



City of Bloomington
Climate Action Plan

October 2020

Prepared by:



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Executive Summary

The City of Bloomington has a long-standing commitment to environmental sustainability. Programs related to energy conservation, renewable energy, waste reduction, and the local food economy and local volunteer efforts have helped establish Bloomington as a regional sustainability leader. The passage of the 2018 Sustainability Action Plan represented the first formal sustainability planning effort for the City of Bloomington.

Bloomington has a vision to minimize the generation of GHG emissions from all sources, toward an end goal of carbon neutrality, and prepare for climate change. As a member of the Global Covenant of Mayors, a signatory to the We Are Still In Letter, Mayors National Climate Action Agenda since 2017, and the U.S. Mayors Climate Protection Agreement since 2006, the City has expressed its commitment to meeting greenhouse gas (GHG) reduction goals set by the 2015 Paris Climate Agreement.

Our Challenge

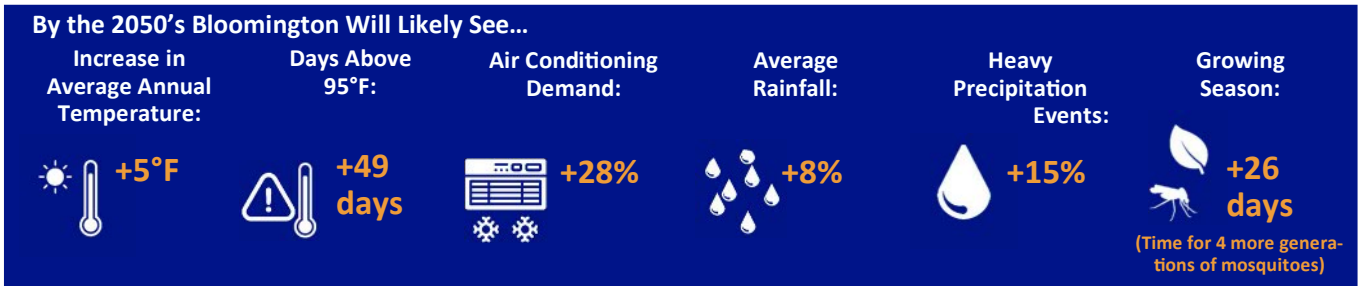
The complex systems that make up modern civilization result in stressors on the delicate balance of our ecosystems. The combustion of fossil fuels is warming earth's atmosphere and changing our climate. Climate change is already affecting Bloomington and its impacts are projected to become much more severe in the coming decades. These impacts also contribute to additional strain on vulnerable populations, social systems, and overall community resilience.

Our Opportunity

The impacts of cities represent a major sustainable development opportunity. Transformation of our energy system is essential in order to stop burning fossil fuels. This transition presents an opportunity for Bloomington. Directing our energy investments into renewable sources will make them more decentralized and resilient and provide for local job creation. Innovation, technology, and collective social change inherent in sustainability action can also support greater community abundance and shared equity.

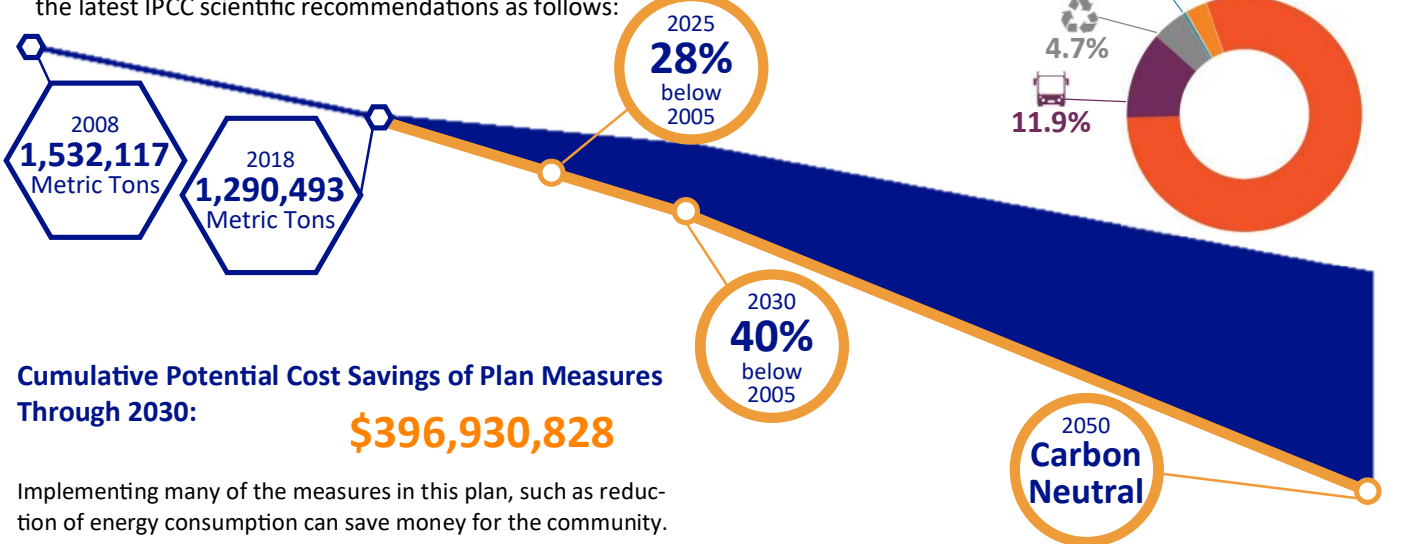
Our Climate Action Vision

To be the first Climate Resilient community in Indiana, leading in the social and economic transitions necessary to reduce citywide greenhouse gas emissions in-line with the Paris Climate Agreement while protecting Bloomington's natural ecosystems, most vulnerable populations, and economic vitality against the increasing impacts of climate change.



Our Carbon Reduction Goal

To reduce community-wide GHG emissions in line with the Paris Climate Agreement with intermediate reduction goals based on the latest IPCC scientific recommendations as follows:



Cumulative Potential Cost Savings of Plan Measures Through 2030:

\$396,930,828

Implementing many of the measures in this plan, such as reduction of energy consumption can save money for the community.

Executive Summary

Our Climate Action Goals:



Transportation and Land Use

Goal T1 - Decrease vehicle miles traveled (VMT) by 8% by 2030.

Goal TL2 - Support and encourage electric vehicle adoption, achieve 30% of vehicles sold and 15% of VMT community-wide by 2030.



Energy And Built Environment

Goal EB 1 - Increase distributed renewable energy to 18% of citywide consumption by 2030.

Goal EB 2 - Increase energy efficiency citywide 16% for electricity and 2% for natural gas by 2030.

Goal EB 3 - Support decarbonization of the local electricity grid.



Waste Management

Goal WM 1 - Increase landfill solid waste diversion by 30% by 2030 (26,500 ton reduction).

Goal WM 2 - Educate, motivate, and empower the public to achieve waste reduction and diversion.



Water and Wastewater

Goal W1 - Promote increased water conservation citywide.

Goal W2 - Maintain source and drinking water quality through climate related challenges.

Goal W3 - Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030.

Goal W4 - Mitigate flood hazards and impacts.



Local Food and Agriculture

Goal FA 1 - Increase food and nutrition security citywide.

Goal FA 2 - Increase local agricultural resilience to climate shocks.

Goal FA 3 - Increase and stabilize local food market.



Health and Safety

Goal HS1 - Educate, engage, and empower the public for climate health and safety.

Goal HS2 - Respond to climate risks and impacts.

Goal HS3 - Prepare Bloomington for climate risks and impacts.



Greenspace and Ecosystem Health

Goal G1 - Increase quantity and quality of greenspace within the community.

Goal G2 - Increase quantity and quality of climate adaptive native habitats.

Goal G3 - Increase citywide tree canopy coverage by 3% by 2030.

Goal G4 - Reduce stormwater and micro heat island impacts.



Climate Economy

Goal CE1 - Build marketplace climate resilience.

Goal CE2 - Attract, create, and support businesses that are committed to sustainability and climate goal.

Goal CE3 - Develop new mechanisms for financing City climate action plan implementation.





Section 01

Introduction



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Introduction

The City addresses sustainability through careful attention to environmental, economic, and social equity issues, and looks for linkages among those issues. Sustainability and livability are our guiding principles and are the foundations of quality, long-lasting economic and community development.

In October 2019, the City of Bloomington issued a request for proposals for the development a Climate Risk and Vulnerability Assessment and Climate Action Plan. The goal of project was to serve as an assessment of Bloomington’s forecasted exposure, sensitivity, and adaptive capacity to changing climate conditions and serve as a foundation for prioritizing climate action and mitigation actions. The assessment was to detail how climate change is affecting Bloomington now, identify current and future climate vulnerabilities, and how those vulnerabilities will change in coming decades. The Climate Action Plan was to recommend strategies for the City and community to prepare for and adapt to local climate change effects and reduce carbon emissions.

In December 2019 the City hired paleBLUEdot to develop the Climate Risk and Vulnerability Assessment as well as this Climate Action Plan. In support of establishing the renewable energy goals included in this plan, paleBLUEdot also produced a citywide Renewable Energy Potentials Study.



You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make.

Jane Goodall,
Anthropologist



The process

The plan was developed in collaboration with a 27 person planning team of community members, economic development representatives, Monroe County staff, and City of Bloomington staff. The planning team was organized into sub-teams aligned with each of the sectors included in this plan (see Plan Framework). The plan was developed through a number of planning workshops from June through October 2020.









Introduction

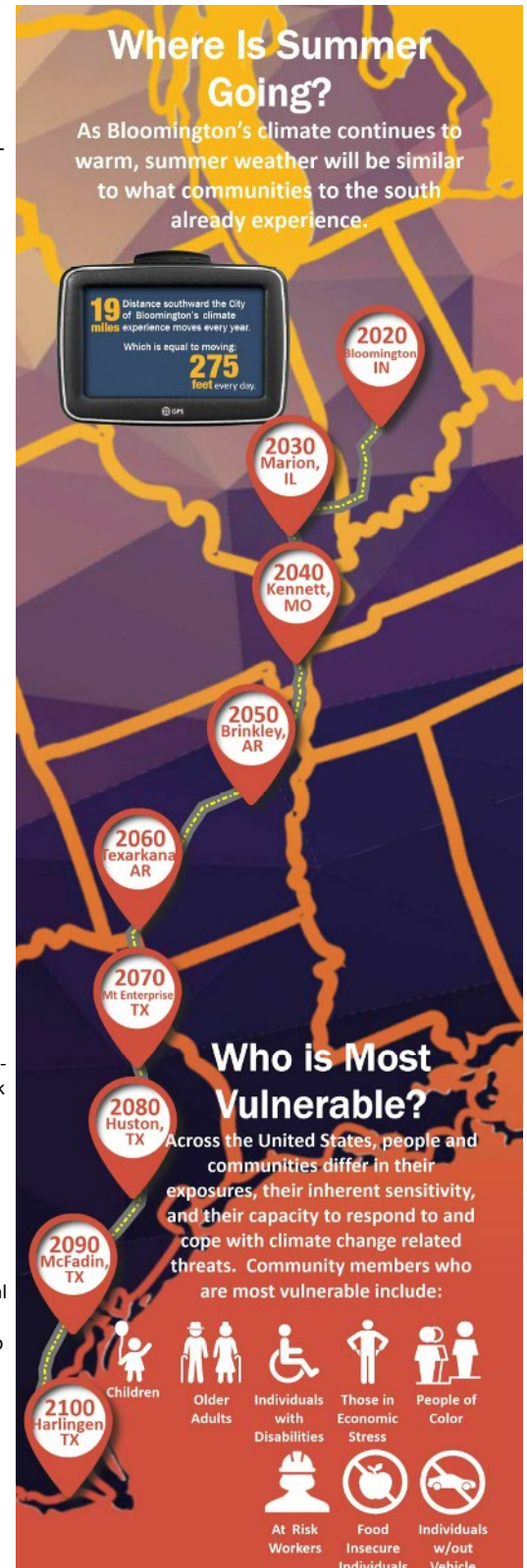
Bloomington's Vulnerability to Climate Risks:

Climate change is a global phenomenon that creates local impacts. It presents one of the most profound challenges of our time. A broad international consensus exists among atmospheric scientists that the Earth's climate system is being destabilized in response to elevated levels of greenhouse gas emissions in the atmosphere.

Two changes to Indiana's climate are occurring already: shorter winters with fewer cold extremes, and more heavy and extreme precipitation. Increases in the global surface temperature and changes in precipitation levels and patterns are expected to continue and intensify for decades. In turn, these changes in climate have impacts on the economy and health of local communities.

The following highlight the vulnerabilities to climate risks facing Bloomington, excerpted from the 2020 Bloomington Climate Vulnerability Assessment:

Medium	Medium-High	High	
<p>Heat Stress (High)</p>  <p>Warmer temperatures and more extreme heat may lead to higher risk of heat-related illness.</p>	<p>Air Quality (High)</p>  <p>Increased heat may result in more days of poor air quality and exposure to allergens, impacting respiratory illnesses.</p>	<p>Vector-Borne Disease (Medium)</p>  <p>Longer growing seasons and higher temperatures may increase vector-borne diseases like West Nile Virus and Lyme disease.</p>	<p>Mental Health (Medium)</p>  <p>Exposure to increased climate impacts and disasters may lead to increased anxiety and other mental health ramifications.</p>
<p>Housing (High)</p>  <p>Warmer temperatures will increase demand for air conditioning and weatherization needs. Energy costs may be difficult for vulnerable populations to meet. Heavier rains coupled with higher risk of surface drought conditions may cause more local flooding, particularly "flash flooding" which could cause damage to housing and reduce mobility for portions of the community.</p>	<p>Stormwater Management (High)</p>  <p>Heavier rains coupled with higher risk of surface drought conditions may significantly increase demand on stormwater management. The city's stormwater infrastructure may not be capable of handling the amount of runoff during more frequent heavy down pours, requiring resources to make needed upgrades.</p>	<p>Trees, Greenspace, and Agriculture (High)</p>  <p>Increased temperatures and changes to precipitation will stress trees, greenspace, and agriculture. Conditions may be more favorable for disease, pests, and invasive species. Trees and crop species which formerly thrived in the area's climate may be less suited for future climate conditions.</p>	<p>Surface Water Quality (Low)</p>  <p>Increases to heavy rain events and flooding/flash flooding risk may negatively impact water quality in the city's lakes, streams, and rivers. Increased pollutants and contamination potential, combined with increased annual water temperatures could increase risk to algal and bacterial growth, harming habitats and limiting recreation.</p>



Introduction

Why Create a Climate Action Plan

The creation, and dedicated implementation of a Climate Action Plan (CAP) is an organized way for a city to contribute to solving the global climate crisis while helping its resident and business communities create improved resilience to the current and future impacts and risks of climate change.

What is a Climate Action Plan (CAP)

Climate action plans are comprehensive road maps that outline the specific Strategies and Actions that a City will implement to reduce greenhouse gas emissions and build resilience to related climatic impacts. The Bloomington CAP addresses both climate mitigation and climate adaptation actions.

What is Climate Change Mitigation?

Climate Change Mitigation addresses the root causes of climate change through the reduction or prevention of greenhouse gas (GHG) emissions. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior.

What is Climate Change Adaptation?

Some impacts of climate change are now inevitable. Climate Change Adaptation seeks to lower the risks posed by these impacts. Both mitigation and adaptation are necessary, because even if emissions are dramatically decreased, adaptation will still be needed to deal with the global changes that have already been set in motion.

The Role of Cities in Climate Action

With a large majority of Americans living in urban areas, cities play a key role in addressing climate change. While each individual city's impact on global GHG emissions is relatively small, the leadership cities provide in motivating change can be extremely significant. According to a survey by the US Conference of Mayors, more than half (53%) had committed to reducing greenhouse gas emissions.

Types of Climate Actions

Leading by Example:

- Actions the City can apply to city operations or facilities to illustrate actions others can take:
- Install solar on rooftops of public buildings
 - Adopt net-zero energy standards for public facilities
 - Convert city fleets to EVs

Advocating:

- Encourage change in support of meeting CAP goals - these can include lobbying at State/Federal and educating public on actions they can take:
- Lobby for PACE financing legislation
 - Promote utility rebate programs
 - Provide Net Zero and Solar Ready Guides to Residents and Businesses

Require:

- Actions the City can take to require actions within the private sector:
- Require energy efficiency and renewable energy within PUD ordinance
 - Adopt an energy benchmarking ordinance
 - Require solar pv feasibility assessment with all new building permits

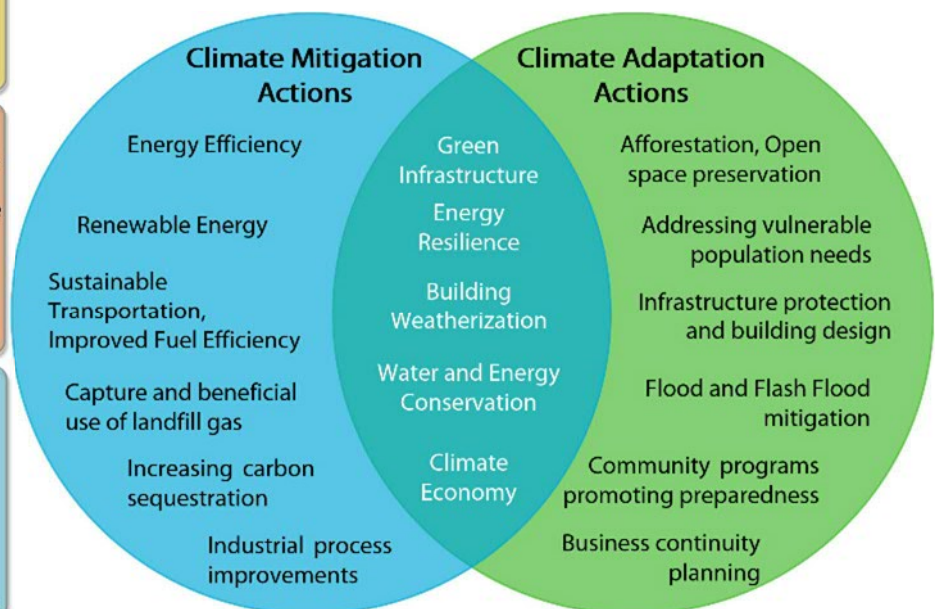
Incentivize:

- These can include direct economic incentives as well as actions which remove barriers:
- Expedite permitting for clean energy projects
 - Offer Net Zero technical assistance
 - Establish a Renewable Energy grant program for income qualified residents.

Climate Action As A Journey

The Climate Action Plan represents a robust vision of the future with a comprehensive scope of action befitting the magnitude of our collective climate challenge ahead. This plan should be seen as a living document. Action progress and effectiveness should be reviewed at regular intervals through the plan's implementation and adjustments should be made to expand or modify the scope of individual actions and to augment the plan with new actions as appropriate to respond to ever-changing market and community conditions.

Synergy of Mitigation and Adaptation Actions



Climate Action Plan Framework

This Climate Action Plan includes an implementation framework designed to achieve community-wide goals for greenhouse gas reduction and climate adaptation and resilience. This CAP is organized around a unifying framework organized by sector as illustrated to the right. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation. Sector actions have primary focus on Climate Mitigation, Climate Adaptation, or both.

Strategies: are specific statements of direction that expand on the sustainability vision and GHG reduction goals and guide decisions about future public policy, community investment, and actions.

Actions: are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and action.

Climate Mitigation: addresses the root causes of climate change through the reduction or prevention of greenhouse gas (GHG) emissions. Sectors with this as a significant focus are shown to the right with this symbol:



Climate Adaptation: seeks to lower the risks posed by the impacts of climate change which are now inevitable or likely. Sectors with this as a significant focus are shown to the right with this symbol:



Transportation and Land Use

This sector area includes emissions from on-road vehicle traffic occurring in the community. Strategies in this sector area include reductions in vehicle miles traveled as well as shifts to public transit and alternative modes of transportation like biking and walking.



Health and Safety

This sector area includes community health impacts and resilience in the face of current climate impacts and projected risks. Strategies in this sector focus on community resilience to extreme heat and weather, vector-borne and water-borne disease, and air quality impacts of climate change.



Energy and Built Environment

This sector area includes all electricity and natural gas consumption within the city. Strategies in this sector area include improved energy efficiency and resilience.



Climate Economy

This sector includes the economic development, jobs, and business creation potential represented by the actions and goals of all sectors in this Climate Action Plan. Strategies in this sector include workforce development, economic development and new business financing, and resilience of businesses in the community.





Waste Management

This sector area includes all solid waste generated by residents and businesses within the community. Strategies in this sector focus on diversion of food, consumer, and construction waste as well as reduction of landfill gas generation and beneficial use of unavoidable landfill gas emissions.



Water, Wastewater and Flooding

This sector area includes potable water distributed to Bloomington residents and businesses, wastewater collection and treatment, stormwater collection, flood mitigation, and surface water health. Strategies in this sector focus on water conservation, wastewater reduction and beneficial use of wastewater emissions, flood mitigation, and stormwater infiltration.



Local Food

This sector area includes commercial and non-commercial food cultivation and distribution, food and nutrition insecurity, and food waste. Strategies in this sector area include reduction of food waste, food system and distribution resilience, strengthening of local food production capacity, and equitable access to healthy food.



Greenspace and Ecosystem Health

This sector area includes the environmental, climate resilience and benefits of urban tree canopy, ground cover, community greenspace and parks, and ecosystems that rely on these natural elements. Strategies in this sector include resilience/expansion of urban tree canopy coverage, improvement of beneficial use of lawn areas, and mitigation of heat island impacts.



Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security, and women's empowerment. Solutions to one problem must be solutions for all .

*Ban Ki-moon,
Secretary General,
United Nations*

Introduction

Benefits of Climate Action

The strategies and actions contained in this plan seek to reduce Bloomington’s dependence on non-renewable fossil fuels, prioritize sustainable uses of land and water, reduce waste, and support improved equity and livability. The actions outlined in this plan will reduce Bloomington’s GHG emissions. In addition to reducing the community’s contribution to climate change this plan strives to identify how climate change will increasingly impact the community. The CAP addresses next steps for Bloomington to adequately respond to climate change. If implemented successfully the CAP will enhance Bloomington’s economic vitality, resilience, and viability as a healthy, livable city.

6 Ways Climate Action Can Be Good For Bloomington’s Economy

1: Bloomington can lower emissions while growing the economy.

Since 2005, Bloomington’s GDP has increased 59% while community wide GHG emissions have fallen over 18%.

2. Electricity from renewable sources is typically less expensive than fossil fuels.

The costs of renewable energy fallen significantly over the last decade and their portion of our energy mix has grown. According *The Coal Cost Crossover*, a study by Energy Innovation, it would be cheaper to replace 3/4ths of existing U.S. coal plants with wind and solar power than to keep them operating with coal.

3. Clean energy jobs already employ about 3.5 million Americans and growing.

The transition to renewable energy is a transition to local energy sources and infrastructure – and retention of more energy expenditures in the local economy. According to a study by the non-profit group MassSolar, every dollar invested in solar creates \$1.20 in local economic benefits.

4. CAP focus areas can save Bloomington residents and businesses money .

Energy efficiency improvements, renewable energy adoption, and reduced single occupancy vehicle dependence strategies included in this plan can result in annual savings for Bloomington businesses and households.

5. Better planned, low-carbon cities are more productive.

According to a study by The Coalition for Urban Transitions, for every 1% increase in population density in US cities, medium and high-skilled wages increase 0.5% and carbon emissions decrease 0.2% per capita.

6. Without climate action, Bloomington will face increasing economic damage.

According to NOAA Records, extreme weather and climate disasters in Bloomington County have increased 7% in the last twenty years, causing an average of \$714,150 in damages annually. According to a study by the University of California at Berkeley, climate impacts can be expected to increase agricultural damage, death rates, energy costs, and violent and property crime rates in the City of Bloomington. In addition, as annual average temperatures and the number of extreme heat days increase, economic productivity will decrease due to labor efficiency losses. These impacts can be used to establish an estimated minimum “Social Cost of Carbon” - a measure of the economic harm of those impacts from emitting one ton of carbon dioxide into the atmosphere.

See calculations on the following page for an estimated cumulative economic savings potential of successfully implementing the Climate Action Plan through 2030.

