

ENERGY &

CLIMATE

ACTION

PLAN



City of Binghamton Summary

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The complete draft City of Binghamton Energy & Climate Action Plan is available at: <http://tinyurl.com/bingclimate>.

I. Executive Summary

Rising energy costs and climate change are two of the defining challenges of the 21st century. Binghamton has already experienced many climate extremes in the last decade and set new local records for flooding, number of summer days over 90 degrees, and extreme winter snowfalls. Over 2,500 scientists in 130 countries make up the Intercontinental Panel on Climate Change and their report concludes that:

1. The Earth's climate is changing.
2. The change is caused by human activity.
3. These effects will worsen if no action is taken.

If we allow the current business-as-usual trends to continue, we will see drastic changes in climate and skyrocketing prices for energy. Both pose significant threats to the wellbeing of people across the planet. However, we shouldn't just see climate change as a threat – taking action to combat climate change is an *opportunity* to create jobs, develop a safer and more reliable energy supply, lower our housing costs, save tax dollars, enhance our environment for generations to come, and improve the quality of life for all residents of our planet. This plan identifies 51 actions in six categories to put Binghamton on a path to accomplish an emission target of a 25% reduction below 2006 levels by 2025 while achieving all of these additional, important goals. Further, the plan addresses actions Binghamton should take to ensure that it is prepared to endure the impacts of climate change.

Binghamton has joined with many other cities across the nation to participate in the Cities for Climate Protection (CCP) campaign sponsored by ICLEI – Local Governments for Sustainability. Officials in each of these cities have publicly recognized global climate change as a legitimate local concern and have committed themselves to addressing that threat by developing and implementing action plans. The development of this Energy and Climate Action Plan and establishing a reduction target for the City of Binghamton is a part of the five milestone climate action process that Binghamton is undertaking as a member of ICLEI. The five milestones are:

1. Conduct a baseline emissions inventory and forecast ✓
2. Adopt an emissions reduction target ✓
3. Develop a Local Action Plan ✓
4. Implement policies and measures
5. Monitor and verify results



Binghamton's MacArthur Elementary School during the 2011 Flood

Overview of Binghamton's Energy and Climate Action Plan

An Energy and Climate Action Plan plots our course for an important journey into our future. Such a plan is a description of the actions – policies, programs, and projects – a government will take to reduce a community's dependence on fossil fuels and to meet its greenhouse gas (GHG) reduction target. Our Energy and Climate Action Plan Committee has undertaken an intensive process to explore policy and program options for reducing Binghamton's emissions and has selected the most practical actions for our community. In this Plan, we have outlined those actions with details as to why they were selected and how they can be implemented.

This plan was developed by a Climate Action Citizen Advisory Committee with input from City staff and assistance from the City's Sustainable Development Planner and Planning Department interns. The eleven member Climate Action Advisory Committee consisted of concerned residents, community leaders, and local professionals. From the winter of 2009 to the fall of 2010, the Committee worked to identify and evaluate potential policies and measures that would reduce greenhouse gas emissions and energy consumption while enhancing public health, economic competitiveness, and City government's operating efficiency. The recommended actions listed in this plan were selected out of hundreds of potential actions for their cost effectiveness, overall impact, feasibility, and related co-benefits. Input from City staff was also sought and considered in the selection process.

To ensure the plan is implemented and that measurable progress is made, the City of Binghamton should:

- Develop an annual action plan and provide an annual report summarizing the progress toward implementing the Energy and Climate Action Plan
- Evaluate existing actions and identify new actions every three years or as needed
- Conduct a greenhouse gas emission inventory every five years
- Update the Energy and Climate Action Plan every ten years

The Plan: Objectives and Actions

1. Buildings and Energy

2. Transportation and Land Use

3. Waste Management, Reduction, and Recycling

4. Local Food, Agriculture, and Urban Forestry

5. Outreach & Education

6. Government Action

7. Adaptation

II. Introduction

Two strategies exist for coping with climate change and its consequences: *mitigation* and *adaptation*. This Energy and Climate Action Plan focuses mainly on mitigating climate change—implementing policies to reduce greenhouse gas levels. Adaptation, which is briefly addressed in section V, refers to implementing initiatives and measures that reduce our vulnerability to the effects of climate change. As the International Council for Local Environmental Initiatives phrases it, mitigation protects nature from society, while adaptation protects society from nature.

The reality is that even if all nations were to reduce their greenhouse gas emissions by 80% by 2050, the Earth’s climate will continue to change and average temperatures will continue to increase well into the 21st century, with average temperatures rising by at least several degrees. However, if we allow the current business as usual trends to continue, we will see not only drastic changes in climate but skyrocketing prices for energy. Both pose significant threats to the wellbeing of people across the planet.

