education.					
Equity Benefit: Focus on and equity based projects					
Implementation considerations: Consideration should be given to visible award labels on storefronts, etc. to maximize education benefit. Sponsorship from vendors should be sought.					
Key next steps: Award frequency, title and selection format should be developed.					

7. Residential Buildings

Energy consumed in residential buildings accounts for 19% of Meadville's total GHG emissions. Improving the efficiency of our residential building will contribute significantly to achieving the city's greenhouse gas reduction target, while saving residents money on utility bills and reducing the need for new infrastructure.

Considering Meadville's high renter and poverty rates, 60% and 24% respectively, it is particularly important that this plan focus on tenant and low-income properties. Financially challenged households pay a disproportionately high income percentage for energy, which results in what is commonly referred to as an "energy burden". Inefficient residences can be unhealthy for vulnerable occupants, such as children and the elderly, due to the poor interior conditions from increased heat and precipitation that is increasingly occurring in Meadville. These conditions can include heat stress, dehydration and airborne diseases from mold.

Acronyms used in this section are Pennsylvania Housing Finance Agency (PHFA), US Environmental Protection Agency (EPA), Crawford County Coalition on Housing Needs (CCCHN), Center for Family Services (CFS), Housing Alliance of PA (HAP), Meadville Housing Authority (MHA) and PA Solar Center (PSC).

R1	Develop Expanded Local Weatherization Programs				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022		Energy sector work, savings for low income homeowners	City Organization	NW Weatherization, PHFA, DEP, EPA	Landlords, homeowners
Explanation of action step: Assess existing weatherization programs and develop expanded efforts to improve more low-income properties**.**					
Equity Benefit: Weatherization focuses on most in-need properties and families.					
Implementation considerations: Supplemental funding is possible through at least PHFA. Other potential support through federal climate justice programs.					
Key next steps: Determine actual extent of weatherization in city, benchmark existing programs.					

R2	City Housing Roundtable				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2023		Identify and prioritize critical local housing issues	CCCHN	CFS, Landlord Association, etc.	Housing sector
Explanation of action step: Roundtable to bring all local relevant agencies together to discuss important housing issues.					
Equity Benefit: Focus will be on low income challenges, including inadequate weatherization programs and inefficient rental properties.					
Implementation considerations: Meetings should be held monthly and identify pertinent available funding programs.					

Key next steps: Inventory all agencies to participate in roundtable discussions.

R3	Upgrade City Rental Regulations, including Energy Standards				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2024		Energy sector work, improved properties for low income tenants	City	ICLEI, HAP, PHFA, Allegheny College	Landlords

Explanation of action step: Program to develop best practices in city rental regulations

Equity Benefit: Standards will ensure safe and healthy properties for all renters and reduce energy burden by requiring efficient properties.

Implementation considerations: Funding through PHFA, Act 129 and other programs could be accessed to help landlords improve inefficient properties.

Key next steps: Assess city regulations with respect to best practices. This should include assessment of all building energy standards, i.e. commercial.

R4	Public Housing Energy Efficiency Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2025		Energy sector work, reduce energy costs for public agencies and tenants.	City Organization	MHA, CCCHN, Fairview Fairmont, etc.	Public Housing Sector

Explanation of action step: Program to expand energy efficiency in local public housing agencies.

Equity Benefit: Public housing services low income families and efficiency will

directly benefit families and agencies themselves.

Implementation considerations: Education programs should be focused on agencies and specific needs and funding resources, such PHFA and Act 129.

Key next steps: Inventory agencies and participation in efficiency programs such as Energy Star.

R5	**Homeowner Energy Education**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2026		Energy sector work, homeowner savings	City organization	ICLEI, PADEP, Banks, Allegheny College	Homeowners

Explanation of action step: Program to provide increased energy efficiency education for all city homeowners.

Equity Benefit: Program will focus on low income homeowners and challenges in financing improvements. Issue of expanding city homeownership in general should be discussed.

Implementation considerations: Local banks can play an important role, especially in developing low income homeowner programs. PACE programs should be developed as a funding tool for all owners.

Key next steps: Develop basic homeowner education programs, focusing on climate change responsibility.

R6	**Residential Solar Development Program**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2028		Energy sector work, lessened grid reliance	City organization	PHFA, Vendors, PSC, Green Mountain	Community

Explanation of action step: City specific program to expand development of residential solar.

Equity Benefit: Focus will be on low income neighborhoods and public housing agencies.

Implementation considerations: Advocacy for expansion of state and federal programs necessary to make projects economic. Public projects should consider funding through PHFA and HUD.

Key next steps: Develop a basic education program featuring local models to illustrate the potential of solar in NWPA.

R7	City Residential Energy Awards Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
On-Going		Provides public education to advance all programs	City organization	City, Meadville Tribune	Community

Explanation of action step: Program to recognize and publicize residential energy efficiency of all sizes.

Equity Benefit: Focus will be on low-income and other equity related projects**.** Events and participation could build community.

Implementation considerations: Consideration should be given to visible award labels on home, building, etc. to maximize education benefit. Sponsorship from vendors should be sought.

Key next steps: Award frequency, title and selection format should be developed.

8. Energy Production

Broadly speaking, the use of fossil fuels for energy (including electricity, heating, transportation, and other uses) is the single largest contributor to greenhouse gas emissions and climate change. Fossil fuels still supply a considerable share of energy for electricity, heating, transportation, and other energy-producing uses. Emissions from fossil fuel combustion for energy, including transportation, represent at least 90% of Meadville's total GHG emissions.

Energy production is a cross-cutting sector and nearly all activities that take place in the community require energy of some sort. Unfortunately, local utilities are not at the forefront of increasing the percentage of their electricity generated from renewable sources. It is in the city's best interest to create local generating capacity, to lessen grid reliance and minimize losses associated with transmission. It is estimated that 50% of all electricity is consumed in "line loss" before any switch is turned on.

However, development of local renewable projects will take significant community education, including the creation of recognizable models within the city. This sector further provides for the consideration of larger scale projects in the near future, in anticipation of expanded state and federal programs.

E1	Comprehensive Renewable Energy Education Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022		Energy sector work	City organization	DEP, ICLEI, Allegheny College, PSC	Community

Explanation of action step: Program to provide education at all levels on renewable technologies and financing, including green energy options.

Equity Benefit: Education will focus on potential benefits to low income households**.**

Implementation considerations: Advocacy necessary on the state and local levels to incentivize additional programming to increase the economic feasibility of renewable energy. Potential funding through PADEP Environmental Education grants.

Key next steps: Determine program outline and resource materials.

E2	**Model Renewable Energy Projects**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2024		Energy sector work, community education.	City Organization	PADEP, ICLEI, Allegheny College, PSC	Community

Explanation of action step: Program to develop visible and prominent renewable energy projects in the city for public education.

Equity Benefit: Projects should focus on low-income neighborhoods and the benefits to financially challenged families.

Implementation considerations: Projects can be of small scale but visible. Potential funding available through PADEP, USDN, Green Mountain Sun Club and EBASCO (library)**.** Consideration should be given to development of a locally based foundation to support small but impactful projects.

Key next steps: Identify all potential funding sources and available installation vendors.

E3	**Community and Other Large Scale Solar Projects Assessment**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2025		Potential communitywide savings, lessened grid reliance	City Organization	PADEP, ICLEI, Allegheny College, PSC, Vendors	Community

Explanation of action step: Conduct a detailed assessment of the possibility of a larger scale renewable system and platforms, such as microgrids.

Equity Benefit: Projects should be considered on a neighborhood scale, especially in low-income areas**.**

Implementation considerations: Research should be done on best practices nationally. Advocacy for state regulations to support large scale implementation should be done. PPA or similar financing approaches should be considered.

Key next steps: State and federal advocacy should be continual to support all scales of development.

9. Waste Generation

Unfortunately, the vast majority of Meadville's solid waste, like much of our national waste, is still sent to a landfill. This is especially true of organic wastes such as food scraps. GHG Emissions waste transportation and decaying putrescible material represent only 1% of the city's overall amount.

However, it should be recognized that recycling and composting have immense environmental benefits in reducing potential landfill cleanup liability and retaining "embodied" energy from reclaimed materials. This plan therefore, recommends that the city expand its recycling efforts, especially related to food waste recovery and composting. Recycling, recovery and related efforts further create entrepreneurial opportunities not possible when wastes are landfilled.

Acronyms used in this section are Meadville Area Recreation Complex (MARC) amd Meadville Area High School (MASH).

W 1	**Develop a commercial compost research program.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/ Actor**	**Partners**	**Educated Parties**
2023		Reduces the cost of waste.		Conservation Compost; Allegheny College Master Gardeners	Residents
Explanation of action step: Develop a commercial compost research program.					
Equity Benefit: Reduction of vulnerabilities associated with climate change.					

Implementation considerations:
Key next steps: Identify lead research team.

W 2	**Expand home composting.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022		Reduces waste and compost cost.		MASH, Food for Thought, Conservation Compost Master Gardeners	Residents; Students
Explanation of action step: Develop and facilitate educational programming to educate the community on the process and benefits of home composting. Identify subsidies available for home composters.					
Equity Benefit: Reduces waste management costs.					
Implementation considerations: Could be facilitated via Youth Climate Council, educating MASH students to further educate community members. Success in this goal could be measured by the number of residents actively composting.					
Key next steps: Develop compost education programming.					

W 3	**Expand commercial composting**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/ Actor**	**Partners**	**Educated Parties**
2023		Reduces waste.		Food for Thought; Grow	Business Owners; Local

				Meadville; MARC; MASH	Restaurants; Residents

Explanation of action step: Incentivize the development of additional commercial composting operations within Meadville via subsidies and operational support.

Equity Benefit: Reduces vulnerabilities associated with climate change.

Implementation considerations:

Key next steps: Identify parties interested in pursuing commercial composting operations.

W 4	**Research compost applications.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2023		Reduces waste and compost costs.		Allegheny College; Conservation Compost	Business Owners

Explanation of action step: Initiate a research group to investigate a range of compost applications. Spur projects that create a demand for compost, increase local food production and reduce food waste.

Equity Benefit: Reduction in the cost of waste management services.

Implementation considerations: Success of this goal can be measured in the number of project applications from the research team.

Key next steps: Identify research team.

W 5	**Develop a food waste recovery network.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/ Actor**	**Partners**	**Educated Parties**
2024		Reduces waste and food costs.	City Organization	Schools, restaurants, institutions	Food for Thought
Explanation of action step: Develop a program that would allow for curbside food waste collection. This waste would be delivered to commercial or non-profit composting operations. Programs could be organized by neighborhood and used for appropriate community gardens.					
Equity Benefit: Priority should be made to non-profits and other organizations serving low income clients and areas.					
Implementation considerations: The success of this goal can be measured in the number of recovery projects initiated or by the number of homes utilizing the network.					
Key next steps: Coordinate transportation logistics and responsibility.					