Types of Sustainability Action Benefits



Introduction

Estimated Economic Risk of Climate Change to Bloomington by 2100

(in today's dollars)

Annual % Change by Category:



Annual Cost Impact
(in 2020 dollars)*

* Figure does not include increased healthcare costs due to increased illness and disease nor increased property damage due to increased extreme

Estimated Social Cost of Carbon

“Social Cost of Carbon” is an effort to properly account for the damages caused by greenhouse gas emissions and the resulting climate change impacts. By including the social cost of carbon in planning efforts, agencies and businesses can properly evaluate policies and decisions that affect greenhouse gas emissions. The “Social Cost of Carbon” is measure of the share of climate change economic harm and impacts from emitting one ton of carbon dioxide into the atmosphere. For Bloomington it can be calculated as follows:

Estimated Economic Risk of Climate Change:

\$150,518,657 ÷
Annual Cost Impact

Current Annual Emissions:

1,290,216
Annual Cost Impact

Current Estimated Localized Social Cost of Carbon:

= \$116
Per Ton

Cumulative Economic Savings Potential of Successfully Implementing the Bloomington Sustainability Plan Through 2030

Transportation Savings Potential:

\$89,743,494

Energy Efficiency and Renewable Energy Savings Potential:

\$62,250,090

Waste Reduction Savings:

\$79,175,711

Social Cost of Avoided Carbon:

\$150,263,165

Cumulative Community-Wide Savings Potential:

= \$381,432,460*

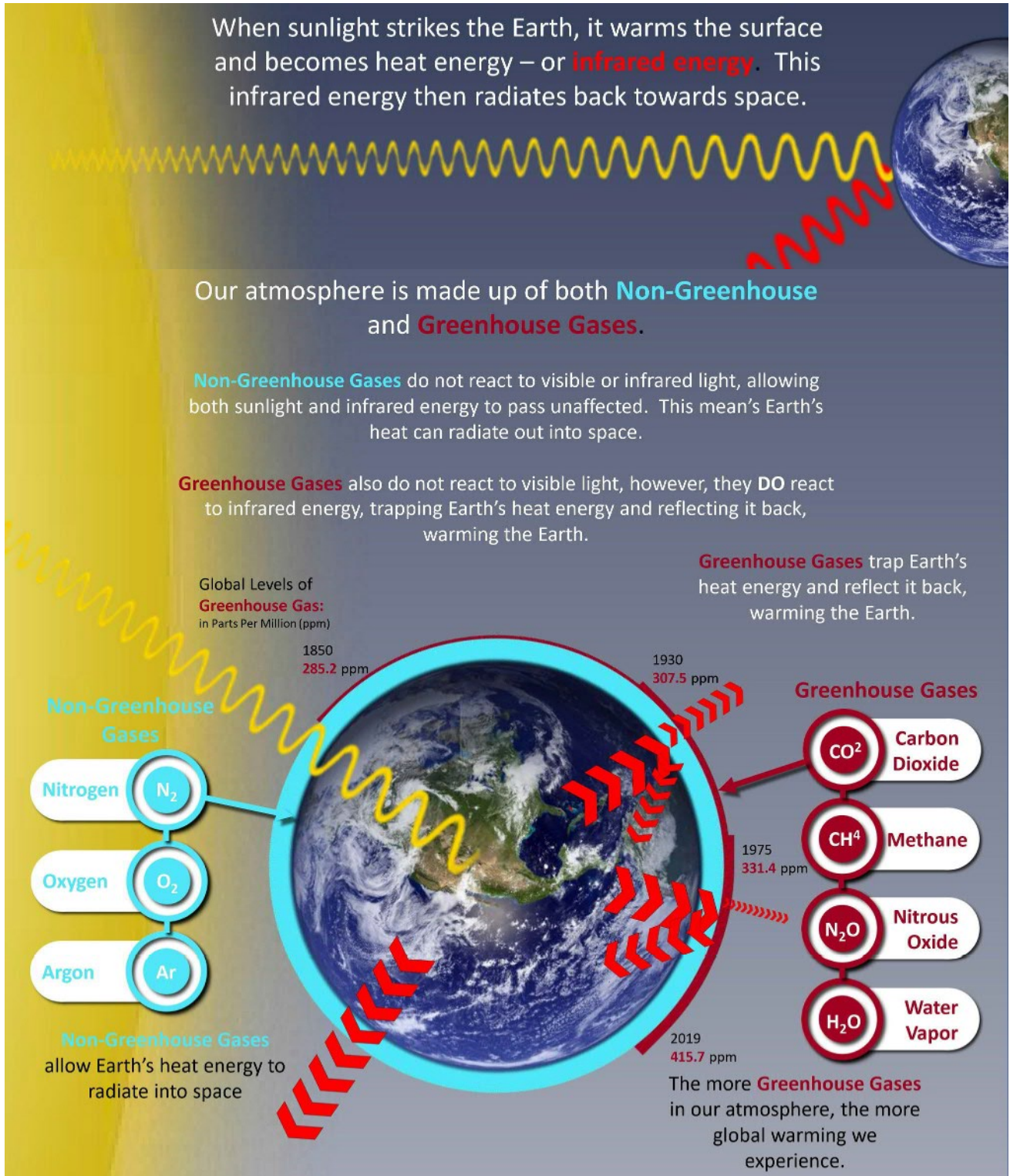
* Value does not include economic potential of job creation and new business potential represented in the Sustainability Plan actions.



Introduction

Greenhouse Gas Emissions (GHG) and Climate Change

The climate change we face today is caused by warming from greenhouse gases trapping infrared energy radiating from the earth. This is called the greenhouse effect. Greenhouse gases have been increasing in our atmosphere since the Industrial Revolution. Scientists attribute the global warming trend observed since the mid-20th century to human greenhouse gas (GHG) emissions which expand the "greenhouse effect" — warming that results when the atmosphere traps heat radiating from Earth toward space.



Introduction

What Are GHG's?

Greenhouse Gases (GHG) absorb radiation and trap heat in the Earth's atmosphere. They are the basis of the Greenhouse Effect. The more GHGs there are, the more heat that is trapped in our atmosphere, leading to Global Warming and Climate Change. The most common greenhouse gases include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).



Carbon dioxide CO₂



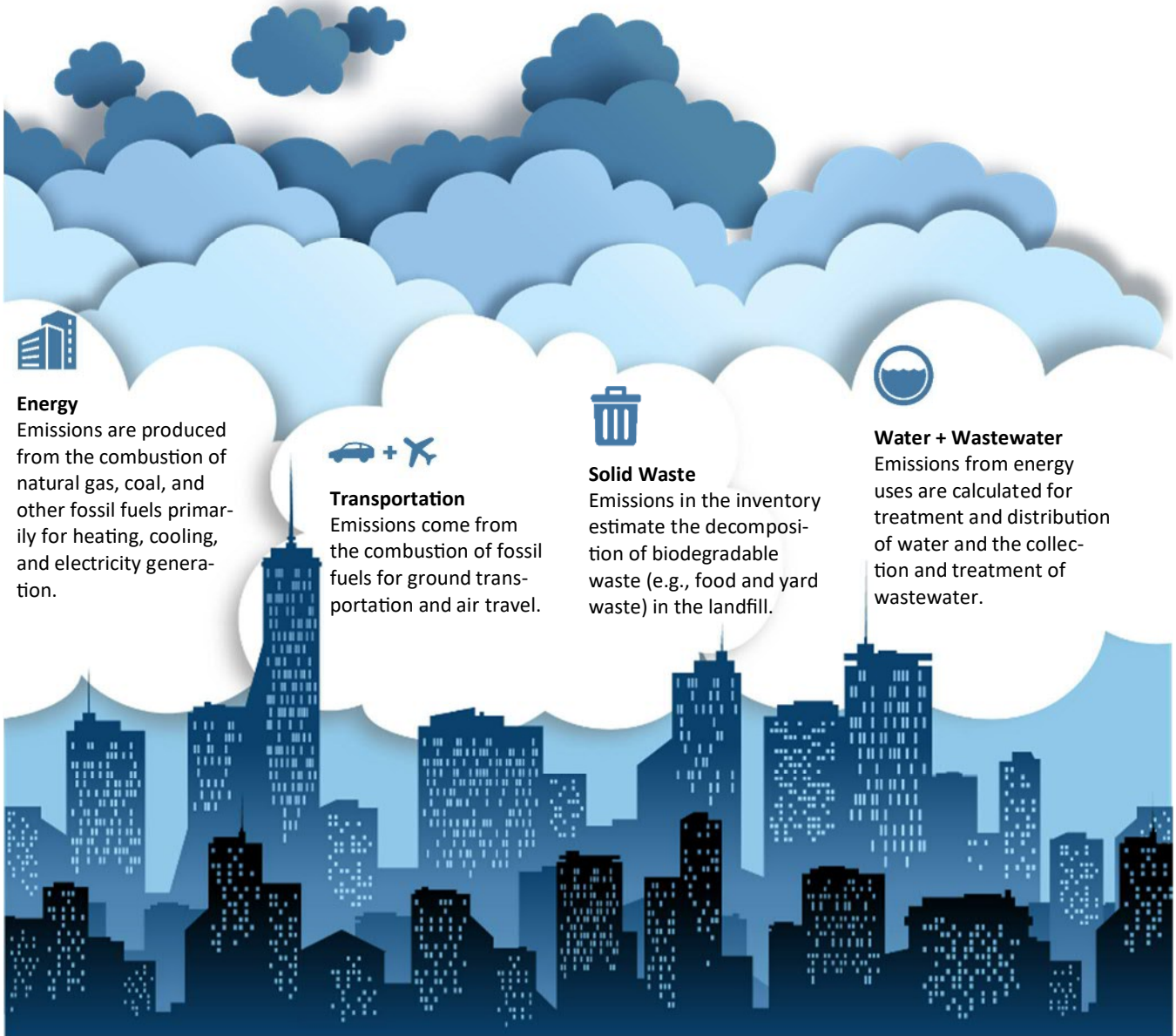
Methane CH₄



Nitrous oxide N₂O

Greenhouse Gas Sectors

Where do GHGs come from?



Energy

Emissions are produced from the combustion of natural gas, coal, and other fossil fuels primarily for heating, cooling, and electricity generation.



Transportation

Emissions come from the combustion of fossil fuels for ground transportation and air travel.



Solid Waste

Emissions in the inventory estimate the decomposition of biodegradable waste (e.g., food and yard waste) in the landfill.

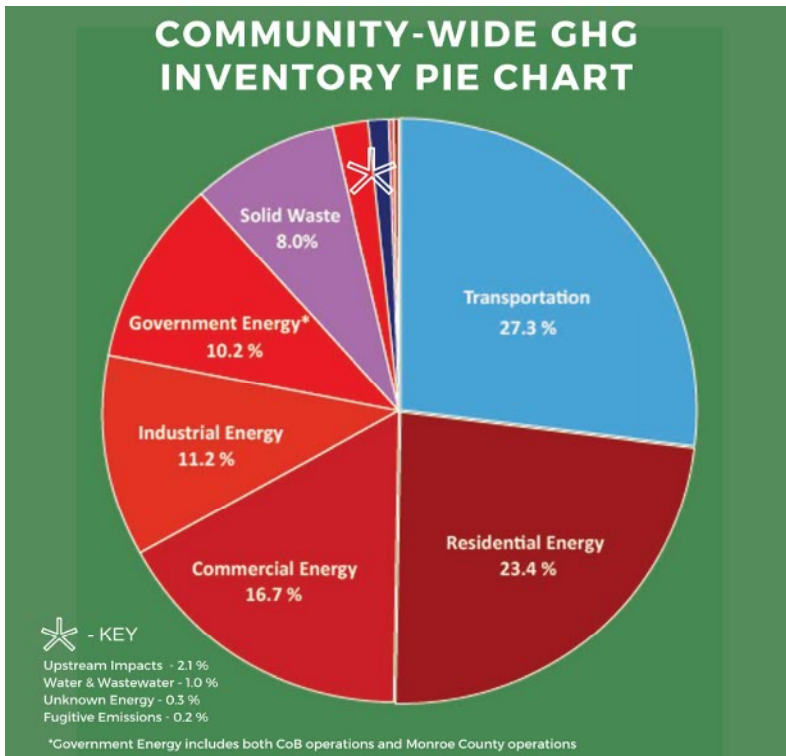


Water + Wastewater

Emissions from energy uses are calculated for treatment and distribution of water and the collection and treatment of wastewater.

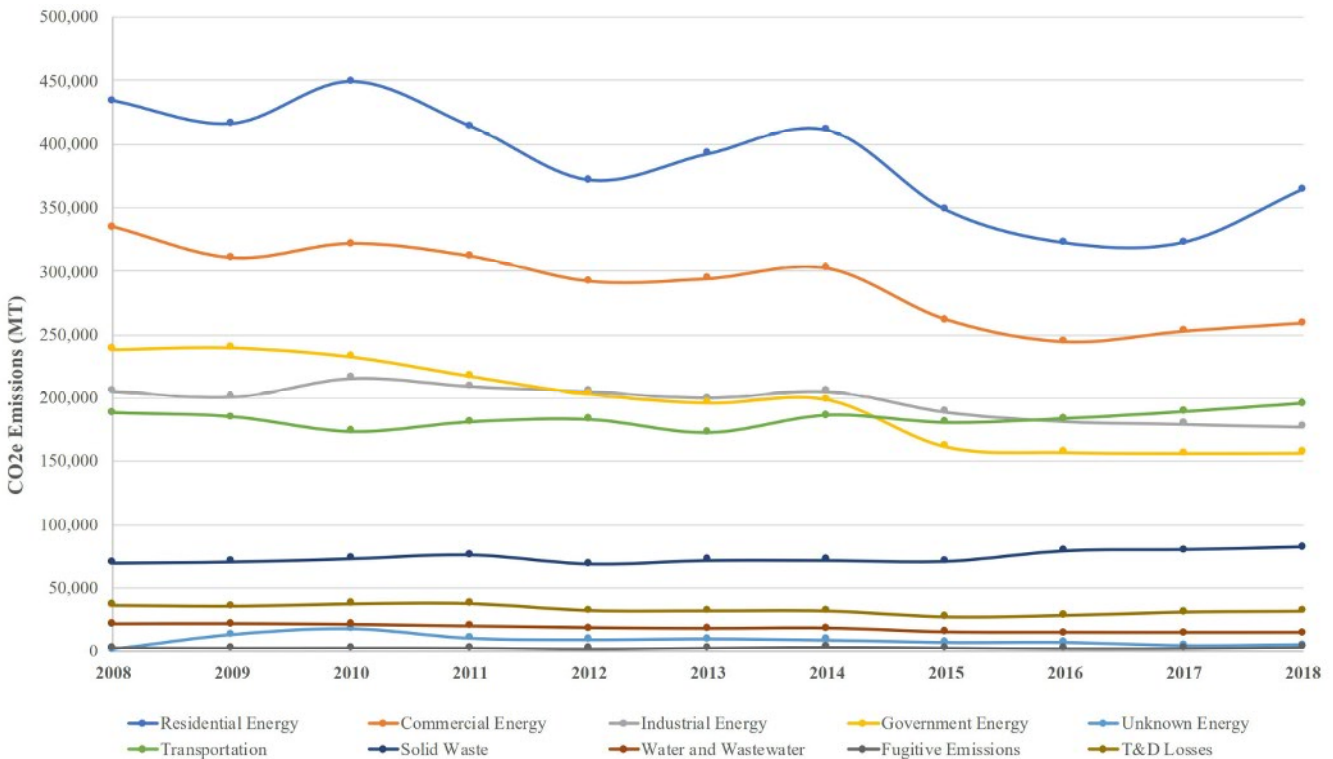
Introduction

Citywide GHG Emission 2018



(Graphic source: City of Bloomington 2018 GHG Inventory)

Citywide GHG Emission History 2008-2018



(Graphic source: City of Bloomington 2008-2018 GHG Backcast)

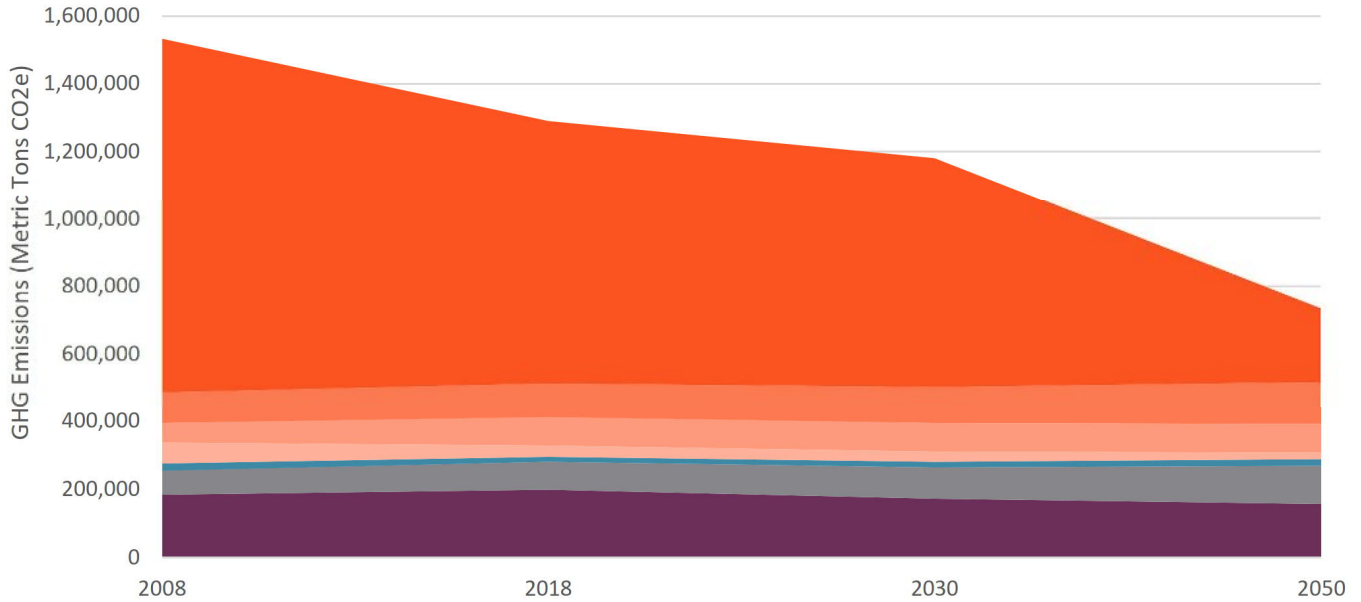


Introduction

Citywide GHG Emission Forecast

A GHG emission forecast supports GHG reduction planning efforts by anticipating what emissions may be like if actions are not taken. Emissions are typically forecast under a business-as-usual (BAU) scenario. The Intergovernmental Panel on Climate Change (IPCC) defines a “business-as-usual” baseline case as the level of emissions that would result if future development trends follow those of the past and no changes in policies take place.

The City of Bloomington GHG forecasts included here were based on population and employment growth estimates determined by 10 and 20 year historic growth rates. In addition to these data, information from the US Environmental Protection Agency, US Department of Transportation, and US Energy Information Agency. The full assumptions used for the Business-as-usual GHG Emissions Forecast model are outlined in detail in the appendix of this plan.



Emissions Sectors

- Transportation
- Waste
- Water & Wastewater
- Other
- Other Industrial Energy
- Natural Gas
- Electricity

Introduction

Sustainability Plan GHG Reduction Goal

The GHG emission reduction goals guiding this Sustainability Plan are to reduce community-wide GHG emissions 40% over the 2005 baseline by 2030, and then to achieve Carbon Neutral by 2050.

GHG Emission Reduction Goal in Global Context

Reviewing the City’s Climate Action Plan emission reduction goal within a global context and GHG emission reduction recommendations formulated by the International Panel on Climate Change (IPCC) can help validate the appropriateness of the goal. The IPCC is the United Nation Environment Programme (UNEP) body for assessing the science related to climate change and providing support in climate action policy making. The scientific consensus of the international IPCC working groups is to reduce global GHG emissions as needed in order to limit global warming to 1.5°C. In addition, the Paris Agreement aims to limit global warming to 1.5 to 2 degrees C above pre-industrial levels, considered to be the threshold for dangerous climate change.

The UNEP Emissions Gap Report published in November 2019 calculates that by 2030, global emissions will need to be 25% lower than 2018 to put the world on the least-cost pathway to limiting global warming to below 2°C. To limit global warming to 1.5°C, the same report finds emissions would need to be 55% lower than in 2018 - an upward adjustment of earlier recommendations which suggested a 45% reduction.

Fair Share Citywide Emission Reductions To Meet Global Need

The concept of “Fair Share” has been introduced into international climate action discussions. Though there is no consensus on how “fair share” should be defined, the most common way of looking at the concept is a straight-line reduction economy-wide. This means that the share of emissions reductions for each jurisdiction (the City of Bloomington, the State of Indiana, the United States, etc) should match their share of global emissions - meaning if the US emits 25% of global emissions, the “fair share” of emissions reductions for the US would be 25% of the global emission reduction goals.

Based on a “Fair Share” model of GHG emission reduction, the City’s goal of 40% below 2005 baseline by 2030 is compatible with the Paris Agreement and meets the threshold of required reductions to keep global warming below 2°C. The goal, however, is not compatible with a 1.5°C global warming pathway, as illustrated by the graphic to the right.

Climate Action Plan Approach to Emissions Reduction

This Climate Action Plan is intended as a “living plan” rather than a static document. This means that the implementation phase of this plan should be characterized by intermittent measurement of progress and plan adjustments. Plan adjustments should look towards increasing implementation goals for actions which illustrate success, modify goals for actions which may fall short of desired outcomes, and identifying additional action opportunities.

As a “living plan,” the 2030 emission reduction goal should be seen as a guiding constant and recognition should be given that initial implementation actions may not yet fully achieve plan goals. Intermittent plan progress measurements and adjustments should identify additional actions, or increases in action implementation targets as needed to meet the ultimate 2030 GHG reduction goal.