Though meaningful action to address climate change and improve our nation’s energy policies has not taken place on the Federal level, bold reforms and innovative actions have emerged over the decade at both the state and local levels. More than 1054 mayors from the 50 states, the District of Columbia and Puerto Rico, representing a total population of over 88,499,854 citizens, have signed the Mayor’s Climate Protection Agreement. More than 1,100 cities worldwide, including 600 in the US, have joined ICLEI-Local Governments for Sustainability (ICLEI). Through this work, ICLEI helped local governments reduce their greenhouse gas emissions by 23 million tons in 2005 alone. This translates into about \$600 million in annual cumulative savings, largely on energy expenditures.¹ Most Mayors and Governors, who deal daily with economic, environmental and social challenges introduced by climate change, are stepping up to the challenge of combating climate change. Rather than waiting for direction from Washington, our state and local leaders have instead taken bold action to deal responsibly with climate change. To these officials, it has become clear that investing in GHG mitigation strategies is a path toward a more vital, prosperous and secure future (see section *Context* for more on this subject).



Map of Signatory Communities of the US Conference of Mayors’ Climate Protection Agreement. Source: <http://www.usmayors.org/climateprotection/ClimateChange.asp>

¹ ICLEI-Local Governments for Sustainability Website: <http://www.icleiusa.org/about-iclei>.

The development of this Energy and Climate Action Plan and establishing a reduction target for the City of Binghamton is a part of the five milestone climate action process that Binghamton is undertaking as a member of ICLEI. The five milestones are:

6. Conduct a baseline emissions inventory and forecast ✓
7. Adopt an emissions reduction target ✓
8. Develop a Local Action Plan ✓
9. Implement policies and measures
10. Monitor and verify results

Strategies for completing the remaining two milestones are addressed in the conclusion of this plan.

The remainder of this introduction will address climate change in the northeast and provide an overview of the structure of this Energy and Climate Action plan, along with detail on how the plan was developed.

A. Climate Change in the Northeast^{2,3}

The most frequently discussed impacts of climate change include changes in sea ice, rising ocean levels, and more severe droughts in arid regions (for a more detailed overview of Climate Change, see *Appendix A: Climate Change 101*). Because Binghamton is neither coastal nor arid, these impacts may seem distant. Binghamton and the Northeastern United States will experience different kinds of changes with a shifting climate that will have significant impacts on our agricultural economy and quality of life in rural to urban communities. In 2009, in *Global Climate Change Impacts in the United States*, Thomas R. Karl of NOAA's National Climatic Data Center wrote that "since 1970, the average temperature in the Northeast has increased by 2°F, with winter temperatures rising twice this much". Of particular concern to the Binghamton region is the increased likelihood, as noted just above, of increased periods of extreme precipitation which will increase flooding. As the U.S. Global Change Research Program noted in its 2010 report *Global Climate Change Impacts in the United States* "one of the clearest precipitation trends in the United States is the increasing frequency and intensity of heavy downpours." It is projected to result in "rainfall that will measure 10 to 20 percent higher than current averages" by the end of the century. Severe floods such as those of 2006 and 2011 may with increasing frequency threaten human health and economic security of the Southern Tier.

² Northeast Climate Impacts Assessment (2007). *Confronting Climate Change in U.S. Northeast*. Available at: <http://www.climatechoices.org/assets/documents/climatechoices/confronting-climate-change-in-the-u-s-northeast.pdf>.

³ Union of Concerned Scientists (2007). *New York: Confronting Climate Change in the U.S. Northeast*. Available at: http://www.climatechoices.org/assets/documents/climatechoices/new-york_necia.pdf.

Projected Northeastern Climate Change to 2100

When developing projections of what the climate is likely to be over coming decades, scientists typically generate three scenarios: one for a “lower”, one for “middle”, and one for “higher” human caused or “anthropogenic” greenhouse gas emissions. The lower emissions scenario assumes an 80 percent reduction of greenhouse gas emissions by 2050. The higher emissions scenario, *a.k.a.* “business as usual”, assumes little if any significant reduction in annual human caused or anthropogenic greenhouse gas emissions. Under the business as usual scenario, the National Climatic Data Center report projects that by the end of this century, in the Northeast:

- The length of the winter snow season would be cut in half across northern New York, Vermont, New Hampshire, and Maine with fewer cold days and more precipitation
- Cities that today experience few days above 100°F each summer would average 20 such days per summer
- Short-term (one-to-three month) droughts are projected to occur as frequently as once each summer in the Catskill Mountains
- Hot summer conditions would arrive three weeks earlier and last three months longer
- Extreme heat and declining air quality will pose increasing problems for human health, especially in urban areas
- Large portions of the Northeast are likely to become unsuitable for growing popular varieties of apples, blueberries, and cranberries
- Climate conditions suitable for maple/beech/birch forests are projected to shift dramatically northward, eventually leaving only a small portion of the Northeast with a maple sugar business
- Agricultural production is likely to be adversely affected as favorable climates shift northward. Dairy cattle are projected to suffer declines in July milk production because of increased heat stress
- Quality of life will be affected by increasing heat stress, water scarcity, severe weather events, and reduced availability of insurance for at-risk properties

B. What is an Energy and Climate Action Plan?

An Energy and Climate Action Plan plots our course for an important journey into our future. Such a plan is a description of the actions – policies, programs, and projects – a government will take to reduce a community’s dependence on fossil fuels and to meet its greenhouse gas (GHG) reduction target. Our Energy and Climate Action Plan Committee has undertaken an intensive process to explore policy and program options for reducing Binghamton’s emissions and has selected the most practical actions for our community. In this Plan, we have outlined those actions with details as to why they were selected and how they can be implemented.

