Binghamton Climate Action & Resiliency Plan

City of Binghamton, New York

DRAFT

Prepared by:

C&S COMPANIES®

May 17, 2024

A Message from the Mayor

February 1, 2024

It is my distinct pleasure to introduce the 2024 Binghamton Climate Action Plan. This document represents the efforts of the City and the Community to take stock of their accomplishments under the 2011 Energy and Climate Action Plan, and chart a course for the City's future in a climate changed world.

The Binghamton 2011 Energy and Climate Action Plan was published with the overarching purpose of guiding the City of Binghamton's polices, practices, and programs to minimize household, business, and government energy costs and greenhouse gas emissions. The overarching goal of the 2011 Plan was to reduce greenhouse gas emissions by 25% by 2025. Through the efforts of the City and the Community, this goal has been achieved – exceeded, even, with a 67% reduction in municipal emissions (i.e., City operations) and a 53% reduction in community emissions.

In addition, in reviewing the many actions that were proposed in the 2011 Climate Action Plan, we can state truthfully that almost all of those actions were implemented, either fully or in part. Those few actions that were not implemented are being considered or are in process of being implemented today. As a City and a Community, there is a lot to be proud of in terms of what we have accomplished so far. Of course there is much more to be done, including achieving the ambitious goal of zero carbon emissions. But we should take heart from both our emissions track record and list of actions taken so far that the City of Binghamton is capable of achieving what it sets out to do.

The 2011 Plan was developed and finalized just as Binghamton was recovering from the second of two devastating floods. These floods foreshadowed what future events in Binghamton in a climate changed-world could look like. While continuing to push to reduce GHG emission to zero through efficiency, electrification, and the use of renewable energy, the 2024 Plan focuses on preparing the City and the Community to respond to and recover from the impacts of climate change, increasing resilience and responsiveness to weather extremes, reducing the harm that climate change will cause to the local and regional economy and communities, and ensuring that the benefits of these efforts are realized by all.

Jared M. Kraham

Kraham, Jared M.
Mayor

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Climate Action & Resiliency Plan 2024

The goal of the Climate Action & Resiliency Plan 2024 is to update and build from the Energy & Climate Action Plan first developed by the City of Binghamton in 2011. To do this, a new Green House Gas (GHG) Inventory was completed using the USEPA Local Inventory Tool to calculate emissions from 2022 municipal and community data. This information was then used to identify how far we have come, new challenges we are facing, and to target our new goals. The City of Binghamton, both municipal government and community members, have worked hard to conserve energy, to purchase and produce clean energy, to assist those less fortunate with expensive energy efficiency upgrades, maintain our commitment to recycling, and to reduce our impacts to our two boundary rivers, the Susquehanna and Chenango. This plan is designed to continue those strong trends with current goals and actions, and to address the new and increasing impacts of climate change that our community has experienced.

For Today and For Tomorrow

- Binghamton businesses and residents continue to reduce waste through recycling; by supporting the re-use economy and shopping at the many consignment, antique and thrift shops and boutiques; and by donating our re-usable items. Recycling, buying recycled, and repurposing useful items not only saves money while generating business revenue, but helps to reduce the generation of greenhouse gases.
- Our homes and community buildings are more energy efficient, and more are powered by renewable energy.
- The impact of climate change has been felt on our urban forests as pests and diseases not often experienced or found in this region are now able to survive. Work continues to be done to plant trees to replace those we've lost, to identify infestations and infections and stop the spread through treatment and management plans.
- The number of community gardens and green rooftops continue to increase and expand, providing additional needed capacity to hold and retain rainwater for slower infiltration, reduced overland runoff, and reducing the flood potential of our rivers.
- The expansion of community and urban agriculture not only is beneficial for the effective functioning of our ecosystem, but brings fresh food into our markets, neighborhoods and local food banks. Locally produced and purchased food reduces greenhouse gas emissions through reduced shipping and less vehicle miles traveled.
- Protecting and enhancing the walkability of our community, creating shared accessible pathways, and expanding on the existing connectivity of our business districts, neighborhoods, schools, and parks is one of the strengths of our community and is crucial in reducing our dependence on fossil fuels.
- Working together, our community continues to offset and reduce the impacts caused by climate change, through increasing the resiliency and ability of our community to adapt as we are confronted by these new challenges.

Timeline: Binghamton Climate and Sustainability

1992
Rio Earth Summit (United Nations Framework Convention on Climate Change)

1997
Kyoto Protocol

2007
Mayor Matt Ryan signed the U.S. Conference of Mayors Climate Protection Agreement pledging a reduction in the City's greenhouse gas emissions to 7% of 1990

2008
Kyoto Protocol compliance period (U.S. target: 7% below 1990 levels

2008
Mayor Matt Ryan introduced a Resource Conservation Policy to help the City to reduce carbon emission, minimize resource consumption, and cut costs

2011
The installation of a 49.68 KW solar photovoltaic system at the City's Water Treatment Plan was completed

2010
The City's greenhouse gas inventory for the baseline year 2006 was completed

2010
City Selected to Participate int eh Development of the New York State Climate Action Plan

2009
The City became a member of Local Governments for Sustainability and committed to participating in the Cities for Protection campaign

2009
The City's Commission on Sustainable Development and Smart Growth released its report, ***Moving Toward Sustainability: An Opportunity for Growth and Prosperity***

2011 December
Action Plan Completed

2012-2025
Implementation of the Action Plan

2012-2025
Monitor and evaluate the impacts of the Action Plan

2025: Goal
Reduce levels 25% below 2006 levels

2035: Goal
City of Binghamton is net zero energy and carbon neutral

2024
Binghamton Climate Action and Resilience Plan completed

2023
Binghamton certified Bronze as a Climate Smart Community

2021
Binghamton hit 50% reduction in GHG emission from the 2006 benchmark

2017
Binghamton designated a NYSERDA Clean Energy Community

2014
Binghamton attains 25% GHG emissions reduction goal from the 2006 benchmark. This goal was completed approximately 11 years early.

SECTION 1

Introduction

In 2011, the City of Binghamton published its first Climate Action Plan. This set GHG emissions goals for the City to meet, specifically a 25% reduction from the baseline year by 2025. It also identified numerous Climate Actions to undertake to reduce emissions and prepare for the impacts of climate change. The GHG emissions inventory associated with the development of the 2024 Climate Action Plan showed that the City and the Community had far exceeded the 25% reduction goal before the 2025 deadline. Moreover, a systematic review of the Climate Actions in the 2011 plan showed that the vast majority of the actions had been achieved (see Appendix A – Status of 2011 Climate Actions)

The GHG emissions reductions and the ability of the City and Community to take meaningful climate actions constitute an encouraging message for the success of future actions and efforts to reduce GHG emissions.

The 2024 Climate Action Plan is intended to be a continuation and extension of the actions and goals set forth in the 2011 Plan.

New Path Forward: Building on our Energy & Climate Action Plan

As the 2011 Energy and Climate Action Plan set our course forward, the 2024 Climate Action & Resiliency Plan creates a path by building and expanding on the knowledge and experiences of the past decade. The goals in this plan have been developed with the memories of the back-to-back five hundred year floods fresh in our community, along with the scars and measured markings from those floodwaters. This plan consists of actions to achieve those goals, based on the successful implementation of plans that lead our course forward. New policies, new programs have been identified to meet the new challenges before us, hopefully to soften those ahead of us, to mitigate the known impacts and disastrous results of climate change. We have met those stated goals from 2011, and now raise the bar for ourselves and for those who step in to take our places within the next 10 years. We continued the planning process by creating a challenge that, although ambiguous, will reduce the burden we leave to tour successors. Our 2024 Climate Action & Resiliency Plan brings together actions designed to achieve the goals identified as our path forward to climate change resilience. In this Plan, we have outlined the climate change impacts felt by our community since 2011, and those actions necessary to reduce and offset the impacts of future climactic changes caused by our reliance on fossil fuels.

To ensure progress continues to be made, the City of Binghamton should:

- Continue with energy conservation and expand renewable energy purchase and development;
- Conduct a greenhouse gas emission inventory in 2029 and modify the plan as needed;
- Track progress against resiliency objectives and take advantage of opportunities to promote both City and community adaptation as they arise.
- Update the goals and actions of the Climate Action & Resiliency Plan in 2035.

SECTION 2

Climate Impacts: What Binghamton Is Preparing For

Numerous federal, state, local, and non-profit-originated reports are available that describe the current state and forecasted impacts of climate change on the State of New York, including the Southern Tier, together with associated weather, resources, and economic sectors.[1] The following sections identify two key climate change threats to the City of Binghamton: Flooding and Extreme Storm Events, and Extreme Heat and Wildfires.