2030 Citywide GHG Emissions Goal:

522,198
Metric Tons

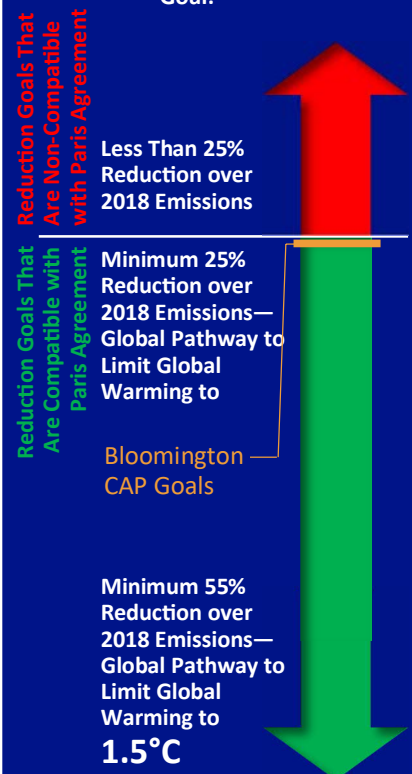
Global Emission Reduction To Limit Global Warming to 2°C:

555,670
Metric Tons
25% below 2018

Global Emission Reduction To Limit Global Warming to 1.5°C:

333,400
Metric Tons
55% below 2018

“Fair Share” Model Review of Sustainability Plan 2030 Goal:



Introduction

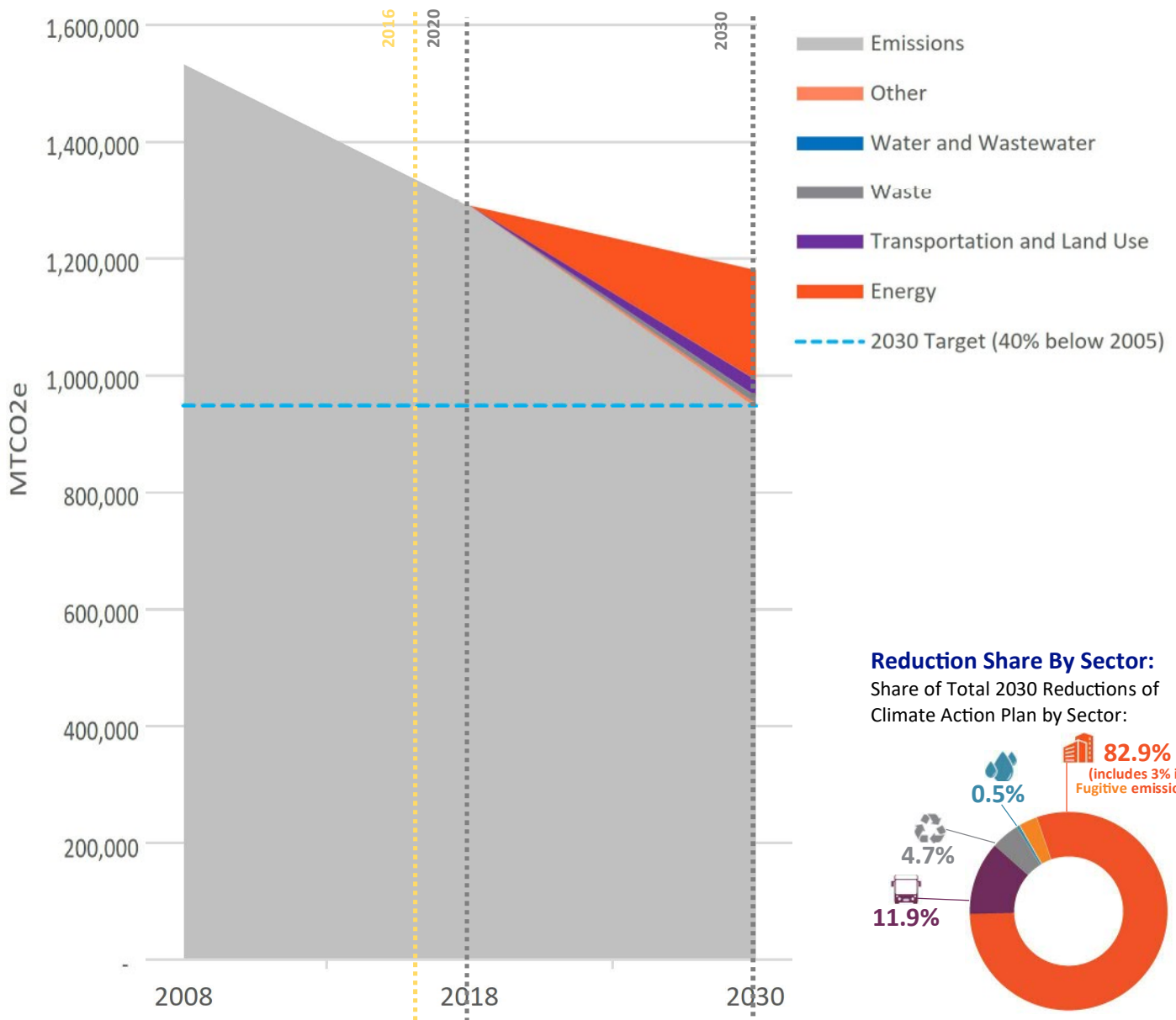
Estimated Citywide GHG Reductions Included in This Plan

Compared to the 2018 citywide GHG emissions, the total estimated emissions citywide reductions included in the initial implementation actions of this plan plus the projected Business-as-Usual (BAU) reductions are projected to total 344,735 metric tons annually (see page 1-13). These estimated reductions are projected to result in total citywide GHG emissions of 945,759 metric tons. The potential cumulative GHG emissions reductions over the 10 year implementation period are estimated at over 1,280,000 metric tons - an elimination of over **25.3 Billion** cubic feet of man made greenhouse gas atmosphere annually.

The total projected GHG emissions reductions estimated for the initial implementation actions of this plan are projected to be sufficient to achieve a total reduction in annual emissions of 40.0% below 2005 baseline emissions by 2030. As outlined on the previous page, the implementation phase of the plan should be characterized by intermittent measurement of progress and plan adjustments based on results in order to achieve the ultimate 2030 reduction goals.

Citywide GHG Emission Reductions Wedge Diagram

The diagram below shows the estimated emission reductions from the Business-as-Usual projections, by emission sector, of the Sustainability Plan actions and targets.







Section 02 Transportation and Land Use



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Transportation and Land Use

Why Transportation and Land Use Is Important

The design of a city can limit or expand the choices and opportunities available to its residents in where they live, how they travel and the impact of those decisions on the global environment. Transport systems - which includes private and public vehicles, trains, and planes - have significant impacts on the environment, accounting globally for 20% to 25% of world energy consumption and carbon dioxide emissions - in Bloomington transportation accounts for 27.3% of citywide GHG emissions (2018 GHG Inventory).

The transportation sector, which includes private and public vehicles, trains, and planes contribute 15.4% of citywide GHG emissions for the City of Bloomington. The majority (62.6%) of Bloomington residents drive to work alone and the remaining 37.4% walk (13.2%), carpool (9.21%), use public transit (6.42%), telework (4.51%), bicycle (3.1%) with the remaining 0.96% reporting "Other". Of the workforce in Bloomington, the average commute-to-work time is 16.1 minutes compared to the State of Indiana average of 23 minutes while only 1.08% have "super commutes" in excess of 90 minutes compared to 1.82% for the State of Indiana. 91.1% of Bloomington households (26,626 households) live within ½ mile of transit routes and 24.1% (7,031 households) live near rush-hour high frequency transit routes.

Continuing to improve the equity and sustainability of Bloomington's land use and transportation systems requires a focus on developing systems and networks that allow for greater choice in where residents live and work as well as how they commute. Implementation of Complete Streets and a connected system of transit, bike and pedestrian infrastructure along with emphasis on neighborhood design that supports density and walkability will help Bloomington reach its goal of a 40% reduction by 2030.

Climate Change Considerations



Climate Impacts

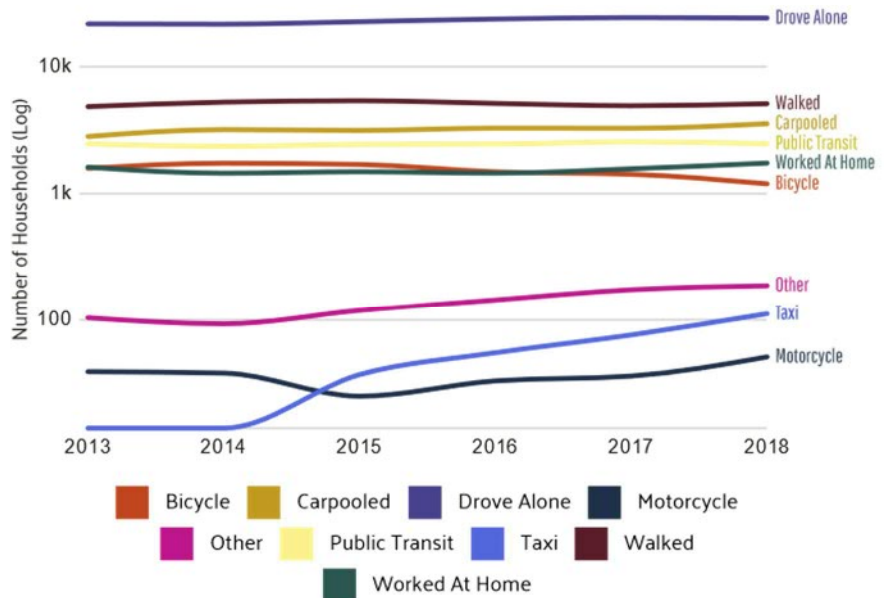
This sector impacts climate change through the combustion of fossil fuels (gasoline, aviation gas, propane) for on-road cars and trucks and off-road vehicles and equipment



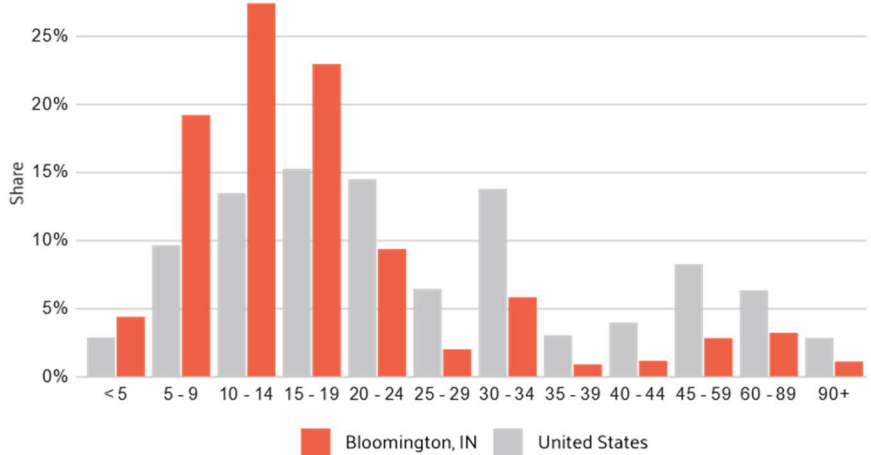
Climate Hazards

Hazards to Transportation and Land Use include increased damage to roads and transportation infrastructure due to increased freeze and thaw cycles, flooding, and extreme weather and temperatures

Commuter Transportation in Bloomington



Commute Time for Bloomington Workers



Transportation and Land Use

Equity Considerations

- Increased opportunities for public transit and active transportation can help address health disparities for many at-risk populations.
- Affordable and reliable options for mobility for people with special transportation needs can significantly improve transportation equity. Populations with special transportation needs include older adults, youth, persons with disabilities, and persons with reduced incomes.
- Some neighborhoods in Bloomington have fewer housing and transportation options than others. This can limit people’s choices in where they live and how they get to work or other activities. Households that rely on public transit service or who rent their home will be limited in where they can find housing that meets both needs.

Sector Goals






Goal T1

Decrease vehicle miles traveled (VMT) by 8% by 2030.

Goal TL2

Support and encourage electric vehicle adoption, achieve 30% of vehicles sold and 15% of VMT community-wide by 2030.

Mode Shift Targets Supporting Sector Goals

	Bloomington Transit Use	Single Occupancy Vehicle Use	Carpool + Shared Mobility	Walk + Bike	Electric Vehicles
Today	 + 6.4%	 - 62.6%	 + 9.2%	 + 16.3%	 + 0.82% (Statewide)
2030 Targets	9.4%	59.8%	11.2%	17.3%	10%



Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Transportation and Land Use section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.


[Click here for full list of sector actions](#)



Goal T1 Decrease vehicle miles traveled (VMT) by 8% by 2030

How We'll Get There

How We'll Measure Progress

Strategy TL1-A:

Reduce single occupancy automobile use by 7%

The local transportation system is planned, funded, built, and maintained by a combination of local, state, and federal organizations, including the Bloomington Monroe County Metropolitan Planning Organization (MPO). BMCMPPO is a partnership of local governments and transportation service providers to execute federally funded transportation priorities outlined in the Transportation Improvement Program. MPO members include the City of Bloomington, Monroe County, the Town of Ellettsville, Indiana University, and the Bloomington Public Transportation Corporation (Bloomington Transit), and Area 10 Agency on Aging. Additionally funded transportation projects are also funded, planned, and executed by City of Bloomington.

Reported “drive alone” commuter transportation data—US Census, Annual VMT data reported

Initial Actions

- TL1-A-1 Update the City's Transportation Plan and Transportation Improvement Program to incorporate reductions in carbon emissions and vehicle-miles-traveled, improved bicycle, pedestrian and transit service standards, and a policy requiring project evaluation to include criteria on climate, equity, economic benefit, health, safety and cost effectiveness.
- TL1-A-2 Establish a City employee Parking Cash Out benefit program to promote alternative commute options. (https://www.bestworkplaces.org/pdf/ParkingCashout_07.pdf <https://www.boston.gov/transportation/parking-cash-out>)

Strategy Expected Benefits

Reduced Costs



Improved Air Quality



Reduced Traffic Congestion



Reduced GHG Emissions



Strategy TL1-B:

Increase bicycle/ pedestrian commuting from 16.3% to 18.3% through infrastructure to encourage alternatives to vehicles.

The 237 miles of roadway within City limits is maintained by the City of Bloomington Public Works Street Division, with additional miles maintained Indiana Department of Transportation and the Monroe County Highway Department. For multimodal transportation, the Parks Department manages over 15 miles of recreational and multi-use paths. The City Trails and Trees bond passed by City Council in 2018 is adding over seven miles of new trails to the transportation system, including the 7line, RCA/ Powerline and a hiking loop at Griffy Lake

Reported bike/walk commuter transportation data—US Census, Annual VMT data reported

Initial Actions

- TL1-B-1 Establish a stable funding source adequate to maintain and improve the existing transportation system and to invest in transportation capital projects and programs that reduce carbon emissions and improve equity.
- TL1-B-2 Implement the Multimodal Projects recommendations included in the 2019 City of Bloomington Transportation Plan.

Strategy Expected Benefits

Reduced Costs



Improved Air Quality



Improved Public Health



Reduced GHG Emissions



Goal T1 Decrease vehicle miles traveled (VMT) by 8% by 2030

How We'll Get There

How We'll Measure Progress

Strategy TL1-C:

Increasing transit utilization by 5% through infrastructure and frequency investments.





Bloomington Transit is the main local transit service in the City and operates 14 routes with a fleet of 49 buses (Transportation Plan, 2019). The Bloomington Transit Route Optimization Study indicated that increasing frequency, adding weekend service, and expanding service to the west side, to employment centers, housing complexes, and to Ivy Tech are top priorities for transit users. While existing services adequately meet rider's needs, some riders expressed dissatisfaction with service provision especially that the transit schedules did not align with or satisfy travel needs. Given the current street network, improvements to bicycle, pedestrian, bus, and other supported modes of non-automobile travel along the major N-S and E-W corridors through the center of Bloomington were identified in the Transportation Plan as high-priority for investment

Reported public transit commuter transportation data—US Census, Annual VMT data reported

Initial Actions

- TL1-C-1 Implement recommendations of the Bloomington Route Optimization Study
- TL1-C-2 Collaborate with Bloomington Transit to establish a Guaranteed Ride Home program as free reimbursement program for registered commuters

Strategy Expected Benefits

<p>Reduced Costs</p> 	<p>Enhanced Transit System</p> 
<p>Reduced Traffic Congestion</p> 	<p>Reduced GHG Emissions</p> 

Strategy TL1-D:

Increase shared mobility utilization; target: increase shared mobility (carpooling) from 9.21% to 12.21% of commuters by 2030.

Shared mobility can broadly be as transportation services and resources that are shared among users, either concurrently or one after another. This broader definition includes micromobility (bikesharing, scooter sharing); automobile-based modes (carsharing, rides on demand, and microtransit); and commute-based modes or ridesharing (carpooling and vanpooling). According to the US Census, workers commuting via carpooling has remained consistently near the 9% level since 2013. Increased carpooling for individuals requiring similar commute routes directly reduces annual VMT and GHG emissions.

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported

Initial Actions

- TL1-D-1 Outline clear policies for electric bikes, skateboards and scooters on city bike lanes, paths and trails. Establish a communication campaign to effectively reach users.
- TL1-D-2 Establish a subsidy / incentive for EV car sharing services with the goal of increasing car share coverage, particularly among vulnerable populations and those without current vehicle access. Qualifying programs must use plug in EV's or other no-carbon vehicle alternatives only.

Strategy Expected Benefits

<p>Reduced Costs</p> 	<p>Improved Social Connectivity</p> 
<p>Reduced GHG Emissions</p> 	<p>Improved Quality of Life</p> 



Goal T1 Decrease vehicle miles traveled (VMT) by 8% by 2030

How We'll Get There

How We'll Measure Progress

Strategy TL1-E:

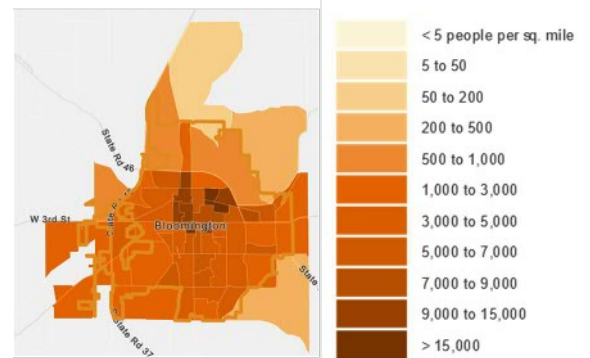
Encourage density and increase housing options and affordability; target: increase gross density by 3% by 2030.

Residential density in the City of Bloomington ranges from 700 people per square mile to over 19,300, with an average of approximately 3,600 people per square mile. When well planned, increased density means shorter commutes, increased "walkability" between home and a range of destinations, reinforced public transit corridor utilization, increased housing near jobs and community resources, and overall increased quality of life for residents.

Initial Actions

- TL1-E-1 Eliminate minimum parking requirements from Unified Development Ordinance and replace with a transportation reference guide for development that includes considerations for all modes. Allow developers to determine and defend their transportation needs.

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported



Strategy Expected Benefits

Reduced GHG Emissions



Reduced Traffic Congestion



Strategy TL1-F:

Build Complete Streets; Target: 10% increase in complete street coverage by 2030.

Complete Streets are streets designed and operated to enable safe use and support mobility for all users of all ages and abilities and all modes of travel including pedestrians, bicyclists, scooter riders, public transportation riders, and drivers. Complete street strategies address a wide range of elements, such as sidewalks, bicycle lanes, bus lanes, public transportation stops, crossing opportunities, median islands, accessible pedestrian signals, curb extensions, modified vehicle travel lanes, streetscape, and landscape treatments.

Initial Actions

- TL1-F-1 Review, modify, and adopt a revised BMCBMO Complete Streets Policy to add criteria and review procedures for City funded projects. Include in the review and modification an assessment of national best practices in support of achieving the goals of the Climate Action Plan.
- TL1-F-2 Conduct a Sidewalk and Bike Path Quality Assessment and Master Plan to identify needs to accelerate bike paths, building sidewalks, crosswalks, and other walking infrastructure, particularly in high-need areas and areas serving vulnerable populations. Effort to include an implementation plan establishing annual increases in the total miles of sidewalks, on-road bicycle lanes and multi-use paths.

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported

Strategy Expected Benefits

Reduced Costs



Improved Social



Reduced GHG Emissions



Improved Quality of Life



Goal T1 Decrease vehicle miles traveled (VMT) by 8% by 2030

How We'll Get There

How We'll Measure Progress

Strategy TL1-G:

Increase pedestrian access and safety.

Walking is a basic and common mode of transport in all societies around the world. Virtually every trip begins and ends with walking. Beyond the environmental and GHG emission reduction benefits, increased walking has well established health benefits such as increasing physical activity that may lead to reduced cardiovascular and obesity-related diseases. According to the World Health Organization "Pedestrian safety measures improve walking environments and contribute to urban renewal, local economic growth, social cohesion, improved air quality and reduction in the harmful effects of traffic noise."

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported

Initial Actions

- TL1-G-1 Implement improvement recommendations of the 2019 Transit Stop Safety and Accessibility Assessment.
- TL1-G-2 Create and implement a 5 year transportation funding plan that matches the Metropolitan Transportation Plan and 2019 Transportation Plan.

Strategy Expected Benefits

Safer Streets

Improved Mobility



Strategy TL1-H:

Reduce commercial/industrial vehicle use by 5%

Commercial and Industrial vehicle use makes up an estimated 10% of city-wide VMT. Utilization of low-carbon goods movement alternatives and fleet utilization optimization can support the reduction of commercial vehicle miles traveled and increase commercial/industrial profitability.

Reported commercial / industrial VMT data—US Census, Annual VMT data reported

Initial Actions

- TL1-H-1 Establish an Electric Vehicle Suitability and Fleet Optimization Study incentivization utilizing fleet monitoring technology to assess fleets for alternative fuel suitability as well as identify fleet optimization management options for reduced VMT. (<https://www.geotab.com/fleet-management-solutions/evsa/>) Include City's fleet in program efforts. Goal: Achieve 6 fleet assessments annually.

Strategy Expected Benefits

Improved Air Quality

Reduced GHG Emissions



Strategy TL1-I:

Reduce citywide off-road and lawn equipment emissions to below 35,000 metric tons annually.

Emissions from off-road equipment like construction and lawn equipment comprise a significant portion of fossil fuel consumption in Bloomington. Reduction of fossil fuel off-road equipment use is associated with improved emissions as well as improved air quality, particularly for the users of the equipment. <https://www.edmunds.com/car-reviews/features/emissions-test-car-vs-truck-vs-leaf-blower.html>

City electric off-road equipment adoption rate

Initial Actions

- TL1-H-1 Introduce a policy to replace City off-road and lawn equipment with electric and low-carbon fuel alternative options at the time of replacement with traditional internal combustion engine (ICE) as optional requiring proof of need. Establish emissions standards, testing and biofuel preference for any combustion vehicles remaining in the equipment fleet. Encourage County, School District, and Indiana University to implement similar policies.

Strategy Expected Benefits

Improved Air Quality

Reduced GHG Emissions



Goal TL2 Support and encourage electric vehicle adoption, achieve 30% of vehicles sold and 15% of VMT community-wide by 2030

How We'll Get There

How We'll Measure Progress

Strategy TL2-A:

Transition City fleet to electric vehicle and alternative fuels (hybrid/ hybrid electric, plug in hybrid electric).

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported

Adoption of electric and other alternative no-fossil-fuel vehicles is a core requirement of reducing GHG emissions associated with City operations. Beyond reduced emissions, electrification of municipal fleets have a number of benefits including improved air quality, decreased fuel costs, decreased maintenance requirements, and even improved driver safety.

Initial Actions

- TL2-A-1 Introduce a policy to replace City fleet vehicles and buses with electric and hybrid options at the time of replacement, and require emissions standards, testing and biofuel preference for any combustion vehicles remaining in the fleet.

Strategy Expected Benefits

Reduced Costs

Reduced Pollution



Strategy TL2-B:

Support and encourage electric vehicle and alternative fuel (hybrid/ hybrid electric, plug in hybrid electric) vehicle adoption citywide.

Reported "carpool" commuter transportation data—US Census, Annual VMT data reported

Electric vehicles (EVs) are a critical component of meeting Bloomington's long-range emission reduction goals, in fact, meeting those goals will not be possible without a transition to alternative fuel vehicles. While no greenhouse gas emissions directly come from EV, short-term transition to EV's in Bloomington will have limited overall emissions decrease due to the relatively high emissions factor associated with Bloomington area electrical generation which is still significantly produced from fossil fuels. However, the GHG reduction benefits of EV's will continue to rapidly increase in the Bloomington area as electric grid goals are achieved. Additionally, other co-benefits of EV transition such as lowered vehicle operation costs and improved local air quality will be leveraged even in early transitions.

Initial Actions

- TL2-B-1 Coordinate with Monroe County and State of Indiana to establish an annual auto registration reporting process to monitor the adoption rate of Electric Vehicles in the City.
- TL2-B-2 Create an Electric Vehicle (EV) Action Plan to guide access to chargers on City property and citywide, explore alternative technologies like Smart cable technology and streetlight/ev charger integration, address barriers to charging for garage-free homes and rental properties, increase use of EVs in car sharing programs, assess options to lower EV and EV charger implementation costs, and recommend an EV charging amendments to the Unified Development Ordinance to support EV plan.
- TL2-B-3 Support electric car charging station infrastructure in new commercial and multifamily housing during the initial construction phase by providing information on appropriate conduit and electrical panel considerations as a part of permit application process. Collaborate with electric utility to develop and provide information on utility, local, State, and Federal incentives supporting EV infrastructure.