The plan provides us with guideposts pointing the way to:

- a prosperous local economy
- a future with more transportation options
- more choices for efficient, renewable energy
- energy-efficient buildings
- a healthier population
- reduced waste and less costly landfills
- a greener city with better air quality

An Energy and Climate Action Plan helps everyone envision pathways to:

- Transition to a better future by focusing on key sectors: buildings, energy, land use, waste management, transportation, and food networks
- Educate our community about solutions
- Advocate for policy changes at the local level and gain a commitment from stakeholders
- Promote innovation and investment
- Inspire residents and business to work together toward a better future on this planet
- Improve the image of Binghamton as a city moving toward a positive future, thus attracting new residents, visitors and economic development.

Why do we need an Energy and Climate Action Plan?

Since half the world's population lives in urban areas and a significant portion of the human activities that lead to global climate change are concentrated in cities, city governments must be included in global efforts to mitigate climate change. Municipal governments have an important role because they have considerable authority over land-use planning, transportation policy and waste management, and can also 'lead by example' by reducing energy consumption and greenhouse gas (GHG) emissions.

Binghamton has joined with many other cities across the nation to participate in the Cities for Climate Protection (CCP) campaign sponsored by the International Council for Local Environmental Initiatives (ICLEI). Officials in each of these cities have publicly recognized global climate change as a legitimate local concern and have committed themselves to addressing that threat by developing and implementing action plans.

Binghamton has already experienced many climate extremes in the last decade and set new local records for flooding, number of summer days over 90 degrees, and extreme winter snowfalls. Over 2,500 scientists in 130 countries make up the Intercontinental Panel on Climate Change and their report concludes that:

1. The Earth's climate is changing.
2. The change is caused by human activity.
3. These effects will worsen if no action is taken.

Every person, business and governmental agency on the planet has a responsibility to take action in face of this growing threat to our way of life. However, we shouldn't just see climate change as a threat – taking action to combat climate change is an *opportunity* to create jobs, develop a safer and more reliable energy supply, lower our housing costs, save tax dollars, enhance our environment for generations to come, and improve the quality of life for all residents of our planet.

C. Overview of Binghamton's Energy and Climate Action Plan

This plan was developed by a Climate Action Citizen Advisory Committee with input from City staff and assistance from the City's Sustainable Development Planner and Planning Department interns. The eleven member Climate Action Advisory Committee consisted of concerned residents, community leaders, and local professionals. From the winter of 2009 to the fall of 2010, the Committee worked to identify and evaluate potential policies and measures that would reduce greenhouse gas emissions and energy consumption while enhancing public health, economic competitiveness, and City government's operating efficiency. The recommended actions listed in this plan were selected out of hundreds of potential actions for their cost effectiveness, overall impact, feasibility, and related co-benefits.⁴ Input from City staff was also sought and considered in the selection process.

From the winter of 2010 to summer of 2011, the Committee wrote the plan, taking care to layout each recommended action in nontechnical terms with helpful information that can be used to facilitate implementation. An effort was made to provide information in the same format for every recommended action. In cases where a cost analysis was omitted, it was determined that implementing the recommended action would not result in any significant costs or expenditures of staff time for City government. Additionally, some recommended actions do not have CO₂e, energy, and financial savings analysis at the top of the page if this information was provided in a related recommended action or if an accurate analysis wasn't feasible. The plan has four core strategic action areas (see below for detail) which are used to outline recommended actions to reduce emissions for both the community and local government. The four core strategic action areas are:

- 1. Buildings and Energy**
- 2. Transportation and Land Use**
- 3. Waste Management, Reduction, Re-Use and Recycling**
- 4. Local Food, Agriculture and Urban Forestry**

⁴ Strategies that reduce greenhouse gas emissions typically have additional benefits, labeled in this document as co-benefits. For example, policies that reduce vehicle miles traveled and greenhouse gas emissions from transportation also have public health co-benefits, i.e. improved air quality and thus reduced asthma rates, increased physical activity and thus reduced chronic disease rates, etc.

