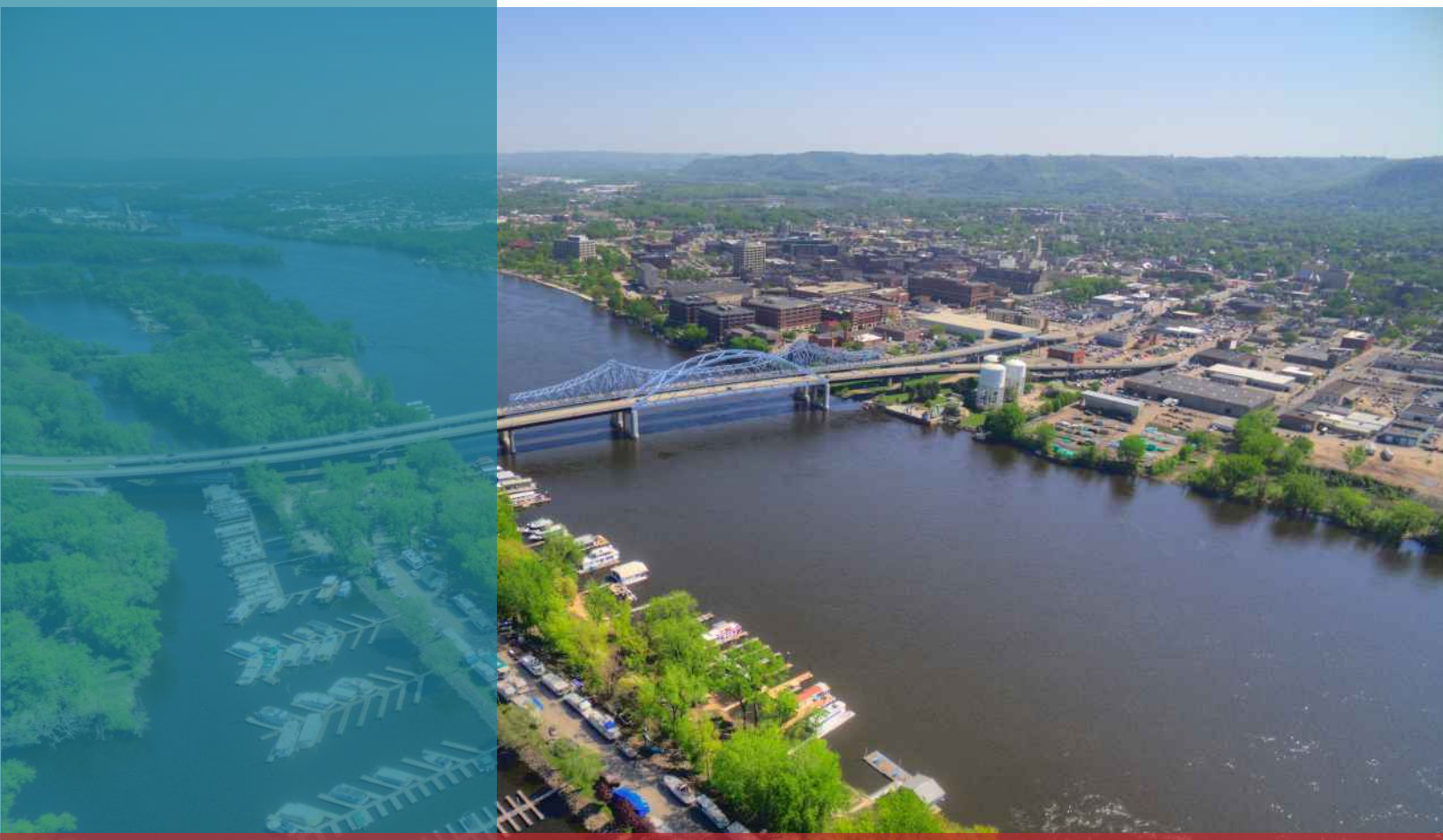
LA CROSSE
WISCONSIN



City of La Crosse
CLIMATE ACTION PLAN

December 2022
Revised March 2023

Prepared by:

making change personal
paleBLUEdot LLC

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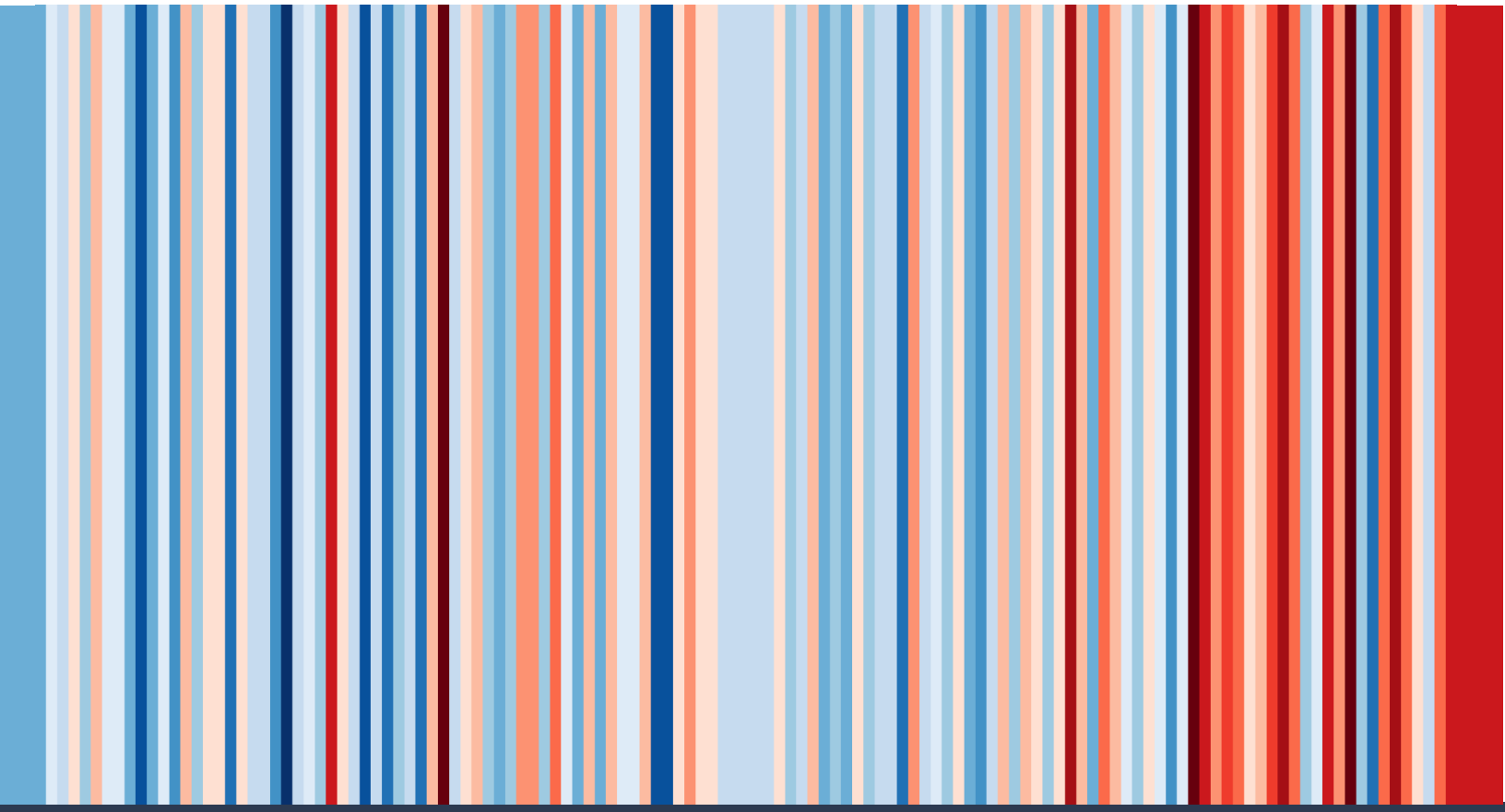
Land Acknowledgement