Although numerous other climate risks and threats exist including declining water quality, ecological degradation, and the spread of invasive species, these three primary areas present the most imme-

[1] New York State Department of Environmental Conservation, Climate Change Effects and Impacts: https://www.dec.ny.gov/energy/94702.html | New York State Department of Environmental Conservation Observed and Projected Climate Change in New York State: An Overview (August 2021) https://www.dec.ny.gov/docs/administration_pdf/ccnys2021.pdf | Fourth National Climate Assessment 2018 Chapter 18: Northeast https://nca2018.globalchange.gov/chapter/18/ | Fourth National Climate Assessment 2018 Chapter 3: Water https://nca2018.globalchange.gov/chapter/3/ | Union of Concerned Scientists, Northeast Climate Impacts Assessment (2007) https://www.ucsusa.org/sites/default/files/2019-09/confronting-climate-change-in-the-u-s-northeast.pdf | U.S. Global Change Research Program Fifth National Climate Assessment, 2023, Chapter 21: Northeast https://nca2023.globalchange.gov/chapter/21/

diate and existential threats from climate change. Flooding, heat, and wildfires are the root cause of most of the other problems, and therefore addressing them head-on will have positive downstream effects on the other climate risk categories.

Equity Considerations

The term "Disadvantaged Community[2]" defines populations that meet certain criteria identified by the New York Climate Justice Working Group March 27, 2023. These criteria include such things as percentage of the population living in poverty, the housing vacancy rate, prevalence of certain chronic diseases, percent of adults over the age of 65, and other metrics. The criteria also consider proximity to environmental hazards such as remediation sites, and exposure to climate risks such as extreme heat and ares of potential flooding.

Equity and environmental justice are important concerns in the climate change space. Disadvantaged communities, whether due to race, age, income or other measures, are not only more vulnerable to the impacts of climate change, but are also less likely to receive the support they need to reduce their risks and adapt. Climate actions must be more intentional with respect to these populations.

Fortunately, both federal and New York state programs providing support for climate resilience are deliberately steering funds and technical assistance to disadvantaged communities to ensure that they benefit from these investments. The City of Binghamton will be monitoring funding opportunities and collaborating with its communities to apply for grants and other support to address the specific needs of these communities.

The City will continue to reach out to vulnerable populations including but not limited to: racial minorities, the elderly, the disabled, those under the age of 18, as it implements the climate actions outlined in this document. The City will also ensure that their voices are heard in future climate planning and implementation efforts through such bodies as the Climate Advisory Committee and the City's planning process.

Flooding and Extreme Storm Events

Since 2011, Binghamton has survived back-to-back 500-year floods, numerous localized floods, and repetitive flooding issues. This has resulted in concerns regarding the ability of our current flood mitigation

2006 Flood Court Street

2011 Flood Downtown Binghamton

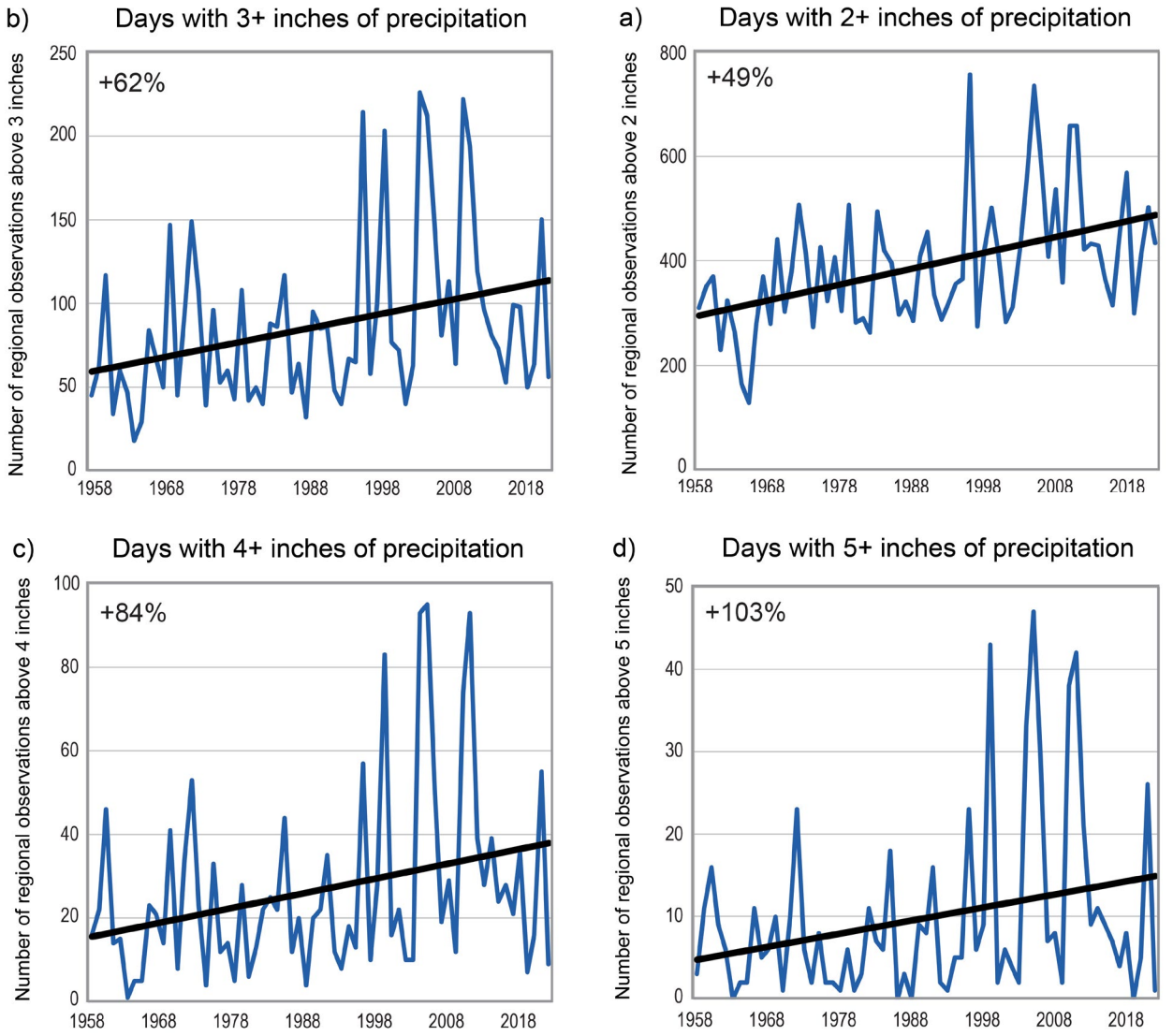
2018 Court Street Flash Flood

[2] https://climate.ny.gov/-/media/Project/Climate/Files/Disadvantaged-Communities-Criteria/LMI-daccriteria-fs-1-v2_acc.pdf

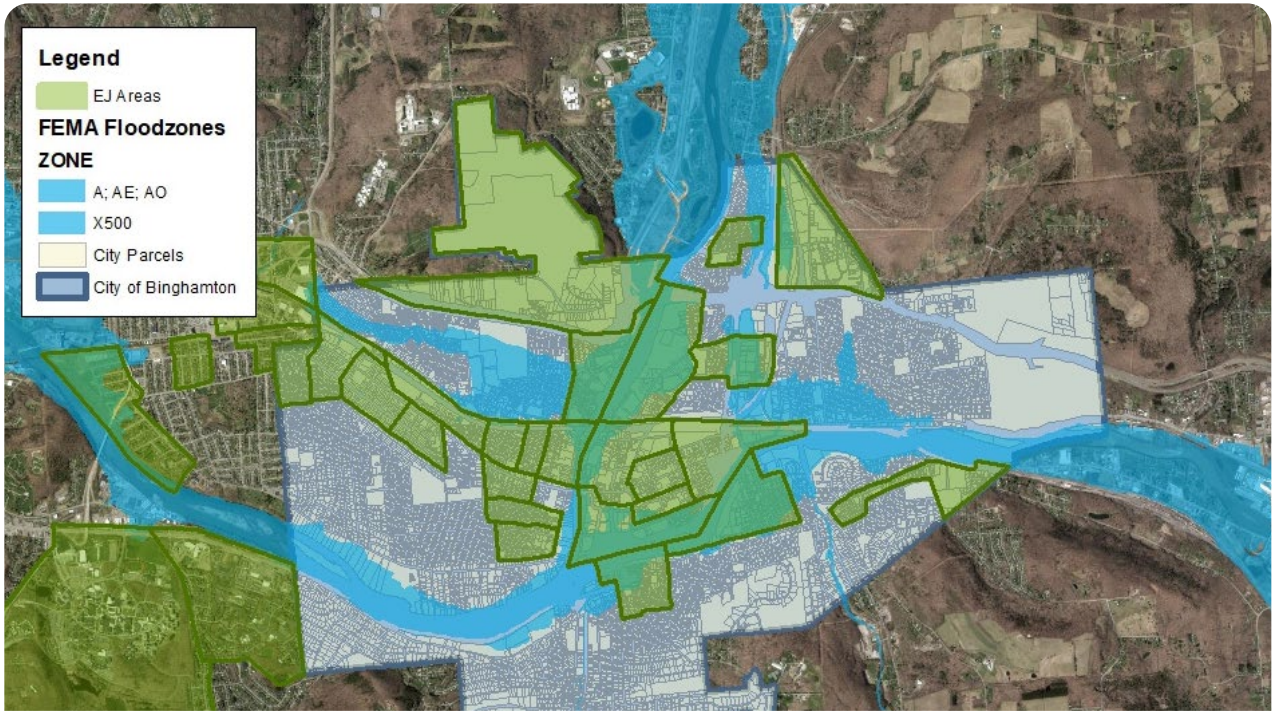
system to protect our community from the flooding events caused by an increasing number of extreme storms. Our location at the confluence of two rivers and circled by the Endless Mountains has established our region as historically flood-prone. The increasing amount of pavement as our roadways expanded, as our community grew, as urbanization replaced a riverine community has only increased our rate of flooding. The impact of climate change on weather patterns has increased the severity and intensity of storms, leading to an increased frequency of extreme rainfall events as illustrated in the following four graphs, and an increase in flood situations within our community.