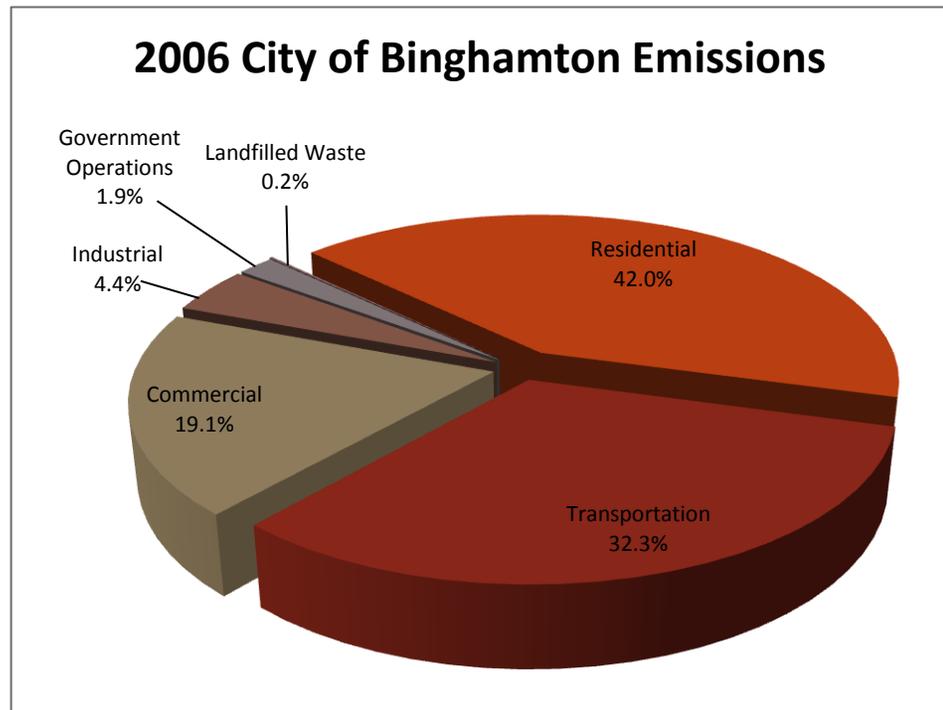
Binghamton’s Target: 25% Reduction by 2025

The Climate Action Citizen Advisory Committee proposes that the City adopt the emission target of a 25% reduction below 2006 levels by 2025. The Committee believes that this target is ambitious yet attainable if the recommended actions in this plan are implemented. Coupled with the State and Federal policies and programs, the Committee hopes that this goal will even be exceeded.

III. Greenhouse Gas Inventory Summary

In 2009, a comprehensive, city-wide Greenhouse Gas Inventory for the baseline year of 2006 was performed in order to determine the components of Binghamton’s greenhouse gas emissions and what activities were responsible for producing those gases.⁵ An inventory is an essential part of developing a climate action plan as it helps a community determine which investments will generate the greatest reductions in emissions.

The overall profile of Binghamton’s greenhouse gas emissions is similar to that of other communities in the United States, with buildings and transportation accounting for the majority of emissions. In Binghamton, the private building sector (commercial, industrial & residential) accounts for 60.5% of overall emissions. Transportation is the next largest emission source and contributes to nearly a third of Binghamton’s emissions. The remaining sectors (industrial, governmental, and landfilled waste) account for a relatively small portion of Binghamton’s overall emissions, but are significant sources nevertheless (see 2006 City of Binghamton Emissions Figure).



⁵ The complete inventory can be found online at: <http://www.cityofbinghamton.com/department.asp?zone=dept-planning&pid=78&pm=page>.

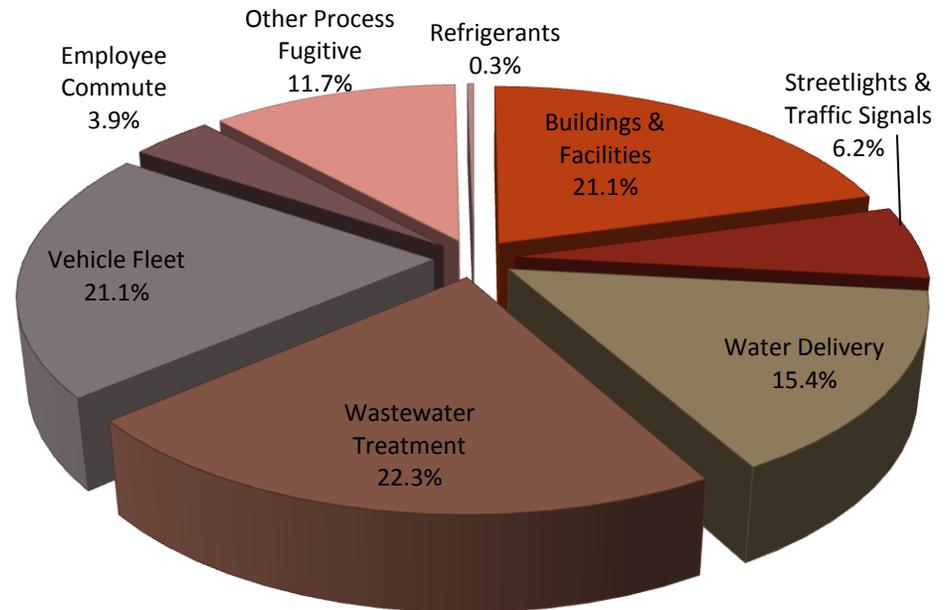
The inventory reported that Binghamton’s total greenhouse gas emissions in 2006 was 648,544 tons of carbon dioxide equivalents (CO₂e). Based on population data from the 2000 Census, Binghamton’s 2006 emissions per capita were 14.2 tons of CO₂e. This number is significantly lower than the United States per capita emissions, yet it is higher than the per capita emissions for larger North American cities.

Like other communities, the inventory showed that the majority of emissions in Binghamton came from the private sector, or the ‘Community’ as categorized by the Clean Air Climate Protection inventory software. Only 1.9% of the emissions in Binghamton came from activities that are within the City government’s financial or operational control.