W 6	**Expand city recycling infrastructure.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2024		Reduces waste. Improves community aesthetics.	City of Meadville	Allegheny College	City Officials; Residents
Explanation of action step: Expand types and quantity of recycling available. Provide drop-off locations. Expand routes and reduce fees for curbside recycling. Develop and facilitate educational programming as to the process and benefits of					

recycling, including publicizing expanded options.

Equity Benefit: Reduces cost of recycling and provides access to curbside recycling.

Implementation considerations: Success in this project can be measured by the number of new residents reached via expanded programs, the number of new drop-off points available, and/or additional pounds of recyclable material collected each month.

Key next steps: Identify funding sources to subsidize expanded routes and cost reductions for low-income residents.

W 7	**Develop a "Fix it First" Program.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2023		Reduces waste. Creates business opportunities.		Meadville Vo-Tech	Residents, Students

Explanation of action step: Develop a "repair cafe" service that provides residents the opportunity to repair household items they may otherwise discard. Operations could be run out of Meadville Vo-Tech, allowing appropriate students the opportunity to procure income. Depending on popularity and demand, it provides an avenue for new business operations.

Equity Benefit: Repairs provide a cost efficient alternative to replacing household goods.

Implementation considerations: Success of this goal could be measured in the number of projects repaired.

Key next steps: Identify appropriate facilitators and coordinate operations.

W 8	**Initiate a city recycling awards program.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2023		Reduces waste. Creates demand for additional recycling infrastructure.	The City of Meadville		Residents, Business Owners

Explanation of action step: Publicize an award system for the corporation, small business and neighborhood that exceed certain recycling metrics by the largest margin each year. Host an awards dinner/event to hand out awards.

Equity Benefit: Coordinate with low-income communities to increase volume of recycled materials though educational outreach and logistical support.

Implementation considerations: Success of this goal could be measured by the competitiveness for each award, as well as who - particularly commercial actors - is competing.

Key next steps: Develop and distribute promotional material.

10. Transportation

Emissions from transportation are a common sight in Meadville. Besides emitting greenhouse gases, transportation-related use of fossil fuels also produce a host of other air pollutants when combusted, reducing local air quality and affecting our health.

Transportation accounts for 16% of Meadville's total GHG emissions. This chapter focuses on programs and policies to reduce emissions from transportation, including design-oriented approaches as well as an expansion of walking, biking, or public transportation routes.

Many alternative transportation programs, i.e. walking, have additional health related benefits. Likewise, the use of electric vehicles (EV) will also improve local air quality. This initiative will require significant public education and infrastructure development, and has clear economic and public health potential.

Acronyms used in this section are Crawford Area Transportation Authority (CATA) and Meadville Area Chamber of Commerce (COC).

T1	City Biking Development Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022		Support biking groups, less vehicle miles, increased exercise	City organization	Biking groups, hospital	Community

Explanation of action step: City-based program to expand local bicycling
Equity Benefit: Focus on low-income neighborhoods to make biking a better alternative than vehicles.
Implementation considerations: Existing groups and programs should be researched to develop resource and funding databases. Development will include assessing and upgrading city infrastructure and biking focused events.
Key next steps: Inventory groups and programs.

T2	**City Walking Development Program**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2024		Less vehicle miles, better health, greater business	City organization	Walking groups, hospital	Community
Explanation of action step: City based program to expand local walking					
Equity Benefit: Focus on low-income neighborhoods to support walkability, especially to vital services					
Implementation considerations: Existing groups and programs should be researched to develop resource and funding databases. Development will include assessing and upgrading city infrastructure and creating walking focused events.					
Key next steps: Inventory groups and programs.					

T3	City EV Development Program				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2026		Support car dealers, EV installers, better AQ	City organization	EV companies	Community

Explanation of action step: City-based program to expand local electric vehicle use

Equity Benefit: Focus on low-income neighborhoods to develop EV rideshare and micro mobility options, i.e scooters.

Implementation considerations: State and federal advocacy important for incentives to EV economics. Sponsorship from car dealers and related industries should be developed.

Key next steps: Develop a basic education program regarding EV benefits, especially from a climate change perspective.

T4	**City Mobility Awards**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
On-Going		Public education regarding economic and health importance of alternative mobility	City organization	City, COC, CATA, hospital	Community

Explanation of action step: City based program to recognize exemplary efforts in developing cleaner alternative transportation.

Equity Benefit: Focus on projects in low-income neighborhoods and those that address equity issues, i.e expanded busing.

Implementation considerations: Consideration should be given to visible award labels on buildings, etc. to maximize education benefit. Sponsorship from vendors should be sought.

Key next steps: Award frequency, title and selection format should be developed.
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11. Ecosystems

Meadville's mitigation of, and adaptation to, climate change can be built around an effort to reconceptualize our community as a living, breathing ecosystem. Understanding ourselves as pieces of a larger whole will be a necessary part of reconsidering the ways in which our choices reverberate through our environment. Expanding our collective appreciation of the impact that the health of our environment has on the health and wellbeing of our loved ones may be crucial to ensuring community investment in the Climate Action Plan. Our people are our greatest asset. These are the lives and livelihoods for whom and by whom the important work of development must be done.

Meadville is a city of towering trees and beautiful parks, where French Creek runs under kayaks and alongside bike trails. Our community has already chosen to develop itself within a forest, the ecosystem that most defines our state. Life in a forest brings incredible benefits, particularly when preparing for the two greatest risks from climate change facing Pennsylvania: flooding and heat waves. A full, healthy tree canopy provides shade and naturally cools neighborhoods, bringing not only space for outdoor enjoyment but also lower heating bills. A well maintained root network, interspaced with natively vegetated rain gardens and bioswales, is able to manage and absorb stormwater runoff. These features of our forest home save taxpayers money in stormwater infrastructure, save homeowners money toward flooding repairs and protect the local watershed from contamination.

A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise. - Aldo Leopold

Ecosystem Objectives:

Enhance natural ecosystems to sequester carbon while adapting to greatest climate risks.

1. Encourage and empower a local circular food economy.
2. Develop natural systems for stormwater management and recovery.
3. Develop a system of watershed governance.

Section 11A: Green Spaces

“When we see land as a community to which we belong, we may begin to use it with love and respect.” — Aldo Leopold

A reconceptualization of Meadville as a forest begins with investing in and tending to the city’s green spaces. As an ICLEI member and a Gold Standard sustainable city, Meadville already has basic obligations toward enhancing our natural spaces. Enhancing the equity and resilience of our city prioritizes those neighborhoods facing the brunt of climate change impacts, and who have been historically overlooked in city planning and development decisions. As a breathing system, forest ecosystems require balance and harmony, factors which can only be achieved by working with and listening to the most vulnerable members of our community.

A plan focused on strengthening green spaces within Meadville allows us to deepen the systematic and structural insight we bring to developing our city in ways that not only reduce greenhouse gas emissions, but that also add beauty, recreational opportunities, and resiliency to the community. It guides us in setting standards that ensure we are choosing to utilize native vegetation, repaving with permeable pavement, creating safe spaces for walking and biking, and designing micro-forests, parks and rain gardens as centers for community wellness and education. Meadville’s existing tree canopy registry will prove a valuable asset and is a great start toward ensuring that our forest is able to sequester the majority of the carbon we are expected to produce by 2050.

Ecosystem Objective 1: Reconceptualize Meadville's green spaces as an urban forest to ensure systematic protection and enhancement of green ecosystems for the sequestration of carbon and in adaptation to our greatest climate threats.

Eco 1 GS 1	**Update and maintain Meadville's Tree Canopy Database.**				
Timeline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2024		Improves ecosystem services throughout the community, reducing cooling costs and health burdens. Extends outdoor spaces for recreation.	City of Meadville: Consider standards for canopy coverage, specifically for low-income areas	Allegheny College, The Neighborhood Center	Residents
Explanation of action step: Work with existing Allegheny team to update existing tree canopy database. Create a schedule for regular updates. Set goals (or create municipal standards) for canopy coverage, particularly in low-income areas where energy costs have a greater impact on livelihoods. Allegheny canopy researchers coordinate with The Neighbohood Center to plant trees in necessary					
Equity Benefit: Low-income families are hardest hit by high energy costs. Sufficient tree coverage will reduce cooling bills while providing cool outdoor spaces for children and residents.					
Implementation considerations: Allegheny and The Neighborhood Center will work with students to engage young people. Educational components may need to be developed. Funding for trees native to Crawford county can be sought through Tree Vitality.					
Key next steps: Update tree canopy database.					

Eco 1 GS 2	**Conduct a maintenance and sustainability review of each city owned park and create individualized action plans for each park, prioritizing parks in low-income areas.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2022		Providing residents with free, well shaded, outdoor recreation areas will likely reduce home cooling costs in the summers. Developing detailed and comprehensive plans for each park will enable the City to better budget and plan for maintenance. Healthy, clean and safe parks have been shown to reduce crime and improve livelihoods.	City of Meadville	Master Gardeners; Meadville Neighborhood Center; Allegheny College; MASH/MAMS; Youth Groups	Volunteers; Residents
Explanation of action step: Although a review of the cities parks was conducted in 2016, many of the needs identified remain incomplete. Ensuring that action plans are established for each park may increase the likelihood of implementation. Consider developing a policy that all updates to parks must align with goals of Meadville's CAP.					
Equity Benefit: City parks provide free outdoor recreation and connection to nature. Parks in low-income neighborhoods are in greater states of disrepair than parks in higher-income parts of our community. Increasing the vegetation and/or tree population of our parks will also improve the air quality of these neighborhoods.					
Implementation considerations: The City already depends heavily on volunteers for park maintenance. A partnership between an environmentally-focused youth group out of MASH and/or MAMS and Allegheny students could be an ideal means of implementing renovations and providing regular upkeep. Funding for large-scale park repairs or remodels can be sought through green grants, including using the DollarWise Grant via the US Conference of Mayors to fund rain garden installations or Tree Vitality for tree planting. Parks can be great spaces for educational activities and community classrooms, as well. These sorts of activities would open the possibility to access additional funding, such as the Child Entrepreneurship Grant.					
Key next steps: Conduct a maintenance and sustainability review of each park within the City of Meadville.					