We acknowledge the city of La Crosse occupies the ancestral lands of the Ho-Chunk, who have stewarded this land since time immemorial. This land acknowledgment gives gratitude for the original caretakers and affirms the continuing relationship between Indigenous People and this land. The City of La Crosse is committed to building reciprocity with the local native communities and seek their participation and knowledge in climate mitigation and adaptation efforts. Through the La Crosse Climate Action Plan, we seek to work toward an equitable and resilient future as well as inspire La Crosse community members to honor and protect the land and resources.



← 1895 **Wisconsin's Annual Temperature Trends** 2020 →

Each stripe represents the temperature Wisconsin averaged over a year[1]. Blue = Below Average Red = Above Average

La Crosse's Future Climate

By 2050, La Crosse's climate can be expected to be:

+4-5°F
warmer average annual temperature than now.

+15% higher
Annual average rainfall than now

+15-20 more days
annually with a high temperature over 95°F.

+30% more
Heavy precipitation events annually

+69% more
air conditioning demand and energy needed than now.

+20 days longer
Growing, allergy, and mosquito season

The City of La Crosse is committed to environmental stewardship and sustainability. In 2009, the City adopted the Strategic Plan for Sustainability, prepared by the Joint Oversight Committee on Sustainability. This plan provided the City with an overall framework for addressing a variety of sustainability initiatives.

In 2019, the City of La Crosse Common Council passed a resolution which set a goal of reaching carbon neutrality community-wide, in both energy and transportation by 2050.

In August 2021, the City engaged paleBLUEdot for the development of a Climate Action Plan outlining strategies and actions to support achieving its climate goals. This report plan is the result and was developed in collaboration with the City's Climate Action Planning Team.

This Climate Action Plan builds on the success of the City's 2009 sustainability plan and establishes strategies and actions through 2030 paving a path toward the City's long-term carbon neutrality goal. Achieving community-wide greenhouse gas (GHG) reductions and addressing the impacts of climate change requires addressing considerations across a wide range of sectors. This Climate Action Plan is organized around nine community-wide focus areas of GHG reduction and climate adaptation . Each sector has over-arching Strategic Goals (or "Strategies") established to meet 2030 goals and is organized for detailed implementation Actions.

The 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 La Crosse and its impacts are projected to become much more severe in the coming decades[2]. These impacts also contribute to additional strain on vulnerable populations, social systems, and overall community resilience[3].

The Opportunity

Transformation of our energy system is essential to stop burning fossil fuels. This transition presents an opportunity for La Crosse. Directing our energy investments into renewable sources will make them more resilient and provide for local job creation.[4,5] Innovation, technology, and collective social change inherent in climate action can also support greater community abundance and shared equity.

The Process

The work that went into the La Crosse Climate Action Plan:

11 month planning timeframe

46 planning team members

15 community partner groups engaged

722 community members providing input

5 foundational research study documents

2 on-line community input survey efforts

GHG Emission Reduction Goal in Global Context

To validate the City's emissions reduction goal, the recommendations of the International Panel on Climate Change (IPCC) were considered. The scientific consensus of recent IPCC recommendations is that it is necessary to reduce global GHG emissions at a pace that will limit global warming to 1.5°C or no more than 2°C above pre-industrial levels. This is considered to be the threshold for dangerous climate impacts.

The UNEP Emissions Gap Report published in November 2019 asserts that by 2030, global greenhouse gas (GHG) emissions will need to be 25% to 55% lower to put the world on the pathway to limiting global warming to below 2°C or 1.5°C respectively by 2030[6].

Our Carbon Reduction Goal

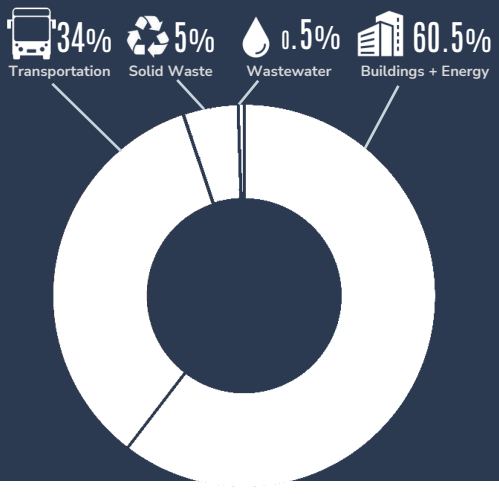
This plan seeks to re-affirm the City's commitment to reduce GHG emissions while aligning with the recommendations of the IPCC. These commitments were accounted for in the formulation of appropriate carbon reduction goals for La Crosse:

The City of La Crosse's GHG emission reduction goals are to reduce community-wide GHG emissions by 40% to 50% below 2019 levels by 2030 and achieve carbon neutrality by 2050.*

* "Carbon neutrality" means annual zero net anthropogenic (human caused or influenced) CO2 emissions by a certain date. By definition, carbon neutrality means every ton of anthropogenic CO2 emitted is compensated with an equivalent amount of CO2 removed (e.g. via carbon sequestration).