Strategy Expected Benefits

Reduced Costs

Improved Air Quality



Reduced GHG Emissions

Reduced Pollution



Transportation and Land Use

Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as reduction of single-occupancy auto use, can save money for the community. The estimated community savings of the goals for this section include:

Goal TL1 Decrease VMT by 8%:

\$69,318,961

(Based on AAA calculated auto use cost per mile and 2020 Bloomington Transit pass costs)



Goal TL2 Increase EV utilization to 15% of VMT

\$20,424,533

(Based on AAA calculated auto use cost per mile and 2020 Bloomington Transit pass costs)



Estimated Cumulative Savings Potential

\$89,743,494

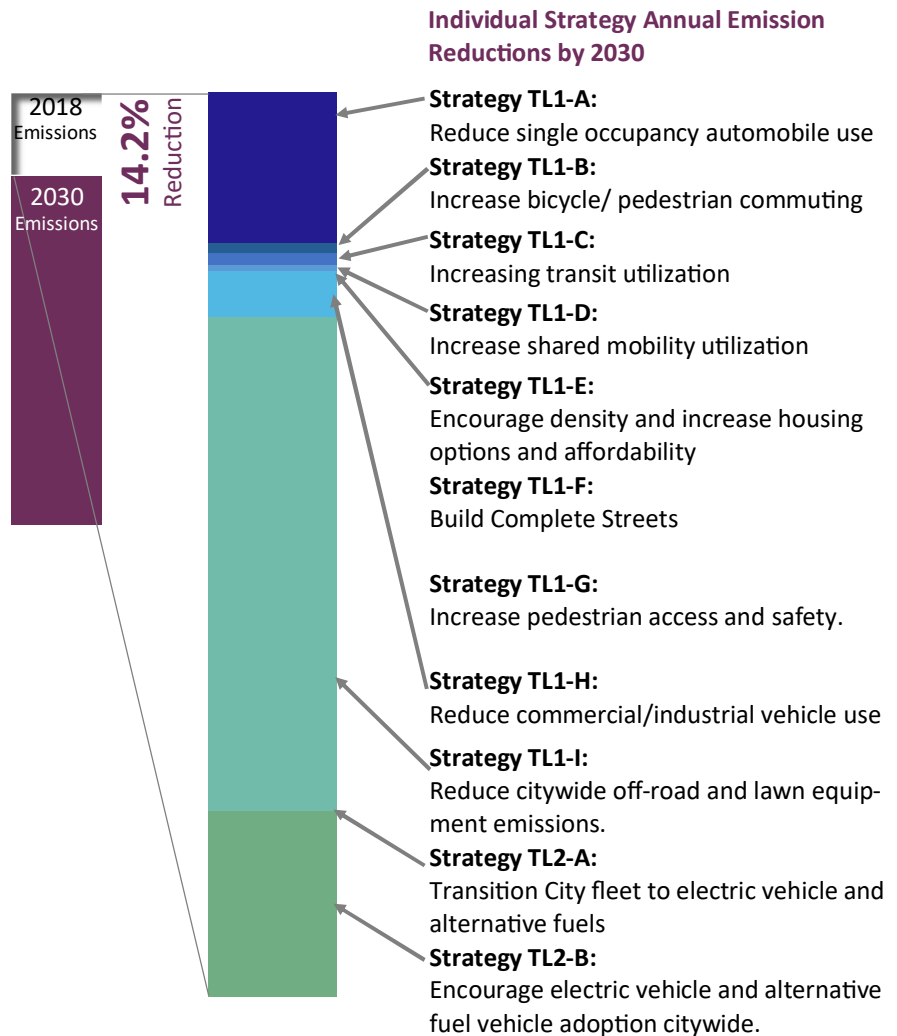
\$2,905
per household

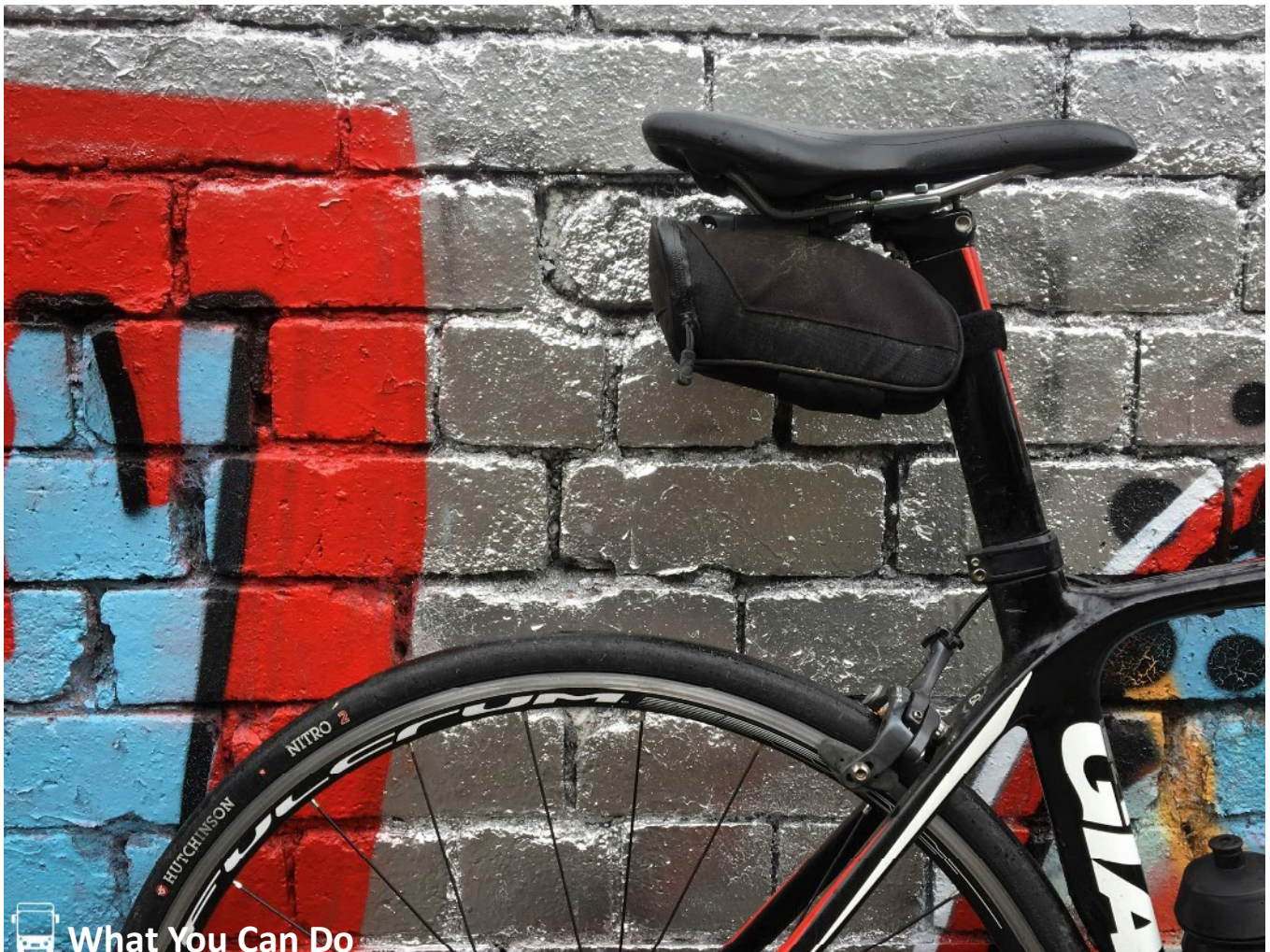
Planned Transportation and Land Use GHG Emission Reductions

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 28,037 metric tons (MT) by 2030 - a 14.2% reduction over 2018 levels.

This is equivalent to eliminating **550 million** cubic feet of man-made greenhouse gas atmosphere annually by 2030.





What You Can Do

- Take a walk, ride a bike, or take public transit. Leaving your personal vehicle behind when commuting or running errands can make a big difference for your carbon footprint and can also be a healthy and enjoyable alternative to driving.
- Commit to biking, walking, or taking public transit to work at least once a week.
- Avoid driving alone where possible. Ride transit, carpool, walk, and/or bike.
- If possible, telecommute or carpool to avoid transportation emissions.
- Purchase a fuel-efficient vehicle. When purchasing your next personal vehicle, consider more efficient alternatives such as hybrid or electric vehicles. Explore existing incentives to save money on purchasing an electric vehicle: <https://www.duke-energy.com/energy-education/energy-savings-and-efficiency/electric-vehicles>.
- Reduce your air travel; Consider alternative travel options that are less impactful.
- Replace your gas powered lawn and off-road equipment with electric.
- Buy carbon credits to offset your impact: Can't avoid the trip? Buy a credit to help mitigate the impact.
- Own a business? Explore how you can offer your employees mode-neutral commute incentives (<https://www.vtppi.org/tdm/tdm8.htm>)



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Section 03 Energy and Built Environment



[Click here to return to TOC](#)



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Energy and Built Environment

Why Energy and Built Environment Is Important

Building construction and their operations can have extensive direct and indirect impacts on the environment, society, and economy. Buildings use significant resources (energy, water, raw materials, etc.), generate waste (occupant, construction, and demolition), emit potentially harmful atmospheric emissions, and fundamentally change the function of land, and the ability of that land to absorb and manage water.

Building energy use is a major contributor to greenhouse gas (GHG) emissions. The Building Energy sector includes all residential, commercial, and industrial buildings. Greenhouse gas emissions from this sector come from **direct emissions** – from fossil fuels burned *on-site* for heating or cooking needs – as well as **indirect emissions** – from fossil fuels burned *off-site* in order to supply that building with electricity. Building design plays a large role in determining the future efficiency and comfort of facilities. Increasing energy efficiency can help reduce GHG emissions and result in significant cost savings for both homes and businesses. The Bloomington community can also achieve environmental, social, and economic benefits through enhancements to the built environment.

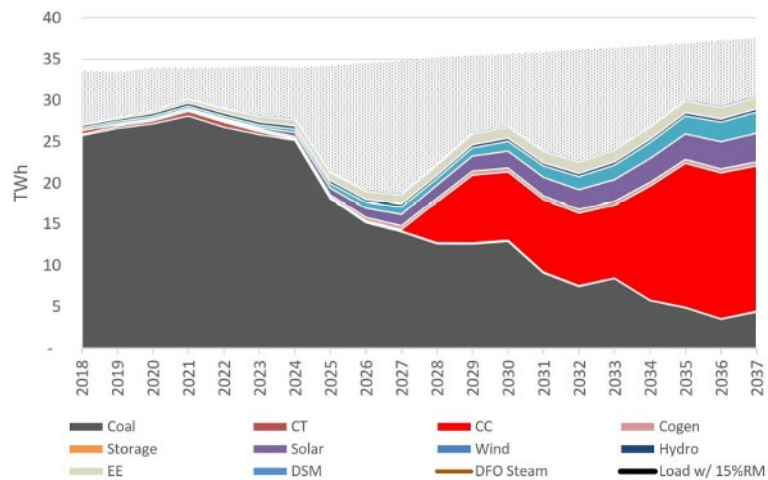
The Energy and Built Environment sector contributes 15.4% of citywide GHG emissions for the City of Bloomington. Within this sector, the share of residential consumption is 37.9%, commercial and government buildings is 43.7%, and industrial share is 18.4%.

2018 Bloomington Energy Sector Breakdown



The current fuel mix used to generate electricity by City of Bloomington’s electricity utility, Duke Energy, is heavily coal based with over 61% derived from coal, 37% from natural gas, and less than 1% combined for hydro, wind, and solar. According to Duke Energy’s 2018 Integrated Resource Plan, the projected energy mix of their portfolio is anticipated to decrease reliance on coal, with a significant increase in natural gas and some increase in solar and wind through 2037. This planned shift in energy portfolio will help contribute to Bloomington’s GHG reduction goals, however, will not be enough to meet the reductions needed.

Duke Energy Portfolio Energy Mix Projection



Advancing significant GHG emission reductions in the Energy and Built Environment sector will require a focus on reduced coal and fossil fuel use in the generation of electricity and building heating systems. The success of Duke Energy reducing the use of fossil fuel use in the generation of grid electricity, increased implementation of distributed (on-site) renewable energy citywide, and improved energy efficiency will be key in Bloomington reaching its goal of a 40% reduction by 2030.

Climate Change Considerations



Climate Impacts

This sector impacts climate change through the combustion of fossil fuels (coal, natural gas, heating oil, propane) to generate electricity and heat/cool our buildings.



Climate Hazards

Hazards to Energy and Built Environment include damage to buildings and energy grid infrastructure from extreme weather and flooding, increased power outages, and increased energy demand and cost expenditure due to rising temperatures and weather variability.

Energy and Built Environment

Equity Considerations

- Often, families that live in properties that are not energy efficient are also those that can least afford high-cost utility bills. These households may lack the ability to pay for energy efficiency improvements or access renewable energy options.
- Renters of both single family homes as well as multi-family housing usually do not have the ability to implement energy efficiency measures to the buildings they live in to gain the benefits of energy efficiency. Energy efficiency retrofits are typically in the hands of the landlord while the costs associated with the resulting energy use are usually paid by the occupant.
- Families with fewer resources must dedicate a disproportionately larger share of their income towards energy costs. This energy access inequity exacerbates other vulnerabilities including exposure to heatwaves and other climate vulnerabilities. Families sometimes are forced to forego basic access to service altogether - an estimated 70 households in Bloomington go without heating fuel of any type.
- Air pollution, mainly from fossil energy use, disproportionately impacts low income and communities of color due to community locations and physical characteristics.

Sector Goals

Goal EB 1

Increase distributed renewable energy to 18% of citywide consumption by 2030

Goal EB 2

Increase energy efficiency citywide 16% for electricity and 2% for natural gas by 2030

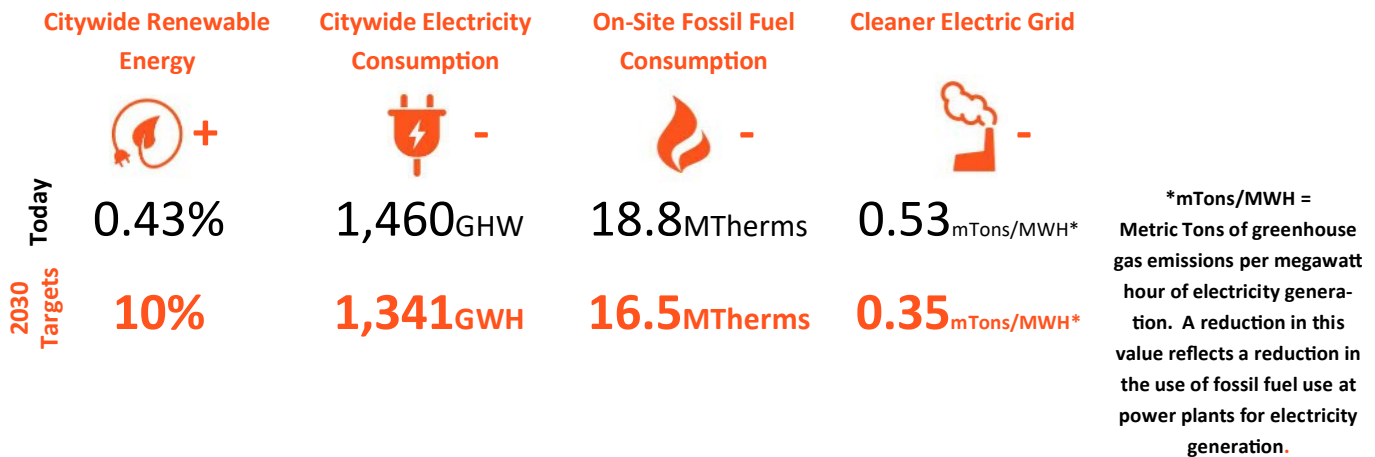
Goal EB 3

Support decarbonization of the local electricity grid

Goal EB 4

Promote "fuel switching" to reduce on-site fossil fuel use in the building sector 3% by 2030

Energy Mix Targets Supporting Sector Goals



Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Energy and Built Environment section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)



Goal EB1 Increase distributed renewable energy to 18% of citywide consumption by 2030 (estimated 170MW total installed capacity)

How We'll Get There

How We'll Measure Progress

Strategy EB1-A:

Increase solar on City facilities 20% by 2030

Total on-site renewable energy capacity installed, renewable energy credits (REC) purchased

The City of Bloomington is a leader in on-site solar installations in the region with solar installed on 39 of the City's facilities and sites. City solar arrays generated 3 GWH of electricity in 2019, or approximately 70% of City building electricity consumption in 2018 or 10.8% of City operations electricity consumption in 2018 (including water and wastewater processing). Identifying additional solar installation potential, including ground mounted arrays, "carport" arrays, and remaining cost effective rooftop array locations can increase the City's renewable energy portfolio. An increase of 20% on-site solar generation would result in 80% carbon-free City facility electric consumption.

Initial Actions

- EB1-A-1 Continue implementation of building on-site renewable energy upgrades on city facilities, including piloting net zero energy retrofits. Conduct a detailed "Renewable Energy Master Plan" for all primary city facilities which have not yet already achieved renewable energy meeting 100% annual energy demand. Plan to incorporate strategies to address electricity storage, energy resilience, emergency operations, and provide an implementation plan to achieve on-site renewable energy target and outline options to achieve 100% renewable energy for all city facilities (on-site and off site options).
- EB1-A-2 Establish a policy which requires all new construction and significant renovation projects for City facilities to be constructed to meet "Solar Ready" requirements and to include a solar feasibility assessment and project option for inclusion of on-site solar. "Return on Investment" assessment to include a localized Cost of Carbon. See City's Solar Ready Guidelines: <https://palebluedot.llc/bloomington-solar-ready-guide>

Strategy Expected Benefits

Reduced Costs



Improved Energy Resilience



Jobs / Economic Development



Reduced GHG Emissions



Strategy EB1-B:

Support and accelerate installation of on-site solar PV citywide

Total citywide on-site renewable energy capacity installed.

Over 420 solar PV's are currently installed in Bloomington for a total of 5 megawatts (MW) in nameplate generating capacity (based on Solar Indiana Renewable Energy Network data February 2020). Residential arrays are 44%, government facility arrays are 39%, commercial and industrial arrays total 11.6%, and utility solar installations are 5.4% of the total existing installed capacity. Fewer than 1.5% of households and 1.75% of commercial/industrial establishments have on-site solar installed indicating significant opportunity for increasing on-site solar installations citywide.

Initial Actions

- EB1-B-1 Identify the "Solar Top 50" commercial/industrial properties within the city and produce detailed solar feasibility assessments for each site. Assessments to include potential solar generation and economic performance and return on investment estimates, information on financing and ownership models, and next step resources. Provide solar assessment reports to properties and conduct an informational workshop to assist building owners and businesses in understanding the assessments and next step potential. "Solar Top 50" assessment effort could be repeated annually, particularly through 2025

Strategy Expected Benefits

Reduced Costs



Improved Energy Resilience



Jobs / Economic Development



Reduced GHG Emissions



Goal EB1 Increase distributed renewable energy to 18% of citywide consumption by 2030 (estimated 170MW total installed capacity)

How We'll Get There

How We'll Measure Progress

Strategy EB1-B:

Support and accelerate installation of on-site solar PV citywide
(continued)

Total citywide on-site renewable energy capacity installed.

Initial Actions

- EB1-B-2 Sponsor a community-wide "Solarize" program for commercial and Industrial group purchase of Solar PV. Include an invitation to participate to all building sites included in the "Solar Top 50" feasibility effort. (goal, installed capacity equal to 1.8% of commercial/industrial sector electrical consumption annually) <https://www.nrel.gov/docs/fy12osti/54738.pdf>
- EB1-B-3 Continue to sponsor a community-wide "Solarize" program for residential group purchase of Solar PV. (goal, 250 homes installed annually) <https://www.nrel.gov/docs/fy12osti/54738.pdf>
- EB1-B-4 Partner on a county-wide solar strategy to expand solar, especially to low and moderate income households. (goal, 100 low income homes installed annually)

Strategy Expected Benefits

Reduced Costs



Jobs / Economic Development



Improved Energy Resilience



Reduced GHG Emissions



Strategy EB1-C:

Improve energy policy.

Reported "drive alone" commuter transportation data—US Census, Annual VMT data reported

According to the Department of Energy, complex or poorly-defined local government processes can add up to \$2,500 to the cost of solar pv installations. Completing SolSmart designation can help municipalities simplify and making approval processes more efficient which, in turn, reduces costs for solar developers, installers, and City operations. In addition, policies which protect the ability of one property to continue to receive sunlight across property lines without obstruction from another's property are critical to ensure long-term viability of solar resources for property owners.

Initial Actions

- EB1-C-1 Complete the SolSmart process to streamline permitting for renewable energy installations and assist in reducing solar project "soft costs" related to City solar processes. Achieve a SolSmart Gold rating by 2025
- EB1-C-2 Establish Solar Access Ordinance and policies which recognize changing conditions due to the proliferation of residential rooftop solar energy systems.

Strategy Expected Benefits

Reduced Costs



Improved Community Equity



Improved Energy Resilience



Reduced GHG



Goal EB2 Increase energy efficiency citywide 16% for electricity and 12% for natural gas by 2030

How We'll Get There

How We'll Measure Progress

Strategy EB2-A:

Increase total City owned building electrical energy efficiency 16% for electricity and 12% for natural gas by 2030

Annual City operated facility electricity and natural gas consumption reported.

The City of Bloomington facilities use approximately 4,550,000 kWh of electricity and 245,000 therms of natural gas annually. Executing energy efficiency improvements and exploring operational changes, particularly for "plug loads", can continue to improve the City's energy efficiency. Reducing City facility electricity consumption to 3,822,000 kWh and 206,000 therms could save up to 16% of the City's annual energy costs.

Initial Actions

- EB2-A-1 Update the City's Green Building Program policy to include clear energy reduction requirements to be measured annually during the building's operation (such as "achieving and maintaining a minimum ENERGY STAR rating of 75, and built to meet or exceed IGCC code"). Consider increasing the minimum LEED design standard to Gold. Invite County, School District, and other public agencies located within the City to participate in City's Green Building Program standards.
- EB2-A-2 Establish a policy to require all primary City facilities to benchmark and disclose annual energy consumption. Invite County, School District, and other public agencies located within the City to participate in City's facilities benchmarking and disclosure effort.
- EB2-A-3 Conduct a Building Energy Audit on all primary City owned facilities without energy audits conducted within last 5 years. Fully implement recommendations of these and previous audits. Prioritization should be given to the City's largest energy consuming sites.

Strategy Expected Benefits

Reduced Costs

Reduced GHG Emissions



Improved Building Quality and Comfort

Jobs / Economic Development



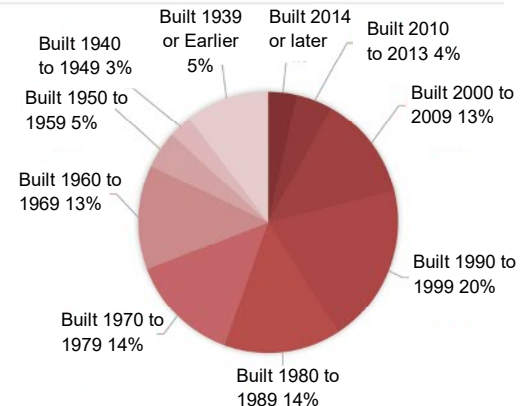
Strategy EB2-B:

Support and accelerate energy efficiency citywide.

Annual citywide electricity and natural gas consumption reported.

Compared to State of Indiana averages, electric consumption in Bloomington is 142% of the residential average (per household) and 87% of the commercial and industrial average (per job) while natural gas consumption is 76% of the residential average and 8% of the commercial and industrial average. The deviation from State averages in the residential sector may be a result of a higher-than state average for houses using electric heat (51.6% in Bloomington compared to 29.9% Statewide) while the difference in the commercial and industrial sector may be due to Bloomington's deviation from the State average share of types of employment - on a per capita basis Bloomington's commercial/government employment is 129% and industrial employment 25% State averages. Significant energy savings are likely possible in all sectors. According to the US Energy Information Administration, homes built after 2000 used 15% - 40% less energy than homes built before 1990. Nearly 60% of all homes in Bloomington were built prior to 1990.

Bloomington Homes by Decade Built



Initial Actions

- EB2-B-1 Adopt, implement, and promote a Commercial Building Energy Benchmarking and Disclosure ordinance for all public buildings and all commercial buildings 30,000 square feet and larger. <https://www.energystar.gov/buildings/program-administrators/state-and-local-governments/see-federal-state-and-local-benchmarking-policies>

Strategy Expected Benefits

Reduced Costs

Reduced GHG Emissions



Goal EB2 Increase energy efficiency citywide 16% for electricity and 12% for natural gas by 2030

How We'll Get There

How We'll Measure Progress

Strategy EB2-B:

Annual citywide electricity and natural gas consumption reported.

Support and accelerate energy efficiency citywide. (continued)

Initial Actions

Strategy Expected Benefits

- EB2-B-2 Work with utilities to incentivize and promote replacement of inefficient equipment before end-of-life, and facilitate the bulk purchasing of efficient equipment. Goal: achieve 250 households replacing equipment annually
- EB2-B-3 Establish an Energy Efficiency Upgrade cost sharing incentive program providing a 25% matching grant for qualified buildings and applicants. Target utilization by 60 businesses annually. Example program: <http://www.minneapolismn.gov/environment/greencostshare> <http://www.minneapolismn.gov/www/groups/public/@health/documents/webcontent/wcmssp-221550.pdf>
- EB2-B-4 Work with partner organizations to promote building retrocommissioning and operation and maintenance practices that improve affordability, comfort, indoor air quality and energy efficiency in all commercial and multifamily buildings. Target 60 businesses commissioned annually
- EB2-B-5 Collaborate with utilities, community partners, and rental property owners to promote and provide comprehensive audits followed by energy efficiency upgrades benefiting multifamily residents, with a particular focus on low-income communities. Target: Achieve 220 audits and upgrades annually.