As cities grew and expanded, our consumption of fossil fuels increased, leading to an increase in the emissions causing our climate to change. We can reduce the impacts of climate change by modifying how we live and by changing how our city grows. Reducing pavement, creating greenways, restoring riverbanks, and reducing runoff protects our rivers and reduces the likelihood of flooding. Making walking, biking and transit safer and more accessible to everyone reduces our reliance on automobiles, bringing GHG emissions down. Changing our City's location isn't as easy, replacing our flood mitigation system will not be as easy either.

Trends in Extreme Precipitation in the Northeast



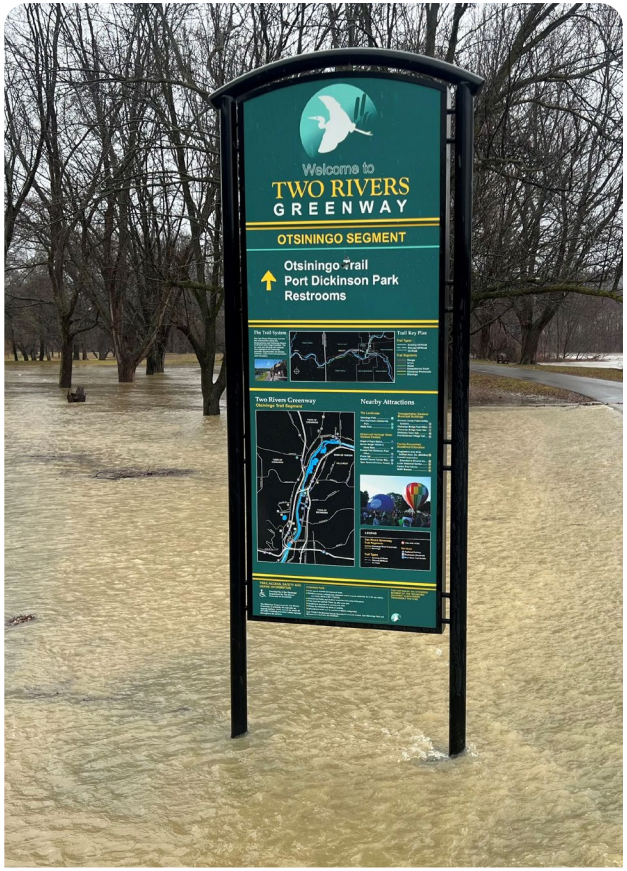
Source: U.S. Global Change Research Program, 5th National Climate Assessment, Chapter 21: Northeast, Nov 2023



The Intersection between Environmental Justice Communities and the Binghamton-Area Flood Plain

Flooding is the area of gravest concern to the City and the community, as expressed both in public meetings and comments, as well as discussions with City departments. The flooding is typically widespread and can be catastrophic for individuals and the community at large. Even when recovery is possible, it takes years to fully recover from, and results in the delay of revitalization plans and economic improvement. Insurance does not cover all damage and cannot compensate businesses and homeowners for the loss of time and the stress of rebuilding. The increasing threat of stronger and more frequent hurricanes, extreme rainfall events, and localized flash flooding causing more serious floods, additional nuisance flooding and sewer back-ups is a continuing concern.

Floods, like other natural disasters, disproportionately impact disadvantaged communities. Binghamton's floodplains overlap with many of the City's Environmental Justice Areas (seen above). These overlaps illustrate where the impacts of flooding will hit those least able to prepare and recover, and where time, effort, and resources should be conscientiously applied to ensure that the benefits of climate action flow to everyone including those who need the most assistance.



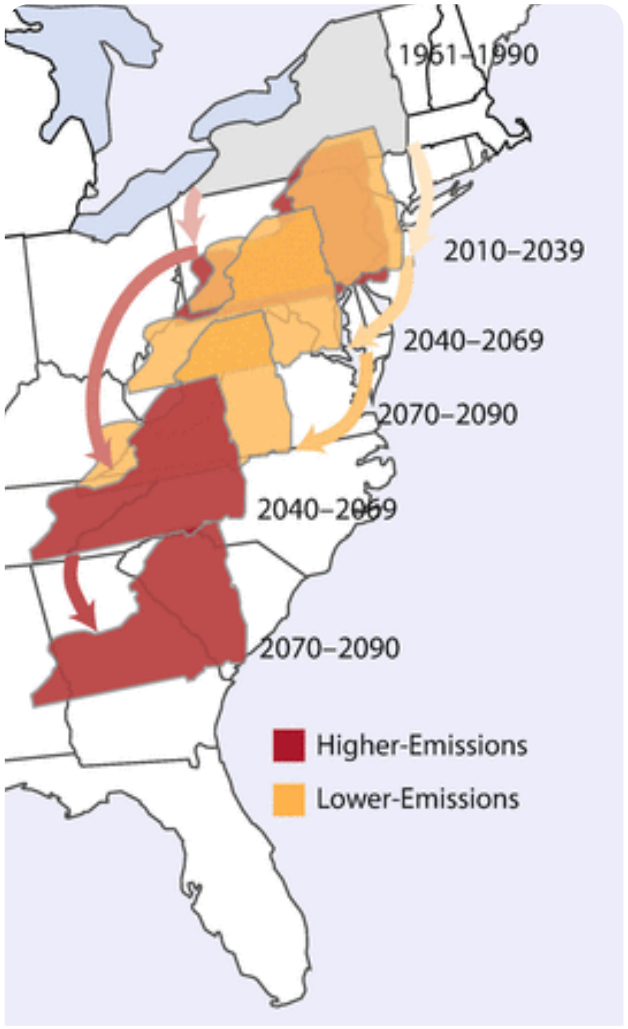
December 2023 Flood Otsinigo Park

The expected increase in extreme rainfall events will increase the frequency and magnitude of severe floods. With climate change, it is reasonable to expect that their impacts will be further magnified. History of this flooding in Binghamton and surrounding towns and counties located in the Susquehanna River Basin has been continual with the earliest records starting in 1833 and the most recent event December 2023 resulting in the closing of the Otsiningo Park Festival of Lights.

Extreme Heat and Wildfires

Extreme heat is the leading cause of death among hazardous weather events in the U.S. and the impacts of extreme heat will become more severe as climate change progresses. New York State is projected to experience more frequent and longer days above 90ºF. Warmer winters are already disrupting the usual seasonal patterns of snowfall and snowmelt, with impacts on agriculture, the water cycle/management, and natural ecosystems such as forests. These temperature-related impacts will be felt throughout the Southern Tier region on an increasing basis.

As an urban area, a pressing concern for Binghamton is the impact of extreme heat, specifically within urban heat islands.

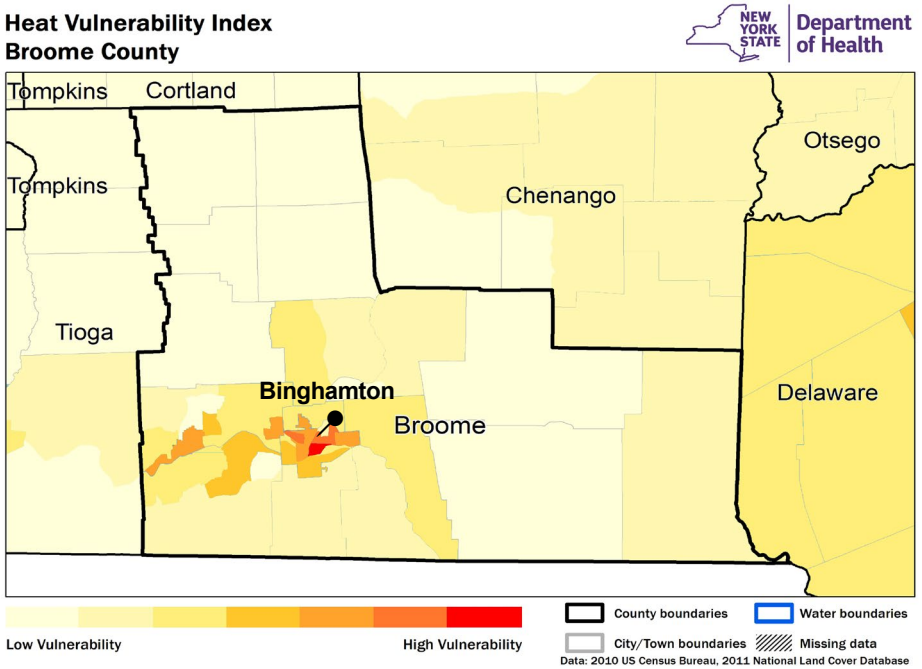


Migrating New York State Climate[3]