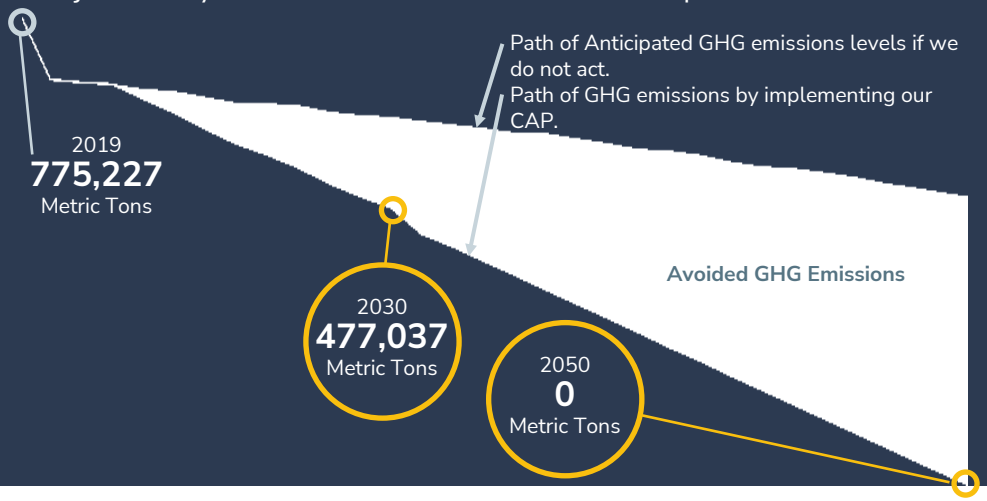
2019 GHG by Sector

City-wide Emissions



La Crosse's Carbon Reduction Pathway

Projected City-wide GHG reductions from CAP implementation



The Plan

The La Crosse Climate Action Plan:

addresses
9 SECTORS
of GHG emissions and climate adaptation

through
41 STRATEGIES
to achieve goals

supported by
281 ACTIONS
detailing steps to be taken

over an
8 YEAR
Implementation timeframe

Climate Action Plan as Living Plan

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. 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 long-term 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.

Implementation is For Everyone

The causes and impacts of climate change are broad. Solving it must be equally broad. Some actions will need to be led by City Council, City departments, and/or the business community;. In addition, there are some things that households and individuals can do to make an impact. Ultimately, achieving the visionary goals outlined in this plan will require engagement and a sense of responsibility not only by the City of La Crosse leadership and staff, but by the community itself as well. It is critical for all to remain engaged and active, advancing and advocating for actions you feel are important.

Next Steps and Implementation

This La Crosse Climate Action Plan is only the beginning of an on-going process to evaluate and advance the community's climate resilience, GHG emissions, and overall sustainability goals. The plan includes a Climate Action Implementation section providing detailed actions in a framework for launching, guiding, monitoring, and evaluating the execution of this plan.

Top Climate Actions

The following are likely the phase 1 actions with the greatest impact—GHG reduction or climate adaptation potential—or those which help to establish a solid foundation for later actions included in the Climate Action Plan. These climate actions represent a "Quick Start" sub-list of impactful actions for community-wide and municipal operations and are recommended for prioritized implementation.

GHG Reduction Actions (Mitigation)

Section 02 Transportation and Mobility

TM 2-2	Increase bus frequency. At a minimum, extend 30-minute service on weekdays by one hour until 6:42 pm on routes 1, 2, 4, 5, and 6 to provide flexibility to employees who work into the evening..
TM 3-3	Assist private fleet operators who with grant applications for EVs and EV infrastructure; require they set EV goals of 30% by 2030 and 100% by 2040 in order to qualify for assistance. Goal: 10 New organization commitments annually.

Section 04 Buildings and Energy

BE 1-3	Contract with an organization to reduce the cost for low-income residents to receive professional home energy audits and recommendations for energy use reduction and monitoring. Develop a program to identify and implement measures that increase the durability, safety, and efficiency of their homes. Goal: 500 households annually, each achieving 15% energy reductions .
BE 1-4	Promote existing commercial and industrial energy efficiency audit and upgrade programs. Develop energy efficiency programs for businesses that don't own their own building. Use the Minnesota Chamber of Commerce's Energy Smart program as a model. Goal: 15% of commercial/ industrial buildings by 2030 achieving a 20% efficiency increase per location .
BE 4-5	Organize annual Residential Solar Group Purchase program for La Crosse, supported by a program administrator such as MREA or others experienced in solar group purchase programs. Goal: 70 participants and 750 KW installed annually.

Climate Resilience Actions (Adaptation)

Section 03 Land Use and Housing

LH 4-1	Based on the City's Ground Cover, Tree Canopy, Heat Island, and Carbon Sequestration Study, identify vulnerable urban tree canopy and street tree sections and develop policies to incentivize, encourage, or require strategic tree planting for heat island mitigation.
LH 3-5	Enhance stormwater system plans and infrastructure to handle an increase in severe weather events based on climate change projections rather than historic trends.

Section 04 Buildings and Energy

BE 5-5	Use green infrastructure and other nature-based approaches (e.g., floodplain restoration) to reduce the vulnerability of buildings to flooding, with particular focus on critical facilities .

Section 09 Health and Safety

HS 3-1	Support existing community networks and connections led by and/or geared towards populations vulnerable to extreme weather events, including people who are elderly, homebound, disabled, isolated, or those likely to need financial assistance.
HS 1-16	Incentivize building owners to increase the resilience of existing and new buildings. Ensure that incentive programs prioritize multi-family dwellings and improvements that benefit vulnerable populations

SECTION 01

Introduction

GHG EMISSIONS IN LA CROSSE

229,553
Metric tons CO2e in 2020 from vehicle use

403,071
Metric tons CO2e in 2020 from building energy

31,239
Metric tons CO2e in 2020 from solid waste

3,239
Metric tons CO2e in 2020 from water & wastewater

Click here to return to TOC

The City of La Crosse has a tradition of being a leader in addressing sustainability and environmental issues. In 2009, the City adopted the Strategic Plan for Sustainability prepared by the Joint Oversight Committee on Sustainability. This plan provided the City with an overall framework for addressing a variety of sustainability initiatives.