Eco 1 GS 3	**Implement sustainable practices into all municipally funded lawn care and maintenance projects.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Decrease in cost delegated for landscape management; Reduction in health care costs, watershed protection, damages caused by acid rain and soil impairment.	City Council - create policy or procedures	Master Gardners; City Gardens; Conservation Compost; Fathauk Farms	Municipal landscaping staff; Volunteers
Explanation of action step: Development of policy norms such that all lawn care and landscaping funded by the City of Meadville uses natural alternatives to pesticides and fertilizers, only installs native plants, seeks to eradicate invasive species where possible, and limits mowing frequency. Any manual irrigation is done responsibly. Installing rainwater re-use systems should be considered.					
Equity Benefit: Sustainable maintenance would reduce cumulative health burdens by minimizing exposure to pesticides.					
Implementation considerations: Research will need to be done into suitable pesticide alternatives. Utilizing local compost would be an ideal alternative to commercial fertilizer. One option is for the City to contract compost deliveries with Conservation Compost. This project may increase the number of volunteer hours required. Volunteers can be educated on the benefits of the new system to build investment and commitment. Utilizing sustainable methods will open up the city's landscaping projects to funding via "green grants." Success in this goal will be achieved when all municipal properties are utilizing best practices.					
Key next steps: Take an inventory of pesticides and commercial fertilizers currently used in the care of city green spaces. Identify suitable alternative products and methods.					

Eco 1 GS 4	**Policy implemented to ensure that green space (incl. urban farming) is considered following demolition or abandonment.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Decrease in flooding damages, water protection costs, health care, imported food; reduces heat long-term this also works to minimize cooling costs.	City of Meadville	Planning Department; Beautification Department	City Officials; Developers; Residents
Explanation of action step: The City can implement a policy to assure that whenever a blighted area is being considered for redevelopment or sale, due consideration is given to converting the area into a green space of some sort. This green space could be a passive natural area, a park, a community garden or a micro-forest.					
Equity Benefit: Converting blighted areas into community gardens would improve access to fresh food, particularly in low-income areas. Conversion to green spaces will improve access to outdoor recreation, reduce health burdens and improve air quality.					
Implementation considerations: Additional partners will need to be identified to consult on conversion options. Conversion will only be financially feasible with the help of volunteers and partners already assisting in park maintenance, community gardening or forestry. Success of this goal can be measured by the passage of such legislation and further by the number of sites transformed into urban gardens/green spaces.					
Key next steps: Draft, deliberate and pass municipal legislation.					

Eco 1 GS 5	**Carbon credit program to quantify and monetize sequestered carbon.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2030		Reduction in energy costs; carbon credit as part of "city carbon allowance."	City of Meadville	City Council; Businesses; External carbon registries; Allegheny College	Everyone
Explanation of action step: Cities can become members of carbon credit programs in which they register their tree coverage and receive credits for the carbon those trees sequester. Offering carbon credit certification incentivizes local carbon emitters (e.g. businesses) to reduce their emissions and invest into tree planting initiatives. Research should be done via Allegheny on the feasibility of such programs in Meadville.					
Equity Benefit: This system will stabilize and gradually reduce carbon production, which will naturally benefit the most vulnerable communitees first and most noticiably. These benefits will include a reduction in climate related health burdens, as well as a likely increase in access to cool, clean outdoor spaces.					
Implementation considerations: Implementation of such a large structural project would require the creation of a committee to oversee development, implementation and monitoring. These individuals could be city staff or volunteers with relevant background knowledge. Community education towards business owners and residents will need to be a key part of this goal. Sucess will be indicated when a cabon registry is in place, reguarly updated, and consistently expanding.					
Key next steps: Seek out expert advice on carbon registry programs and interest of community actors who might purchase credits.					

Eco 1 GS 6	**Targeted clean-up of the Japanese malweed plant on the Ernst trail and French Creek riparian zones.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2027		Protects and increases tourism revenues; Prevents ecosystem destabilization, decreasing costs in damages due to flooding and erosion; Improves public health.		Ernst trail; MASH/MAMS; Youth Groups; Allegheny College	Volunteers; Youth groups; Residents
Explanation of action step: Japanese malweed has overtaken natural areas in Meadville to such an extent that groups normally doing this work, such as the French Creek Valley Conservancy, have identified that to target this species would overwhelm their resources. Eradication is labor intensive and time consuming. This is another opportunity for Allegheny students to work with MASH/MAMS students, as well as other youth groups, to focus volunteer efforts on this specific plant. Students could be given some form of ecology ("credit") or community service hours for this work.					
Equity Benefit: Eradication of invasive species, particularly one as dominant as the Japanese malweed, is vital to ensuring that natural ecosystems continue to function in a healthy, safe and manageable way. Failure to clean-up these spaces could lead to a loss of ecosystem services, including carbon cycling. General increased benefits to those disproportionately affected by climate change.					
Implementation considerations: Some form of incentive should be provided to students to ensure continued participation and recruitment - this will be a multi-year project. Success of this goal can be measured in the number of acres or square footage of habitat repaired and maintained. These groups - or other partners - could also file reports on their removal projects.					
Key next steps: Discuss incentives opportunities with necessary MASH/MAMS/Allegheny faculty.					

Eco 1 GS 7	**Increase residential sustainable management practices, including reducing number of times lawn is cut in a season, landscaping using native plants, planting "with" natural inclines/bioswales.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Decreases cost of water, gasoline, pesticides, and flood damages; Decreases healthcare costs.	City Council - Amend existing flat stormwater fee to include reductions for home owners with installation of management best practices.	Meadville Neighborhood Center; The Landlord's Assoc.; Crawford County Conservation District	Home Owners; Residents;
Explanation of action step: Educational workshops, digital courses and materials will be organized to educate home owners about more sustainable methods of managing their own personal green spaces. These practices can be incentivised, for example, through stipends for purchasing native plants and stormwater fee reductions for installing landscaping to better manage stormwater.					
Equity Benefit: The current stormwater fee is a flat tax on all homes; by working with low-income communities to find grants and/or partners to assist in installation of management techniques to reduce the existing fee.					
Implementation considerations: The success of this goal will depend on the ability to find partners to donate or discount services for the installation of stormwater best management practices. Success can be measured in the number of residents educated and the number of lawns implementing best practices.					
Key next steps: Develop educational programing with partners.					

Eco 1, GS 8	**Place social, economic and environmental sustainability at the center of all urban regeneration projects and achieve certification as an EcoDistrict.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Prioritizes economic development projects that prioritize local needs, under-developed areas and reduce long-term maintenance costs.	City of Meadville - Policy or framework	Everyone (City officials and departments, business owners, civil society, residents, students)	Everyone
Explanation of action step: Enacting legislation or a framework of best practices with sufficient incentives to ensure that the goals and spirit of the CAP is followed in each phase of all new municipal projects, in order to meet the standards of the EcoDistrict Protocol.					
Equity Benefit: Ensuring equity, one of three central imperatives of the EcoDistrict Protocol, will guarantee that the neighborhoods most vulnerable to climate change in our city are given sufficient investment and attention in future city planning and development.					
Implementation considerations: The goals and benefits of EcoDistrict certification ought to be included in any/all mandatory trainings for officials, developers and local business owners, as aproporiate. Likewise, all community education projects affiliated with the CAP will include information on the standards set by the EcoDistrict Protocol.					
Key next steps: Discuss and deliberate policy within City Council.					

Section 11B: Local Food

A key part of any ecosystem is the internal food web which powers production and distributes energy. Today's global food system produces high levels of carbon emissions, uses billions of tons of pesticides and chemical fertilizers, and creates human rights abuses in communities far from our dinner table. At the same time, we live within an agricultural county where farmers are struggling to make ends meet. Those with large contracts live within strict parameters set down by corporations with little concept of our rural culture or our environment. Locally sourcing as much of our food consumption as we can provides a means of supporting our farmers, our own public health and nutrition, while reducing emissions and pollution sources.

Food insecurity has become an important issue in the United States and here in Meadville, as many families struggle with finding fresh, healthy food for themselves and their loved ones. Ensuring that local, healthy food is affordable and accessible, and that nutrition education is readily available, supports these families. Likewise, ensuring that excess food from our school district and our restaurants is passed along to organizations providing services to the most vulnerable in our society, empowers individuals to care for themselves in times of hardship.

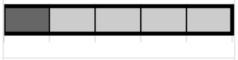
"Much of our food system depends on our not knowing much about it, beyond the price disclosed by the checkout scanner; cheapness and ignorance are mutually reinforcing. And it's a short way from not knowing who's at the other end of your food chain to not caring–to the carelessness of both producers and consumers that characterizes our economy today. Of course, the global economy couldn't very well function without this wall of ignorance and the indifference it breeds. This is why the American food industry and its international counterparts fight to keep their products from telling even the simplest stories–"dolphin safe," "humanely slaughtered," etc.–about how they were produced. The more knowledge people have about the way their food is produced, the more likely it is that their values–and not just "value"–will inform their purchasing decisions." — Michael Pollan, "The Omnivore's Dilemma."

Ecosystem Objective 2: Encourage and empower a local circular food economy.

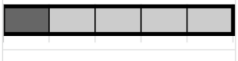
Eco 2, LF 1	**Identify financial and social supports to allow for increased sale of county agricultural products by Meadville food vendors.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2024		Improves local agricultural economy; Assists and incentivizes local restaurants; Increases community access to fresh, local food.		Food for Thought; The Market House; Local food vendors; Farmers;	Local food vendors; Farmers; Residents
Explanation of action step: Serving local food in Meadville can be made more feasible for food vendors by identifying support systems to provide assistance building connections with reliable suppliers, as well as transporting and storing food products. Incorporating systems for SNAP benefits to be used at The Market House and city farmers' markets is an example of one type of financial support project.					
Equity Benefit: Although multiple vendors already serve locally produced food, most of this is above the price point for low-income families in Meadville. Providing assistance that minimizes the cost for the vendors - and creating conditions that ensure these savings are passed on to the consumer - increases access to fresh food for these families.					
Implementation considerations: Multiple grants are available to subsidize local and regional producers through the USDA. Success of this goal can be measured by the number of vendors selling food produced within the county.					
Key next steps: Identify a group, organization or individual responsible for coordinating these efforts.					

Eco 2, LF 2	**Build an online marketplace for Crawford County farmers to sell to and connect with local venders or individuals.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Summer 2023		Improvement in local agricultural economy		The Market House; Farmers; Vendors; Residents	Farmers; Vendors; Residents
Explanation of action step: Vendors and farmers both struggle to identify and rely on trading partners. This online platform would allow each party to search, connect with and review their counterparts. Farmers could create a profile that details how their food is produced, what they are planting each season, what and when they expect to harvest and at what price point they will need to sell. Vendors can design profiles indicating what produce or animal products they will need each week, how they would like it to be produced, and what they are willing to pay. Each side can place bids or negotiate efficiently while maintaining written records of correspondence. After a purchase, each party can review their experience, encouraging quality and reliability.					
Equity Benefit: Providing vendors with the ability to easily identify and negotiate with mulitiple producers will aid in finding the best price points for the food they wish to sell. Lower costs of local food increases acess to fresh, whole foods for low-income residents.					
Implementation considerations: Success of this goal can be measured by the number of participant profiles on the website and by the number of transactions completed. Norms, standards and programs should be put in place to maintain a respectful community space.					
Key next steps: Identify a group, organization or individual responsible for coordinating these efforts.					