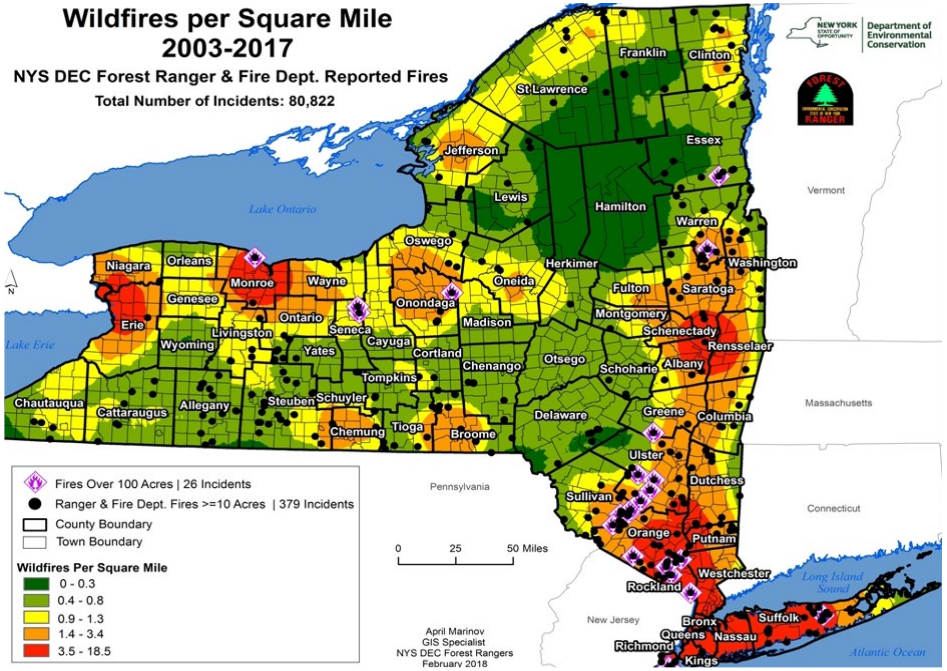
Extreme heat and heat waves increase the risk of heat-related illnesses and death for urban residents, particularly for low-income residents, the elderly, and those with no access to air conditioning. Prolonged and extreme heat waves put pressure on both local and regional electrical systems, increase utility bills, and stress emergency rooms and other components of the public health system, all of which need to be resilient together to respond effectively to these events. Air conditioning is more widespread than it used to be, but the region is yet unaccustomed to extreme heat as part of the summer routine, and the heat problem is most acute when it intersects with people living in older housing and the homeless. The average age of Binghamton's housing stock is 79 years with almost half of the housing stock constructed prior to 1940[4], when summer temperatures rarely rose above the mid-70s, and housing was therefore not built or configured for extreme heat or air conditioning.

Extreme heat also places stress on infrastructure, particularly the electric grid. This stress can be direct with extreme temperatures impeding the electrical conductivity of the transmission and distribution lines, substations, and transformers; and indirect such

[3] Confronting Climate Change in the U.S. Northeast" Union of Concerned Scientists, 2007. https://www.ucsusa.org/sites/default/files/2019-09/confronting-climate-change-in-the-u-s-northeast.pdf
[4] NOAA/National Centers for Environmental Information, Climate at a Glance City Time Series, Syracuse summer maximum temperature 1939-1950 https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/city/time-series



Broome County Heat Vulnerability Index Map



Map of Wildfires as Reported by NYS Forest Rangers and Fire Departments 2003-2017

2023 Extreme Heat Map

as increasing summer peak demand and increase as the need for air conditioning increases.

As warming continues over the next decades, New Yorkers should expect have to adapt to a pattern of life that is rooted in a climate more like Virginia and the Carolinas, as shown on the Emission map. Extreme heat can have serious consequences for human health, particularly for vulnerable individuals and communities. The Broome County Heat Vulnerability Index Map above was developed by the New York State Department of Health to help communities identify heat-vulnerable populations and regions within their counties. It it based on four criteria[5] including:

1. language vulnerability,
2. socio-economic vulnerability,
3. environmental and urban vulnerability,
4. and elderly isolation and elderly vulnerability.

[5] https://www.health.ny.gov/environmental/weather/vulnerability_index/

Hazardous Air Conditions from Wildfires in Canada

Hazardous Air Conditions from Wildfires in Canada

Wildland fires on the scale experienced in the Western U.S. and most recently throughout Canada typically occur after periods of extreme drought and record heat. Neither of these are common today in the Southern Tier's wetter and more temperate climate. However, wildland fires do occur within the area, and smoke from wildfires observes no boundaries. With average temperatures getting warmer throughout the year, more weather extremes such as heatwaves and droughts are occurring with greater frequency. Combined with negative impacts on tree health due to invasive pests and tree diseases, the chances for the conditions that lead to more wildfires in New York will increase.

The Binghamton Area has on average a higher propensity for wildfires than other parts of New York State (see Wildfire map on previous page) and should assume that wildfires could become more frequent and severe in the future. For communities unfamiliar with a regular fire season as is experienced in the western United States, emergency responders and citizens can be caught unprepared when these fires and smoke impacts from wildfires occur.

Even if Binghamton is not directly impacted by wildfires, the 2023 Canadian Wildfires caused several days of hazardous air quality in Binghamton as shown on the next page and reported by local news outlets (WNBF News Radio. "Binghamton Area Smothered by Toxic Smoke From Quebec Wildfires." *https://wnbf.com/author/bobjoseph/* Bob Joseph. June 6, 2023), as in the case of heat emergencies, this will place a burden on vulnerable populations, schools, Emergency Rooms and health clinics, and other components of the public health system.

When wildfires consume the natural landscape, the result includes a reduced ability of the environment to sequester carbon, which is one of the most important tools in the fight against climate change. An increased awareness of the new and expanding potential for wildfire and smoke drift was present in comments received by the public.

SECTION 3

Public Engagement and Participation in the Development of the 2024 Climate Action Plan

Climate Advisory Committee

The Mayor of the City of Binghamton convened a Climate Advisory Committee to participate in the climate planning process, particularly the development of the Climate Action Plan. The Climate Advisory Committee Included the following members:

- Chris Catt, Siemens, Market Lead, Government Energy & Sustainability
- Brian Cregan, HubControls, General Manager
- Jacob Kumpoon, KLAW, Chief Operations Officer
- Amelia LoDolce, VINES, Executive Director
- Beth Lucas, Broome County Planning Department, Director
- Jonny Norton, Foam It Insulation
- Per Stromhaug, Binghamton University, Office of Entrepreneurship and Innovation Partnerships, Associate Vice President
- Dr. Juliet Berling, City of Binghamton, Director of Planning, Housing, and Community Development

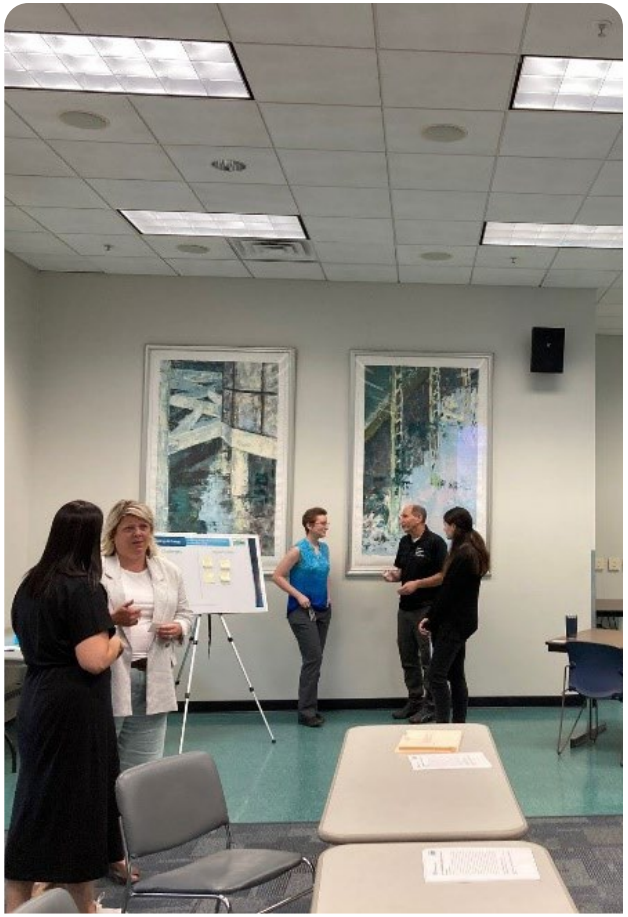
- Sarah Glose, City of Binghamton, Director of Economic Development
- Megan Heiman, City of Binghamton, Deputy Mayor
- Ronald Lake, PE, City of Binghamton, City Engineer
- Patrick McGinnis, City of Binghamton, Commissioner of Parks & Recreation
- Anna Shahee, City of Binghamton, Parks & Recreation, Naturalist
- Ollie Hynes, Hub Control, CEO & Founder
- Charles Laxton, HVAC Specialist
- James Vernay, Electronics Engineer
- Ashley Seyfried, Southern Tier 8 Regional Board

Two Climate Advisory Committee meetings were held before the development of the 2024 Climate Action Plan draft. The first meeting was held April 27, 2023 at City Hall to introduce the Committee to the project, including the GHG inventory and the Climate Smart Communities (CSC) application process. The Committee's second meeting was held at City Hall on July 7, 2023 to review the final greenhouse gas inventory.