Reduced Costs

Reduced GHG Emissions



Improved Building Quality and Comfort

Jobs / Economic Development



Strategy EB2-C:

Annual citywide electricity and natural gas consumption reported.

Increase net zero energy residential building stock to 1% of homes Citywide by 2030.

Net zero buildings are buildings with high energy efficiency that produce as much on-site renewable energy as they consume in a year. Net zero buildings tend to be high performance buildings that provide a higher level of occupant comfort and building health. According to a 2019 study by the Rocky Mountain Institute, net zero homes in the Indiana region average a return on investment of 12 years or less - after which they deliver "free" energy to their owners. As a part of this Climate Action Plan, a Net Zero Energy Guide and Solar Ready guide have been developed to assist Bloomington homeowners and commercial building owners in exploring and achieving a Net Zero building. (<https://palebluedot.llc/bloomington-net-zero-energy-guide>) (<http://palebluedot.llc/bloomington-solar-ready-guide>)

Initial Actions

Strategy Expected Benefits

- EB2-C-1 Promote, provide and distribute the City's Net Zero Energy Building Guide document to local home shows or remodeler showcase events, designers, homebuilder associations, and realtors. (<https://palebluedot.llc/bloomington-net-zero-energy-guide>) Include the City's Net Zero Energy Building Guide and Solar Ready Guideline documents on the City's Design Guidelines webpage (<https://bloomington.in.gov/utilities/review/design/manual>)
- EB2-C-2 Provide training on solar ready and net-zero strategies as found in the City's Net Zero Energy Building Guide and Solar Ready Guidelines to area builders with local builders association. Target 1% market coverage (130 homes) attending training annually. (<https://palebluedot.llc/bloomington-net-zero-energy-guide>) (<http://palebluedot.llc/bloomington-solar-ready-guide>)

Reduced Costs

Reduced GHG Emissions



Improved Building Quality and Comfort

Improved Energy Resilience



Goal EB3 Support decarbonization of the local electricity grid

How We'll Get There

How We'll Measure Progress

Strategy EB3-A:

Support Duke Energy's grid emissions goal of 50% below 2005 levels by 2030.

Reported annual electric grid GHG Emissions Factors.

The electric utility serving Bloomington, Duke Energy, has established a goal of reducing the GHG emissions associated with their electricity 50% by 2030 and to achieve net zero by 2050. Implementation of this goal by Duke Energy is critical in achieving the overall GHG emission reduction goals represented in this Climate Action Plan - should Duke Energy not accomplish this grid emission goal it could mean additional GHG emissions of 520,000 metric tons or more annually. <https://news.duke-energy.com/releases/duke-energy-aims-to-achieve-net-zero-carbon-emissions-by-2050>

Initial Actions

- EB3-A-1 Collaborate with Duke Energy for the development of a pilot/demonstration community solar project. Identify underutilized sites such as landfill, brownfield, superfund sites, or detention pond sites (for floating solar) and identify most advantageous site to develop and install pilot solar garden. Explore potential for cost benefits for low income subscribers with Renewable Energy Credits supporting Duke Energy's carbon reduction goals. (example projects at superfund sites: <https://www.epa.gov/superfund-redevelopment-initiative/alternative-energy-superfund-sites>)

Strategy Expected Benefits

Reduced GHG Emissions



Reduced Pollution



Strategy EB3-B:

Advocate for stronger state policy.

Status of State energy efficiency and renewable energy policies

Surrounding states have shown that policies such as the allowance of Property Assisted Clean Energy (PACE) programs, and improved solar policies such as allowance of Power Purchase Agreements, Solar Lease agreements, virtual net metering, aggregated net metering, and community solar laws can help "level the playing field" for improved energy efficiency and renewable energy. Collaborations with other communities and non-profit groups to help educate and guide State leaders towards making improved policy decisions can play a critical role in meeting Bloomington's goals.

Initial Actions

- EB3-B-1 Collaborate with other communities, industry, and state agencies to support the State establishing the enabling legislation for Commercial Property Assisted Clean Energy (C-PACE) and Residential Property Assisted Clean Energy (R-PACE) financing

Strategy Expected Benefits

Reduced GHG Emissions



Jobs / Economic Development



Improved Community Equity



Improved Quality of Life



Goal EB4 Promote "fuel switching" to reduce on-site fossil fuel use in the building sector 3% by 2030

How We'll Get There

How We'll Measure Progress

Strategy EB4-A:

Support and accelerate electrification of on-site fossil fuel combustion systems citywide

The reduction and elimination of on-site fossil fuel combustion community-wide is a critical long-term pathway towards GHG emission reductions. As the Bloomington area electric grid becomes cleaner (see goal EB3), the benefits of electrification will become more and more meaningful. According to US Census data, over 50% of Bloomington homes use electric heat, while technologies like conduction cook tops illustrate the effectiveness and improved safety of electricity in lieu of natural gas.

Initial Actions

- EB4-A-1 Conduct an "Electrification Assessment and Action Plan" to outline actions and priorities for electrification of all City facilities to move towards zero on-site fossil fuel combustion. Work with regional energy partnerships to implement Plan for all City facilities. Include new and existing buildings, explore strategies to address electricity storage, and create a case study to highlight and share challenges, solutions, and lessons learned to share with the broader community.

Reported Natural Gas consumption citywide, US Census data on homes using electric fuel for heating

Strategy Expected Benefits

Improved Air Quality



Reduced GHG Emissions



Strategy EB4-B:

Support and accelerate low/no carbon alternatives to on-site fossil fuel combustion

Renewable Natural Gas, RNG, is natural gas derived from organic waste material found in daily life such as food waste, garden and lawn clippings, and animal and plant-based material. RNG is considered a carbon-neutral fuel because it comes from organic sources that once absorbed carbon dioxide from the atmosphere during photosynthesis. RNG has even greater benefits when it's produced from organic waste that would otherwise decay and create methane emissions. In addition, RNG utilization provides a beneficial pathway for waste streams. Although combustion of biofuels and RNG does emit CO2 they are considered low or no-carbon fuels. Burning fossil fuels releases carbon that has been locked up in the ground for millions of years, while burning biomass emits carbon that is part of the biogenic carbon cycle. In other words, fossil fuel use increases the total amount of carbon in the biosphere-atmosphere system while bioenergy systems operates within this system; biomass combustion simply returns to the atmosphere the carbon that was absorbed as the plants grew.

Reported Natural Gas consumption citywide, reported Renewable Natural Gas consumption citywide

Initial Actions

- EB4-B-1 Work with Vectren to establish an option for Renewable Natural Gas sourced from regional sources for residential and commercial customers. Program to include tracking for citywide natural gas reporting for GHG inventories. Achieve 1% use by 2030 (30 households and 6 businesses per year)

Strategy Expected Benefits

Improved Energy Resilience



Jobs / Economic Development



Goal EB5 Increase financing options for Energy Efficiency and Renewable Energy projects citywide.

How We'll Get There

How We'll Measure Progress

Strategy EB5-A:

Promote Equity in Energy and Resource Costs and Ownership

Low income communities are among the most vulnerable to the impacts of climate change, the most likely to struggle with housing cost burdens, and the most likely to struggle with energy insecurity - low-income families are adversely impacted by rising utility costs with the poorest families spending between 7.2% and 10% of their incomes on electricity, while the average household pays less than half of that amount, or only 3.5% of their income on electricity. Low income households are also nearly 3 times more likely to rent rather than own their home (<https://www.zillow.com/research/homeownership-by-income-9419/>), meaning they have much less control over the energy efficiency of their home. In recent studies, ACEEE and EEFA found that 97 percent of the excess energy burdens within renter households could be eliminated by bringing their homes up to median efficiency standards while a 2015 study by the U.S. Department of Energy found that the value of energy upgrades is 2.2 times their cost. The less energy efficient a building is, the higher that value to cost ratio becomes. Supporting pathways to create equity in energy alleviates energy burdens for those that need relief the most as well as expands the market for energy efficiency and renewable energy investments.

Reported Natural Gas consumption citywide, US Census data on homes using electric fuel for heating

Initial Actions

- EB5-A-1 Promote the development of partnerships with low-income and supportive housing serving organizations, the County, and the Bloomington Housing Authority to ensure that efficiency and renewable programs, incentives, and practices, meet the specific needs of these populations.
- EB5-A-2 Collaborate with Duke Energy and Vectren to increase energy efficiency funding options for families including low-interest financing, on-bill financing, Pay As You Save, and other programs as determined to be most effective.
- EB5-A-3 Establish a Recover Forward energy fund to invest in energy efficiency and renewable energy projects with a focus on supporting improved equity in Renewable Energy and Energy Efficiency in the community.
- EB5-A-4 Collaborate with partners such as Citizens Action Coalition to establish and regularly host utility bill clinics similar to those offered by Minnesota Citizens Utility Board (<http://cubminnesota.org/>) to help residents understand their bills, discuss energy savings options, and hear about rebate/incentive availability and clean energy options.

Strategy Expected Benefits

Improved Community



Improved Community Equity



Jobs / Economic Development



Reduced GHG Emissions



Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as reduction of electrical and natural gas use, can save money for the community. The estimated community savings of the goals for this section include:

Residential Energy Efficiency and Renewable Energy Savings:

\$28,667,366
\$927
per household

(Based on current average energy rates applied to energy reductions and an estimated average 12 year ROI on solar)

Commercial/Industrial Energy Efficiency and Renewable Energy Savings:

\$33,582,724
\$662
per job

(Based on current average energy rates applied to energy reductions and an estimated average 12 year ROI on solar)

Estimated Cumulative Savings Potential

\$62,250,090

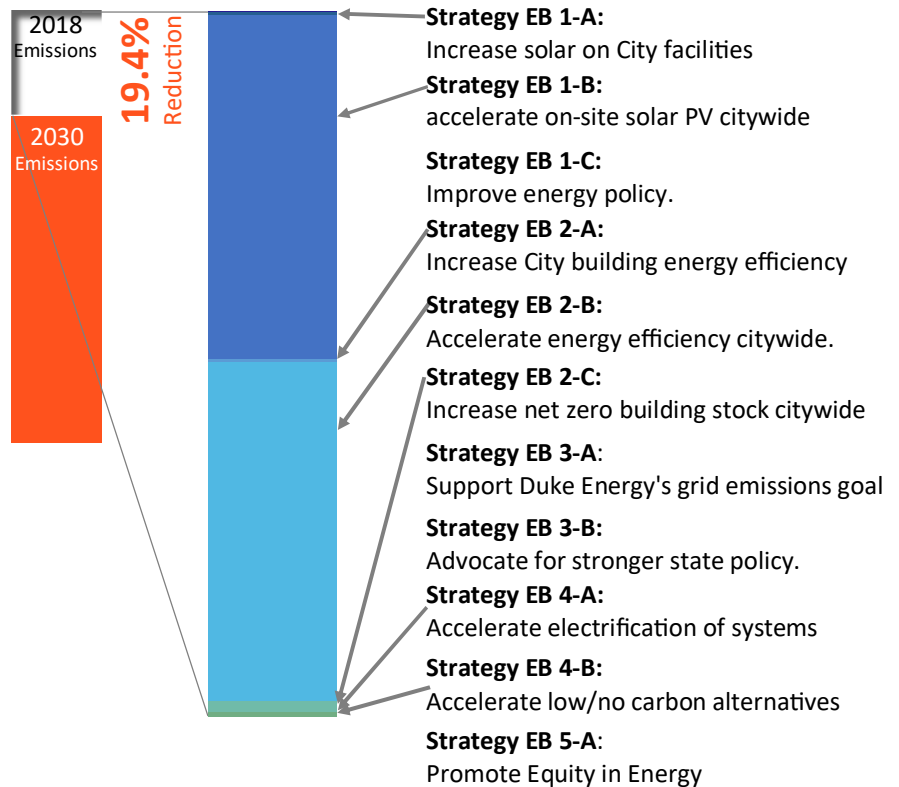
Planned Energy and Built Environment GHG Emission Reductions

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 186,891 metric tons (MT) by 2030 - a 19.4% reduction over 2018 levels.

This is equivalent to eliminating **3,667 million** cubic feet of man-made greenhouse gas atmosphere annually by 2030.

Individual Strategy Annual Emission Reductions by 2030





What You Can Do

- Take advantage of rebates offered by Duke Energy and Vectren and weatherize your home to protect the interior from the elements (as well as reducing your energy bills!) <https://www.duke-energy.com/find-it-duke/energy-efficient-rebates>, <https://www.vectren.com/savings/in-home/rebates>).
- Replace your shingles with a “cool roof” that is lighter in color, reflecting away light in the summer time and reducing your cooling loads.
- Turn off lights and electronics when not in use - or even better, unplug them. Some electronics continue to use power, even when turned off.
- Switch your lightbulbs to more energy efficient LED lights.
- Turn your heat down and A/C up by two degrees, especially if you are not home or away on a trip.
- Reduce your water heater temperature to 130° F to save energy and money on heating water.
- Schedule a free Home Energy Assessment through IPL to learn of opportunities for energy efficiency and weatherization.
- Seal air leaks and properly insulate windows to save up to 20% on heating and cooling bills, while also increasing the comfort of your home.
- Think small before you rent or buy. Consider what size home or business you need, and consider downsizing to avoid having to spend more on energy.



CITY OF BLOOMINGTON



Section 04 Waste Management



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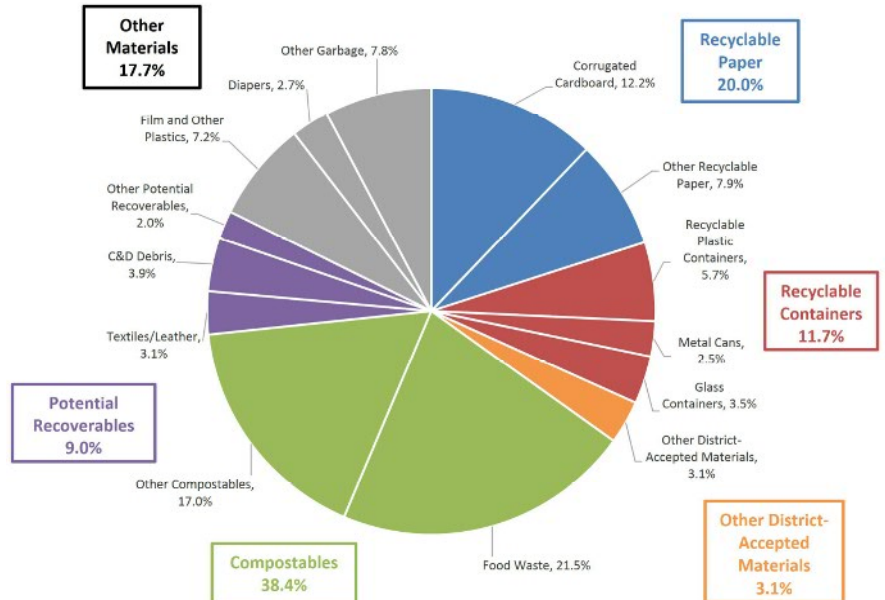
Why Waste Management Is Important

In Bloomington, solid waste contributed 6.3% of citywide greenhouse gas emissions in 2018. However, studies indicate that municipal solid waste sector has great potential to avoid emissions throughout the economy thanks to prevention and waste recovery. Landfills are the third largest anthropogenic (man-made) source of methane, accounting for approximately 11% of the estimated total global methane emissions.

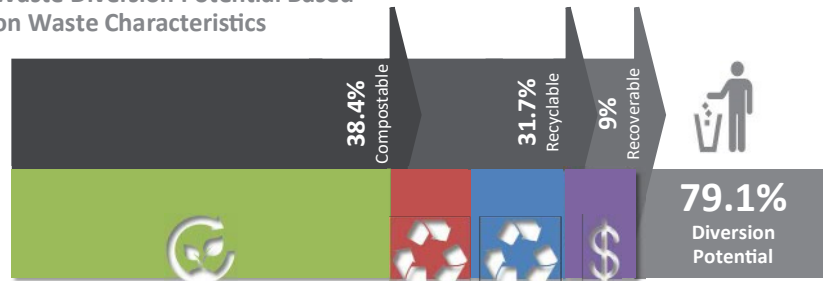
Habitat destruction, global warming, and resource depletion are some of the effects of our materials consumption. Recycling - converting discarded materials into new materials or putting them to beneficial use - is an important approach in mitigating these impacts and reducing the pollution caused by wasting. Recycling reduces the need for raw materials so that natural resources, and the environments in which they exist, can be preserved. Recycling creates manufacturing jobs, extends the value of materials, and conserves natural resources while reducing the need for landfill space.

Food discards and residuals that decompose in landfills release methane, a greenhouse gas that is at least 28 times more potent than carbon dioxide. This fact makes food wasting a significant contributor to solid waste greenhouse gas emissions. On the other end of the food supply chain, food production accounts for 26% of global emissions. In the United States, approximately 30% of the food produced is wasted - meaning nearly 8% of US emissions come from the production and distribution of wasted food.

Bloomington 2018 Mix Waste Characteristics (by weight)
Graphic Source: Monroe County Mixed Waste Processing Feasibility Study



Waste Diversion Potential Based on Waste Characteristics



Based on the mix waste characteristics, shown on the charts to the right, 38.4% of Bloomington waste (citywide private haulers) is compostable organics, 31.7% are recyclable materials, and 9% are potentially recoverable/reusable. Taken together, this indicates the waste stream has up to 79.1% which can be readily diverted to beneficial use.

Climate Change Considerations



This sector impacts climate change through combustion of fossil fuels in the collection and processing of materials, as well as the generation of methane from anaerobic decomposition of organic materials in landfills.



Climate Hazards

Hazards to the waste management system include damage to infrastructure from extreme weather and flooding.



Opportunities

As indicated in the Waste Diversion Potential diagram above, a significant portion of Bloomington's waste stream has the potential for being put to beneficial use while avoiding GHG emissions.

Waste Management

Equity Considerations

- Accessibility to recycling and composting programs may not be equally and readily available to all community residents and may also be impacted by other participation-related barriers, including awareness of programs, user fees, accessibility based on housing type, and language barriers.
- Populations that are situated very close to the landfill or composting facility may experience nuisance issues like bad odors and potential health issues unless mitigation actions are implemented.

Sector Goals




Goal WM 1

Increase landfill solid waste diversion by 30% by 2030 (26,500 ton reduction).

Goal WM 2

Educate, motivate, and empower the public to achieve waste reduction and diversion.

Solid Waste Targets Supporting Sector Goals

	Citywide Organics Diversion	Citywide Recyclables Diversion	Citywide Recoverable Material Diversion
Today (share of waste)	 - 38.4%	 - 31.7%	 - 9%
2030 Targets	26.9%	22%	6.3%



Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Waste Management section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)



Goal WM 1 Increase landfill solid waste diversion by 30% by 2030 (26,500 ton reduction)

How We'll Get There

How We'll Measure Progress

Strategy WM1-A:

Increase organics diversion by 30% by 2030 (from 38.4% of community mixed waste to 26.9%)

Reported organics processed at landfill, Waste mix reported by characteristics study

All organics collected at IU are hauled to Green Earth by JB Disposal Services. Yard waste generated by City Parks and Recreation, as well as organics collected from private residences and commercial customers is hauled by the private composting company, Earthkeepers, to Fable Farms. Compost drop off services are offered at one District owned facility for those with an Earthkeepers subscription. According to the 2018 Mixed Waste Processing Feasibility Study, most compostable waste is not being diverted from the landfill with the current system. Significant generators of food waste from non-residential sources in Bloomington include restaurants, grocery stores, food manufacturers, nursing homes, schools, and hospitals. Restaurants and grocery stores alone account for 93 percent of food waste from non-residential sources and represents a significant opportunity for improvement.

Initial Actions

- WM1-A-1 Create a pilot "Food Scraps Bag" pilot program to test food scraps composting collection across restaurant, commercial and residential customer base where food scrap bags are separated at landfill without separate compost bins and collection vehicles. <https://cutt.ly/tfBf5Dj>
- WM1-A-2 Establish a "Towards Zero Waste Certification" program to provide education to food retailers and restaurants on strategies to reduce waste and to promote businesses successfully achieving certification levels. Target: 20 additional businesses enrolled annually <https://carbonfreedining.org/> <https://true.gbci.org/> <https://www.crra.com/certification>
- WM1-A-3 Support edible food donation through coordination with the food bank and donations from City and community partner events. Explore expansion of effort by identifying food retailer and restaurant partners for increased participation and support.

Strategy Expected Benefits

Reduced Costs

Reduced GHG Emissions



Improved Community Equity

Improved Quality of Life



Strategy WM1-B:

Increase recyclables diversion by 30% by 2030 (from 31.7% of city mixed waste to 22%)

Reported recyclable material processed at landfill, Waste mix reported by characteristics study

The District manages five drop-off recycling centers throughout the County for use by its residents, as well as a pay as you throw and hazardous waste recycling program. Private haulers, such as Republic, also provide recycling services and collect commingled recyclables from for delivery to a material recovery facility in Indianapolis to be sorted, baled, shredded or granulated for purchase from brokers or end-user purchasers. If materials are not loose, clean, dry, or appropriately sorted, that decreases the feasibility of the items being recycled. Recyclable containers (plastic, metal, and glass) and recyclable paper items make up 31.7% of communitywide waste stream indicating a significant opportunity for increased diversion of materials being landfilled and an opportunity for increased beneficial use.

Initial Actions

- WM1-B-1 Ensure that recycling in schools, City buildings, public housing, and public spaces is fully implemented.
- WM1-B-2 Conduct outreach to determine what assistance may be needed to increase recycling and composting.

Strategy Expected Benefits

Reduced GHG Emissions

Jobs / Economic Development



Goal WM 1 Increase landfill solid waste diversion by 30% by 2030 (26,500 ton reduction)

How We'll Get There

How We'll Measure Progress

Strategy WM1-C:

Increase diversion of potential recoverables by 30% by 2030 (from 9% of city mixed waste to 6.3%)

Reported potential recoverable material processed at landfill, Waste mix reported by characteristics study

Potentially recoverable materials are materials that have the potential to be recovered or recycled, but are not currently collected for recycling at the District's collection centers or in the City's single stream recycling program. Some of these materials, such as textiles/leather and construction and demolition debris, would require source separation and/or additional processing to recover, rather than recovery through mixed waste processing. Outreach and partnering with waste sources (businesses, households, etc) to support the identification of recoverable materials and explore re-use and recycling pathways represent an opportunity to increase diversion of these materials.

Initial Actions

- WM1-C-1 Develop and fund a waste audit and diversion assistance program for businesses. Program to support businesses in establishing tracking and reporting waste streams, identify reduction, diversion, beneficial use opportunities, identification of potential financing sources, and connect businesses with energy audit and other resources in support of full CAP goals. Target: 60 business waste audits completed annually. Example programs: <https://www.mnchamber.com/your-opportunity/waste-wise> <https://www.portland.gov/sustainabilityatwork>
- WM1-C-2 Conduct a Beneficial Use Study to identify greatest beneficial use opportunities present in current City solid waste streams. Study to estimate potential return on investment and identify job and economic development potential associated with opportunities. Research/identify pilot project opportunities to explore capture of benefit.

Strategy Expected Benefits

Reduced Costs

Reduced Pollution



Jobs / Economic Development



Reduced GHG Emissions



Strategy WM1-D:

Support waste reduction through policy and operational refinements

Status of Zero Waste policy, PAYT trash rate establishment, Universal Waste Ordinance, and other policies supporting significant waste diversion.

According to a 2011 study ("Policy versus Practice in Municipal Solid Waste Diversion" Canadian Journal of Urban Research), municipalities typically do not pursue policies supporting aggressive landfill diversion and increased beneficial use of waste streams until their landfill capacities reach crisis levels. Establishing visionary policies and operational refinements to advance meaningful landfill diversion and beneficial use of waste streams, therefore, represents a significant environmental opportunity for Bloomington, as well as an opportunity to avoid long-term landfill capacity crisis and to model for other communities the benefit of visionary policy establishment in lieu of waste management by crisis management more frequently experienced by other communities.

Initial Actions

- WM1-D-1 Establish a Zero Waste policy for City operations that outlines increasing incremental annual waste reduction goals charting a path to Zero Waste. Policy to require that outside users of City facilities also follow Zero Waste policy and will modify the event permit application to require the inclusion of recycling and composting at events.

Strategy Expected Benefits

Improved Quality of Life

Improved Community Equity



Goal WM 2 Educate, motivate, and empower the public to achieve waste reduction and diversion.

How We'll Get There

How We'll Measure Progress

Strategy WM2-A:

Create, implement, and promote public awareness and education campaigns.