Eco 2, LF 3	**Develop a farming incubator outside of city limits for local residents to learn and expiriment with farming styles while expanding the produce available for local food vendors.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Summer 2023		Develops economic skillset and supplimental income for resident participatnts; Provides additional source of affordable local produce for venders; Further reduces the price point of local food for consumers.		Kettle Lake Kitchen; Venders; Food for Thought	Resident Farmers
Explanation of action step: Land owned by a local business owner is utilized as space for Meadville residents to rent for a small fee and develop their own plots. Tools and equipment can be shared. Education could be provided and lessons/processes documented.					
Equity Benefit: Increases access to local food, either by providing a place for low-income residents to grow their own food or by increasing the amount of local food in the city's food supply chains. Provides a means of supplimental income and livlihood benefits.					
Implementation considerations: Success of this goal can be measured by the number of farmers consistently utilizing the incubator and by the proceeds they make from selling their produce.					
Key next steps: Build awareness of the project through community education events and identify resident farmers.					

Eco 2 LF 4	**Expand participation in community gardens in Meadville, both quantitatively and qualitatively.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Summer 2022		Decreases amount of annual budget residents need to allocate toward food costs. Provides environmental and nutritional education.		Food for Thought; Grow Meadille; MASH/MAMS/Youth Groups	Residents; Volunteers
Explanation of action step: Use community education and outreach to expand participation in community gardens in Meadville. Incorporate regular trainings via Master Gardeners. Strive to have at least one active coordinator for each garden. Identify effective mechanisms to ensure participation in existing community gardens.					
Equity Benefit: Improves access to fresh food and decreases amount of money spent on groceries each year. Provides outdoor recreation and community reinvestment through meaningful work.					
Implementation considerations: Success of this goal can be measured by the number of education workshops, active coordinators and active volunteers.					
Key next steps: Coordinate community education to build interest in community gardening projects.					

Eco 2, LF 5	**Encourage neighborhood farmer's markets, particuarly within low-income neighborhoods.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Summer 2023		Provides an additional income sources for community farmers. Decreases annual food and transportation costs for consumers. Builds community networks.	City Council - Review and amend policy allowing for food grown within city limits to be sold locally	Allegheny College; Fairview Fairmont; Food for Thought; Grow Meadville; The Market House	Residents
Explanation of action step: Ideally, participants in community garden products could sell their produce within their own neighborhoods. This would require regulatory change at the municipal level. Past neighborhood markets have been held by Allegheny College students outside of Lincoln Ave. Grocery. This model could be repeated and expanded in other low-income arease of the city, utilizing county produce.					
Equity Benefit: At the moment there is no grocery vendor in the Fifth Ward. Ensuring consistent, seasonal markets in this area alone would reduce food and transportation costs, while improving access to fresh food, within a systematically disadvantaged neighborhood. Similar benefits would be acquired for other low-income neighborhoods brought into the project.					
Implementation considerations: Logistical costs for markets, as well as produce purchases for externally partnered projects, could be funded through USDA grants. Success for this goal could be measured by the number of markets hosted, the number of people served, and the amount of profit aquired by local farmers.					
Key next steps: Organize market in the Fifth Ward. Apply for a grant, if neccessary.					

Eco 2, LF 6	**Build the tree canopy in low-income areas incorporating fruit trees as street trees.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Summer 2023		Decreasese annual food costs. Supplements nutrition and may act as preventative health care. Adds to natural stormwater management infrasturcture.		Food for Thought; Tree Vitality; MASH/MAMS/Youth groups	Residents
Explanation of action step: As part of the Urban Forest Plan, tree planting initiatives can seek to incorporate fruit trees into their street tree plans. Prioritizing plantings in low-income areas provides a free and nutritious food source for children and families.					
Equity Benefit: Improves access to nutritious food while providing an additional buffer of transportation emissions and improving air quality. Improves the aesthetic and climatic experience of outdoor spaces in neighborhoods where children are more likely to be outdoors.					
Implementation considerations: Signage or other public facing materials ought to be visible to ensure residents that the food is safe to eat and is not chemically treated in any way. Fruit trees would also be suitable for formalized walking paths and park spaces. Funding could be sought through Tree Vitality. Success of this project could be measured by the number of fruit trees planted.					
Key next steps: Identify gaps in the tree canopy in low-income neighborhoods suitable for fruit tree plantings.					

Eco 2, LF 7	**Ensure that schools are healthful parts of our community, providing nutritional education supliments and nutritional food.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Start of 2025-2026 school year		Improves evolutionary wellness and nutrition. Reduces lifelong health burdens. Educates young people around the benefits of eating fresh food and investing in the local food supply.		Crawford Central SD; PTO; YMCA; Fairview Fairmont;	Children; Students
Explanation of action step: Coordinate biannual nutritional workshops at daycare centers, elementary and highschools to engage children with local food and nutritional systems. Begin a dialogue with school board, Nutrition Inc. and PTO members that seeks to find a means of providing whole nutrition within school meals at affordable prices.					
Equity Benefit: Low-income children are more likely to depend on the school system (Nutrition Inc.) for one or more meals a day. Improving the nutritional quality of these meals improves nutrition and wellness while informing healthy choices. This further reduces likely health burdens for these children and their families.					
Implementation considerations: Funding for the educational components of this project could be aquired through the Childcare Entrepreneur Fund or a DollarWise grant. Success in this goal can be measured by the number of students participating in the educational activities and by negotiations with Nutrition Inc. resulting in the provision of healthy food in our schools.					
Key next steps: Train educators and volunteers to provide nutritional programming. Conduct research for the school board to use to support negotiations with Nutrition Inc.					

Section 11C: Water

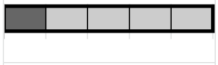
The green spaces of our city are only made possible by the regular precipitation that we experience nearly all year round. These wet conditions are projected to intensify due to climate change, and flooding in Meadville, which is already a significant challenge, will become more severe in the near future. As such, it is imperative that we begin strategically preparing our city to manage the large influx of stormwater that will otherwise damage property and harm the local environment and economy. Permeable pavement, rain gardens, and bioswales provide necessary stormwater infrastructure and reduce municipal costs in the long-term. Making use of the stormwater we receive will assist in limiting the amount of stormwater that requires filtration and reintegration. This will limit the carbon emissions produced by this process, while saving homeowners costs on water and sewage fees.

Stormwater run-off also contaminates our watershed, particularly the 4.4 miles of French Creek that runs through Meadville. Not only is French Creek the foundation of the city's tourism industry, it is also an integral part of our community ecosystem. Importantly, the watershed can act as a natural monitoring system and the health of French Creek provides indicators as to the health of our community as a whole.

Working with existing citizen scientists programs, as with the French Creek Conservancy, to monitor and report on the quality of our watershed will help save the city money in protection and clean-up projects. Allegheny College also has a major role in this work, through its youth based Creek Connections program and new French Creek Watershed Institute.

. Finally, the watershed extends far beyond the boundaries of Meadville, and ensuring that projects and policies are coordinated throughout French Creek is the most effective means of preserving the immensely valuable local resource.

Ecosystem Objective 3: Develop natural systems for stormwater management and recovery.

Eco 3, W 1	**Provide for the development of rain gardens and bioswales on private property by allowing for decreases in residential stormwater fees.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Possible reduction of stormwater fee. Reduces of costs due to flood damage. Possible insurance benefits. Reduces city stormwater management costs, as well as costs associate with cleaning or maintaining municipal water sources.	City Council - Amend stormwater fee policy to allow for residents to reduce their payment through the addition of BMPs.	Ernst Seeds; Blooming Valley Landscaping; Allegheny College	Residents; Business Owners
Explanation of action step: Businesses and organizations have the ability to reduce their municipal stormwater fee by adding stormwater best management practices to their properties. Changing the policy to allow home owners to do the same would provide incentive for increased installation of necessary stormwater infrastructure at no cost to the city.					
Equity Benefit: Meadville's flood plains overlap with low-income neighborhoods. Providing means and incentives for these residents to install stormwater management infrastructure would reduce costs associated with flood damages, as well as reduce their annual stormwater fee. Improvements to the watershed also impact low-income communities first. These projects provide educational opportunities for residents and demonstrate community investment in their neighborhoods.					
Implementation considerations: Assistance can be provided to home owners utilizing grant funding and in-kind donations from local partners. Volunteer labor can also be provided. Each installation would act as both an educational opportunity and an ecosystem maintenance project. Success in this goal can be measured by the number of rain gardens intalled and by reduction in stormwater volume.					
Key next steps: Determine possible incentives - including reduction in the annual stormwater fee - for homeowners.					

Eco 3, W 2	**Adopt a policy requiring all new paving, sidewalk repairs, and municipal parking lots to incorporate stormwater BMPs to the fullest extent possible**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Provides additional funding sources for street and sidewalk improvements. Reduces stormwater load and costs associated with flooding damage. Utilizes existing walking and biking infrastructure to supplement traditional routes, improving safety and reduces need for sidewalk repair.	City Council: Remove Brick to Aspalt policy. Create standards for all new pavement installation or repair projects.	Planning Department; Food for Thought; Fairview Fairmont; Meadville Neighborhood Center	Residents; City Officials
Explanation of action step: When a road or sidewalk needs repaired, permeable pavement should be considered. If it is not used, there could be a required explanation as why that decision was made. This would require removing the existing Brick to Asphalt policy. Federal/state funding can be replaced with green climate grants, obtained via partners. Other considerations, as cited in the County Stormwater plan, should include non-parallel sidewalks, tree lots, green space buffer zones, bioswales and bike lanes.					
Equity Benefit: Streets and sidewalks in low-income areas are in need of repair. Identifying additional funding for these projects and commiting to prioritizing these neighborhoods will improve flood management, walkability and safety in these areas. Providing walking and biking infrastructure could also decrease daily transportation emissions and improve air quality.					
Implementation considerations: Implementing these design ideas via the Climate Action Plan opens up a range of federal and state level funding oportunities. Success of this project can be measured first by policy adoption and subsequently by the number of BMPs installed.					
Key next steps: Deliberate and draft policy language. Educate the public on the benefits of this model.					