Public Meetings

Two public meetings were held on the Climate Action Plan. The first was held June 28, 2023 at the Binghamton Public Library, and consisted of a presentation on the GHG emissions inventory, the CSC process, and Plan itself. The presentation was followed by a question and answer session. Following the Q&A, those attending the meeting were solicited for comment and feedback on what they wanted to see in a plan, and what their climate change concerns were.

Public Meeting Flyer



Public Meeting June 28, 2023

Storyboards were placed around the room describing the climate action categories from the 2011 plan with opportunities to identify challenges and opportunities for each. Categories with identified challenges and opportunities on storyboards included:

Category	Challenges	Opportunities
Buildings & Energy	• Fuel poor • Lack of knowledge regarding available incentives to reduce energy usage • NYSEG	• Inflation Reduction Act incentives for energy efficiency and communicating its benefits to the public • Solar energy • Funding for residential energy construction upgrades
Transportation & Urban Planning	• Zoning prohibiting sustainable housing including multifamily • Out of date building assessments • 363 bisecting the community • Mandatory parking requirements • Brownfields	• Brownfields • Zoning Code Updates • Carbon planning to reduce pavement, increase green space and repurpose parking lots in City Center • Bus pass opportunities for government employees • Bike lanes everywhere
Waste Management, Reduction & Recycling	• Available data • Binghamton's contamination percentage for recycling	• Composting • Better garbage retrieval bins • Set up central city food scrap compost system for restaurants & breweries
Local Food, Agriculture, and Land Use	• Getting trades connected and involved with different initiatives • Community gardens – not often fully utilized • Lack of green space • Stormwater runoff	• Rural health network • Americorps • Greenwalls • Bringing back the Shade Tree Commission • VINES gardens • Increase green space
Moving Forward / Resilience	• Flood mitigation in First Ward • South Side water issues • Control runoff from Town of Dickinson	• Evaluate the demographic and geography of First Ward • Ross Park water retainment • Ask representatives to meet with homeowners to discuss concerns • New, larger storm and sanitary sewer in the First Ward • Research watershed

Chart of Categories, Challenges, and Opportunities

Comment sheets were also provided to attendees asking them to submit their concerns, interests, and aspirations for the new Climate Action Plan. The attendees were also informed of how to submit comments through the Climate Plan web site, hosted by the City of Binghamton Planning, Zoning, and Historic Preservation Department.

A second public meeting was held on the draft plan, at the February 6, 2024 meeting of the Binghamton Planning Commission. The purpose of this meeting was to present and discuss the proposed goals of the Climate Action Plan and receive comments, recommendations and concerns from the Planning Commissioners.

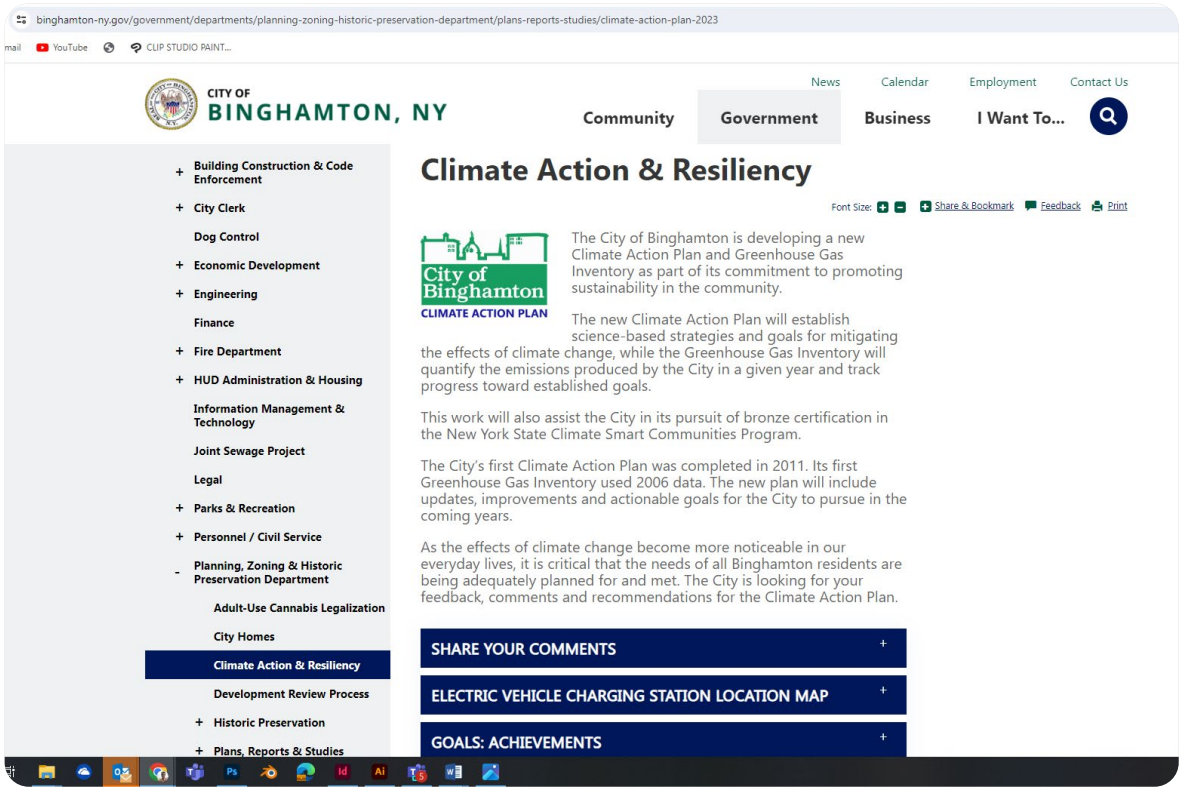
Pop-Up Outreach

The City of Binghamton set up booths to distribute public information on the Climate Action Plan at three summer events with the objective of reaching the public who wouldn't typically attend or have the means to attend a public meeting. Materials about the project, website details, and ways to provide feedback were distributed at the events below:

- The Trucks on the Tracks Binghamton Food Truck Festival, August 3, 2023
- The Downtown Binghamton Farmers Market August 8 and August 22, 2023
- Porchfest, August 27, 2023

Web Site

The Department of Planning, Zoning, and Historic Preservation hosted all the content on the 2011 and 2024 Climate Action Plans, including the 2006 and 2022 GHG emissions inventories, achievements from the 2011 Plan, presentations and comments from the 2024 plan process, and an on-line comment submission form at this site: Climate Action & Resiliency | City of Binghamton New York (binghamton-ny.gov)



SECTION 4

Binghamton 2022 Community and Municipal GHG Inventories and Targets

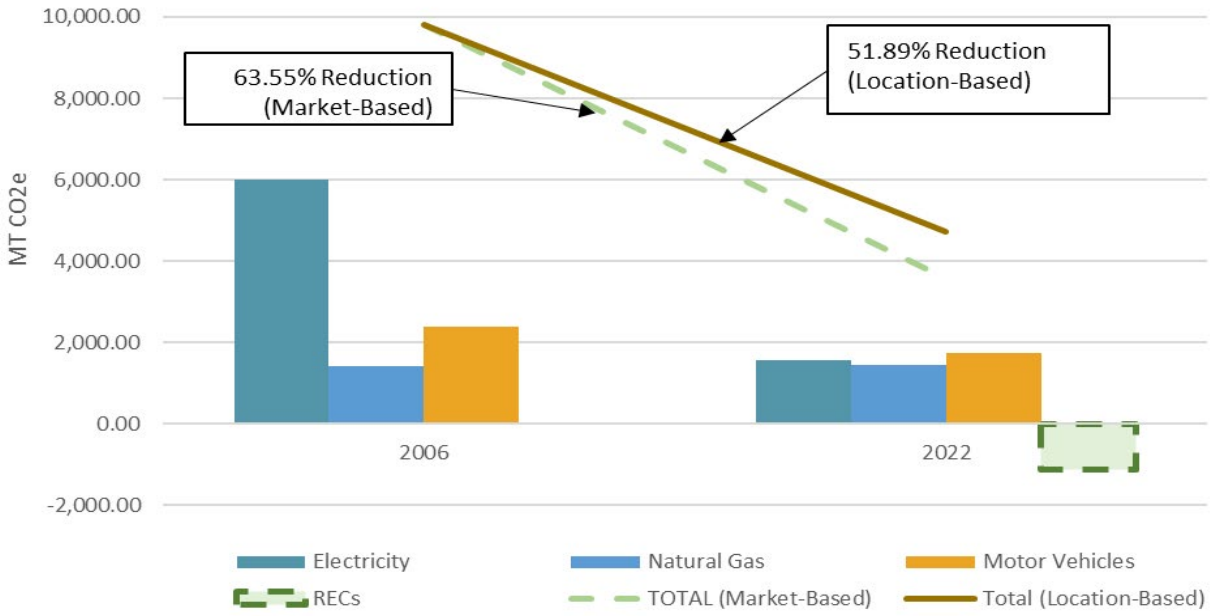
How Far Have We Come? Binghamton Green House Gas Emissions Inventory 2006 and 2022

The City of Binghamton has conducted GHG emissions inventories for the Community (i.e. commercial and residential inhabitants) and Municipal Operations (municipal buildings, streetlights, and shared operations) for both 2006 and 2022. The two snapshots provide a useful picture of how both the community and municipal operations emissions profiles have changed over the last 16 years. The 2006 and 2022 inventory reports provide detailed information on GHG emissions for those two years and are available on the City's website. The section below provides a summary of what has happened in the intervening years and why, and also indentifies goals for future emissions reductions for both the City of Binghamton and our community.