The community has become increasingly concerned about the global climate crisis. In 2019, the City of La Crosse Common Council passed a resolution which set a goal of reaching carbon neutrality community-wide in both energy and transportation by 2050.

In 2021 the City kicked off its Climate Action Planning effort and in September of 2021 engaged paleBLUEdot for the development of the City's first Climate Action Plan. This report is the result of those efforts and was developed in collaboration with the City's Climate Action Planning Team.

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 La Crosse CAP addresses both climate mitigation and climate adaptation actions.

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. CAPs can also help a community's resident and business communities create improved resilience to the current and future impacts and risks of climate change. Climate action can also create investment in innovation, jobs, and actions that save households and businesses money while improving quality of life—particularly among the community's most vulnerable populations.

Co– Benefits of Climate Action Planning

According to the World Health Organization, studies are increasingly showing that the implementation of climate policies leads to both cost savings and improvement in health. The actions communities take to reduce greenhouse gas emissions in various sectors, including housing, transportation, and energy have many co-benefits that go beyond climate change mitigation. These co-benefits to climate planning include reduced air pollution, substantial human health gains and reduced health risks, increased resource efficiency, improved local economic security, and improved resilience of ecosystems and our built environment.[1,2,3,4] These benefits result in positive financial impacts as well as improved quality of life and natural resources.

Positive Financial Impacts

Many climate actions have a direct positive financial impact (e.g. savings from reduced fuel consumption). Many actions also have significant indirect financial impacts. Studies show that air pollution benefits of climate actions can cover a significant part of the cost of those initiatives.[5] Still others help avoid costs through increased resilience such as reducing dependence on fossil fuels – estimated at $5 per metric ton (MT) of GHG reduction.[6] Health benefits may offer the most significant financial opportunity. One study estimated global average health co-benefits of $58-380 per metric ton of GHG.

Improved Quality of Life

The actions included in this and other climate action plans support a continued improvement to the community's quality of life. Studies indicate that successful implementation of many climate actions will result in increased mobility options, job creation, and reductions in poverty and inequality.[8]

Improved Natural Resources

Addressing global warming could help lessen the harmful impacts of climate change on the ecosystems that now provide us with multiple benefits.[9] Increasing the La Crosse's community-wide tree canopy to meet the goals of this climate action plan, for instance, could increase the economic benefit provided by the community's trees by as much as $250,000 annually while other actions can result in improved access to greenspace for residents.[10]

Common Co-Benefits of Climate Planning

Climate Change in Wisconsin

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 Wisconsin's climate are occurring already: shorter winters with fewer cold extremes, and more heavy and extreme precipitation.

Climate Change in La Crosse

The climate in the La Crosse has already changed. From 1980 through 2018, the community has experienced an increase in annual average temperature, an increase in the number of days above 95°F, an increase in the number of heavy rain events, and a decrease in the number of days below 32°F.[12,13]

Some of the most significant changes in the climate relate to variability. Climate variability can be seen in the changes in annual precipitation for La Crosse. Overall annual precipitation has increased; however, this increase is not evenly distributed throughout the year. Fall and winter precipitation have increased up to 15.5%, while spring and summer precipitation have remained nearly unchanged.[14,15]

La Crosse's climate is anticipated to continue to warm through this century and beyond. Precipitation is anticipated to likely increase in all seasons particularly in the spring and fall. The primary changes to climate characteristics for the community include:

- Warmer annual average temperatures with a more significant warming in winter months
- Increase in extreme heat days
- Increase in heavy rain fall events with increase in flood potential
- Increase in time between precipitation with increase in drought potential
- Greater variability in temperature and precipitation trends

Looking Back

From 1980 through 2018, La Crosse has experienced:

Increase in annual average temperature:	**1.62°**
Increase in annual precipitation:	**4.3%**
Increase in heavy precipitation	**34%**
Increase in days >95°F:	**2 days**
Decrease in days <32°F:	**-8 days**
Growing season:	**+9 days**

Looking Forward

By 2100 La Crosse can anticipate:[12, 19]

Increase in annual average temperature:	**6°-12°F**
Increase in annual precipitation:	**+15%**
Increase in heavy precipitation	**30%**
Increase in days >95:	**50 days**
Decrease in days <32:	**-45 days**
Growing season:	**+43 days**
Air Conditioning Demand:	**+178%**

Economic Risk of Climate Change to La Crosse by 2100

Future economic and social impacts of climate change include impacts to agriculture (including food costs), energy costs, labor, death rates, and crime among others. The estimated economic impacts for La Crosse are:[16]

$34,470,809

Annual Cost Impact (in 2018 dollars)*

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

Social Cost of Carbon

"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. In 2020, Wisconsin state legislators proposed an initial cost of carbon in Assembly Bill 766 of:

$50*

Per Ton

Climate Risks to La Crosse

The projected changes to La Crosse's climate in the coming decades represent potential risks to residents. These risks are inequitably felt and are particularly acute in populations especially vulnerable to them such as children, seniors, and those with disabilities (see the La Crosse Climate Vulnerability Assessment for more information). Below are some of the more significant risks to the community's population.

Extreme Heat and Weather

Certain groups of people are more at risk for stress, health impacts, or death related to extreme weather events including tornadoes, wind storms, lightning, winter storms, hail storms, and cold waves. Vulnerability to heat stress can be increased by certain variables including the presence of health conditions like diabetes and heart conditions, demographic and socioeconomic factors, and surrounding land cover.

Air Quality

Climate change is expected to affect air quality through several pathways including production and potency of allergens and pollen, and increased regional concentrations of ozone, increased potential of smoke from wildfires, and increased particulate air pollution and dust.

Flooding

According to the latest National Climate Assessment, the frequency of heavy precipitation events are already increasing for the nation as a whole as well as for Wisconsin specifically. These heavy rain events are projected to increase throughout Wisconsin. Increases in both extreme precipitation and total precipitation are likely to increasingly contribute to over-bank flooding (river and lake flooding) as well as flash flooding.

Food Insecurity

Climate change is likely to destabilize cropping systems, interrupt transportation networks, and trigger food shortages and spikes in food cost.

Infrastructure Failure

Extreme weather events, flooding and flash flooding, as well as increasing daily stresses caused by increasing climate variability, all represent potential causes of failure of our aging infrastructure. Power outages, road damage, bridge collapse, and water infrastructure failure each represent significant physical climate risks to the community - especially individuals who are climate vulnerable.

What Are GHGs?