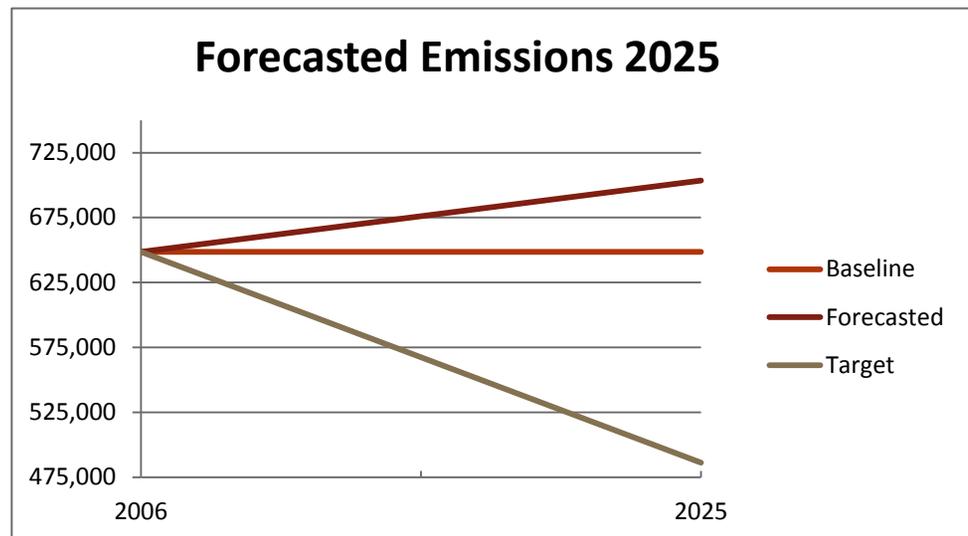
City Government contributions to the total greenhouse gas emissions were broken down into Buildings & Facilities, Streetlights & Traffic Signals, Water Delivery, Wastewater Treatment, Vehicle Fleet, Employee Commute, Other Process Fugitive and Refrigerants (see Government Emissions Figure next page). The largest sources of emissions from government operations were Wastewater Treatment, Vehicles, Buildings, and Water Delivery.

The Inventory Report also provides a forecast of Binghamton’s future emissions. Projected changes in GHG emissions were determined using resources such as The Annual Energy Outlook conducted by the Department of Energy. If the City were to maintain its current practices (a “Business as Usual” scenario), it would emit 703,634 tons of CO₂e in 2025, 8.5% more than the 642,344 tons it emitted in 2006. To achieve a 25% reduction in emissions from the baseline year of 2006 by 2025, Binghamton must cut its greenhouse gas emissions by 162,136 tons.

Government Emissions



Forecasted Emissions 2025



IV. The Plan: Objectives and Actions

1. Buildings and Energy

2. Transportation and Land Use

3. Waste Management, Reduction, and Recycling

4. Local Food, Agriculture, and Urban Forestry

5. Outreach & Education

6. Government Action

7. Adaptation

1. Buildings and Energy



Overview

Buildings in the U.S. account for 72 percent of the nation's electricity consumption and 38 percent of all carbon dioxide emissions, use 40 percent of raw materials globally, and create 136 million tons of building-related construction and demolition debris annually. Binghamton is like most other U.S. cities in that buildings account for 60.5% of all emissions produced in the City. Buildings have an enormous impact on our health, environment, and economy. Reducing the amount of energy we consume through our buildings will provide countless benefits for the community. Creating more efficient buildings will lower utility costs, decreasing the operating costs for businesses and making homes more affordable. Making energy efficiency improvements to our buildings will also create many local employment opportunities.

Reducing energy needs in this sector by 25% of 2006 levels will prevent over 105,294 tons of CO₂e from being released into the atmosphere. Many approaches can be pursued in order to reach this goal.

Co-Benefits

- Job Creation
- Reduced Utility Costs
- Energy Independence
- Cleaner air and water
- Increased Property Values

1. Buildings and Energy

| 2025 Objectives | Recommended Actions |
|---|---|
| 1. Reduce energy use in existing buildings by at least 25% | 1.1 Promote programs that offer incentives for residential and commercial building energy efficiency improvements |
| | 1.2 Develop additional financial programs to help building owners undertake energy efficiency improvements |
| | 1.3 Improve the energy efficiency of properties that are participating in City programs |
| | 1.4 Encourage the disclosure of building energy performance to prospective tenants and buyers |
| | 1.5 Develop “Greener is Greater Binghamton Challenges” for homes and for businesses |
| | 1.6 Create incentives for adaptive reuse of residential and commercial buildings |
| | 1.7 Develop green building incentives for Projects Receiving Payment In Lieu of Taxes (PILOT) Agreements |
| 2. Reduce energy use in new construction and major renovations of existing buildings by at least 30% | 2.1 Adopt green building incentives for high performance new construction |
| | 2.2 Support adoption of the 2012 International Energy Conservation Code in New York State |
| 3. Promote the use of renewable energy in place fossil fuels | 3.1 Encourage residents and businesses to purchase electricity from renewable supply sources |
| | 3.2 Encourage homeowners and businesses to install onsite renewable energy generation systems |

2. Transportation and Land Use



Overview

In 2006, the Binghamton Metropolitan Transportation Study estimated that about 885,499 miles are traveled by vehicles within the City every day. This travel uses fossil fuels, which causes transportation to account for about a third of all emissions produced in the City of Binghamton. Reducing the energy consumed by travel, as well as utilizing alternate fuels, is an important way to decrease our effects on the environment, and to create a more energy independent future.