Municipal Operations

Inventory

Municipal operations comprise those emissions associated with the activities of City government. These include the shared use of City properties (e.g. Government Plaza and the Binghamton-Johnson City Sewage Treatment Plant), municipal buildings, and emissions from government-owned vehicles used by employees of the City of Binghamton. These emissions are Scope 1 (direct combustion of fuel for City-owned vehicles and natural gas for heating buildings) and Scope 2 (emissions from the generation of purchased of electricity).



Reductions in Municipal GHG Emissions, 2006-2022

The total municipal emissions in 2022 were estimated at 4,718.95 metric tons of carbon dioxide equivalents (MT CO2e), which is a 51.85% reduction from 2006. However, the City purchases renewable electricity from wind through Constellation Energy using renewable energy certificates – referred to as RECs. These RECs offset the Scope 2 emissions from electricity for each year they are purchased. The impact of this purchase on City emissions is illustrated in the graph above, with the solid trend line ("Location Based") showing the GHG emissions reduction without the RECs, and the dotted line ("Market-based") showing the reduction achieved using the RECs. Under the market-based accounting approach, the RECs reduced the City's total GHG emissions in 2022 to 3,576.25 MT CO2e, or a reduction of 63.51%. Another significant portion of the Scope 2 reduction came about due to the fact that the City sources so much of its energy from electricity, which enabled to the City to achieve its 25% GHG reduction goal in 2014.

However, an analysis of the total reduction shows that, even without the reduction of the GHG intensity of the grid, the City would still have achieved a meaningful reduction, in part through its decreased consumption of natural gas in buildings and decreased fuel consumption by the City-owned fleet. These reductions show the effectiveness and importance of energy efficiency as a GHG emissions-reducing strategy, and demonstrate that the City government is doing its part in the fight against climate change.

The Future GHG Emissions Landscape

It is difficult to forecast future emissions with precision. However, it is possible to determine what share of emissions reductions the City will be responsible

for. If the grid became 100% carbon-free, the City's GHG emissions would be reduced 26%. The remaining 74% of reductions would have to come almost entirely from electrifying buildings and vehicles.

For **Electricity,** New York State has set the goal the 70% of grid electricity shall be generated from renewable sources by 2040, with the ultimate goal of full decarbonization of the electric grid.[6] Already 60% of the electricity within New York State is being produced from carbon-free sources. Once the grid is fully decarbonized, there would be no reason for the City to purchase RECs as all grid-provided electricity would be 100% carbon-free.

For **Natural Gas,** the State-wide emphasis is to convert to electric to further reduce natural gas consumption.

Motor Vehicles: The industry is currently transitioning to electrification. A majority of the City's vehicles have electric equivalents, but the costs of the new vehicles are high. All of these trends put increasing demands on the electric grid, and also on resource-constrained City governments to make the investments to transition their fleets. Once the transition has been made, however, lower ownership costs and vehicle longevity will help to offset these investments.

[6] Climate Leadership and Community Protection Act (CLCPA)

Municipal Operations Target

Electricity: Assuming New York State policy remains the same and the industry is able to comply, all electricity on the grid will be ultimately be decarbonized. In the event of a 100% green grid, the City's GHG emissions will be automatically reduced by another 26%, assuming no growth in other areas. The City's goal in this case will be to contribute by installing its own renewable energy systems, continuing to purchase green energy, electrifying its buildings and fleet. In addition, energy efficiency measures, such as insulation and high-efficiency HVAC equipment, should be implemented at every opportunity to minimize energy consumption overall.

Natural Gas: The City's three top consumers of natural gas are the Joint Sewage Treatment Plant (25%), City Hall located at 38 Hawley St. (43%) and the Department of Public Works Municipal Garage and Refueling Station (12%). Curtailing the use of natural gas the Sewage Treatment Plant would require a process change, which should be further investigated. Natural gas systems conversion to electric heat, for example at City Hall, would require a complete overhaul of their heating system – challenging but worth investigating and necessary if the City is to reach a net zero goal. Natural gas is used by the municipal buildings for space and hot water heating. It is technically possible to simply switch from natural gas to electricity. This will require a significant investment, incentives available by the State of New York will make this transition more affordable for the municipality to pursue.

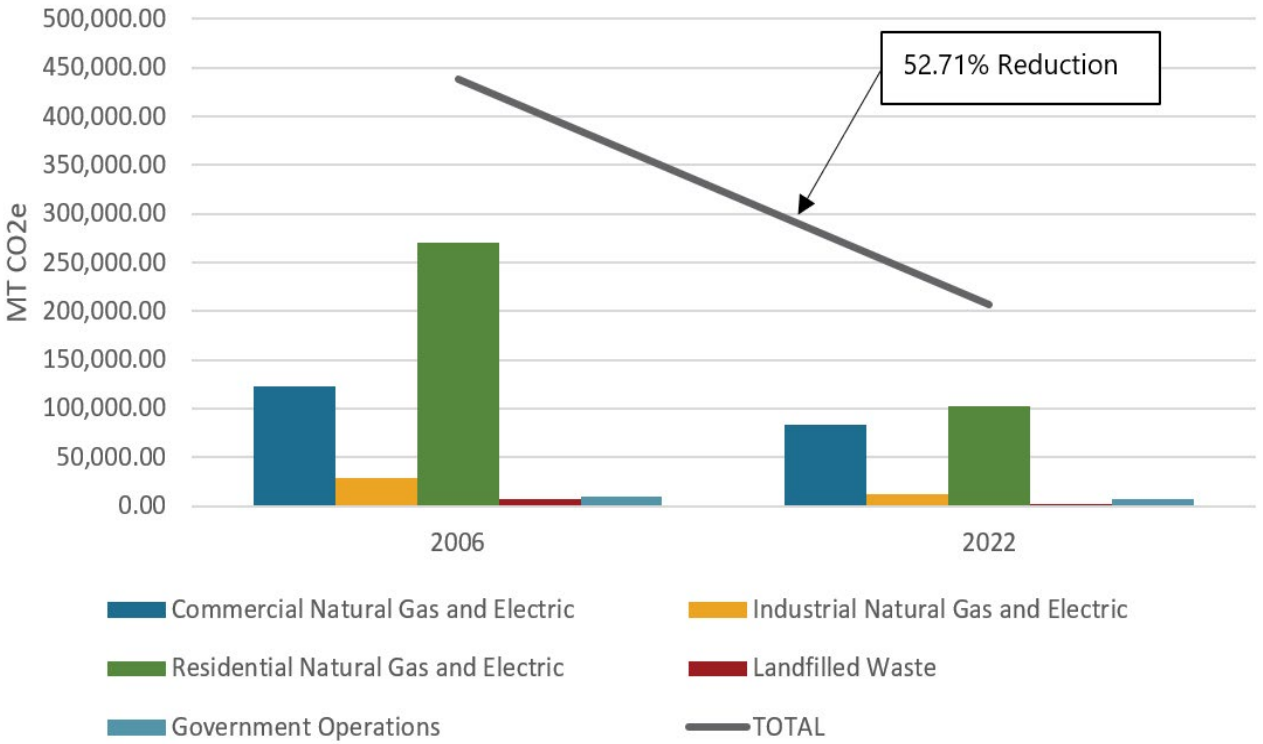
Motor Vehicles: For Motor Vehicles, the automotive industry is moving from sedans to electrify increasingly heavy-duty and specialized vehicles such as utility vehicles, light trucks garbage trucks, school buses, and larger vehicles. If all municipal vehicles are electrified, and the grid becomes carbon-free, the City (and community) vehicle emissions will eventually become carbon-free. Currently, the City's municipal fleet consists of less than 200 vehicles, of which approximately 180 of which are gasoline, hybrid, or electric (two). Twenty five percent are cars, and the remaining 75% are light trucks. The Binghamton Police Department owns 50% of the City's fleet. The remainder are distributed across the Fire Department, Public Works, Buildings Construction and Code Enforcement, Engineering, Water and Sewer, and other remaining offices. A Fleet Management plan focused on the efficient replacement of gas- or diesel-powered vehicles with electric vehicles is a recommended strategy to reduce these sources of GHG emissions. With 75% of the city fleet more than five years old, this conversion will have a strong impact on GHG emission reduction.

Community Emissions

Inventory

Community emissions comprise all the GHG emissions within the City limits, minus the Municipal Inventory. The community emissions inventories rely primarily on data reported by the gas and electric utilities for buildings which are compiled from meter readings, but also rely on estimates of vehicle miles traveled for transportation. Due to this, community inventory is less precise than the City inventory. Figures were calculated using the same approach as the 2006 inventory to make them roughly comparable. Between 2006 and 2022, the same general trend was observed i.e. a large decrease due to the greening of the grid, and a smaller yet significant decrease due to more efficient use of energy. In total, the Binghamton community GHG inventory fell by almost 53%. A large proportion of this was due to the greening of the grid, but energy efficiency also played a role.