A greenhouse gas (GHG) is a molecule in the atmosphere which does not react to light energy in the visible range, but does react to light energy in the infrared range-like that which is emitted from the Earth after being warmed by the sun. The most common greenhouse gases include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).

Why do GHGs Matter?

GHGs let the sun's light shine onto the Earth's surface, but they trap the heat that reflects back up into the atmosphere. In this way, they act like the insulating glass walls of a greenhouse. The more GHGs there are the more heat that is trapped in our atmosphere and the more we experience the impacts of global warming.

What can we do to reduce GHGs?

Greenhouse gases can be reduced by making changes to the key sectors throughout our community—particularly through the reduction and elimination of fossil fuel combustion and the advancement of clean energy sources.

20

* MT = Metric Ton

** GDP = Gross Domestic Product

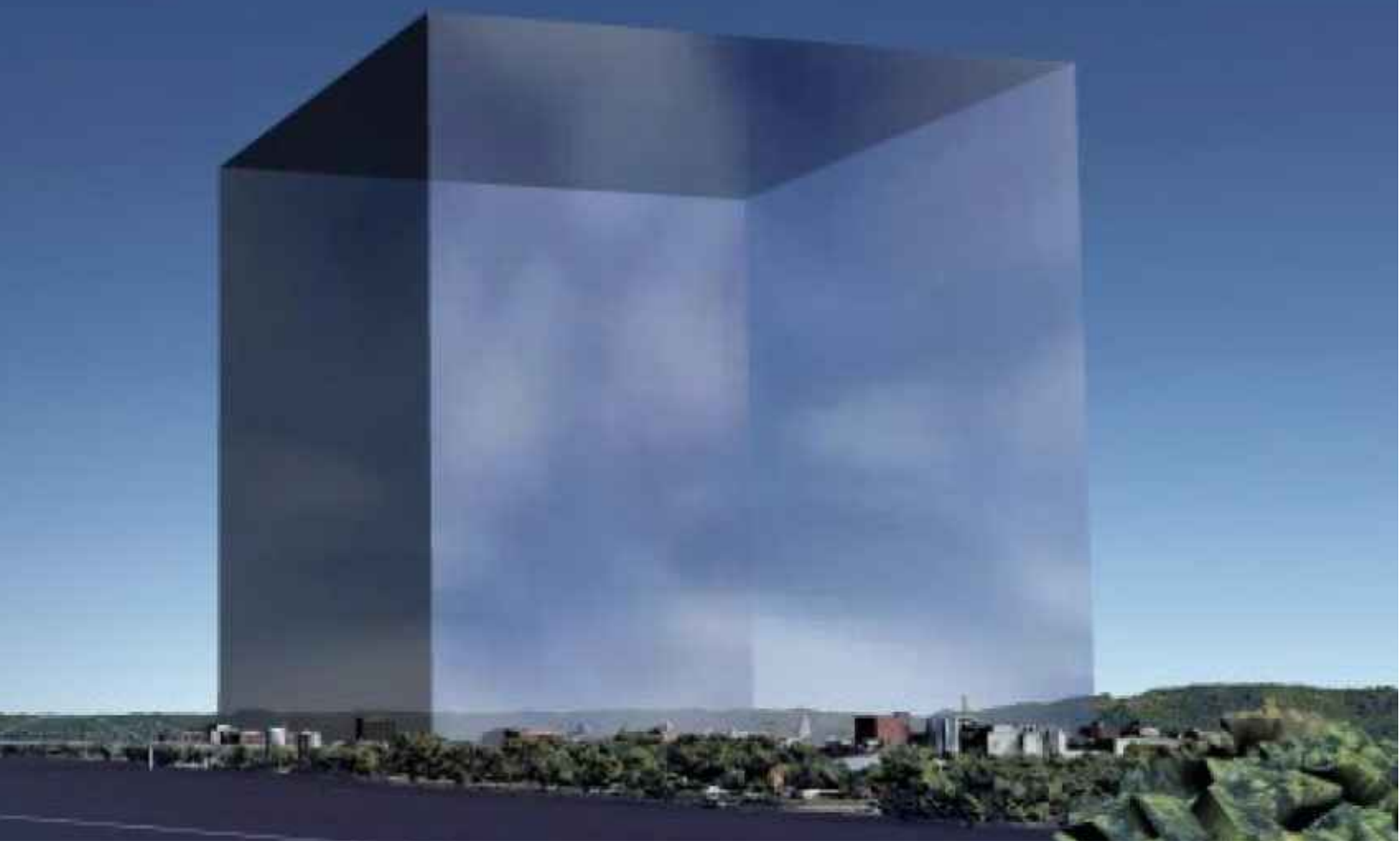
*** Employment data from US Census OnTheMap. Data for 2020 not yet available at time of printing

La Crosse GHG Emissions Overview

Community-wide total emissions for La Crosse decreased from 775,227 metric tons (MT) in 2019 to 667,101 MT in 2020. As an historic review of just two years, these numbers cannot yet be seen as a trend; however, we can glean some understanding of the likely underlying causes for the reduction in emissions. Reductions in 2020 are largely driven through a significantly reduced emissions factor for electricity generation as reported by Xcel Energy, a slight decrease in natural gas consumption, and a decrease in transportation volumes—presumably caused by COVID-19 impacts.

How Large Are Our GHG Emissions?

The community's total emissions for 2019 are equal to **13.1 Billion** cubic feet of man-made greenhouse gas. This volume of atmosphere is equal to a cube **2,357** feet high, wide, and deep. The image below views the cube from over 2 1/2 miles away.



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The City of La Crosse's GHG emission reduction goals are to reduce community-wide GHG emissions by 40% to 50% below 2019 levels by 2030 and achieve carbon neutrality by 2050.*

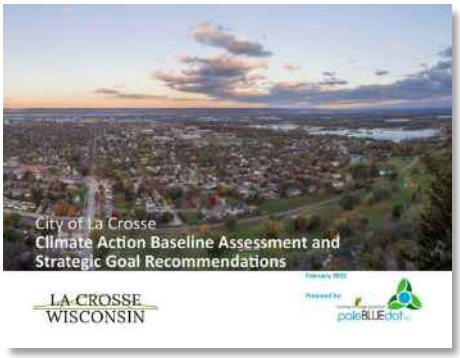
This community-wide goal is reflected in strategies established for individual sectors. Sector goals related to GHG emissions reductions are designed to balance reduction across all sectors and achieve the overall emissions goals set forth for the community. The goals seek to strike a balance between achievability while also stretching for improvement beyond business-as-usual.