Co-Benefits

- Decreased traffic congestion
- Less money spent on gas and maintenance
- Cleaner air
- Improved human health
- Preservation of resources

Many changes can be made in the ways in which we get from place to place in order to achieve the goals of reducing transportation emissions while improving public health and creating a more attractive community. First, there must be a reduction in the amount of fossil fuels we use through conservation and efficiency. Second, exploring alternative energies can reduce (if not eliminate emissions) support ingenuity, and create jobs. Lastly, changing the ways in which we manage and develop the land will reduce the amount of emissions produced.

2. Transportation and Land Use

| 2025 Objectives | Recommended Actions |
|--|--|
| 1. Reduce transportation emissions through greater fuel conservation and efficiency | 1.1 Promote and facilitate commuting by walking, biking, carpooling, and public transit instead of private cars |
| | 1.2 Reduce idling by commercial and private vehicles |
| | 1.3 Provide education for vehicle owners on how to improve vehicle fuel economy |
| 2. Reduce transportation emissions by encouraging the use of alternative fuel sources | 2.1 Provide information to the public on alternative fuel sources in our area |
| | 2.2 Accelerate the transition to plug-in hybrids and electric vehicles by supporting the installation of a network of electric car charging stations |
| 3. Reduce energy consumed and emissions produced as a consequence of how land is used and developed | 3.1 Adopt land use strategies which reduce emissions and encourage smart growth |
| | 3.2 Expand waterfront development |
| | 3.3 Consider greenhouse gas emissions in environmental evaluations of planning scenarios and individual land use decisions |
| | 3.4 Partner with other municipalities and regional planning agencies to encourage smart growth and sustainable development throughout the region |

3. Waste Management, Reduction, and Recycling

Overview

Co-Benefits

- Increased Lifespan of Landfills
- Job Creation
- Preservation of Materials
- Municipal and private Cost Savings

Although landfill waste is the cause of a relatively small percent of total greenhouse gas emissions produced by Binghamton, landfills are large emitters of methane, which has a more significant climate impact than carbon dioxide per pound.

The collection of waste adds to the City’s emissions through the transportation of collected waste. The tonnage of waste landfilled has been increasing overall while the percentage of waste that is recycled has been declining (the City of Binghamton began a recycling program in 1991). Recycling not only reduces local emissions of methane, but it reduces emissions as a cause of resource extraction and manufacturing. Thus, it is important to improve recycling in order to reduce GHG emissions.

| 2025 Objectives | Recommended Actions |
|---|---|
| 1. Increase Binghamton’s municipal solid waste recycling rate to 45% by 2015 and 50% by 2020 | 1.1 Increase household recycling |
| | 1.2 Require recycling at events on City property |
| 2. Divert other types of wastes from the landfill | 2.1 Divert organic wastes from the landfill |
| | 2.2 Reduce and Reuse construction and demolition material waste |

4. Local Food, Agriculture, and Urban Forestry

Overview

Co-Benefits

- Money Saved on Grocery Bills
- Access to Fresh and Nutritious Food
- Support the Local Economy
- Job Creation
- Food Security

On average, food travels more than 1,500 miles from where it is grown and processed before arriving on our plates. Shipping our food long distances is a practice which requires fossil fuels and creates a large amount of emissions. By promoting local food through community gardens, urban agriculture, and rural-urban market connections, we can eliminate many of the negative aspects of our current food system.

Community gardens, urban agriculture, and urban forestry projects are ways to produce fresh, healthy food in our own backyards, as well as aesthetically enhance our neighborhoods. Such projects will increase access to fresh food, support the local economy, and reduce hunger while increasing property values and providing a wide variety of environmental benefits in our urban neighborhoods.



4. Local Food, Agriculture, and Urban Forestry

| 2025 Objectives | Recommended Actions |
|--|--|
| 1. Support the development of a sustainable, locally- based, low-carbon food system | 1.1 Increase the amount of food produced inside City limits through community based initiatives |
| | 1.2 Encourage gardening and edible landscaping on residential, commercial and industrial properties |
| | 1.3 Support the development of commercial agricultural and food processing enterprises within the City |
| | 1.4 Encourage the consumption of locally produced foods |
| 2. Increase tree canopy coverage and open space creation | 2.1 Promote Tree Planting, Landscaping, and the Creation of Green and Open Space that Helps to Restore Natural Processes |

5. Outreach & Education

Overview

Meaningful change to reduce greenhouse gas emissions and improve energy independence cannot occur simply through regulation, but will be the result of proactive mobilization and education. Binghamton residents already care about their communities, their quality of life, and their impact on the planet. Two important steps to consolidate community involvement in the effort to mitigate climate change is through the creation of a Climate Change Task Force and the development of a centralized website to share information.