Status of communication, marketing, and education campaigns

Landfill alternatives have many benefits including GHG emissions reductions, utilization of beneficial materials, and potential for economic development. If community residents and businesses do not properly utilize these diversion programs or limit their consumption of disposable goods, the programs developed will make far less of an impact than they are capable of. A focus on a robust, clear, and consistent message to support education, awareness, and mormotion of utilization of resources available can support achieving better success.

Initial Actions

WM2-A-1

Create a comprehensive communication campaign to provide standardized information and communications on waste reduction, recycling, and organics collection options to reach the residential sector. Example campaigns: City of Portland Be Cart Smart, City of Fayetteville Solid Waste Diversion and Recycling Education Plan: <https://palebluedot.llc/bloomington-cap-policies>

Strategy Expected Benefits

Reduced Costs

Improved Quality of Life



Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as reduction of electrical and natural gas use, can save money for the community. The estimated community savings of the goals for this section include:

Organics/Food Waste Diversion Savings:

\$77,608,211
\$913
per capita

(Value per ton diverted is average value for prevention and recovery strategies based on "A Roadmap To Reduce US Food Waste" by ReFED)

Commercial/Industrial Energy Efficiency and Renewable Energy Savings:

\$1,567,500

(Business waste savings based on MN WasteWise reported average business savings)

Estimated Cumulative Savings Potential

\$79,175,711

Planned Energy and Built Environment GHG Emission Reductions

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 11,085 metric tons (MT) by 2030 - a 13.6% reduction over 2018 levels.

This is equivalent to eliminating **218 million** cubic feet of man-made greenhouse gas atmosphere annually by 2030.

Individual Strategy Annual Emission Reductions by 2030



- Strategy WM 1-A:**
Increase organics diversion by 30%
- Strategy WM 1-B:**
Increase recyclables diversion by 30%
- Strategy WM 1-C:**
Increase diversion of potential recoverables by 30%
- Strategy WM 1-D:**
Support waste reduction through policy and operational refinements
- Strategy WM 2-A:**
Create, implement, and promote public awareness and education campaigns





What You Can Do

- Challenge yourself and your household to eliminate at least 30% of your food waste. Minimize your food waste by first eating what you already have in your fridge. Meal planning and making grocery lists can also reduce your food waste.
- Bring your own reusable produce and tote bags when grocery shopping to avoid using plastic bags.
- Challenge yourself and your household to increase your recycling capture by at least 30%. Minimize your food waste by first eating what you already have in your fridge. Meal planning and making grocery lists can also reduce your food waste.
- Make sure to wash and wipe dry your recyclable goods, so as to lower contamination in recycling streams.
- Avoid getting food “to-go” to prevent the use of Styrofoam containers, single-use plastics utensils and plastic bags.
- Purchase reusable goods like durable water bottles, cutlery, and to-go containers to avoid using single-use plastics.
- Never throw hazardous household waste, like batteries and chemicals, in the trash. Dispose of them in an environmentally responsible way.
- Buy gently used, second-hand clothing and avoid "fast fashion."
- Keep a bag in your car to collect trash and prevent littering.





Section 05 Water and Wastewater



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Why Water and Wastewater is Important

Water is at the core of climate change and sustainable development. Quality water is vitally important for socio-economic development, maintaining healthy ecosystems, and for human survival. Water is central to the production and preservation of a wide range of services benefiting people. Our processing of water is also linked to our greenhouse gas emissions. Water related energy use totals 13% of US electricity consumption and has a carbon footprint of at least 290 million metric tons. Meanwhile, wastewater treatment is responsible for 3% of global GHG emissions.

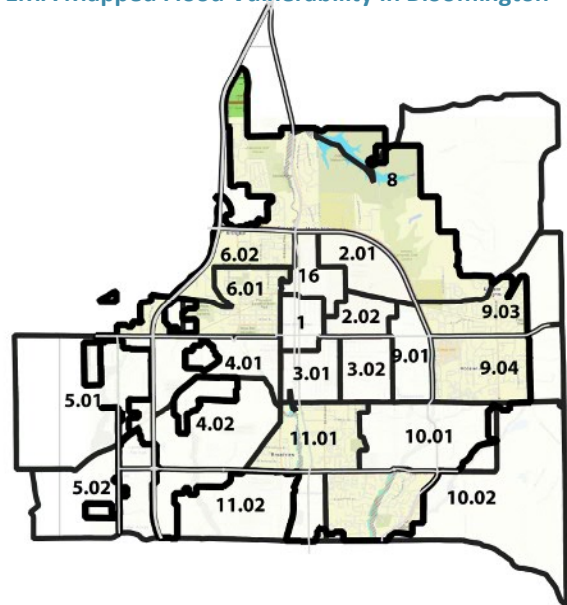
Water is also at the heart of adaptation to climate change - climate change, particularly in the Midwest will be closely linked to changes in precipitation including increased likelihood of drought combined with increased instance of heavy rain events, flooding, and flash flooding. On average across the Wabash River Basin, precipitation is projected to be 3% higher in the 2020s under a high-emissions scenario compared to the 1971-2000 average (FutureWater Indiana). Many impacts of climate change also increase stress on our water systems, increase water pollution potential, and place more risk on maintaining safe water resources. Water is an irreplaceable, critically important resource fundamental to the well-being of our communities. Water can only be considered renewable with high quality best water management practices in place.

According to *“Hoosiers’ Health in a Changing Climate: A Report from the Indiana Climate Change Impacts Assessment”*:

The increased frequency and severity of precipitation, as well as the timing in the spring and winter, considerably increase the risk of flooding, especially in low-lying areas throughout the state. These flood events will be responsible for fatal and non-fatal injuries and waterborne disease. Heavy storms can cause storm drains and sewage pipes to overflow and residential stormwater management systems (e.g., sump pumps) to fail. Contact with stormwater/wastewater has been correlated with increased rates of gastrointestinal illnesses. Dampness in homes, schools and other buildings caused by flooding can increase mold growth and lead to higher rates of asthma and allergies.

The graphic to the right illustrates FEMA flood vulnerable areas (see Bloomington Climate Risk and Vulnerability Assessment). The Census Tracts with the highest impact sensitivities are highlighted. This graphic indicates that many of areas of higher flood risk appear in the tracts with the highest impact sensitivities. These sections may benefit from flood mitigation strategies.

FEMA Mapped Flood Vulnerability in Bloomington



According to FloodFactor, 7% of all properties are at risk for flooding or approximately 1,500 properties out of 21,330 assessed, by 2300 the number will increase to 1,543 properties.

The City of Bloomington Utilities department (CBU) provides water to all Bloomington residents and businesses and sells water wholesale to nine rural water cooperatives. CBU provides over 1.6 billion gallons of water to 25,299 water customers directly plus most of the remainder of Monroe County through wholesale customers and also serves 22,574 sewer customers and provide stormwater management services for the entire city of Bloomington. In 2018, the water and wastewater sector contributed 1.14% of citywide GHG emissions with water distribution responsible for 5,847 metric tons and wastewater treatment accounting for 8,904 metric tons.

Climate Change Considerations



Climate Impacts

This sector impacts climate change through fossil fuel use to generate the electricity required to process and distribute water.



Climate Hazards

Hazards to the water and wastewater system include damage to infrastructure from extreme weather and flooding. Citywide hazards include increased flooding and flash flooding potential.

Equity Considerations

- Low-income neighborhoods frequently suffer more damage from flooding, according to studies by the National Academies of Sciences, Engineering and Medicine. The frequency and magnitude of heavy rain events is expected to increase as a result of a changing climate, making the future flooding impacts for at-risk neighborhoods potentially more acute
- Disadvantaged communities within cities often have denser populations, more impervious surfaces, and less open/green spaces. These areas can also be prone to flooding and sewer overflows. Stormwater management through the creation of open, green spaces serve to revitalize and promote health within these disadvantaged communities.

Sector Goals

Goal W1

Promote increased water conservation citywide.

Goal W2

Maintain source and drinking water quality through climate related challenges.

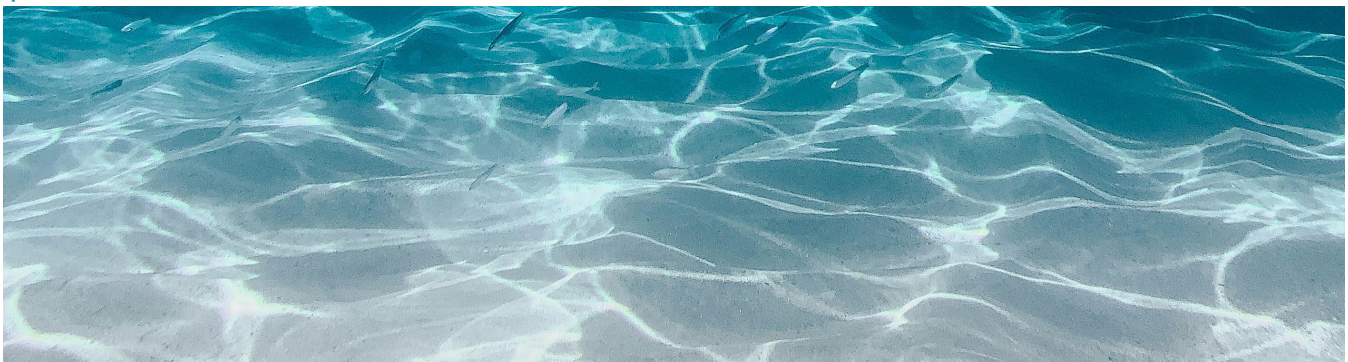
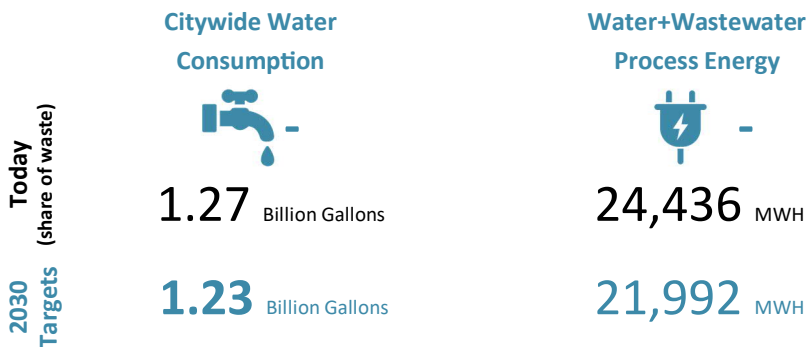
Goal W3

Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030.

Goal W4

Mitigate flood hazards and impacts.

Water and Wastewater Targets Supporting Sector Goals



Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Water and Wastewater section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)



Goal W1 Decrease water consumption by 3% by 2030

How We'll Get There

How We'll Measure Progress

Strategy W1-A:

Reported citywide water consumption

Promote increased water conservation citywide

Average per capita daily water consumption within the city was 96.2 gallons in 2016. The population of Bloomington and the surrounding area is anticipated to increase while water supplies are finite meaning we have an obligation to use our limited resources responsibly. Prudent water use practices will help ensure that future generations have access to clean and abundant water sources, despite growing populations and the lack of new supplies. Reducing per capita water consumption by 3% will conserve over 38 million gallons annually.

Initial Actions

- W1-A-1 Facilitate reduction of water use by top 20 customers. Request large institutions and businesses to identify specific opportunities for employees or customers to conserve water and incorporate water efficiency into internal operations
- W1-A-2 Accelerate the installation of low-flow water fixtures in residential homes and expand the program to commercial businesses. Goal: achieve 100 households and 10 businesses upgraded annually

Strategy Expected Benefits

Reduced Costs

Improved Community

Resilience



Strategy W1-B:

Reported citywide water consumption

Maintain and update city plans and standards in support water conservation goals

Reducing water consumption within City of Bloomington facilities supports citywide water conservation goals, provides opportunities to exhibit water conservation techniques, and will create operational cost savings for the City.

Initial Actions

- W1-B-1 Evaluate the potential to update the City's Green Building Program to include installation of rainwater collection systems at City facilities for graywater uses, and investigate opportunities for graywater reuse at existing and new City facilities and properties. Implement grey-water systems identified capable of reducing energy/water demand in other areas (for example, watering urban tree canopy to reduce heat island effect and air conditioning needs)

Strategy Expected Benefits

Improved Community

Protected / Enhanced

Resilience

Ecosystems



Goal W2 Maintain source and drinking water quality through climate related challenges.

How We'll Get There

How We'll Measure Progress

Strategy W2-A:

Water quality as reported through annual drinking water quality reports.

Maintain source and drinking water quality through climate related challenges.

Bloomington has a surface water source for drinking water, Lake Monroe. The Monroe Water Treatment Plant filters and cleans the water for public distribution. The MWTP is operated by the City of Bloomington Utilities Department. The Water Treatment Plant is a conventional settling/filtration facility and has several stages of disinfection before the water is sent out into the distribution system. According to the 2020 Annual Drinking Water Quality report, Bloomington water is within required levels of all 12 water contaminate measures, 5 of which are at or below "ideal" levels. <https://cutt.ly/zggXnII>

Initial Actions

- W2-A-1 Strengthen riparian/stream/wetland protection in local ordinances and regulations where feasible

Strategy Expected Benefits

Reduced Pollution Improved Community

Resilience



Goal W3 Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030

How We'll Get There

How We'll Measure Progress

Strategy W3-A:

Reported energy consumption by City water and wastewater systems.

Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030

According to the 2018 GHG Inventory, processing and distributing water within the city of Bloomington consumed 10,984,760 kWh annually. Meanwhile, wastewater collection and treatment consumed 13,450,909 kWh. Reducing energy use associated with water and wastewater treatment by 10% will save over 2.4 million kWh annually.

Initial Actions

- W3-A-1 Promote measures that reduce the energy needed to heat, treat and transport water, including continued evaluation of new hydroelectric and photovoltaic opportunities.

Strategy Expected Benefits

Improved Energy Resilience

Reduced GHG Emissions



Goal W3 Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030

How We'll Get There

How We'll Measure Progress

Strategy W3-B:

Status of biogas study.

Capture and use of wastewater energy potential

As recommended by the City of Bloomington Waste To Energy Taskforce, the City should further investigate the potential of an aerobic digester wastewater-to-energy installation at the Dillman Road Wastewater Treatment Plant. As outlined in the Taskforce's findings, an aerobic digester on site could produce approximately 325 kW of electricity, which is about 36% of the plant's average electrical consumption.

Initial Actions

- W3-B-1 Research into biogas opportunities at the City's wastewater treatment plant and explore opportunities for renewable natural gas development capacity.

Strategy Expected Benefits

Reduced Costs

Reduced GHG Emissions



Goal W4 Mitigate flood hazards and impacts

How We'll Get There

How We'll Measure Progress

Strategy W4-A:

Reported energy consumption by City water and wastewater systems.

Update design standards and plans for flood mitigation

According to "Hoosiers' Health in a Changing Climate: A Report from the Indiana Climate Change Impacts Assessment," Indiana will see an annual precipitation increase of 6-8% by 2050 with an increase in the likelihood of heavy downpours. Meanwhile, changes in precipitation patterns are projected to increase Indiana's drought potential severity index by 5% - meaning heavier rainfalls will likely be falling on harder ground more susceptible to increased water runoff and flash flooding. Maintaining community plans and design standards based on projected climate impacts will be key in minimizing flood hazard threats.

Initial Actions

- W4-A-1 Review and update public infrastructure design standards and the City's Stormwater Management Plan to meet Climate Change projections for Bloomington.
- W4-A-2 Perform a flood risk assessment using historical data and future precipitation forecasts to identify areas and critical infrastructure vulnerable to flooding

Strategy Expected Benefits

Improved Community Resilience



Strategy W4-B:

Reported energy consumption by City water and wastewater systems.

Increase green infrastructure capacities citywide

Green infrastructure strategies can build soil quality and improve the permeability (or absorbency) of the soil. The more permeable the surface, the less stormwater runoff there will be, reducing flood risks. Porous natural landscapes, such as meadows and forests, can soak up as much as 90 percent of the rain or snowmelt they receive. By reducing stormwater runoff and protecting floodplains, green infrastructure can help manage both localized and riverine floods.

Initial Actions

- W4-B-1 Promote native landscaping, restore and conserve habitat; encourage rain gardens on private property, avoid turf grass, and convert City-owned space to include stormwater absorption features. Tree selection should consider those on the "Adaptive Planting List" which will thrive in our future local climate

Strategy Expected Benefits

Improved Community Resilience

Protected / Enhanced Ecosystems

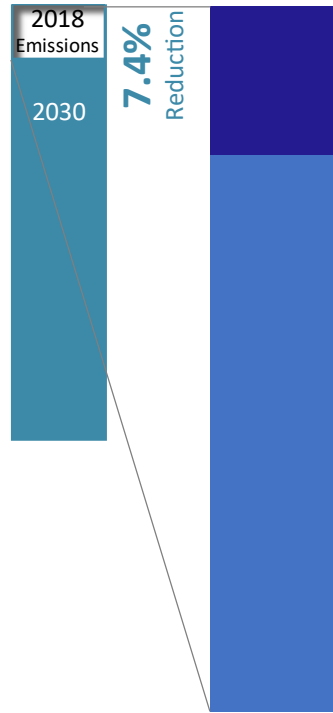


Planned Energy and Built Environment GHG Emission Reductions

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 1,090 metric tons (MT) by 2030 - a 7.4% reduction over 2018 levels.

This is equivalent to eliminating **21.4 million** cubic feet of man-made greenhouse gas atmosphere annually by 2030.



Individual Strategy Annual Emission Reductions by 2030

- Strategy W1-A:**
Promote increased water conservation citywide
- Strategy W1-B:**
Maintain and update city plans and standards in support water conservation goals
- Strategy W2-A:**
Maintain source and drinking water quality through climate related challenges
- Strategy W3-A:**
Reduce energy use associated with treating and transporting water and wastewater by 10% by 2030
- Strategy W3-B:**
Capture and use of wastewater energy potential
- Strategy W4-A:**
Update design standards and plans for flood mitigation
- Strategy W4-B:**
Increase green infrastructure capacities citywide





What You Can Do

- Trade your shower heads and faucets for low-flow, water-efficient options.
- Reduce or eliminate use of fertilizers and pesticides on lawns to protect surface water quality and ecosystem health.
- Purchase a State of Indiana DNR Environmental license plate, your money will go towards the protection of Indiana's land, waters and wildlife.
- Collect rainwater in rain barrels to water your lawn and/or plants.
- Convert lawn areas to native, drought resistant landscaping that does not require watering.
- Install a Smart Irrigation Meter to Prevent watering grass that doesn't need it.
- Pick up after your pets and don't blow grass and leaves into the street.





Section 06

Local Food and Agriculture



[Click here to return to TOC](#)



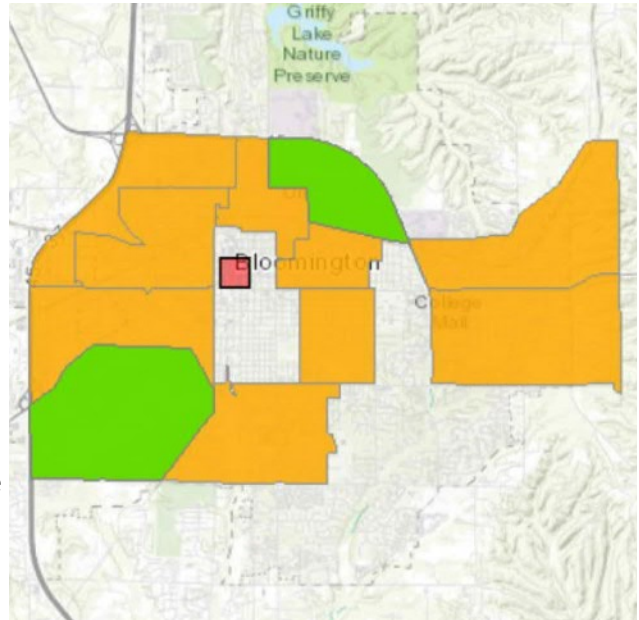
Why Local Food and Agriculture Are Important

Food and climate change are directly linked. For food or nutritionally insecure people, climate change is a threat multiplier. The extreme weather events, extreme temperature variations, changes in precipitation, changing soil temperatures and other climate impacts can impact crop yields as well as introduce interruptions in the current food processing and distribution system - disruptions that are likely to cause food availability or pricing fluctuations.

Many in Monroe County suffer from food insecurity, some Bloomington neighborhoods identified by the Bloomington Food Policy Council as being at particular risk for food insecurity included Crestmont, Reverend Butler, Walnut Woods, Maple Heights, and Broadview. Food insecurity continues to grow in the face of economic challenges with thousands of meals served every week from direct service providers in 2020.

On the map to the left, highlighted sections represent low-income census tracts at least 500 people or 33 % of residents are more than 1 mile (green sections) or 1/2 mile (orange) from the nearest supermarket (defined as a store containing all the major food departments necessary to provide full nutrition to a household) .

USDA Map of Potentially Food Insecure Census Tracts



Indiana is one of the most powerful agricultural states in the nation, ranked #10 in total production. However, more than 90% of the food consumed and processed in Indiana is imported from other states. Studies conducted by the Indiana State Department of Agriculture (ISDA) and the Indiana State Department of Health (ISDH) over the past eight years have outlined several reasons for this:

- a lack of agricultural diversity and midscale farms producing specialty crops in Indiana
- weak farm to buyer network connections
- lack of local or state policies that support purchasing of local food with public money
- few processing centers for value added food businesses

Though there are now three Farmer’s Markets serving the Bloomington area, there are limited retail and institutional purchasing outlets as part of the local food system.

Strengthening local food sources can address both climate change relationships with food and also supports small business local economy. Studies have indicated that nearly 32 jobs are created for every \$1 million in revenue generated by produce farms involved in a local food market, compared to only 10.5 jobs for those involved in wholesale channels exclusively. Healthy local food systems can also play a critical role in addressing food access vulnerability and food insecurity within neighborhoods of higher vulnerability. A robust local food system establishes additional supply chains and resilience to distribution disruptions, increasing overall community resilience.

Climate Change Considerations



Climate Hazards

Hazards to the local food and agriculture system include reduced crop quality and yield, vulnerability to pests and soil moisture as well as fluctuation in availability, food price volatility and change .

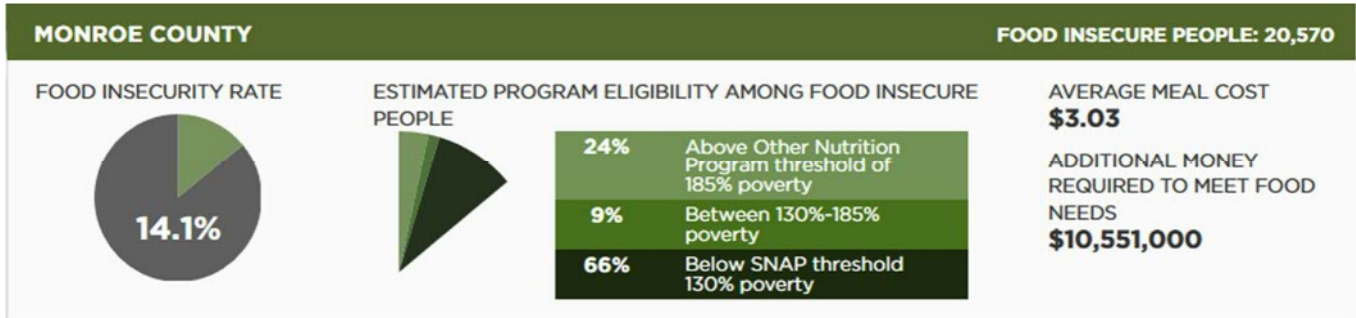


Opportunities

Increased capacity of local food and agriculture systems and improved farm-to-table approaches can reduce community food insecurity while creating local jobs and improved community resilience.

Equity Considerations

- People in low-income neighborhoods may have limited access to full-service supermarkets or grocery stores - an area known as a “food desert”. Over 14% of Monroe County households are food insecure – over 30% of those with incomes above assistance program thresholds.
- Studies have also shown that communities with fewer resources often have more outlets that promote unhealthy dietary behaviors such as fast food restaurants, and little access to affordable nutritious food. This condition is known as a “nutrition desert”.



(Graphic source: Feeding America)

Sector Goals

Goal FA 1:

Increase food and nutrition security citywide.

Goal FA 2:

Increase local agricultural resilience to climate shocks.

Goal FA 3:

Increase and stabilize local food market.



Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Local Food and Agriculture section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)



Goal FA 1: Increase food and nutrition security citywide.