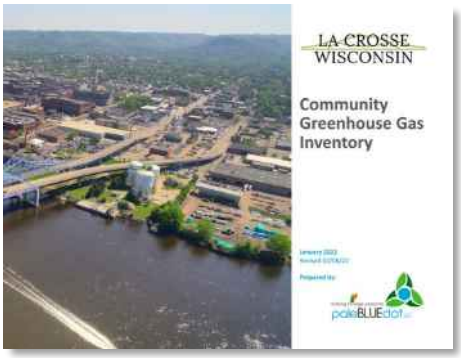
* Net zero emissions refers to a community for which, on an annual basis, all greenhouse gas emissions resulting from community-wide operations are offset by carbon-free energy production .

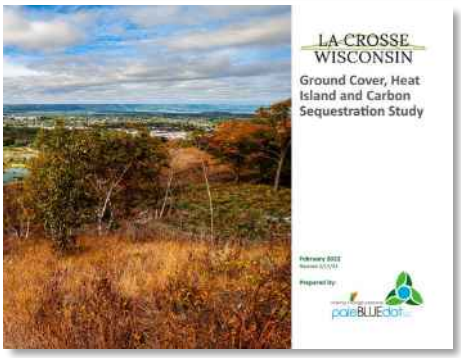
Survey of Peer Regional Community Carbon Reduction Goals

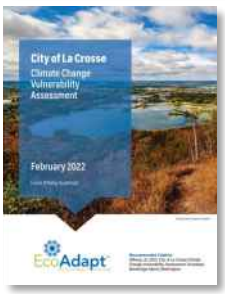
Albert Lea	Reduction in City operations and community-wide emissions of 25% below 2019 levels by 2030 and 80% below by 2040
Burnsville	Reduce community-wide GHG emissions 40% below 2005 levels by 2030 and 80% below 2005 levels by 2050
Duluth	80% reduction in GHG by 2050 from municipal operations compared to 2008 levels
Eau Claire	100% renewable energy and *carbon neutrality by 2050*
Madison	100% renewable energy and net-zero emissions by 2030
Maplewood	Reducing greenhouse gas emissions to 20 percent of the City's 2015 baseline levels by 2050 (an 80 percent reduction).
Milwaukee	By 2030, Milwaukee aims to reduce community-wide net greenhouse gas emissions by at least 45% and net zero GHG emissions By 2050, or sooner.
Minneapolis	100% renewable energy for city operations by 2022 and citywide electricity by 2030
Rochester	100% renewable energy citywide by 2031 across all sectors
Shakopee Mdewakanton Sioux Community	To achieve community-wide Net Zero emissions.
St Louis Park	100% renewable electricity citywide by 2030, carbon neutrality by 2040
St Paul	Carbon neutral municipal operations by 2030, carbon neutral citywide by 2050
Winona	Carbon neutral citywide by 2050


IMAGINE THE YEAR 2050
What does a carbon-neutral La Crosse look like to you?
TELL US!
The City of La Crosse Climate Action Planning committee wants to hear from you! Scan the QR code to provide input in the form of stories, art, poems, and to learn more.
LAND RECOGNITION
DIGITAL LITERACY FOR JOB SEEKERS
THE DRIFT
YOGA FOR ALL
TECH HELP
WOMEN IN JAZZ









The Process

The CAP was developed in collaboration with a 46-person planning team of community members (CAP Team), business community members, institutional representatives, City commissions, and City of La Crosse 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 January 2022 through July 2022. The goals and actions identified in the Climate Action Plan are grounded in community input, expert analysis, and best practices from other cities throughout the United States. Strategic goals and detailed actions were developed, refined, prioritized, and finalized by the Planning Team through a series of workshop meetings. The result of this process is a collaboratively created, co-authored Climate Action Plan which directly integrates the voices of La Crosse residents, businesses, City staff, and representatives of under-resourced communities within the community.

Research Based Climate Action Plan

In support of establishing the goals, strategies, and actions included in this plan, paleBLUEdot also produced a Greenhouse Gas Inventory, a Climate Vulnerability Assessment, a city-wide Renewable Energy Potentials Study, a community-wide Ground Cover, Tree Canopy, and Carbon Sequestration Study, and a Climate Action Baseline Assessment. These assessments created the foundation of the Climate Action Planning process.

Community Engagement

The goal of the La Crosse CAP community engagement effort was to cultivate community co-ownership by engaging them early, often, at various levels, in diverse ways, and facilitating or supporting their participation in decision-making. A significant percent of the engagement effort was focused on engaging traditionally under-resourced communities who are most vulnerable to the risks and impact of climate change—see “Equity and Inclusion”.

Community Engagement Approach

Supporting this goal, the community engagement approach occurred over two phases. The initial phase focused broadly on community concerns, ideas, and general climate plan input while the second phase focused on providing community members with an opportunity to review and give feedback on the Draft Climate Action Plan. Both phases of engagement included inviting community members to take part in planning activities that varied in level of commitment and time needed for participation. This tiered engagement was meant to meet community members, particularly under-resourced communities, where they are and supply opportunities for them to take part at their level of interest, time, and capacity. Listed in level of time and commitment needed, the engagement opportunities were:

Participating on Climate Action Planning Team: This was the most time intensive opportunity and empowered community members to directly shape the CAP by working with City staff and leaders.
Hosting Community Sessions: Community members worked with the paleBLUEdot team to recruit and host an in-person or virtual listening session where community members gave input on the plan.
Participating in Community Sessions: Community participants attended sessions to discuss climate action and provide input
Completing Survey: Participants provided their input by completing an on-line survey.

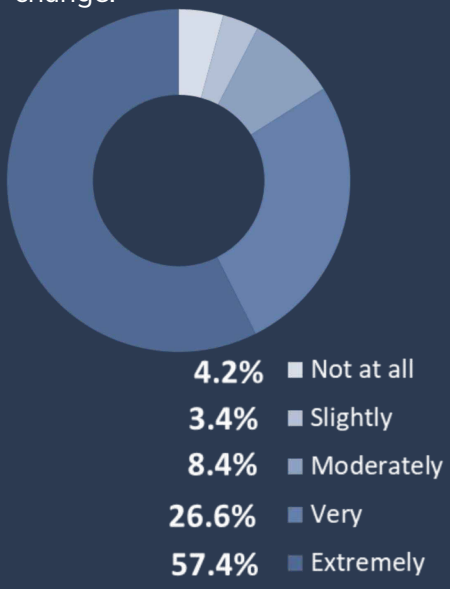
Finding Community Champions

The first step in engaging the community was to identify which populations would be easy to reach and which ones would be more difficult. Through conversation with City staff and an analysis of Census Quick Facts, we found La Crosse's under-resourced communities likely include: communities of color, low material wealth seniors, low material wealth people with disabilities, and renters.