Eco 3, W 3	**Incentivize and asisst business owners in the installation of moss roofs.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2023		Reduces energy costs by providing natural climate control. Reduction in stormwater fee payments as a stormwater BMP. Controls the severity of flooding.		Business Owners; Blooming Valley Landscaping; Allegheny College	Business Owners; Residents
Explanation of action step: Moss is able to sequester large amounts of carbon while absorbing sunlight and providing significant insulation. Moss roofs are less intensive green roofs and requires less start up costs. Small business could work with partners to identify climate grants and installation professionals.					
Equity Benefit: Moss roofs will aid in stormwater management and reducing net greenhouse gas emissions. As such, the communities most vulnerable to the impacts of climate change will benefit.					
Implementation considerations: Funding for these projects could be secured through DSIRE - Small Business Advantage Grant Program for Pollution control and heat recovery. Existing incentives include the city stormwater fee reduction program with the implementation of stormwater best management practices. Success of this goal can be measured in number of roofs installed.					
Key next steps: Develop and distribute educational materials on moss roofs to business owners via digital platforms and personal networks.					

Eco 3, W 4	**Incentivize and assist in the coordination of various rainwater collection and reutilization programs for large and small businesses, municipal buildings, and residential homes.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022-2023		Reduces water costs; Reduces municipal costs for stormwater mangement and watershed protection.	City of Meadville - waiver for plumbing reintegration	MAWA; MASA; Business owners	Residents; Business Owners
Explanation of action step: Will vary depending on scale and budget of project. In general, large businesses and wealthy residents could install stormwater reintegration systems that utilize stormwater via raingardens for toilets, irrigation and other uses. Small businesses, non-profits and other institutions could extend raingutter networks to better direct rainwater into (rain) gardens or other vegetation. Residents could use rainbarrels to collect and reuse rainwater as needed.					
Equity Benefit: Increasing stormwater management in low-income ares will reduce costs of damages due to flooding. It will also reduce standing water after storms that can serve as mosquito incubators. Also, if/when the city passes legislation to allow homeowners to apply stormwater BMPs toward their stormwater fee, instally these features will save on this annual bill.					
Implementation considerations: Success for this goal could be measured by the number of rainwater reuse operations installed.					
Key next steps: Develop and distribute educational content on rainwater collection.					

Ecosystem Objective 4: Develop a system of watershed governance.

Eco 4, W 5	**Form a Watershed Advisory Committee to inform and make recommendations to municipalities.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
December 2022		Reduces point source pollution prevention and clean-up costs by addressing contamination wholistically. Reduces or eliminates redundancies across municipalities. Ensures the continuation of long-term ecosystem services. Sustains and enhances creek tourism industry.	The City of Meadville	Civil Society within French Creek Watershed	Residents; City Officials
Explanation of action step: The French Creek Watershed Advisory Committee would be made up of civil society members already working on watershed issues. This body would meet biannually to discuss climate specific impacts and challenges facing French Creek. Designated liasons would then relay recommendations to municipal governments in an attemt to make regulations consistent throughout watershed.					
Equity Benefit: Improvements to the watershed provide increased access to free outdoor recreation for low-income families.					
Implementation considerations: Watershed coordination will allow for the development of larger-scale projects elligible for multiple EPA Clean Water Act grants. Success in this goal can be measured by the consistent and efficient meeting, discussion, and recommendations provided by an advisory body.					
Key next steps: Coordinate meeting logistics with partners. Identify liason within City staff to meet with committee liason.					

Eco 4, W 6	**Organize removal of invasive aquatic species from French Creek.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
Winter 2024		Sustains and enhances creek tourism. Reduces costs of watershed protection. Ensures the continuation of long-term ecosystem services.		Allegheny College; MASH/MAMS/Youth Groups	Residents; Students
Explanation of action step: Zebra mussels in French Creek are a persistent, invasive species that no group within the City of Meadville is currently working on. These mussels and other aquatic invasive species threaten the stability and integrity of the water shed and can lead to eutrophication. In coordination with other municipalities via the Watershed Advisory Council, youth led community clean-up projects can serve to protect the watershed while educating students and residents about their local ecosystem.					
Equity Benefit: Improvements to the watershed provide increased access to free outdoor recreation for low-income families.					
Implementation considerations: Funding for these projects is available through the Department of the Interior via Aquatic Invasive Species Grants to Great Lake States and the Fish & Wildlife National Fish Habitat Action Plan. Success in this goal can be measured by the amount of time spent without identifying a member of the targeted invasive species within the stretch of French Creek that flows through Meadville. Alternatively, the number of participants and number of clean-ups held is also a worth assessment metric.					
Key next steps: Seek recomendations from the Watershed Advisory Council regarding best practices for coordinating removal projects.					

Eco 4, W 7	**Coordinate citizen science and reporting initiatives via development of youth groups, youth climate council and/or existing civil society programs.**				
Deadline	**GHG Emissions Impact**	**Economic & Community Impact**	**Policy Action/Actor**	**Partners**	**Educated Parties**
2022-2023 School Year		Reduces and/or eliminates costs associated with watershed monitoring.		Crawford Central SD; Allegheny College; NOAA	Youth; Students
Explanation of action step: Youth groups work with college students and/or interested volunteers to monitor ecosystem services, including water quality. The readings are reported to the city, NOAA, and other watershed monitoring bodies. These readings will serve as a measurements of success for all of the other ecosystem goals, as the watershed will reflect the health of the ecosystem.					
Equity Benefit: Improvements to the watershed provide increased access to free outdoor recreation for low-income families.					
Implementation considerations: Funding for this project is available through NOAA. Success can be measured by the number of participants, the number reports made, classes held, yards of riparian zones maintained and overall health of the watershed.					
Key next steps: Develop Youth Climate Council at MASH.					

12. Vulnerability Assessment

This section provides an assessment of the projected climate impacts that Meadville will face in the coming years, and highlights the type of climate actions that can reduce the risks associated with each type of climate-related hazard in the community. Improving resiliency against negative climate impacts, such as flooding events, reduces community vulnerability and ultimately acts to reduce costs related to repairing, rehabilitating, and rebuilding elements in the community that are damaged or degraded under such conditions. At the same time, reducing vulnerability to negative climate impacts can also provide opportunities to improve community justice, provide aesthetic benefits, and, in some circumstances, even reduce greenhouse gas emissions. This is a preliminary assessment of climate vulnerability in Meadville, and is meant to highlight general climate adaptation approaches that the city can employ to improve its climate resiliency. This current assessment is not intended to be fully comprehensive, but rather to inform the public and to serve as a foundation for future work that will comprise a more robust assessment of climate vulnerability and adaptation measures in Meadville.

Anticipated Climate Impacts

Since the early 1900s, the Commonwealth of Pennsylvania has experienced an increase in average overall temperature of more than 1.8°F, as well as an increasing number of wetter than normal months. Over the course of the next few decades the trends of increasing temperatures and precipitation is projected to continue at an accelerated rate, especially if the world continues on the current path of ever-increasing greenhouse gas emissions. Under this scenario, by the year 2050 Crawford county will be approximately 6.3°F hotter than it was at the beginning of this century. Annual precipitation across the state has also been dramatically impacted by the warming of the planet, with different regions of the state already having seen a 10-20% increase in precipitation over the last century. While the likelihood of meteorological drought in northwestern Pennsylvania is projected to decrease by mid-century, the number of months with above-average precipitation will continue to rise. Current projections indicate that precipitation will continue to increase by another 8% by the year 2050. Often, this increasing precipitation will come in the form of a greater number of heavy rainfall events, which increase the risk of flooding. Additionally, Crawford County

can expect to see at least 30-40 days of temperatures above 90°F annually by the year 2050. These changes will have a variety of ecological, economic, and social impacts on the Commonwealth, particularly related to agriculture, energy, forests, human health, environmental justice, outdoor recreation, water, wetlands and aquatic ecosystems, and coastal resources (Pennsylvania Department of Environmental Protection, 2021). These disruptions have already begun occurring in and around Meadville, and they will only worsen in the future if steps are not taken now to both reduce GHG emissions in substantial ways, and to begin taking actions to adapt to the changing conditions that are already unfolding.

National, regional, and local resources were used to identify the projected climate-related changes in and around Meadville from the current time period through the year 2100. The following sections discuss the most significant climate hazards facing the community according to those projections. Additionally, local data was collected and used to generate the vulnerability-related maps of Meadville included below, which highlight the areas and residents of Meadville that are already disproportionately vulnerable to the local impacts of climate change, and which will be most likely to first be impacted by the worsening conditions as temperatures continue to climb in the coming years. This assessment provides an initial, but crucial look at Meadville's vulnerability to the impacts of climate change, and clearly points to the areas of town where climate adaptation measures should be adopted first. By matching the order in which Meadville adopts climate adaptation efforts with the areas of town that are most vulnerable, the entire community will benefit by becoming not only more resilient, but as a result of reducing local injustices as well. This will place the community in a substantially better position to take future actions based upon a proactive stance aimed at avoiding climate-related problems before they arise, as opposed to regularly being forced into a reactive response to a climate impact after it has already occurred.

For more information about the science behind climate change, see Appendix II: Climate Change Science.

Rising Temperatures & Heat

Below, Figure 5 shows that average daily temperatures have been increasing substantially in Meadville over recent years and will continue to rise through 2090 if global GHG emissions continue to follow their current trajectory of rapid increase, which could result in negative impacts to:

- Public health as a result of heat-related illnesses (including heat stroke) and the exacerbation of respiratory illnesses due to hotter conditions
- Different aspects of agricultural production in northwestern Pennsylvania, such as declines in crop harvests as a result of higher temperatures and related changes to precipitation patterns
- The local economy, such as declines in revenue for local businesses aligned with outdoor recreation in both summer and winter months (e.g. reductions in snowfall/snowpack leading to less skiing opportunities in the winter), and property damage/loss related to flooding