Reductions in Community GHG Emissions, 2006-2022



Transportaion Emissions

Transportation emissions are calculated based on an estimate of vehicle miles traveled (VMT). The 2006 estimate for VMT that year was 323 million miles, according to the Binghamton Metropolitan Transportation Study (BMTS). The 2022 estimate for annual VMT provided by the BMTS was 33 million miles but VMTs have simply not declined that much. An alternative approach based on census data provided an estimate of 164 million miles driven, but there was no way to confirm that this equated to the way that BMTS calculated VMT. It is recommended that BMTS establish a carbon emissions metric in its transportation statistics moving forward, comparting VMT against other methodologies. Because these extreme differences in the metrics could not be reconciled, it was assumed VMT has remained largely static with the population, although it is possible that emissions declined as motor vehicle efficiency increased.

The 53% reduction in GHG emissions by the community shown in Figure 2, excludes transportation, but if general allocation between buildings (60.5%), transportation (32.3%), and government/landfill waste (3%) held between 2006 and 2022, and trans-

portation emissions remained stagnant, **then the actual percentage reduction in GHG emissions was closer to 33%, still achieving the 25% reduction goal.**

The Future GHG Emissions Landscape

Much of the future landscape for the community inventory is governed by the same factors as the City.

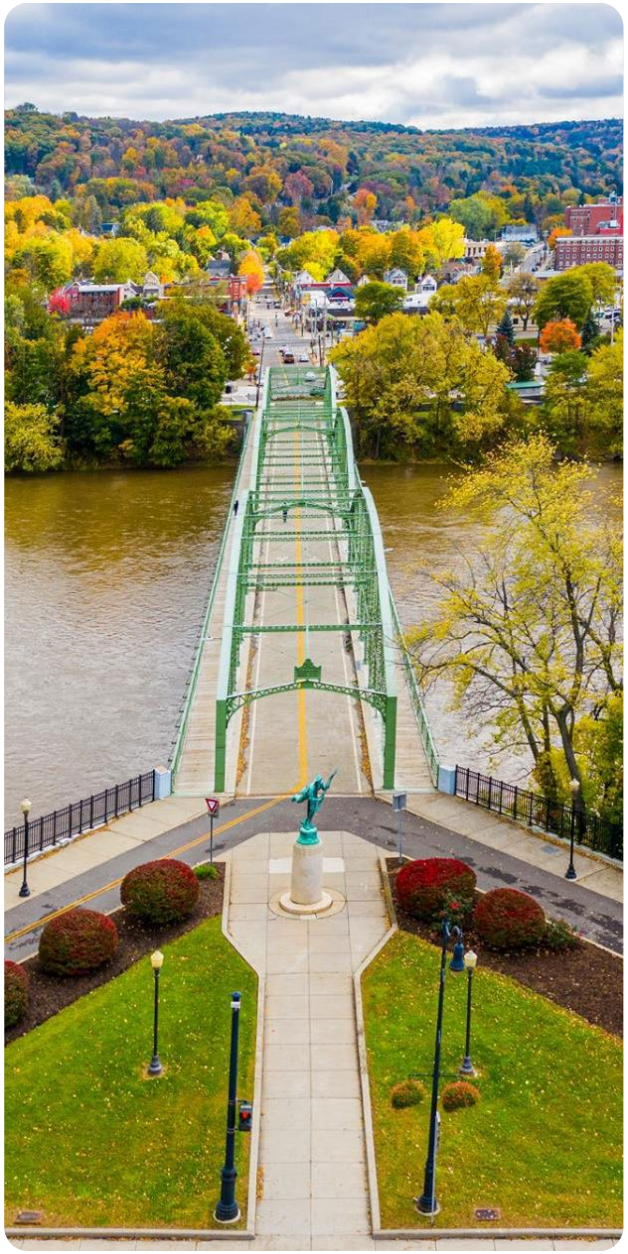
Under the New York Climate Leadership and Community Protection Act, **Electricity** will be 70% decarbonized by 2030, with total decarbonization of the electric grid by 2040.[7] Eliminating **Natural Gas**, for which many households (and City Hall) are dependent on for heat and hot water, will be an immense challenge given the distributed nature of the decision-making. State policy is helping to underwrite the transition to heat pump technology, but individual households must balance that cost against other expenses. Increasing public awareness off and ease of access to available incentives is a goal for the municipal government.

For **Motor Vehicles**, the EV transition is happening quickly, but like natural gas, the decision to change to an electric vehicle is an individual one. Legacy vehicles will dominate the emissions landscape for many years to come. Creating a supportive charging environment (inreasing the number of EV charging stations) and a culture of emissions-free driving, as well as alternative forms of transportation will contribute to community reductions in not only vehicle miles traveled, but in GHG emissions as well.

GHG Emissions Targets For The City And Community Of Binghamton

This section considers both the targets set by the State of New York in the Climate Leadership and Community Protection Act, the existing potential for the City to reduce its GHG emissions through various efforts, and the potential ultimate goal of a Net Zero City. This report approaches the problem of reducing GHG emissions by setting carbon-neutrality and net-zero emissions as the ultimate goal, and then identifying the actions that the City and the Community must take to achieve that goal.

We recognize the optimism inherent in setting such a goal, but believe that with optimism and careful planning, by taking advantage of all the programs and incentives that are available in the State of New York, and staying focused on the things that make Binghamton a great city and community, this is an achievable target.



[7] Climate Leadership and Community Protection Act (CLCPA)

SECTION 5

2035 Goals and Actions

This section identifies Binghamton's 2035 Climate Goals and the Actions that the City, community, and other stakeholders will take to reduce GHG emissions and increase climate resilience.

The actions in 2011 Climate Action Plan were subdivided into the following five categories.

1. **Buildings and Energy**
2. **Transportation and Urban Planning**
3. **Waste Management, Reduction, and Recycling**
4. **Local Food, Agriculture, and Land Use**
5. **Moving Forward/Resilience**

2011 Goal Categories

Many of these actions are cross-cutting, and address multiple goals and challenges. Moreover, beyond the GHG and climate objectives they would attain, all of them have co-benefits that include cleaning the water, air, and soil; making clean transportation more flexible, available, and affordable; and extending the benefits of state and federal funding to disadvantaged communities least able to access grants on their own.

The 2024 goal categories have been aligned to match how the City intends to address the different aspects of climate change, with a similar organization of objectives, but with some significant changes particularly with respect to the actions associate with Climate Resilience.

1. Buildings and Energy

Reducing and ultimately eliminating GHG emissions from the burning of fossil fuels such as gasoline and natural gas is central to fighting climate change. Thirty-one percent of GHG emissions in the State of New York are from buildings.[8] Optimizing building energy use plays a pivotal role in achieving net zero carbon emissions. The City and the community have benchmarked their GHG emissions for 2022, and have shown that progress has been made since 2006 that exceeded the previously established goal, largely due to the decarbonization of New York's electricity grid. Although it is true that future decarbonization of the grid will yield further GHG emissions reductions for Binghamton, 75% of the remaining emissions reductions will be dependent on the actions of the City and the community. Fortunately, with the rapid advances in the performance of technologies from heat pumps to EVs to solar panels, and multiple sources of support to reduce their costs, future emissions reductions will take place, providing those technologies are fully embraced.

The following Goals and Actions outline what the City and Community can do in the area of buildings and energy. The City has set the goal for itself to achieve net zero emissions and net zero energy, recognizing that this is a challenging benchmark but will yield myriad benefits to the climate and to the City itself as its buildings and facilities modernize. The City and Community together will work on several actions that will promote and support measures to ensure that the community can both contribute to the fight against climate change, and benefit from new energy technologies.

Note that goals and actions related to EVs are identified under the Transportation and Land Use category.

[8] New York State 2023 Statewide GHG Emissions Report, New York Department of Environmental Conservation, 2023 Statewide GHG Emissions Report (ny.gov)

2035 Goals	Recommended Actions
1. Net-Zero Carbon and Energy-Efficient City Facilities	1.1 Benchmark annual city energy use and GHG emissions in Energy Star Portfolio Manager to track and report emissions reductions.
	1.2 Adopt a Municipal Energy Master Plan with the goal of achieving net zero energy/carbon.
	1.3 Engage in a Municipal Energy Savings Performance Contract to conduct energy audits and efficiency upgrades.
	1.4 Meet 5% of municipal building energy needs from on-site renewable energy production.
	1.5 Partner with NYSEG, NYSERDA, and other energy distributors and agencies for funding and training (continue).
	1.6 Purchase Renewable Energy Certificates (RECs) for 100% renewable energy (continue).
2. Support a Net-Zero Carbon and Energy-Efficient Community	2.1 Prioritize City incentives, grants, forgivable loans, and low interest loans for residential energy efficiency improvements and conversion to all electric, and solar energy production installations (continue).
	2.2 Promote and support community electrification of heat and hot water systems.
	2.3 Develop and promote financial programs for commercial building energy efficiency improvements and solar energy production installations.
	2.4 Promote residential and commercial energy audits with NYSEG and NYSERDA.
	2.6 Ensure new municipal and community construction are compliant with current NYS Energy Conservation & Construction Code.
	2.7 Adopt energy conservation & efficiency to municipal Payment In Lieu of Taxes (PILOT) Agreements.
	2.8 Develop Clearinghouse for local businesses and residents to connect with renewable energy suppliers.
	2.9 Identify potential site location for community solar projects; identify federal and state funding.