The paleBLUEdot team conducted four rounds of interviews with 12 individuals representing community partners. These one-on-one interviews provided an opportunity for focused input into the planning process while helping to identify representatives within La Crosse's under-resourced communities who might participate in the planning core team and/or listening sessions. As a result of this engagement effort, four community champions were identified who each convened one or two Community Input Sessions. These sessions supported opportunities for in-depth group dialogue from 32 La Crosse residents from under-resourced communities enabling their carefully considered input and feedback in the development of the La Crosse Climate Action Plan.

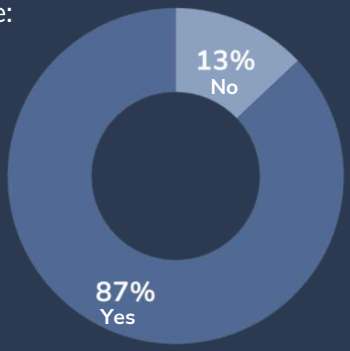
La Crosse Concern Over Climate Change Impacts

According to the City's Climate Change Survey, 92% of respondents are moderately, very, or extremely concerned over potential impacts of climate change:



La Crosse Impacted by Climate Change

According to the City's Climate Change Survey, 87% of respondents have been personally impacted by the effects of climate change:



Engaging La Crosse's Youth

The community engagement process included a specific focus on connecting with La Crosse's youth. As with the broader community engagement effort, this began with outreach to potential youth community champions with the goal of collaboration across the community by connecting public health, literacy, and conservation across a broad age range. As a result, La Crosse Public Library and Myrick Park Center were approached to serve as partners in the youth engagement efforts due to their strong commitment and ties to La Crosse's diverse youth populations. Jeni Lee Walker, author of the Climate Resiliency Guide, was also an essential partner in the planning and implementation of these engagement efforts.

Engagement included climate-themed events at Myrick Park Center's Nature Saturday and No School Nature Camp along with Saturday Storytimes and ongoing teen Climate Storytelling opportunities at the La Crosse Public Library. These types of events offered youth and caregivers climate awareness education in accessible settings hosted by trusted community leaders thus building the capacity of all. It is recommended that ongoing CAP efforts continue to involve youth as crucial and unique stakeholders in the long term success of the CAP. Actively engaging youth from the onset shows awareness of the vital role youth play and empowers youth to engage in actions themselves and to encourage others, including their peers and family members, to engage as well.


Equity Focused Community Engagement

The consulting team organized four focus groups and one-on-one meetings with community liaisons. They intended to build relationships, deepen understanding of needs, and identify the best ways to broaden engagement within underrepresented communities.

These meetings occurred in two phases. The goal of the first phase was to gain insight into community members ' perspectives on climate change issues, solutions, and considerations the City should incorporate into the plan. Once the Draft Climate Action Plan was complete, the goal of the second phase was to collect input and insight on potential equity concerns and opportunities. Participants also identified resources and partners for Climate Action Plan implementation. They may also support the refinement of equity considerations and community engagement with traditionally underrepresented communities.

Action Equity Impact Review

In addition to the screening criteria, actions included in the plan were reviewed for equity impacts using the paleBLUEdot Equity Assessment Tool. The tool provided CAP Team members with a framework which reviewed each subject action against three equity considerations. Actions were then re-crafted based on the findings of the CAP Team members. The equity assessment considerations used were:

- What are the potential positive impacts/ benefits/ access opportunities created by this action? Who will benefit?
- What are the potential negative impacts/ consequences/ barriers created by this action? Who will be affected by these?
- Are there other equity factors to consider? (inclusive language, supportive services needed, etc

Inclusion and Equity in CAP Actions

Climate change disproportionately impacts La Crosse's most vulnerable community members including low-income and disadvantaged populations, marginalized ethnic groups, racial minorities, the elderly, the very young, and those facing challenges to their health. At the same time, innovative climate action can be a powerful avenue toward reducing inequality, sparking economic growth, and expanding income opportunities.

Therefore, the strategies and actions throughout this climate action plan have been developed with the goal of simultaneously addressing the threat of climate change while seeking out the benefits and opportunities created by climate action for reducing inequality. As the impacts of climate change increase, so does the need to implement effective strategies and actions that ensure equity and empowerment for all in La Crosse.

Finalizing La Crosse Plan Actions

The CAP Team reviewed a preliminary list of actions. Screening criteria enabled them to evaluate, refine, prioritize, and finalize the actions incorporated in the Climate Action Plan. The Planning Team established screening criteria early in the process and included:

- **Impact/Effectiveness of Implementation**: How likely is it to achieve the goal? Will it impact a large portion of the targeted emissions sector or population? How likely is it that the action will work to address the goal? Is this addressing a high-priority vulnerability or a major source of emissions?
- **Equity of Implementation:** Will this action positively support advancing equity within the community? Will it address an existing inequity in the community, such as disproportionate poor air quality, access to transit, flood risk, etc? Does the action address the needs of vulnerable and historically marginalized populations? Does the action reduce vulnerability for all populations? Is it fair? Are there unintended consequences of action?
- **Support**: How likely is the action to be adopted by the City or community? Is it politically feasible? Is there community support? Is it consistent with the City's priorities and readiness to implement?
- **Overall Cost to Benefit:** Does this action have a good overall cost-to-benefit potential? Overall cost-to-benefit should include benefits relative to GHG emissions reductions (cost of carbon), and other direct benefits such as operational cost savings or community savings, but also co-benefits such as economic development potential, quality of life potential, health benefits, and avoided costs including avoided costs of "business as usual" impacts if action was not implemented.

Using This Plan

This Climate Action Plan includes an implementation framework designed to achieve community-wide goals for greenhouse gas reduction and climate adaptation and resilience. The plan is structured around a unifying framework organized by eight community-wide sectors.

Each of these sector areas is described in a separate section with background considerations on the subject covered. Sectors have over-arching strategies established to meet 2030 goals and detailed actions for implementation. Sector actions primarily focus on Climate Mitigation, Climate Adaptation, or both:

Strategies: 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 detailed items that should be completed to carry out the vision and strategies identified in the plan.