How We'll Get There

How We'll Measure Progress

Strategy FA1-A:

Food insecurity reported in City and County

Address financial food insecurity

75% of food insecure individuals in Monroe County are low income with 88% of those individuals below 135% poverty level, indicating a clear relationship between financial insecurity and nutrition insecurity in the community.

Initial Actions

- FA1-A-1 Explore potential of collaborating with low cost produce providers to establish local food markets serving low income, vulnerable, and food insecure communities while addressing retail and commercial food waste. Potential partner: Daily Table <https://daillytable.org/>

Strategy Expected Benefits

Improved Community Resilience Improved Community Equity

Resilience



Equity



Strategy FA1-A:

Food insecurity reported in City and County

Improve food access

Individuals living with food insecurity are particularly vulnerable to impacts and risks of climate change. As indicated in the USDA Food Map, many sections of Bloomington have significant portions of the population who are economically stressed as well as having limited access to transportation and living 1/2 mile or further from a grocery store. Increasing food access will decrease food insecurity improve community resilience and adaptive capacity to climate impacts.

Initial Actions

- FA1-B-1 Conduct a detailed Food Security Assessment to determine food insecurity conditions within the City, areas with limited access to full service grocery stores and markets (particularly within areas of higher vulnerable populations), target areas within the City for improvement, and identify detailed strategies to increase food security within City.

Strategy Expected Benefits

Improved Community Resilience Improved Community Equity

Resilience



Equity



Goal FA 2: Increase local agricultural resilience to climate shocks

How We'll Get There

How We'll Measure Progress

Strategy FA2-A:

Reported percentage of local food growers adopting climate adaptive strategies

Provide information and promote climate responsive agriculture practices

According to research completed for “Estimating economic damage from climate change in the United States”, a 2017 study completed by Solomon Hsiang and others from the University of California at Berkeley, agricultural yields are projected to decline with the increase of Global Mean Surface Temperature in addition to impacts related to precipitation changes. Although increased CO2 levels are anticipated to offset a portion of these yield losses, the impact for much of the United States will be a net negative. By 2100 the projected impact to the Monroe County economy is -35.6%. See the Bloomington Climate Risk and Vulnerability Assessment.

Initial Actions

- FA2-A-1 Collaborate with the County, Indiana University, Monroe County Farmer's Association, Indiana Grown, and local organic farmers associations to encourage adoption of strategies to increase soil health and increased carbon sequestration for Croplands and Grazing Lands. Tools: <http://www.comet-farm.com/> GHG and Carbon Sequestration Ranking Tool: <https://cutt.ly/Vf04djN>

Strategy Expected Benefits

Protected / Enhanced Ecosystems Improved Community Resilience

Ecosystems



Resilience



Goal FA 2: Increase local agricultural resilience to climate shocks

How We'll Get There

How We'll Measure Progress

Strategy FA2-B:

Status of City plan and program development

Support climate resilient agriculture through City plans and programs

Addressing agricultural resilience through community level planning provides opportunities to improve overall community resilience to climate change impacts and to guide long-term local food infrastructure to support communities in greatest need.

Initial Actions

- FA2-B-1 Develop a comprehensive farmland conservation plan that prioritizes food production while taking into consideration other Bloomington greenspace and climate adaptation priorities. The plan could also include specific maps or areas prioritized for farmland conservation or identify those areas most at risk from development or climate change impacts. Program should focus on exploring increased local food-to-table, local food utilization, and local development of cultural food products in support of Bloomington area underserved communities.

Strategy Expected Benefits

Improved Community Resilience Reduced Costs



Goal FA 3: Increase and stabilize local food market.

How We'll Get There

How We'll Measure Progress

Strategy FA3-A:

Status of Food Coordinator staff position; Status of urban agriculture ordinances

Increase local food supply

Strengthening local food sources can address both climate change relationships with food and also supports small business local economy. Studies have indicated that nearly 32 jobs are created for every \$1 million in revenue generated by produce farms involved in a local food market, compared to only 10.5 jobs for those involved in wholesale channels exclusively. Healthy local food systems can also play a critical role in addressing food access vulnerability and food insecurity within neighborhoods of higher vulnerability.

Initial Actions

- FA3-A-1 Continue funding for a municipality position to coordinate and facilitate food system solutions including adaptation and mitigation of climate change impacts. Tasks include education and training for residents and businesses, building relationships between food buyers and food businesses, and coordinating other actions in this section on Food Systems
- FA3-A-2 Revise zoning ordinances to allow urban agriculture and clarify acceptability to remove barriers to front yard and rooftop vegetable gardens, edible landscaping and foraging. Proactively promote and educate the public on urban agriculture ordinances, options and approaches

Strategy Expected Benefits

Jobs / Economic Development

Improved Quality of Life



Strategy FA3-B:

Status of Local Food Procurement policies

Strengthen demand for local foods

Increased demand for locally produced food ensures the economic resilience of local producers, leverages the local job creation potential of local food systems, and supports improved nutrition for consumers while improving community resilience.

Initial Actions

- FA3-B-1 Pass city policy to procure locally grown foods for events and other organized food catering at city-managed facilities. Coordinate with School District, Indiana University, County, and local hospitals to establish similar locally sourced foods procurement policies. Explore development of group purchasing and logistics agreements to increase efficiency of local farm-to-agency process. <https://goodfoodpurchasing.org/>

Strategy Expected Benefits

Improved Community Equity

Improved Quality of Life





What You Can Do

- Support your local community gardens - or even better, grow your own.
- Eat carbon-friendly. Animal products are extremely GHG-intensive to produce compared to plants. Eating less meat and dairy can make a big cut in food consumption emissions. Eating regionally-grown food that is suitable for the Indiana climate can also make a difference through reduced transportation-related emissions. A great place to start is with “Meatless Mondays” or one meat-free meal a day.
- Purchase locally-grown food, supporting local agriculture and minimizing energy spent transporting products.
- Support restaurants and grocery stores that use and sell locally-grown food.
- Buy food that is in season, minimizing the distance food must travel.
- Support your local farmers markets.
- Buy ethically grown and harvested food, like fair-trade coffee and chocolate.
- Plant fruit or nut bearing trees or shrubs that are well suited for our hardiness zone on your property.





Section 07

Health and Safety



[Click here to return to TOC](#)



Why Health and Safety Are Important

There is a strong relationship between human health and environmental health. From the air we breathe to the water we drink and use, life here on Earth depends on the natural resources and the environment around us. This link between the environment and human health is a critical consideration of the impacts of climate change. As outlined in the City’s Climate Risk and Vulnerability Assessment, changes in climate, such as higher average temperatures and increased storm frequency and intensity, can intensify public health stressors. These climate change impacts endanger public health and safety by affecting the air we breathe, the weather we experience, our food and water sources, and our interactions with the built and natural environments. As the climate continues to change, the risks to human health continue to grow.

In the same way local governments and the health care industry promotes healthy behaviors such as eating right and exercising; agencies should recognize the relationship between climate action, environmental stewardship and community health since the health of our environment affects public health.

A “Climate Risk” is the potential for negative consequences and outcomes for human health, systems, or communities. The most common way of evaluating the level of risk associated is “likelihood of Occurrence” x “Impact Level” or vulnerability. The chart below reviews the expected impacts, likelihood of occurrence, impact level based on Population vulnerability reviewed in the Bloomington Climate Risk and Vulnerability Assessment, potential timeframe, and resulting overall risk level for Climate Risks to Population (Health Impacts).

Climate Risks for Bloomington Populations

Health Impacts	Expected Impact(s)	Likelihood of Occurrence	Impact Level (Population Vulnerability)	Timeframe	Risk (Likelihood x Impact)	Impact-related indicators
Extreme Heat	Increased demand for cooling; heat stress and emergency visits, heat related health	Possible	High	Medium-term	High	Cooling Degree Days, days above 95
Flooding	damage to property; flood related health impacts; infrastructure impacts	Likely	High	Short-term	Very High	Flood events, flash flood occurrences, wettest 5-day periods, number of heavy rain events, disaster declarations, change in NOAA storm
Drought	Damage to crop/tree/ecosystem, reduced drinking water source, increased flash flood potential due to decreased soil permeability	Possible	Moderate	Medium-term	Moderate	Consecutive days without rain, aquifer level, surface water condition, river flow
Air Quality Impacts	Increased particulate matter, increased ozone impacts, increased instances of asthma	Possible	High	Medium-term	High	Air quality index
Vector-Borne Diseases	Increased instances of Lyme disease, encephalitis, heart worm, malaria, Zika virus.	Likely	Moderate	Long-term	Moderate	Disease records
Nutrition Insecurity	Food price volatility/change, fluctuation in availability	Possible	Moderate	Medium-term	Moderate	Food price index, Foodshelf demand, % of school children qualifying for free and reduced lunch
Water Quantity/Quality Impacts	Water shortage, surface water quality impacts due to heat and stormwater runoff	Possible	Low	Long-term	Low	Aquifer health; Water quality test results
Water Borne Disease	Bacteria exposure at infected surface water locations, contamination of drinking water due to flood	Unlikely	High	Medium-term	Low	flood events; algae blooms

Since 1998, extreme weather has cost Monroe County: **\$714,150** Annually

Climate Change Considerations



Climate Hazards

Climate stressors include increases in the frequency and intensity of poor air quality days, extreme high temperature events, heavy rainfalls, extended pollen seasons, changed distribution of disease carrying pests .



Opportunities

Strategies which improve community connectedness, mobility, community resilience through healthy lifestyles frequently coincide with climate mitigation measures such as improved pedestrian safety and low income home weatherization.

Equity Considerations

- Some populations, including aging adults, children, persons with disabilities, economically stressed, non-English speakers, homeless persons, and workers employed in climate exposed jobs are particularly vulnerable to extreme weather, natural disasters, and the health, supply chain, and economic impacts of climate change. Many of these individuals also have limited access to the information, services, and resources needed to ensure resilience in the face of these impacts.
- Areas within the city with increased flood risk, air quality impacts, compromised tree canopy coverage, and older housing stock with insufficient air conditioning are vulnerable environments within our cities with heightened exposure to climate change risks and compromised capacity to adapt.
- Vulnerable populations are disproportionately represented within the vulnerable environments of our cities and frequently lack resources to improve the adaptive capacity of their surroundings

Sector Goals

Goal HS1

Educate, engage, and empower the public for climate health and safety.









Goal HS2

Respond to climate risks and impacts.

Goal HS3

Prepare Bloomington for climate risks and impacts.

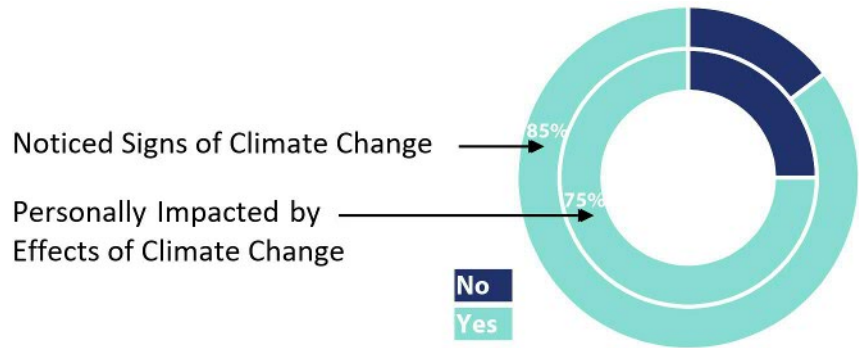
Vulnerable Population Risk Sensitivity Chart

	 Extreme Heat	 Flooding	 Air Quality	 Vectorborne Disease	 Food Insecurity	 Water Quality Impacts	 Waterborne Disease	 Power Failure
children	3,945		3,945	3,945			3,945	3,945
seniors	9,597	9,597	9,597	9,597	9,597			9,597
disabled	9,726	9,726	9,726		9,726			9,726
Low Income Individuals	13,032	13,032	13,032	13,032	13,032	13,032	13,032	13,032
Low Income Families	6,256	6,256	6,256	6,256	6,256	6,256	6,256	6,256
POC	17,738	17,738	17,738	17,738	17,738	17,738	17,738	17,738
Limited English	5,284	5,284	5,284	5,284	5,284		5,284	5,284
At Risk Workers	5,548	5,548	5,548	5,548			5,548	
No Car	3,577	3,577	3,577			3,577	3,577	
Total by category	74,704	70,759	74,704	61,401	61,634	22,866	55,381	65,579
Percentage of Vuln pop	105%	99%	105%	86%	87%	32%	78%	92%
Rank by Vuln	2	3	1	6	5	11	7	4
Percentage of Total Pop	76%	72%	76%	62%	63%	23%	56%	67%



Climate Impacts Already Felt

Over **75%** of the 472 individuals responding to the City of Bloomington’s 2020 Climate Action Plan Community Input Survey reported being personally impacted by the effects of Climate Change. The most noted personal impacts observed were Increased Air Conditioning Use, Increased Contact with Ticks and Mosquitos, Longer Allergy Season, Tree Loss Due to Storm Flooding or Drought, and Flooding/Flood Damage.



Mapping Vulnerable Populations in Bloomington

Composite Vulnerabilities

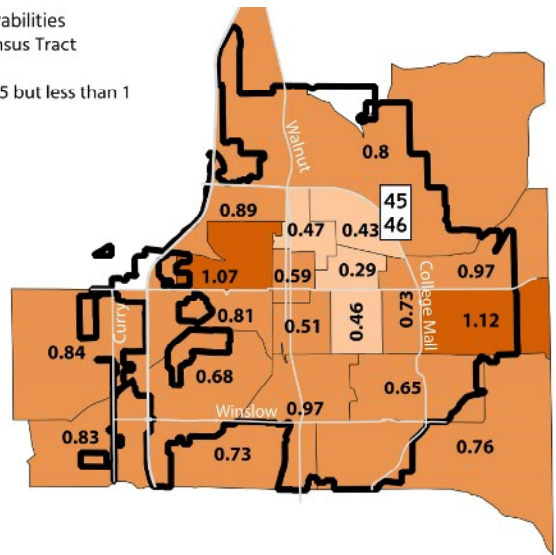
Estimated Population Count

Source: Census 2014-2018 ACS 5-Year Estimates

The map to the right illustrates the Vulnerability Coefficient for each Census Tract based on the charted information above. As outlined above, the Vulnerability Coefficient represents the ratio of total instances of population vulnerabilities to the total population within the census tract. The intent of this Vulnerability Coefficient is to identify the proportion of instances of vulnerability within their populations. Neighborhoods with high proportions of vulnerability are likely to have greater adaptation need than neighborhoods with low proportions of vulnerability.

Composite Vulnerabilities Coefficient by Census Tract

- 0.5 or less
- Greater than 0.5 but less than 1
- Greater than 1



See Bloomington Climate Risk and Vulnerability Assessment for more information

Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Health and Safety section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)

Goal HS1: Educate, engage, and empower the public for climate health and safety

How We'll Get There

How We'll Measure Progress

Strategy HS1-A:

Status of integration of climate change impact projections into training.

Improve training to address risks exacerbated by climate change

Hazard and risk identification supporting public safety, emergency management, and social services professional training has largely been based on historical occurrence. However, research indicates that climate change is affecting future patterns of natural hazards. These changes must be anticipated and integrated into how disaster mitigation, preparedness strategies, and training is developed.

Initial Actions

- ES1-A-1 Ensure public safety staff are properly trained to recognize and respond to physical and behavioral signs of heat-related illness.
- ES1-A-2 Strengthen emergency management capacity to prepare for and respond to the impacts of climate change. The City should prioritize capacity improvements such as training and equipment to address risks exacerbated by climate change - see the City of Bloomington Climate Risk and Vulnerability Assessment 2020. Emergency management should be equipped to address the possibility of multiple emergencies at the same time, such as the combination of extreme heat and power outage.

Strategy Expected Benefits

Improved Public Health



Improved Community Resilience



Strategy HS1-B:

Status of communication campaign development and implementation

Establish and expand public health communication campaigns

Successfully addressing climate change as a public health threat requires prevention strategies which can help influence people's behavior to help prevent and reduce the burden of climate change on human and other populations.

Initial Actions

- ES1-B-1 Develop a communication campaign to reach those without access to internet or technology, limited English speakers, and individuals in hard to reach vulnerable populations.

Strategy Expected Benefits

Improved Community Equity



Improved Social Connectivity



Goal HS2: Respond to climate risks and impacts.

How We'll Get There

How We'll Measure Progress

Strategy HS2-A:

Assist the city's heat, flooding, and storm vulnerable population in preparing for and mitigating climate change impacts.

Shade trees installed; number of households receiving flood readiness assistance; number of households receiving weatherization improvements; number of households with air conditioning

By 2050, Monroe County can expect: 50 days of over 95 degrees (historical: 2 days) an average hottest day of the year of 107 degrees (historical: 97 degrees), an average coldest day of the year of 1 degree (historical: -5 degrees) An increase in spring rainfall of 16 percent above historical averages. The Vulnerable Population Risk Sensitivity Chart (see Bloomington Climate Risk and Vulnerability Assessment) illustrates the instances of vulnerability to each of these projected climate impacts by census tract. Significant portions of the population have a likely elevated sensitivity to the anticipated extreme heat and weather, flooding, and air quality impacts projected.

Initial Actions

- ES2-A-1 Seek to reduce exposure to extreme heat and Improve stormwater damage by promoting, distributing, or providing installation assistance of shade trees targeted at community areas identified as having high heat island impact based on City's Citywide Ground Cover and Heat Island Assessment (see Greenspace section) and/or flash flood prone. Assistance should prioritize vulnerable populations.
- ES2-A-2 Seek to reduce vulnerability to extreme precipitation and flooding by providing precipitation and flood readiness assistance for residents within flood and flash flood prone sectors and for vulnerable populations. Assistance may include on-site and on-line flood assessments and readiness improvements (e.g. <https://www.cnt.org/tools/my-rainready-home-assessment-tool>) as well as provision of education to residents on what actions they can take to reduce their risk to extreme precipitation events and flash flooding through communication campaign and/or development of an information hub with information, tools and resources.

Strategy Expected Benefits

Improved Public Health 	Improved Community Resilience 
Improved Community Equity 	Improved Quality of Life 

Strategy HS2-B:

Establish a climate impacts mutual aid program

Status of mutual aid agreements addressing potential climate impacts

Projected climate change impacts for Bloomington include the potential for increased frequency and intensity of extreme weather events and increased flood hazard. Establishing mutual aid programs to address the specific response requirements these climate hazards represent (such as downed tree removal, storm debris removal, and flood response) can ensure a higher level of preparedness for extreme weather events and their aftermath.

Initial Actions

- ES2-B-1 Coordinate with County, State, University of Indiana, surrounding communities, Red Cross, and utilities to establish a Mutual Aid and Response program. Program to focus on range of current and projected risks and hazards including flooding, extreme weather, storms, power outage, and emergency debris management.

Strategy Expected Benefits

Improved Community Resilience 	Reduced Costs 
Improved Energy Resilience 	Improved Social Connectivity 

Goal HS2: Respond to climate risks and impacts.

How We'll Get There

How We'll Measure Progress

Strategy HS2-C:

Establish and update plans to address climate risks and impacts.

Status of integration of climate change impact projections into community plans.

Maintaining community plans and design standards based on projected climate risks and impacts will be key in minimizing hazard threats to community health and safety.

Initial Actions

- ES2-C-1 Coordinate with County, University of Indiana, Red Cross, and utilities to develop a debris management plan to support response to severe storm events and flooding. Explore potential of integrating HAND neighborhood clean up grants into plan.

Strategy Expected Benefits

Improved Community Resilience



Improved Social Connectivity



Goal HS3 Prepare Bloomington for climate risks and impacts

How We'll Get There

How We'll Measure Progress

Strategy HS3-A:

Strengthen community response capacity and support networks

Status of community network coverage for vulnerable populations; Implementation of monitoring program

The Vulnerable Population Risk Sensitivity Chart (see Bloomington Climate Risk and Vulnerability Assessment) illustrates the instances of vulnerability to each of these projected climate impacts by census tract. Significant portions of the population have a likely elevated sensitivity to the anticipated extreme heat and weather, flooding, and air quality impacts projected. Vulnerability to climate impacts can be lessened through the improved social connectivity and support that can be provided through strengthened community networks focused on vulnerable community members.

Initial Actions

- ES3-A-1 Enhance community networks and connections for those who require special attention, such as the elderly, homebound, disabled, isolated, or those likely to be in need of financial assistance during or after extreme weather events (heat, cold and heavy precipitation)

Strategy Expected Benefits

Improved Social Connectivity



Improved Community Equity



Strategy HS2-B:

Improve equity of climate adaptation measures.

Status of integration of climate change vulnerability into community plans, programs, and decisions.

Integration of climate change impacts and a recognition of the populations and neighborhoods most vulnerable to them into community plans, project approval processes, and program development is a critical requirement to effectively reducing climate change impacts for the portions of the community most likely to be affected.

Initial Actions

- ES3-B-1 Utilize current science, best practices and updated maps of flooding and flash flooding potential, micro heat island vulnerability, and populations most vulnerable to flooding and heat impacts to help inform decisions and priorities about projects, project approvals, and programs that help to cool the urban environment.

Strategy Expected Benefits

Improved Community Resilience



Improved Community Equity





What You Can Do

- Put together an emergency preparedness kit for your household by visiting [Ready.Gov](https://www.ready.gov).
- Check in on the people in your life, especially the elderly and those experiencing mental health problems.
- Practice mindfulness by doing yoga, going for a walk or even just taking deep breaths, all of which have been linked to improved mental and physical health.
- Store your prescription drugs in a safe location, preventing them from falling into the wrong hands.
- Get involved with the Bloomington Community Emergency Response Team (CERT), Join your neighbors and receive training to prepare for potential disasters.
- Stay informed. Sign up for Monroe County Citizen Alert Notification, a free program from Monroe County that sends community alerts to your phone and email when you register online. <https://cutt.ly/xgg3cBR>
- Prepare your home for the extremes. Understand the risk of extreme weather, extreme temperatures, flooding or wildfire to your home, and take action to safeguard your home.





Section 08

Greenspace and Ecosystem Health



[Click here to return to TOC](#)



Why Greenspace and Ecosystem Health Are Important

Trees and natural ground covering play a central role in supporting community health, improving air and water quality, helping to reduce building energy use, and supporting climate mitigation. Recent studies have shown that sometimes, going to a park, or even looking a single tree can significantly improve a person’s health and stress levels. Some doctors have started prescribing parks as a remedy to patients’ health issues. Our understanding of the value of trees has been expanded to include mental and physical health benefits. Trees are critical in filtering air, removing harmful pollutants, such as Carbon Monoxide, particulate matter, and Ground-level Ozone - pollutants that can be toxic at high levels and which can cause asthma and other respiratory impacts.

Conversely, higher levels of impervious surfaces (pavement and buildings) within a community will increase the heat island of the community. Heat island, and micro heat island, refers to the phenomenon of higher atmospheric and surface temperatures occurring in developed areas than those experienced in the surrounding rural areas due to human activities and infrastructure. Increased heat indices during summer months due to heat island effects effectively raise human discomfort and health risk levels in developed areas, especially during heat waves. Based on a 2006 study done by Minnesota State University and the University of Minnesota, the relationship between impervious surface percentage of a City and the corresponding degree of heat island temperature increase can be understood as a ratio.

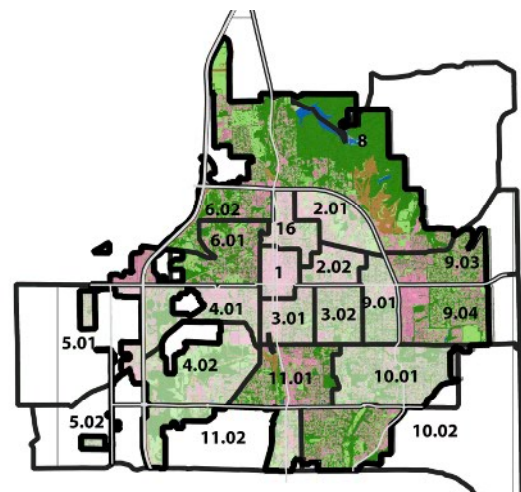
Impervious Surface, Tree Canopy, and Heat Island

The City’s average existing Tree Canopy coverage of 38% is above the national average, however, there are likely portions of the City which could benefit from increased tree canopy. The graphic to the right from the City’s Urban Tree Canopy Assessment Summary Report illustrates the impervious land cover (pink) within the City. To highlight concentrations of vulnerable populations, the census tracts with the highest vulnerabilities (see Summary Chart of Vulnerabilities page 10-3) are shown with full color while all other census tracts have masked colors.