Goals and Recommendations: Buildings and Energy

2. Transportation and Land Use

GHG emissions from transportation in the State of New York are the second-largest category of GHG emissions after buildings at 26%. Similarly, 25% of the City's GHG emissions come from its vehicle fleet, and although the community emissions inventory for 2022 for transportation were not possible to calculate with certainty, it is likely that approximately 25% of the community's GHG emissions are also from transportation. In 2011, EVs were largely confined to exotic or concept models.

Now sedans, light trucks, school buses, and transit buses are electrifying fast, with more heavy-duty vehicles such as dump trucks not far behind. The City intends to focus on reducing gasoline consumption by its fleet, and increasing the number of publicly-available EV charging stations. But land use and how we move around plays a significant role in the need for vehicles in the first place. The City and the community will work together with other partners to focus on smart growth, complete streets, and other approaches to support walking and biking, and also focus on the better sizing and utilization of parking not just for vehicles, but siting solar panels.

2035 Goals	Recommended Actions
1. Reduce community fossil fuel	1.1 Support commuting by walking, biking, carpooling, and public transit in coordination with Broome County.
	1.2 Increase number of publicly-available EV charging stations on municipal lots.
	1.3 Provide EV charging station location maps on municipal Climate Action & Resiliency website.
	1.4 Promote and incentivize alternative forms of transportation by municipal employees (walking, bus, carpooling, electric scooters).
2. Reduce fossil fuel use in municipal government operations	2.1 Develop a Fleet Management Plan to include vehicle replacement with electric vehicles and hybrid vehicles.
	2.2 Support virtual meetings where practicable with hardware, software and consider a virtual meeting room for departmental use.
3. Reduce energy consumed and GHG emissions as a consequence of land use	3.1 Fund a Complete Street and Smart Growth Study for planning options to support compact community and infill development.
	3.2 Identify suitable areas for increased residential density opportunities.
	3.3 Identify areas for reduced parking requirement opportunities.
	3.4 Identify areas and develop a policy for establishing low-emission zones.
	3.5 Encourage and support dual use of parking lots for production of solar energy.
	3.6 Collaborate with the Binghamton Metropolitan Transportation Study (BMTS) in the use of USDOT best practices for carbon intensity metrics for future transportation planning initiatives.

Goals and Recommendations: Transportation and Land Use

3. Materials Management: Reuse and Recycling

Materials and waste are not a large percentage contributor to Binghamton's GHG emissions inventory the way it is counted today (Scope 1 and 2 emissions), but they will become more important over time as the use and re-use of energy-intensive or environmentally important materials such as concrete, asphalt, steel, and wood (i.e. sources of Scope 3 emissions) start being counted in future GHG inventories.

2035 Goals	Recommended Actions
1. Reduce landfilling by increasing recycling and reuse	1.1 Develop a policy for Community Picker Weekends for city sanctioned curbside take it or leave it of reusable household items.
	1.2 Review expansion of municipal recycling services to include additional areas for collection, and areas where increased collection schedules would be beneficial.
2. Divert other types of wastes from the landfill	2.1 Coordinate with Broome County for the expansion of composting to include food waste from commercial restaurants, educational facilities, and grocery stores.
	2.2 Support municipal participation in Western/Central New York Materials Exchange https://www.recycle.net/matex/view.html
3. Greening Procurement by 2035	3.1 Incorporate NYS EO 022 and require all purchases/leases where practicable be made from NYS OGS Green Purchasing site https://ogs.ny.gov/greenny; all other product purchases and leases are to be EPEAT compliant and/or ENERGY STAR qualified, including appliances, computers, printers, copiers, and monitors.
4. Scope 3 GHG Emissions	4.1 Develop a high-level inventory of Scope 3 emissions for the City.

Goals and Recommendations: Materials Management: Reuse and Recycling Use

4. Agriculture, Urban Forestry, and Open Space

Binghamton has role to play not only in reducing GHG emissions, but also in promoting the uptake of carbon dioxide in soils, trees, and plants (also called "carbon sequestration"). The urbanization of un-developed or previously forested or farmed land has contributed to climate change by cutting off pathways for atmospheric carbon to be stored in biomass and soils. Promoting local agriculture, forestry, and open space initiatives can help restore the balance. In addition, farmed or forested land in cities helps to mitigate the urban heat island, treat stormwater, reduce flooding, provide local food and fiber, and support citizen's personal connections to nature and local culture.

2035 Goals	Recommended Actions
1. Support the expansion of urban farming and community gardening	1.1 Coordinate with VINES: Volunteers Improving Neighborhood Environments for the expansion, creation, and management of new urban farms and community garden locations within the city boundary.
	1.2 Coordinate with municipal Economic Development Office for supportive agricultural services and business opportunities.
	1.3 Review Chapter 410 Zoning for the inclusion of an Agriculture Land Use Code, and composting and beekeeping as an accessory use.
	1.4 Coordinate with Broome County on the Creating Healthy Schools and Communities Grant to develop BCSD involvement in City of Binghamton urban farms.
2. Increase carbon sequestration through urban forestry and open space conservation, preservation and expansion	2.1 Replace tree loss on public property following the City of Binghamton 2018 Tree Management Plan.
	2.2 Continue expansion of tree canopy throughout the City and apply for Urban & Community Forestry Grants.
	2.3 Identify and expand tree planting in new areas throughout the City.
	2.4 Adopt an Open Space Policy to allow for Open Space districts to be developed to include new and existing open space areas and parks.

Table 6.1 Goals and Recommendations: Agriculture, Urban Forestry, and Open Space

5. Climate Resilience

Resilience can be defined as the ability to prepare for, respond to, and recover from natural or man-made disasters. The need for climate resilience in Binghamton was at the forefront of this Climate Action Plan, as the entire area is highly aware of the costs of flooding. The flooding of 2011, so soon after the 2006 flood, was incredibly disruptive to people's lives, destroying homes and other property, requiring the reconstruction of the school, the sewage treatment plant, and other facilities, and ultimately costing in excess of $2 billion. Moreover, it put the City in a recovery mode for years. Binghamton will need to prepare not just for future floods, but for the impacts of extreme heat, increased potential for wildfires, and smoke from out of the area wildfires. Many of the goals and actions described below will have to be government-led and will require extensive regional collaboration to be realized, including assisting residents to prepare for emergencies, such as developing a family plan for evacuation and preparing their homes for extreme weather through weatherization programs. The overall objective is on preparation and response, to reduce the time and money spent on recovery.

2035 Goals	Recommended Actions
1. Reduce flood impacts through expanded and increased community open space	1.1 Conduct an Open Space Inventory with each such area identified, described, and listed according to the priority of acquisition or preservation including mapping of streams, wetlands, agricultural soils, steep slopes, flood plains, and erosion hazard areas.
	1.2 Develop an Open Space Conservation Plan.
	1.3 Develop a Floodplain and Recovery Management Plan.
	1.4 Protect open space and floodplains through new and expanded land use regulations.
	1.5 Reduce pavement on municipal surfaces replace with grass, grass pavers, and other organic surfaces.
	1.6 Develop community incentives to remove hardscapes and plant to green space and begin a "Greening the Gray" campaign.
2. Increase community resource information	2.1 Build Climate Action & Resiliency website to include climate impact community specific data, cooling/warming center information, public assistance facilities, assist with individual disaster planning.
	2.2 Identify municipal buildings for emergency conversion to public cooling/warming centers.

Goals and Recommendations: Climate Resilience

3. Temperature extremes	3.1 Coordinate with Broome County for City of Binghamton FEMA Community Rating System analysis.
	3.2 Map the City's urban heat islands; identify funding sources for mitigation.
	3.3 Target additional municipal buildings for treatment with cool roof paint and green roof systems.
4. Increase Grid Resilience	4.1 Identify emergency micro-grid potential for key city and community facilities.
	4.2 Develop plan to rapidly reduce municipal energy demand.
	4.3 Increase building-based solar energy production and storage systems for grid power interruptions.
	4.4 Collaborate with NYSEG to identify and execute grid resilience projects in the City.
5. Wildfire Emergencies	5.1 Create a smoke emergency plan for municipal buildings.
	5.2 Identify municipal buildings for rapid conversion to public wildfire smoke refuge locations.
6. Continued Coordination	6.1 Expand and diversify the membership of the existing Climate Action Task Force and re-invigorate it as a community organization.
	6.2 Increase regional stormwater coordination by collaborating with upstream and downstream communities in the Susquehanna River Basin.
	6.3 Identify and support a community microgrid project.
	6.4 Identify and support a community solar project.
	6.5 Develop climate collaboration between the City and the University of Binghamton.
	6.6 Continue climate collaboration between the City, the Community, and the University of Binghamton.

Goals and Recommendations: Climate Resilience (Continued)