In addition to digital collaboration, residents will be able to come together through a variety of community outreach events. A Climate Change Speakers' Bureau could provide a platform for experts to share their knowledge on a range of issues, from global climate awareness, to region-specific risks and opportunities associated with rising temperatures. Other stages for community discussion can be provided through the various City of Binghamton Neighborhood Assemblies and groups. Civic engagement might take the form of community garden work days, energy efficiency block parties, teach-ins, music events, and workshops on home energy conservation retrofits.

A significant level of civic participation in climate adaptation will only be possible if the print and electronic media are mobilized. Journalists, broadcasters and weather forecasters all need to be aware of the seriousness of climate change and be cognizant of their role in informing the public. Change can only be made when the community is informed and enthusiastic.

| 2025 Objectives | Recommended Actions |
|--|--|
| 1. Create an informed and motivated public that is engaged combating Climate Change | 1.1 Establish a Climate Action Task Force |
| | 1.2 Mobilize the Media |
| | 1.3 Mobilize the Community |
| | 1.4 Develop a Centralized Website for Climate Action in Binghamton |

6. Government Action

Overview

Co-Benefits:

- Reduced operating expenses & lower taxes
- Improved air quality
- Improved health of residents

The City of Binghamton has a responsibility to lead the way on climate and energy adaptation. Municipal operations are responsible for roughly 2% of Binghamton’s greenhouse gas emissions. Regardless of the low percentage, City administration and staff have an obligation to be role models for change in our community. This section of the Plan outlines action items for municipal energy and resource reduction, from using less paper in city offices, to developing comprehensive plans for more green space and street trees. Municipal energy use can be reduced in many of the ways suggested for the general public, from installing more efficient vending machines to promoting alternative fuels and transportation. Building energy use is the source of nearly 60% of the City’s municipal emissions. Yet even simple steps like replacing Exit sign lights with LED lights can save the City 3.02 tons of CO₂ and over \$1,500 annually. With the proposed creation of a Facilities Management Team, made up of different department heads, energy efficiency retrofits on municipal buildings will become a priority.

The City has undertaken a number of efforts to reduce its energy consumption. The upgrades made to City Hall’s heating and cooling system, the replacement of traffic signal lights with LED bulbs, and the replacement of Police vehicles with hybrids have led to significant cost savings for taxpayers. Further, these actions, amongst others, have helped Binghamton to gain credibility as a green municipality.

| 2025 Objectives | Recommended Actions |
|---|---|
| 1. Cut City electricity and natural gas use by 30% by 2025 | 1.1 Develop a Plan for Retrofitting City-owned Buildings to Significantly Reduce Energy Consumption |
| | 1.2 Require LEED Silver Certification for All New and Renovated City-Owned Structures Over 1500 Square Feet |
| | 1.3 Replace All Streetlights with Energy Efficient Bulbs and Fixtures by 2020 |

| | |
|--|--|
| | 1.4 Replace All Exit Signs in City Government Buildings with LED Bulbs |
| | 1.5 Purchase Only Energy Star Appliances for City Use and Require All New Computers to Have Minimum of EPEAT Bronze Rating |
| | Install Vending Misers on All Vending Machines in City Government Buildings |
| 2. Obtain 30% of electricity from renewable sources by 2025 | 2.1 Source 35% of Electricity for City Operations from Renewable Sources by 2020 |
| | 2.2 Advance Energy Independence of the Binghamton-Johnson City Joint Sewage Treatment Plant |
| 3. Reduce consumption of fuel for transportation with City government operations | 3.1 Increase Fuel Efficiency of City Fleet by Purchasing Vehicles with a Higher MPG Rating |
| | 3.2 Reduce Vehicle Trips Taken with Municipal Vehicles |
| | 3.3 Enforce an Anti-Idling Policy for Municipal Vehicles |
| | 3.4 Encourage City Government Employees to Utilize Alternative Forms of Transportation in Their Daily Commute |
| 4. Use alternative fuels for City fleet | 4.1 Purchase Biodiesel for Use in City Vehicles |
| | 4.2 Buy Electric and Plug-In Vehicles for the City Fleet as They Become Commercially Available and Cost Effective |
| 5. Open Space and Urban Forestry | 5.1 Develop an Open Space & Parks Plan |
| | 5.2 Continue to Improve Urban Forestry Management Practices |
| 6. Reduce waste and increase the use of recycled materials within City operations | 6.1 Reduce Paper Use in City Operations |
| | 6.2 Require the Use of Environmentally Preferable Products within City Operations |

7. Adaptation

Adaptation strategies and policies provide a complementary approach to mitigation by reducing the severity and damage of climate change impacts. As it was not feasible to fully address climate change adaptation within this Plan, Binghamton should develop a strategy to ensure that residents and businesses will be able to adapt to climate change without significant damage. To better understand why Binghamton should develop adaptation strategies, it is important to understand the potential impacts of climate change for our region.