Areas which have higher concentrations of impervious surfaces are areas likely to experience micro climate heat island effects and would benefit from anti-heat island strategies particularly those in the tracts with the highest impact sensitivities.

According to the 2019 Bloomington Urban Tree Canopy Assessment Report

The City of Bloomington’s existing tree canopy is 38%; the possible tree canopy is 27%; and the preferred plantable area is 22%, making the maximum tree canopy attainable under current development conditions at 61% (Figure 10). Reaching the projected tree canopy potential of 61% will require the City of Bloomington to preserve all existing tree canopy while expanding the urban forest in designated preferred plantable areas.



Citywide Ground Cover

	Citywide Acres	
Existing Canopy	5,735.22	38.24%
Preferred Plantable	3,357.45	
Other Pervious Surfaces	718.57	22.38%
Impervious Surfaces	5,063.85	
Open Water	124.83	4.79%
		33.76%

Climate Change Considerations



Climate Hazards

Projected climate change impacts may cause forests to experience increased mortality and reduced productivity, more prevalent invasive species and disease all resulting in forest and tree loss, reduction in crop yield. Loss of greenspace, in turn, reduces carbon capture potential of green infrastructure.



Opportunities

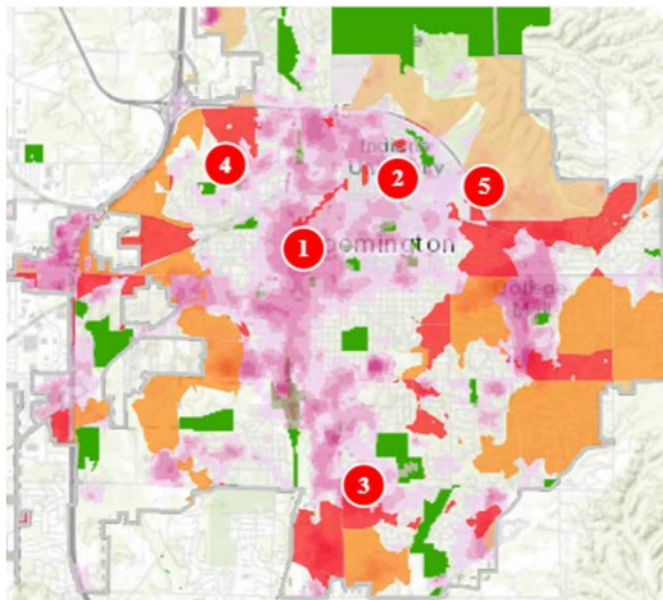
Many strategies within the Greenspace sector can advance community resilience and quality of life. Increased tree canopy, decreased impervious surfaces, and increased utilization of native grasses and plantings can reduce heat island experiences, energy consumption, stormwater runoff, and flood impacts.

Greenspace and Ecosystem Health

Greenspace Recommendations for Equity and Heat Island in Bloomington

The map to the right from the Trust for Public Land’s ParkScore tool shows current and recommended park space throughout Bloomington. The green portions of the map illustrate existing parks with public access while areas with very high need for parks are shown in dark orange and areas with high or moderate need for parks are shown in tan.

Pink sections of the map indicate areas with calculated heat island or micro heat island impacts (darker colors represent higher heat island impacts). The numbered red circles indicate locations ideal for new parks which would serve populations without public park access within a 10 minute walk that are also in an area with higher urban heat island impacts. The lower numbers represent higher priority locations.



(Graphic source: Trust for Public Land ParkScore)

Equity Considerations

- Lower income neighborhoods and neighborhoods with higher proportions of people of color regularly have lower tree canopy coverage; and the environmental, economic, and quality of life benefits trees support; than more affluent neighborhoods.
- “Heat islands” and “micro heat islands” are built up areas that are hotter than other nearby areas. This is caused by lack of adequate greenspace and healthy tree canopy coverage combined with too many hard surfaces like roads, parking lots, and hard building surfaces. Frequently neighborhoods with higher vulnerable populations have the highest heat island impacts.

Sector Goals

Goal G1

Increase quantity and quality of greenspace within the community.

Goal G2

Increase quantity and quality of climate adaptive native habitats.

Goal G3

Increase citywide tree canopy coverage by 3% by 2030.

Goal G4

Reduce stormwater and micro heat island impacts.

PERCENT OF RESIDENTS WITHIN A 10-MINUTE WALK OF A PARK BY AGE



(Graphic source: Trust for Public Land ParkScore)

Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Greenspace and Ecosystem Health section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)



Goal G1: Increase quantity and quality of greenspace within the community.

How We'll Get There

How We'll Measure Progress

Strategy G1-A:

Establish city greenspace plans integrating findings and goals of Climate Action Plan

Integration of climate change impacts and a recognition of the populations and neighborhoods most vulnerable to them into community plans which guide greenspace preservation and development and ground cover conversion efforts to capture the beneficial climate adaptation and mitigation potential of community wide greenspace is a critical requirement to effectively reducing climate change impacts.

Initial Actions

- G1-A-1 Complete a Land Conversion Opportunity Study. Analyze public and private property for unused turf and impervious areas, and create a Ground Cover Conversion Implementation plan by neighborhood/census tract to convert targeted areas to native grasslands, wetlands, and shrub/forested areas. Identify incentive opportunities and establish an outreach campaign.

Strategy Expected Benefits

Protected / Enhanced Ecosystems Improved Community Equity



Strategy G1-B:

Improve the connectivity and functionality of greenspaces within the city.

Integration of climate change impacts and a recognition of the populations and neighborhoods most vulnerable to them into community plans which guide greenspace preservation and development and ground cover conversion efforts to capture the beneficial climate adaptation and mitigation potential of community wide greenspace is a critical requirement to effectively reducing climate change impacts.

Initial Actions

- G1-B-1 Enhance the connectivity of greenbelt and habitat corridors across the community, including identification and improvement of "pollinator corridors" and "wildlife corridors".

Strategy Expected Benefits

Protected / Enhanced Ecosystems Improved Quality of Life



Improved Community Resilience Improved Air Quality



Goal G2: Increase quantity and quality of climate adaptive native habitats

How We'll Get There

How We'll Measure Progress

Strategy G2-A:

Status of policy development

Create and expand native habitat policies and infrastructure.

Aligning City policies guiding utilization and maintenance of public facilities, parks, and right of ways with the goals of the climate action has immediate positive impacts advancing citywide goals and serve as examples and case studies to illustrate effective approaches for residents and businesses throughout the community.

Initial Actions

- G2-A-1 Create a policy for the use of native plants in landscaping at City-owned properties, where suitable

Strategy Expected Benefits

Protected / Enhanced Ecosystems Improved Community Resilience



Strategy G2-B:

Percentage of native species and pollinator friendly ground cover citywide

Increase the use of native species and pollinator restoration areas.

Native plant and tree species tend to be more drought resistant, increase development of soil organic material and health, and support biodiversity and pollinator health.

Initial Actions

- G2-B-1 Install roadside climate adaptive native vegetation that creates effective barriers to prevent drifting of air pollutants to adjacent schools and residences/ parks. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060415/>

Strategy Expected Benefits

Protected / Enhanced Ecosystems Improved Community Resilience



Goal G3: Increase citywide tree canopy coverage by 3% by 2030

How We'll Get There

How We'll Measure Progress

Strategy G3-A:

Status of policy and plan development and implementation

Establish city plans and policies in support of tree canopy goals

Increased tree canopy coverage improves soil health, pollution absorption, air quality, stormwater "uptake", and decreases stormwater runoff and micro heat island impacts. Conversion of impervious surfaces to green spaces utilizing native species, pervious paver systems, and "green roofs" can significantly reduce extreme heat experiences for vulnerable populations. Establishing policies and plans in support of tree canopy goals and outlining planting targets to achieve the goals is an effective path towards achieving the climate action plan greenspace goals.

Initial Actions

- G3-A-1 Conduct a Citywide Ground Cover and Heat Island Assessment. Assessment should include tree canopy, light impervious surface, dark impervious surface, grassland, and water coverage by census tract. Study should include heat island impact study to identify areas of high heat island contribution and impact. Findings of tree coverage, benefits, heat island impacts, and opportunities should be overlapped with vulnerable population mapping from the City's Climate Vulnerability Assessment. Study to establish specific goals of tree canopy coverage, by census tract, for reduction of dark impervious surfaces, and target "Heat Island Coefficient", and prioritized tree canopy goals based on need, potential, historic investment/benefit per household, and opportunity to positively impact vulnerable population. Study to identify specific citywide percentage coverage goals for forested and native planting ground cover. Study to priority areas for heat island mitigation based on need, potential, and impact on equity and vulnerable populations. Study should also evaluate opportunities to plant additional trees near city facilities to reduce heat island. <http://palebluedot.llc/tree-canopy-assessments>

Strategy Expected Benefits



Strategy G3-B:

Support and empower community partners, businesses and residents in meeting tree canopy goals

Establishment and utilization of incentives; citywide ground cover characteristics and tree canopy coverage

Aligning the landscaping and greenspace maintenance actions of property owners and businesses citywide is critical to achieving citywide greenspace goals, particularly in sections of the city with high shares of vulnerable populations.

Initial Actions

- G3-B-1 Explore development of additional incentives for tree planting, particularly in targeted areas within the City as established by the Citywide Ground Cover and Heat Island Assessment.

Strategy Expected Benefits



Goal G4: Reduce stormwater and micro heat island impacts

How We'll Get There

How We'll Measure Progress

Strategy G4-A:

Status of policy development and implementation

Reduce impervious surfaces

Reduction of impervious surfaces, particularly in sections of the community with high existing impervious surface ground cover share, can significantly reduce stormwater runoff and micro heat island impacts. Consistently implementing green streets, living streets, or complete street policies will advance replacement of impervious surface with greenspace and pervious strategies.

Initial Actions

- G4-A-1 Create a "Green Streets" policy (Green Streets are designs that reduce environmental impacts by reducing impervious surface, managing stormwater, and providing shade) or "Living Streets" policy (Living Streets combines the concepts of complete streets and green streets, and also puts additional focus on quality of life aspects for City residents) to guide current and future street construction, reconstruction, and maintenance projects within the City.

Strategy Expected Benefits

<p style="color: #4F812D;">Safer Streets</p>  <p style="color: #4F812D;">Protected / Enhanced Ecosystems</p> 	<p style="color: #4F812D;">Improved Community Resilience</p>  <p style="color: #4F812D;">Improved Quality of Life</p> 
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Strategy G4-B:

Status of policy development and implementation

Increase water uptake capacity of greenspace

Increasing soil capacities for water "uptake", particularly in sections of the city with high flood and flash flood risks, increases the capacity for stormwater management in place and reduces the risks or severity of flooding impacts. Utilization of best practices like biochar soil amendments and soil profile rebuilding at building and road construction sites can improve the capacity of greenspace.

Initial Actions

- G4-B-1 Implement policy requiring a biochar soil amendment for all City building and earth working construction sites. Encourage biochar soil amendment use for private sector construction and earth working construction sites. Biochar improves soil sequestration and builds carbon content of topsoil, and improves water retention and permeability characteristics.
- G4-B-2 Implement a policy to require soil profile rebuilding at new tree installations at all City building project sites or compacted soil conditions to reduce erosion and runoff contaminated with fertilizers, increase soil carbon stores and support long-term soil building. Encourage soil profile rebuilding for private sector building project sites or compacted soil conditions. (<https://www.urbanforestry.frec.vt.edu/SRES/>)

Strategy Expected Benefits

<p style="color: #4F812D;">Improved Community Resilience</p>  <p style="color: #4F812D;">Protected / Enhanced Ecosystems</p> 	<p style="color: #4F812D;">Protected / Enhanced Ecosystems</p>  <p style="color: #4F812D;">Reduced Costs</p> 
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What You Can Do

- Plant a rain garden with native plantings to absorb storm water and replenish our aquifers.
- Plant trees in your yard to provide shade and cooling in summer heat. Select climate adapted trees that don't interfere with power lines and preserve the trees you already have.
- Landscape with drought-resistant, native or well-adapted, non-invasive plants.
- Make your backyard a Certified Wildlife Habitat with the National Wildlife Federation www.nwf.org/garden-for-wildlife/certify
- Remove pavement and increase permeable surfaces, De-pave areas wherever possible to encourage stormwater infiltration onsite.
- Install bioswales/rain gardens or rainwater diversion systems to reduce impact on the storm-water system.
- Install a Green Roof (living roof) to reduce your energy consumption, decrease heat island impacts, and reduce stormwater runoff.





Section 09

Climate Economy



[Click here to return to TOC](#)





Why Climate Economy Is Important

Climate change and the economy are inexorably linked. Left unabated, the impacts of man-made climate change through the end of this century will cost the United States billions of dollars. According to a 2019 study by two EPA scientists, the difference in economic impact between the mid-range climate model and the high range climate model may account for as much as \$224 billion in economic impact annually by 2090. According to a 2019 World Bank report on trends in carbon pricing, a carbon price range of \$40-\$80 per ton is necessary by 2020 to reach the goals set by the 2015 Paris Agreement, while other studies have placed the full cost of carbon at \$200-\$400 per ton. The calculations outlined in Section 1 of this plan estimate a conservative localized cost for carbon at over \$116 per ton.

The economy is also directly linked to climate action as well. One common reason given by those who wish not to see action taken on climate change is that the economy will be damaged. Setting aside the avoidance of the future costs should we not act to mitigate climate change, evidence is building a clear case that acting on climate change, and reducing fossil fuel emissions can be done without weakening the economy. Since 2005, Bloomington has seen city-wide GHG emissions drop over 18% while during that same period the city's GDP has **increased** 59%.

Between 2018 and 2028, there are projected to be 8,936 new jobs annually in Monroe County, 8,455 projected to be replacement openings (Job Postings by County, IN Department of Workforce Development). Though higher-wage sectors of life sciences, technology and healthcare have potential as growing sectors, according to the Bureau of Labor Statistics, 89% of the jobs in the Bloomington MSA are in the following areas of employment: manufacturing; trade, transportation, and utilities; professional and business services; education and health services; leisure and hospitality; and government.

Many of the climate actions included in this plan can reduce Bloomington's contributions to global greenhouse gas levels, deal with the risks posed by climate change, and achieve economic growth and opportunity. Transformative change is needed now in how we build our cities, produce and use energy, transport people and goods, and manage our landscapes. This change also represents opportunities to improve our quality of life, improve health outcomes, and provide opportunities for workforce development, new job creation, and economic development.

Climate Change Considerations



Climate Hazards

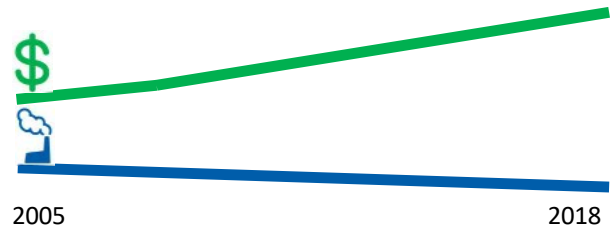
In many sectors, climate change will impact water and energy consumption, resilience, and expenditures. Extreme weather and increasing variability in temperatures and precipitation may stress transportation systems. Increasing extreme weather hazards may threaten supply material and product supply chains.



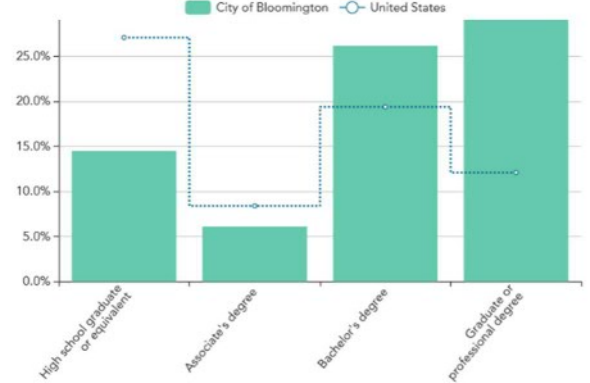
Opportunities

Climate mitigation strategies like transformation of Bloomington's energy system, improvements to the energy efficiency of the city's building stock, enhancement of transportation alternatives, and the implementation of goals like tree canopy increases and reduction to impervious surfaces represent opportunities for the development of new businesses and job creation.

Bloomington GHG Emissions Compared to GDP



Bloomington Residents' Highest Level of Education



Bloomington Solar Businesses





Equity Considerations

- Economic impacts of climate change are inequitably felt. Low income individuals in our communities are especially prone to the impacts of climate change and bear a greatly disproportionate share of the costs.
- Income inequality is rising in the US, with September 2019 levels being the highest in 50 years. High inequality leads to lower life spans, increased instances of mental health issues, and increased obesity rates among other social impacts.

Sector Goals

Goal CE1

Build marketplace climate resilience.

Goal CE2

Attract, create, and support businesses that are committed to sustainability and climate goal.

Goal CE3

Develop new mechanisms for financing City climate action plan implementation.

Accomplishing The Goals

This Climate Action Plan is organized around a unifying framework organized by sector. Each sector has over-arching Strategies established to meet 2030 goals and detailed Actions for implementation.

Strategies are specific statements of direction that expand on the climate action vision GHG reduction goals and guide decisions about future public policy, community investment, and actions. The following are the Strategies guiding the Climate Economy section and the initial actions for each. See **Section 10 Climate Actions and Implementation** for the full list of sector actions and implementation roles.



[Click here for full list of sector actions](#)

Goal CE1 Build marketplace climate resilience.

How We'll Get There

How We'll Measure Progress

Strategy CE1-A:

Evaluate climate risks to businesses.

Status of Climate Economic Impacts Study; Status of technical assistance program; Number of businesses engaged

Projected climate change impacts pose potential challenges to businesses in the form of supply chain interruptions, property damage from extreme weather, labor productivity impacts of extreme temperatures, and potential increased operational costs associated with increasing energy demands. Identification of the risks by economic sector can support businesses in making appropriate plans to avoid or mitigate potential negative impacts.

Initial Actions

- CE1-A-1 Conduct a planning effort focused on identifying economic vulnerabilities based on risks and hazards identified in this report and the City/County emergency management response plan, particularly those affecting the city's vulnerable populations and small businesses. Identify economic opportunities possible through the successful implementation of the CAP plan and achievement of its goals, especially those which can provide opportunity for the city's vulnerable populations. Identify economic resilience strategies and conduct outreach to industry groups and public-private partnerships to promote private sector investment addressing them. Strengthen public-private economic communications in support of strategies, especially with targeted group businesses (minority-owned, veteran owned, economically disadvantaged, etc). Possible example process: <https://www.eda.gov/ceds/> Coordinate with the City of Bloomington's Recover Forward program

Strategy Expected Benefits

Improved Community

Resilience



Reduced Costs



Reduced Costs





Goal CE1 Build marketplace climate resilience.

How We'll Get There

How We'll Measure Progress

Strategy CE1-B:

Accelerate the transition to a carbon free local economy.

Status of permitting process streamlining;
Status of "Green contractor" resource/
database

Businesses which understand the need for addressing climate mitigation strategies and embrace the opportunities of improved energy efficiency and renewable energy will play a significant role in achieving the City's Climate Action Plan goals. These organizations will also benefit the most from the economic savings potential these strategies represent. Supporting that transition is key to helping Bloomington businesses leverage the advantages of climate action.

Initial Actions

- CE1-B-1 Streamline and offer expedited permitting for renewable energy installations.

Strategy Expected Benefits

Improved Energy
Resilience

Reduced GHG
Emissions



Goal CE2: Attract, create, and support businesses that are committed to sustainability and climate goal.

How We'll Get There

How We'll Measure Progress

Strategy CE2-A:

Increase workforce development for the climate economy.

Status of job training and entrepreneurial
program development; Number of residents
trained and employed

Strengthening development of a workforce capable of participating in climate economy businesses such as renewable energy and building energy efficiency strategies is critical to supporting the development and expansion of these economic sectors and meeting the implementation goals of the Climate Action Plan. Focusing workforce development and training on underserved and vulnerable populations within Bloomington will have the added benefit of improving the economic stability of those most vulnerable and improving equity.

Initial Actions

- CE2-A-1 Establish a job training and entrepreneurial development program focused on serving vulnerable populations. Explore Operation Fresh Start as a model (<http://www.operationfreshstart.org/>)

Strategy Expected Benefits

Improved Community
Equity

Jobs / Economic
Development



Strategy CE2-B:

Support Climate Economy economic development and new business creation.

Status of Clean Energy business incubator;
Status of implementation of Renewable Energy
Potential Study recommendations;
Number businesses and jobs created

Establishing an economic environment which encourages and supports entrepreneurs in identifying, launching, and growing businesses which support the transitions needed to successfully implement the Climate Action Plan can hasten the transition and maximize the economic potential for local job creation.

Initial Actions

- CE2-B-1 Establish a Clean Energy business incubator to support the establishment of innovative energy efficiency and renewable energy business models within the community. Explore incorporation with the Ivy Tech Center.

Strategy Expected Benefits

Improved Community
Equity

Jobs / Economic
Development





Goal CE2: Attract, create, and support businesses that are committed to sustainability and climate goal.

How We'll Get There

How We'll Measure Progress

Strategy CE2-B:

Support Climate Economy economic development and new business creation. (Continued)

Status of Clean Energy business incubator; Status of implementation of Renewable Energy Potentials Study recommendations; Number of clean energy and energy efficiency businesses and jobs in Bloomington

Initial Actions

- CE2-B-2 Implement recommendations from the City of Bloomington Renewable Energy Potentials Study 2020. Prioritize utilization of local workforce and local renewable energy companies.

Strategy Expected Benefits

Jobs / Economic Development

Reduced GHG Emissions



Goal CE3: Develop new mechanisms for financing City climate action plan implementation.

How We'll Get There

How We'll Measure Progress

Strategy CE3-A:

Leverage existing financing pathways.

Status of policy development; Status of identification of dedicated Climate Action implementation funding sources

Existing financing structures represent opportunities to establish dedicated financial pathways supporting successful Climate Action implementation.

Initial Actions

- CE3-A-1 Establish a policy that savings generated by energy efficiency measures and renewable energy installations/agreements for City facilities and operations shall be used as a fund to support future energy efficiency and renewable energy projects in support of the CAP goals.
- CE3-A-2 Establish a policy that designates City Electric and Natural Gas Franchise Fee Income as funding source for Climate Initiatives

Strategy Expected Benefits

Jobs / Economic Development

Reduced GHG Emissions



Strategy CE3-B:

Develop new financing pathways.

Status of identification of dedicated Climate Action implementation funding sources

New financing structures represent opportunities to establish dedicated financial pathways supporting successful Climate Action implementation.

Initial Actions

- CE3-B-1 Adopt a "resilience penny" property tax increase of \$0.01 per \$100 of assessed value and dedicate additional funds for climate mitigation and climate adaptation strategies. Funds may be used directly, or may be used as a repayment source for a bond issue.
- CE3-B-2 Explore the potential of developing a "Carbon Impact Fee" similar to the City of Watsonville CA. Additional funds raised to be used for Climate Mitigation and Adaptation implementation. Increased revenue to be used to fund Climate Mitigation and Adaptation implementation with a focus on the actions and strategies which increase the community's equity.

Strategy Expected Benefits

Jobs / Economic Development

Reduced GHG Emissions





Climate Economy At Work In Bloomington

A number of businesses in Bloomington have demonstrated progress in centering their operations on promoting environmental well-being. Notable examples include:

- **Manufacturing**- Cook Medical reduced landfilled waste from their Park 48 and Ellettsville facilities by 364,200 pounds in the last two years.
- **Life sciences**- Catalent has committed to a 15% emissions decrease energy management program is in broad alignment with the ISO50001:2018 energy management standard and has completed water, energy, and waste audits.
- **Health services**- IU Health system is building a system wide road map with have energy teams at each of its hospitals and is switching bulbs at facilities to LED lighting.
- **Education**- Indiana University Bloomington has 9 LEED certified buildings and continues to reaffirm the commitment that all new construction receives a minimum LEED Gold certification or higher.
- **Government**- City of Bloomington made a \$17 million investment to install rooftop solar on 32 facilities, generating 5.71 GWh since 2018.
- **Restaurant**- Lennie's received Bicycle Friendly Business certification in 2019, as well as the parent company One World Enterprise being recognized for "Governor's Award for Excellence in Recycling" from the State of Indiana
- **Utilities**- Vectren, a CenterPoint Energy company, plans to close three coal-fired generating stations while adding renewable energy sources such as solar and wind in the next four years



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