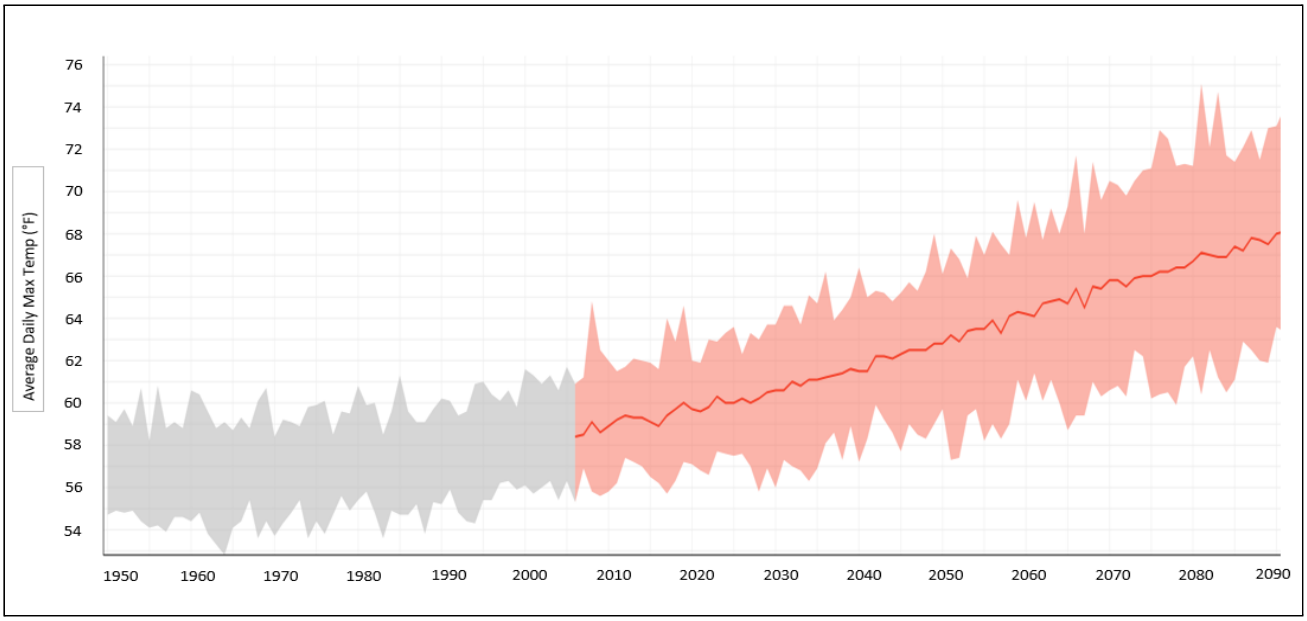


Figure 5: Meadville Average Daily Temperature Between 1950-2090

While an increase of several degrees in the average daily maximum temperature in Meadville may not appear to be cause for concern on the surface, an increase of even a single degree in average temperature over time represents an enormous amount of extra overall heat being trapped on the planet, and that extra heat acts to fuel the climate-related impacts to Pennsylvania and Meadville that are discussed above and below. As Figure 5 demonstrates, Meadville can expect to see significantly higher temperatures in the coming years unless the GHG emissions trajectory is changed from one of high annual increases to one of

high annual decreases. Since at least some additional warming is already "locked in" because of the GHG emissions that have already been added to Earth's atmosphere, Meadville can expect to see some level of worsening climate impacts over the near-term. Understanding what those impacts are likely to be, and understanding where Meadville's vulnerabilities lie can allow the community to make decisions now that will help to avoid more serious problems over the next one, two, or three decades.

It is important to recognize that the negative climate impacts Meadville is facing -- particularly those related to public health, property damage, and costs of cooling homes -- will not be experienced equally throughout the Meadville community. Low-income residents of Meadville will face greater vulnerability to the many risks associated with higher temperatures throughout the community, and the creation of these types of disproportionate outcomes will serve to exacerbate social, economic, and environmental injustices that are already present in Meadville.

Figure 6 represents the median household income for Meadville in 2020, tabulated by census block group. Examining the map reveals that the lowest income areas of Meadville are in, or adjacent to, the Fifth Ward and the South Main neighborhood. These same areas are also the regions of Meadville most at risk for flooding, as can be seen in Figure 7. The overwhelming majority of the land area in Meadville that is in a High Risk Flood Zone – which is a zone with at least a 1% chance of major flooding every year, or an area that can expect a major flood at least once every 100 years (also known as a 100-year flood zone) – is located in and near the Fifth Ward and continuing into the South Main neighborhood. Given that French Creek runs through these lower elevation areas of Meadville, it is understandable why they would be more prone to serious flooding than higher elevation areas further away from the creek. However, because these areas of Meadville are home to, on average, lower-income community members, the flooding issues create a scenario of economic and environmental injustice that is projected to worsen in future years as 100-year flood events become much more frequent.

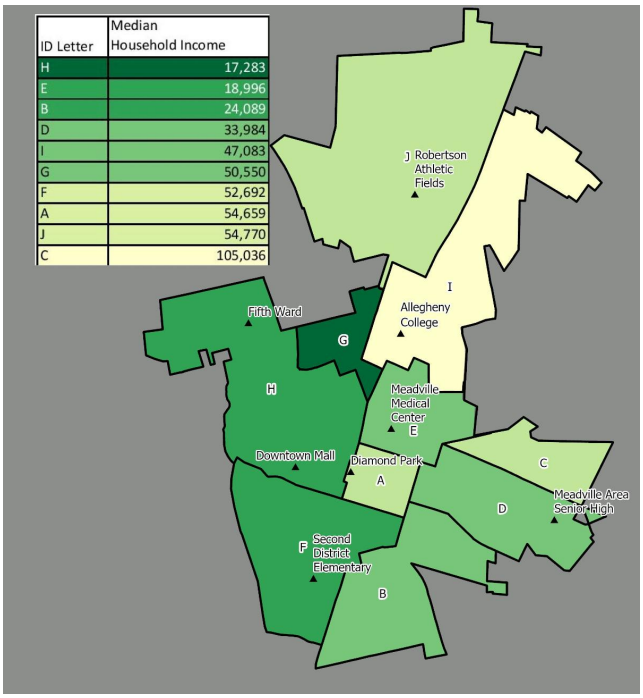


Figure 6: Meadville Median Household Income, by region (2020)

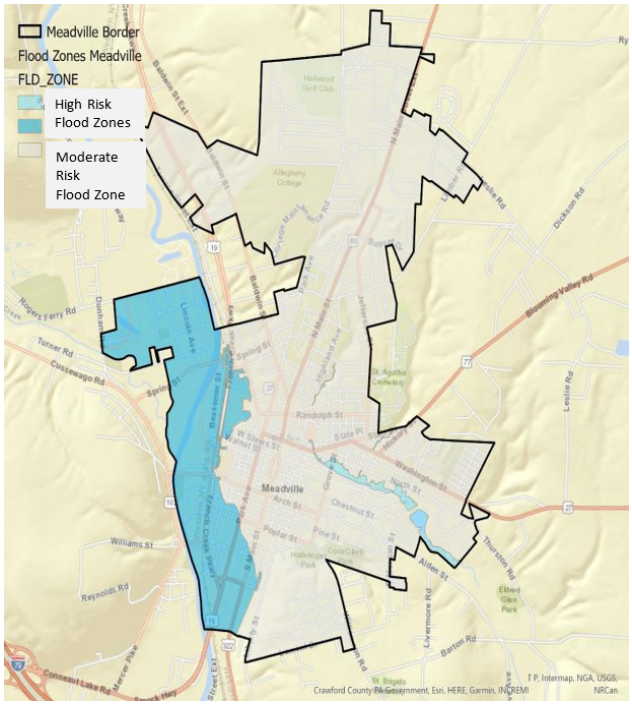


Figure 7: Meadville Flood Zones

This disparity in vulnerability status among Meadville residents is seen across a number of important social, economic, and environmental factors, such as:

- the density of blighted structures in an area (indicator of poverty and possible energy burden)
- the percentage of tree canopy cover in an area (indicator of heat risk and flooding risk)
- the type of flood zone in an area (indicator of flooding risk)
- the distance to the nearest grocery store; the distance to the nearest bus stop (indicator of poverty)
- the percentage of residents eligible for SNAP (food stamp) benefits in an area (indicator of poverty)
- the income level of residents in an area (indicator of poverty and wealth)

Combined, these different factors represent an overall index of vulnerability for both the different physical regions of Meadville, and for the residents who live in those areas. Figure 8 shows the combined

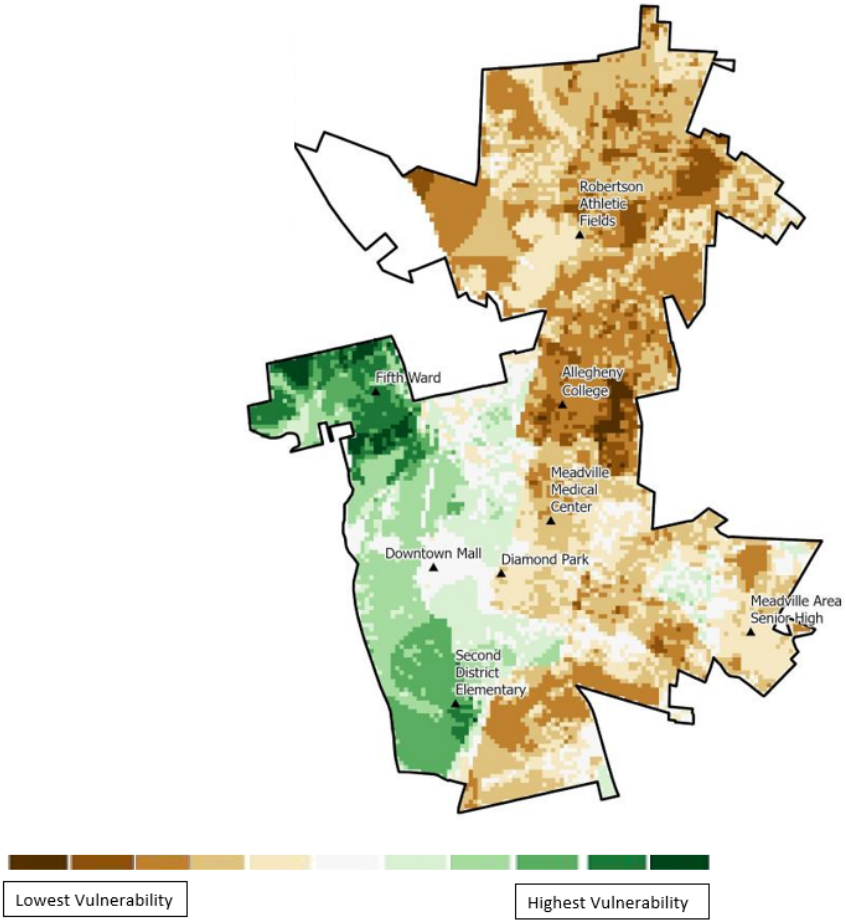


Figure 8: Meadville Climate Vulnerability Index Map

vulnerability index for the city of Meadville based upon the different vulnerability measures highlighted in the list above. Again, it can be seen that the Fifth Ward neighborhood and the South Main neighborhood represent the areas and residents in Meadville that are most vulnerable to the social, economic, and environmental conditions in the city. Worsening climate impacts will hit the community members living in these areas, as well as the properties located there, first and hardest. The social and economic vulnerability represented in these parts of Meadville mean that many of the residents suffering through those impacts will be less able to manage in the aftermath of an event, or to build resiliency in the face of ongoing and worsening daily conditions brought about by the increasing temperature and precipitation scenarios discussed above. Initial strategies to reduce Meadville's risk related to the impacts of climate change should focus on these areas that have been identified as having the highest level of vulnerability to those impacts.