ADAPTATION: HUMAN SYSTEMS

To minimize the adverse effects of climate change in the Binghamton region, private and public sector institutions and individuals would benefit most were they to engage in *proactive* or anticipatory adaptation, rather than reactively responding to climate change impacts. Proactive adaptation to adverse climate change events or processes means that public and private sector institutions and households in Binghamton would be able to maintain approximately comparable (or hopefully only slightly degraded) levels of welfare and services after adverse climate change events as before those events.

Proactive adaptation requires that human systems in Binghamton (government, business, health care providers, education, households, etc) build redundancies into their operations. That is, all sectors should provide for more than one means or resources to perform any given activity or function in case one part or component of a system fails. Proactive adaptation for the Binghamton region would require public and private institutions and households to be well informed of the increased risks associated with climate change and plan for those changes accordingly. For Binghamton, some of the higher risks include:

- Greater volatility of weather including more frequent periods of intense precipitation both as snow and especially as rain.
- More frequent incidents of severe flooding and thus:
 - Higher risk of disruption to water and sewage treatment facilities
 - Increased property damage
 - Rising costs of flood insurance (or rising unavailability of flood insurance)
 - Greater stress on bridges and roadways adjacent to or crossing over existing road systems
 - More frequent disruption of traffic
- More frequent intense storms accompanied with high winds and wind gusts and thus more frequent and prolonged power outages as well as more frequent and severe wind caused property damage

- Significant and accelerating rise in the cost of extreme weather-related property damage. Evan Mills of the Lawrence Berkley National Laboratory has noted that in the United States, “insured weather-related losses in recent years have been trending upward much faster than population, inflation, or insurance penetration, and far outpace losses for non-weather related events”.

Among the adaptation strategies advocated by ICLEI are:

- Reduce vulnerability to widespread power grid outages by encouraging distributed generation from multiple renewable sources
- Reduce potential for grid overload and failure by decreasing demand through improved conservation and efficiency
- Enact more rigorous building standards to increase the resiliency of the built environment to high winds, flooding, etc
- Reduce reliance on centralized food systems where commodity production is concentrated in a few locations that may be vulnerable to climate disruptions such as storm damage, pest outbreaks, etc
- Reduce vulnerability to flooding by promoting functional watersheds, including healthy forests and open space
- Counteract urban heat island impacts by planting trees to provide shade and cooling
- Reduce the area that emergency personnel must cover thus making delivery of disaster assistance more efficient (i.e. build more compact communities)
- Make evacuation routes and procedures more visible and efficient
- Reduce the number of miles and cost of repairing or replacing infrastructure (i.e., roads, bridges, electrical and sewer lines)
- Conserve water and provide greater storage capacity and redundancy of that capacity for water so that more is available during more frequent and severe droughts
- Improve early warning systems to increase preparation time and the quality and timeliness of information for households, government, and business
- Ensure that special preparations assist the segments of the population most vulnerable to the weather phenomenon of a changing climate

RECOMMENDED ACTIONS

The City of Binghamton should create an Adaptation Task Force to explore, identify, and recommend proactive adaptation strategies that will enhance the resiliency of the City, its residents and institutions, to the effects of climate change projected for the region through 2100. The Task Force should devote special attention to the development and implementation of measures to predict and reduce the physical and human costs of severe flooding and its associated disruption of transportation and communication infrastructure. Due attention should be accorded to the design and implementation of effective multi-media extreme weather alert and warning systems (including loud, area-wide sirens) that would

inform each and every citizen of impending severe thunderstorms, tornadoes, snowstorms, stream and river flooding and of the actions they should take to minimize risk to themselves, home, and property.

Rapid and substantial reduction in all anthropogenic greenhouse gas emissions (“lower emissions” scenario) would do much to reduce the severity of climate change between now and the end of this century. However, even if all such emissions were to cease tomorrow, the inertia built into the world’s climate system (for example, greenhouse gases already present in the atmosphere, the additional heat now stored in the oceans, *etc.*) will result in a rise in the average temperature of the Northeast by 2100, more volatile weather, and altered human and natural systems.

The inertia of national and global political systems to reduce dramatically greenhouse gas emissions means climate change of significantly larger magnitude. The absence of real mitigation, then, makes the presence of substantial “adaptation” even more necessary. To recap:

- Adaptation is an important complement to greenhouse gas mitigation policies.
- Adaptation to climate change will not be a smooth or cost-free endeavor
- Managed [human] systems will fare better than natural systems
- Proactive approaches to adaptation are more likely to avoid or reduce damages.

Adaptation, as a complement to mitigation, will enhance the capacity of the City of Binghamton and the surrounding region to cope with and respond to the changes projected for the climate of the Northeast by the end of this century.

Success in both mitigation and adaptation will require citizens and their elected and appointed officials to be well informed about climate change and appropriate policy responses. Success will require cooperation between the public and the private sectors. Success will require a willingness and ability to plan for the future and to do so based on the best science amplified with a sense of concern for the common good for this and future generations. Success will also require the prudent expenditure of significant amounts of public time, talent, and money. And, given that we are now in an era of climate change almost unprecedented in human history, success will involve trial and error, failure, and the ability and ingenuity to learn from failure. With strength, determination, and the capacity to learn, the citizens of the City of Binghamton can help lead the way in adapting to the new climate of the 21st century.