Adaptive Greenhouse Gas Reduction Measures

Actions and activities that reduce the risk of climate change impacts and improve resiliency are known as climate adaptation measures. Some climate actions can both reduce greenhouse gas emissions, while also acting to reduce the risk of climate hazards and improve resiliency. For instance, increasing the number of shade trees in a city can reduce GHG emissions by acting to cool urban spaces. Shaded pavements and buildings are cooler on their surfaces and within than those exposed to direct sunlight. Because of this, shaded structures require less energy to cool, which results in fewer GHGs being produced in service of those structures. Shaded pavements can dramatically reduce the nearby air temperature, which, in turn, acts to keep the air temperature within a city from being increased above the level seen outside of the city limits where there are fewer exposed paved surfaces and buildings. Those same trees that provide shade to pavements and buildings can also serve as a climate adaptation measure by slowing runoff during severe rainstorm events and lowering the risk of flooding.

The following are a few additional examples drawn from a much larger list of possible actions that act to both reduce GHG emissions and create positive climate adaptations that reduce vulnerability and improve community resilience:

- Actions that improve energy efficiency and distribute renewable energy can (1) reduce pressure on the electricity 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 aimed at efficiency for existing buildings (e.g. weatherization)
    - Onsite combined heat and power (CHP), which allows for the capture and use of heat that would otherwise be wasted, resulting in lower energy costs and lower GHG emissions
    - Smart grid technologies aimed at making the energy grid more efficient by reducing the substantial amount of wasted energy that is the hallmark of the existing energy grid
    - Microgrids, which are self-sufficient, small-scale electric grids that operate at the level of a neighborhood, college campus, hospital complex, or business center hub, and that can

function separately from the primary electric grid and bolster resiliency when economic or technical conditions are not favorable to draw energy from the larger electric grid system

- Actions that reduce impervious surfaces like concrete and asphalt can reduce the potential for flooding by retaining stormwater in place and slowing water runoff during heavy rain events. These types of actions include, but are not limited to:
    - Expanding or restoring green space like parks, particularly in areas where runoff and/or flooding is a serious issue
    - Installing the following, which can be low-cost, aesthetically pleasing measures that dramatically reduce runoff and flooding:
        - Green roofs, which hold water and release it slowly during heavy rain events, and also serve as a great insulator for buildings (which reduces energy needs and costs)
        - Rain gardens, which are constructed specifically to catch and retain rainwater and water runoff in order to reduce flooding risks
        - Bioswales, which are landscaping techniques designed to slow and divert water runoff during heavy rain events
        - Pervious pavers, which -- unlike standard concrete or asphalt -- allows water to permeate through to the soil below, reducing surface runoff and diminishing the risk of flooding

- Installing green roofs and planting trees adjacent to buildings can regulate indoor temperatures during extreme heat events, reducing energy needs and costs
- Expanding and protecting alternative transportation routes (bicycle, pedestrian, bus, and rail) provides network redundancies and alternative routes for emergency evacuation
    - Bicycling infrastructure, such as dedicated bike lanes and safe bicycle parking
    - Walking infrastructure, such as good condition, safe sidewalks

The following table (Figure 9) identifies specific greenhouse gas reduction actions highlighted in the previous chapters that have the potential to reduce risk from climate hazards. The table also indicates the specific hazards that the actions address.

Action	Extreme Temperatures	Flooding	Drought	Seasonal Variations	[Other Hazard]
Rental Regulations	X			X	
New Green Space	X	X	X	X	X
Weatherization Programs	X			X	X
Ecodistrict	X	X	X	X	X
Expand Urban Tree Canopy	X	X	X	X	X
Rain gardens and Bioswales		X		X	
"Streetscaping"	X	X	X	X	X
Green Roof Assistance	X	X		X	
Rainwater Collection		X	X	X	
Watershed Advisory Commission		X	X	X	X

Figure 9. GHG Mitigation and Hazard Reduction Actions

13. Monitoring Plan

In 2022, following City Council approval of this Plan, the City of Meadville will begin to engage members of our community along with institutional stakeholders to move forward on our Climate Action Plan. Of priority will be engaging in conversation with economically challenged communities such as the Fifth Ward, South Main Street and Gill Village, as a way of tilling the ground for educational efforts around such initiatives as growing our tree canopy, consolidating and extending current garden projects and preparing the way for more walking and biking.

In 2022, priority activities will include:

- Creating a city associated organization or citizen advisory group from a cross-section of Meadville citizens, including people from the business/manufacturing community, the local school district, public health, transportation, and youth.
- Submitting data requests for past years as part of a GHG inventory update.
- Scheduling a number of public meetings, in person if possible, in order to raise public interest and awareness of climate change and the City's CAP.

A key function of the citizen group will be overall CAP monitoring. This organization would be responsible for tracing the impacts of the various actions while comparing estimated impacts to what we are actually achieving on the ground in energy saving, renewable energy production, and GHG emissions reduction.

Assessing the implementation status of such actions will help determine whether they are successful and identify corrective measures as we further understand what needs to be done. This process will allow us to identify barriers toward implementation, determine best practices and seize emerging opportunities.

The following table describes the components of the monitoring reports our initiative requires. Action reports are due every two years and are expected to include status updates on overall action as well as the mitigation action plan and the adaptation action plan. A full monitoring report will be presented every year while additions to the components comprising the action report will be presented every three years. The full update will include a current GHG inventory, regularly updated. This process helps the City keep track of its GHG emissions reduction progress.

With City Council's CAP approval in early 2022, the first monitoring action report will be due in 2024 and the first full monitoring report with the updated GHG inventories will be due in 2023. The City will establish an expectation that utilities provide yearly updates so that progress and funding can be properly assessed.

Overall Action:	*Action Reporting*	*Full Reporting*
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, or on hold) of	**Yes**	**Yes**

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Appendix I: Methodology

Energy

The following table shows each activity related to energy consumption, data source, and notes on data gaps.

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Residential, commercial, and industrial electricity consumption	Penelec; First Energy Corp	
Residential, commercial, and industrial natural gas consumption	National Fuel	On site natural gas generation/usage was not assessed due to a lack of available data
Residential fuel oil and propane	NA	Not assessed due to lack of available data
Local Government Operations		
Electricity consumption	Penelec; First Energy Corp	Aggregated with overall commercial electricity consumption
Natural gas consumption	National Fuel	Aggregated with overall commercial gas consumption

Transportation

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Vehicle miles traveled	Northwest Regional Commission	Gasoline and Diesel engines are aggregated
Transit ridership	CATA	All fuel types are aggregated
Local Government Operations		
Government vehicle fleet	Northwest Regional Commission	Aggregated with overall vehicle miles traveled
Employee commute	Northwest Regional Commission	Aggregated with overall vehicle miles traveled

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH_4 and N_2O to each vehicle type. The factors used in the calculations for this report are shown below, and are based on the 2018 US National defaults (updated as of 2020).

Fuel	Vehicle type	MPG	CH_4 g/mile	N_2O g/mile
Gasoline	Passenger car	24.21	.0186	.0093
Gasoline	Light truck	17.52	.0201	.0167
Gasoline	Heavy truck	5.36	.086	.0664
Diesel	Passenger car	24.21	.0005	.001
Diesel	Light truck	17.52	.001	.0015
Diesel	Heavy truck	6.22	.0051	.0048

Wastewater

Activity	Data Source	Data Gaps/Assumptions
Communitywide & Local Government Operations		
Nitrogen Discharge		Data pending
Digester Gas Combustion/Flaring		
Energy used in wastewater facilities [if reported separately]	Not reported separately	Aggregated with overall energy use

Potable Water [if reported separately]

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
		Not reported separately
Local Government Operations		
		Not reported separately

Solid Waste

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
		Data pending
Local Government Operations		
		Data pending

Fugitive Emissions

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
N/A		
Local Government Operations		
N/A		

Inventory Calculations

The 2018 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO_2e emissions.

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).

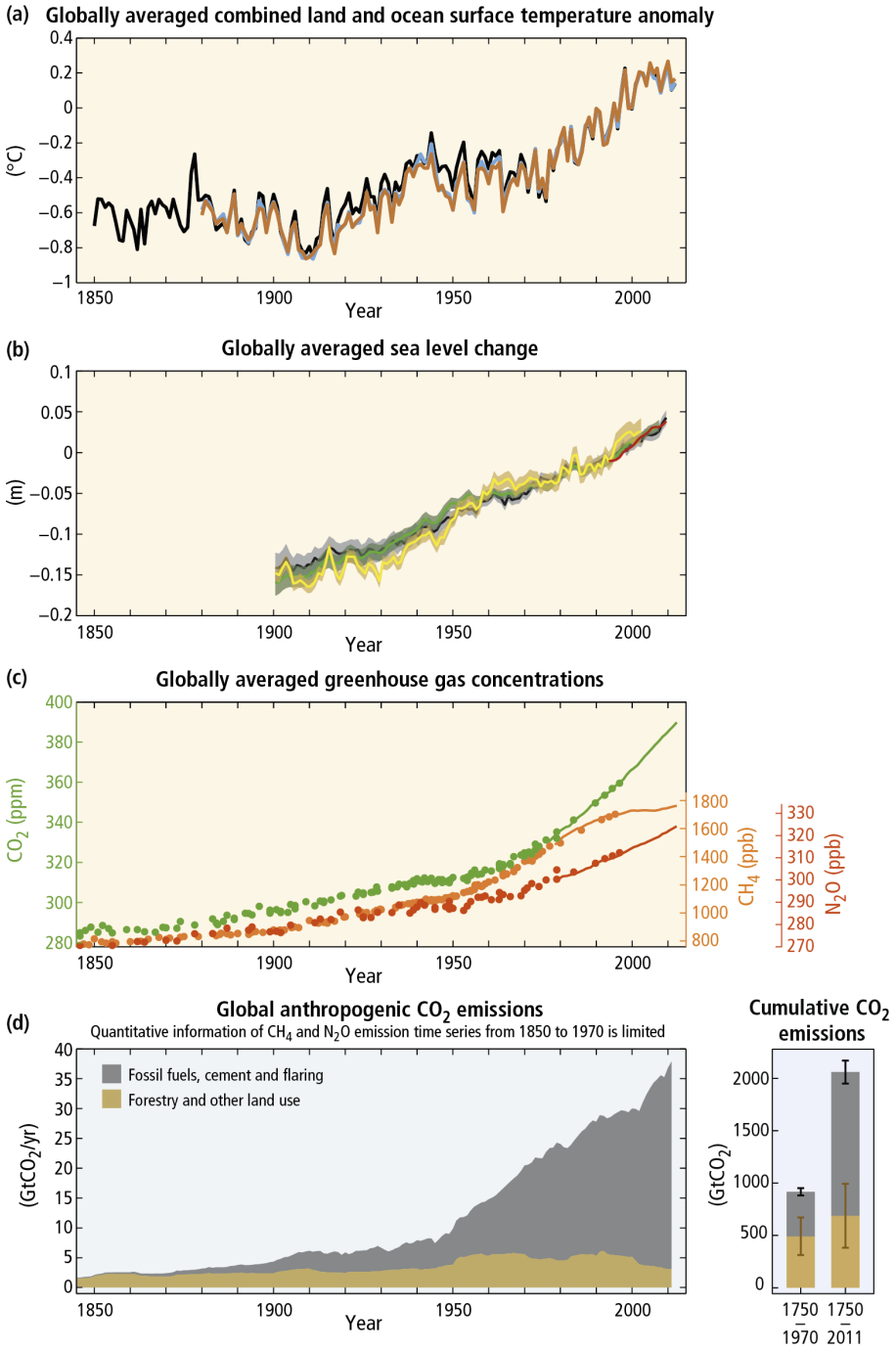

Figure 1 Observations and other indicators of a changing global climate system

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

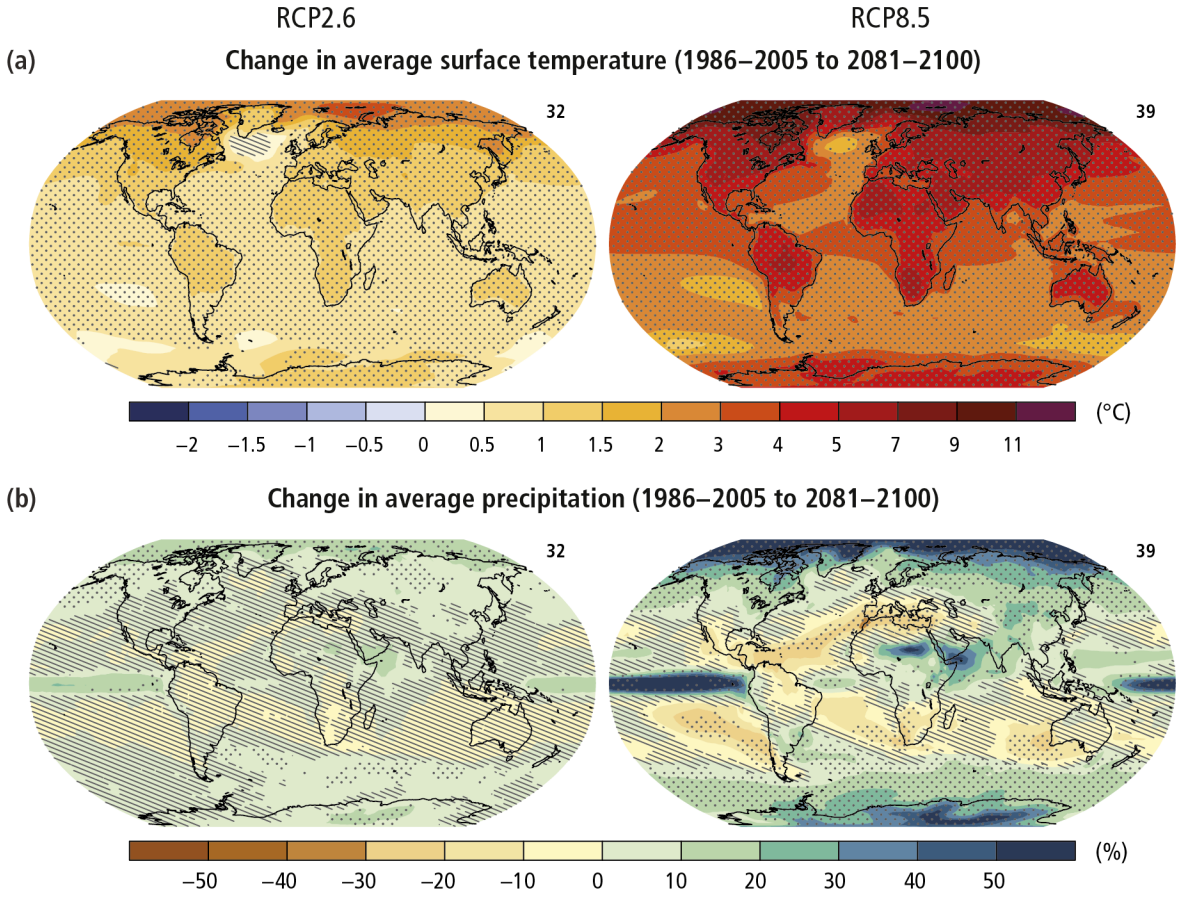

Figure 2 Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios.

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

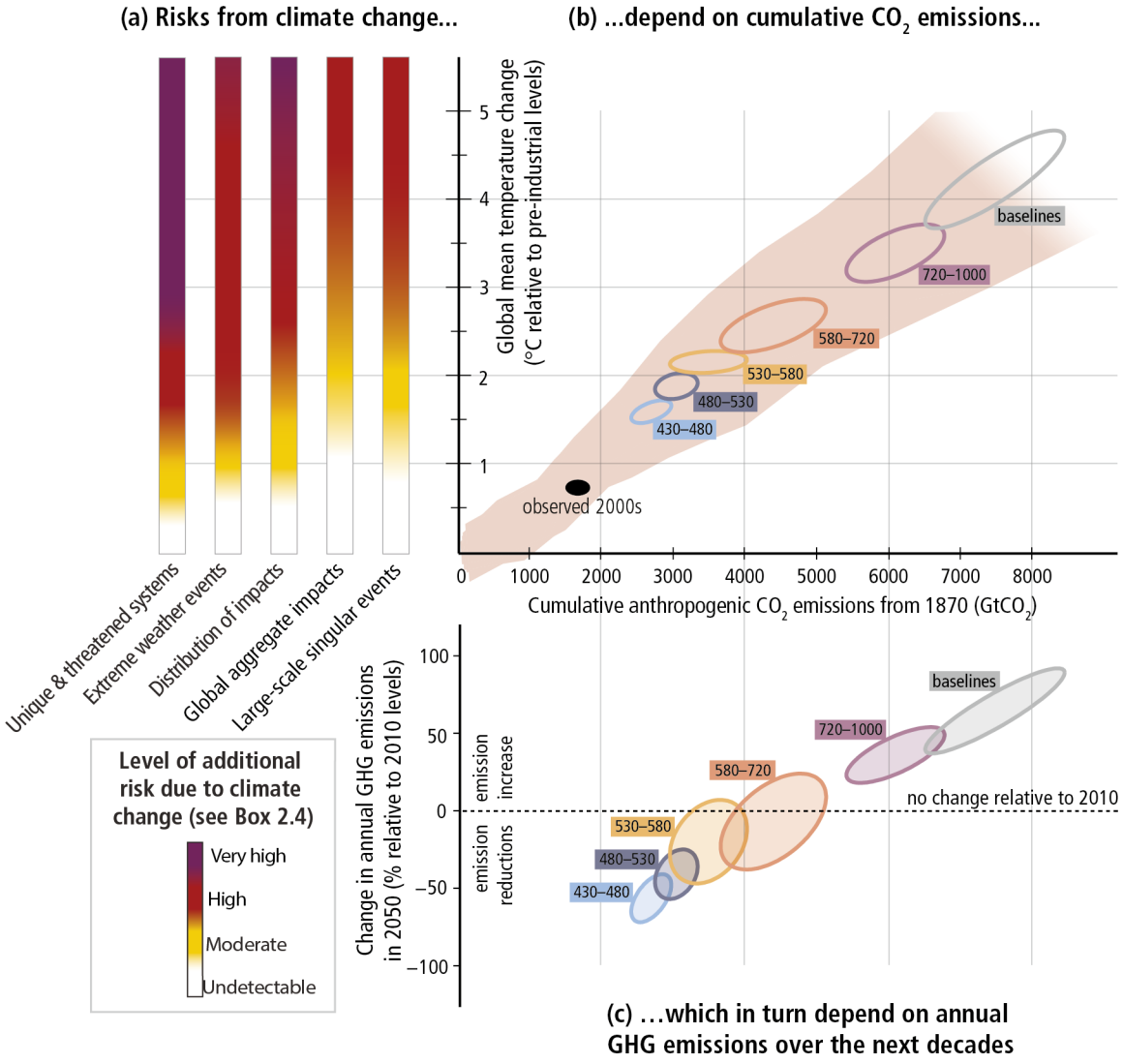

Figure 3 The relationship between risks from climate change, temperature change, cumulative carbon dioxide (CO2) emissions and changes in annual greenhouse gas (GHG) emissions by 2050.

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.

CITY OF MEADVILLE

Resolution No. 48 *of* 2022

By Councilmember Vogel

A RESOLUTION OF THE COUNCIL OF THE CITY OF MEADVILLE, COUNTY OF CRAWFORD, COMMONWEALTH OF PENNSYLVANIA, ADOPTING THE 2022 MEADVILLE CLIMATE ACTION PLAN.

RESOLVED, by the Council of the City of Meadville,

That:

WHEREAS: The City of Meadville recognizes that climate change is among the most significant problems facing the world today and potentially poses the greatest economic, environmental, and social challenge of the 21st century.

WHEREAS: The City of Meadville also recognizes that meaningful action is needed at all levels of government to mitigate and adapt to climate change, protect the public trust, ensure a resilient community, and leave a healthy environment and atmosphere for future generations. The City of Meadville will engage residents, visitors, businesses, and organizations, to do the same.

WHEREAS: The Climate Action Plain is a culmination of ideas, goals, and initiatives that will serve as a formal road map to maintain progress in the City's commitment to reducing energy and fuel consumption, while enhancing economy, quality of life and community.

WHEREAS: The research for and drafting of the Climate Action Plan is the result of dedicated work by volunteer residents of the City of Meadville, with support and guidance from the Pennsylvania Department of Environmental Protection and ICLEI – Local Governments for Sustainability.

WHEREAS: Implementation and/or approval of the specific initiatives included in the Climate Action Plan shall be subject to approval by City Council by further resolution or ordinance.

NOW THEREFORE, BE IT RESOLVED that the Council of the City of Meadville hereby adopts the Meadville Climate Action Plan.

ADOPTED and APPROVED by Council on this 15th day of June, 2022.

BY: _____
Jaime Kinder, Mayor

ATTEST: _____
Katherine Wickert, City Clerk