STRATEGIES

Our Climate Action Strategies

The following is a summary of the strategies detail through this plan:

Transportation and Mobility

Addressing GHG emissions from and resilience of on and off-road vehicles and equipment.

TM 1: Decrease commuter and community-wide VMT by 5% by 2030.

TM 2: Increase public transit access and commuter ridership from 1.6% to 3% by 2030 (represents an 88% increase in the number of commuters using public transit over 2019 baseline).

TM 3: Increase battery electric vehicle (BEV) utilization to 20% of community-wide rolling stock by 2030 (from approximately 77 vehicles to 11,800 vehicles community-wide).

TM 4: Establish viable bio and/or renewable diesel sources to serve community by 2025. Achieve 25% community-wide diesel consumption replacement with bio and/or renewable diesel by 2030.

TM 5: Improve the comfort and safety of walking and biking within La Crosse.

TM 6: Achieve 30% conversion of municipal operations gasoline and e10 gasoline vehicles and equipment within municipal fleet to EV's by 2030. Achieve 100% conversion by 2040.

TM 7: Increase fuel efficiency of remaining municipal operations combustion engine fleet by 10% by 2030.

TM 8: Reduce community-wide off-road and lawn equipment annual emissions.

Land Use and Housing

Addressing climate resilience of housing stock and climate mitigation and adaptation potential of land use patterns.

LH 1: Increase the number of housing units within the current city limits by 5% by 2030.

LH 2: Increase community resilience to increased flooding and flash flooding caused by Climate Change.

LH 3: Update community plans, zoning, and design standards to increase housing and community resilience to the impacts of climate change, including flooding and extreme temperatures.

LH 4: Update community plans, zoning, and design standards to mitigate heat island impacts, particularly for populations most vulnerable.

LH 5: Reduce share of population living in high energy poverty from 16.4% to 11.4% by 2030.

Buildings and Energy

Addressing GHG emissions from and resilience of our building stock and building energy supply.

BE 1: Reduce community-wide residential, commercial, educational, and industrial building energy consumption by 15% by 2030 (electricity and natural gas).

BE 2: Increase adoption of Net Zero construction community-wide to 10% of new residential and commercial construction annually by 2030 (estimated at 13 net zero homes and 8 net zero commercial buildings annually).

BE 3: Achieve 10% residential and commercial and industrial building "fuel switching" from on-site fossil fuel combustion to electrification by 2030.

BE 4: Increase renewable energy from 0.24% to 5% of community-wide residential and commercial electric use by 2030.

Increase resilience of community-wide building stock to the impacts of climate change.

BE 6: Improve total municipal building energy efficiency by 15% by 2030 (electricity and natural gas).

BE 7: Achieve 10% municipal building thermal “fuel switching" from on-site fossil fuel combustion to electrification by 2030.

BE 8: Increase on-site renewable energy from 0.57% to 7.5% of City operations electricity consumption by 2030.

Waste Management

Addressing GHG emissions from waste management and improved community resilience through waste reduction.

WM 1: Decrease total per capita municipal solid waste handled by 5% or more by 2030 (3,360 tons or more annually).

WM 2: Achieve 50% organics landfill waste diversion, including food waste reduction, by 2030 (11% of total MSW, approximately 7,400 tons).

WM 3: Increase recycling from 12.8% to 20% of total MSW handled by 2030 (from 8,590 tons to 12,600 tons diverted. Calculation assumes achieving strategy WM 1).

WM 4: Increase diversion of reusable materials by 15% by 2030 (decreasing from 18.9% of community mixed waste to 16%).

Water and Wastewater

Increasing resilience of our water supply and reducing GHG emissions associated with wastewater treatment.

W 1: Promote increased water conservation community-wide with a targeted reduction of 6.5% by 2030 (202 million gallons conserved annually by 2030).

W 2: Reduce wastewater generation community-wide with a targeted reduction of 5% by 2030 (180 million gallons reduced annually by 2030).

W 3: Improve the resilience of the community's water, wastewater, and stormwater infrastructure to flooding, particularly in high-risk areas.

Strategies as Minimum Goals

As aspirational goals, the La Crosse Climate Action Plan’s strategies and goals should be understood as minimums. The intent, ideally, is that implementation of the climate action plan will ultimately exceed the goals set forth in the plan.

STRATEGIES

Our Climate Action Strategies

The following is a summary of the strategies detail through this plan:

Local Food and Agriculture

Increasing resilience of our food systems and improving food access and security.

LF 1: Increase the production of and access to local food, particularly serving low-income and food insecure individuals.

LF 2: Reduce food waste and hunger, achieve a 50% reduction in food insecurity community-wide by 2030.

LF3: Protect and preserve agricultural land while increasing its resilience to climate shocks.

Greenspace, Trees, and Ecosystems

Improving community adaptation through improved green infrastructure and addressing ecosystem resilience.

GS 1: Increase community-wide tree cover from 30% to 32.5% by 2030 and 35% by 2040 (350 acres added by 2030, 700 acres added by 2040).

GS 2: Increase pollinator supportiveness of lawns and grasslands in the community and achieve a 5% turf replacement with native grasses and wildflowers by 2030 (175 acres reduced by 2030).

GS 3: Reduce community-wide "dark" impervious surface coverage from 26.4% to 8% by 2030 and 5% by 2040 (280 acres reduced by 2030, 700 acres reduced by 2040).

GS 4: Increase climate resilience of community's parks and open spaces.

Health and Safety

Improving community resilience through healthy community connections, infrastructure, and systems.

HS 1 : Assist the community's vulnerable population in preparing for and mitigating local climate change impacts.

HS 2: Ensure that the City's mission critical, emergency services and health care facilities are prepared for impacts of climate change.

HS 4: Improve community adaptation capacity through strengthened social support networks.

Economy

Increasing the preparedness of our businesses and workforce and leveraging economic advantage of climate action.

E 1: Capture local economic potential of climate action.

E 2: Support the development of the community's workforce to be well-positioned to pivot towards the shifting needs and new opportunities of the Climate Economy.

E 3: Support/incentivize local businesses and agricultural operations in building marketplace climate resilience.

E 4: Establish sustainable financing for the City's climate action implementation.

E 5: Prepare for climate change immigration/migration.

Cross-Cutting

Cross-Cutting Actions are foundational or organizational recommendations that apply to multiple Sectors.

CC 1 : Continue to Build Internal Capacity for Support of Climate Action Plan Implementation.

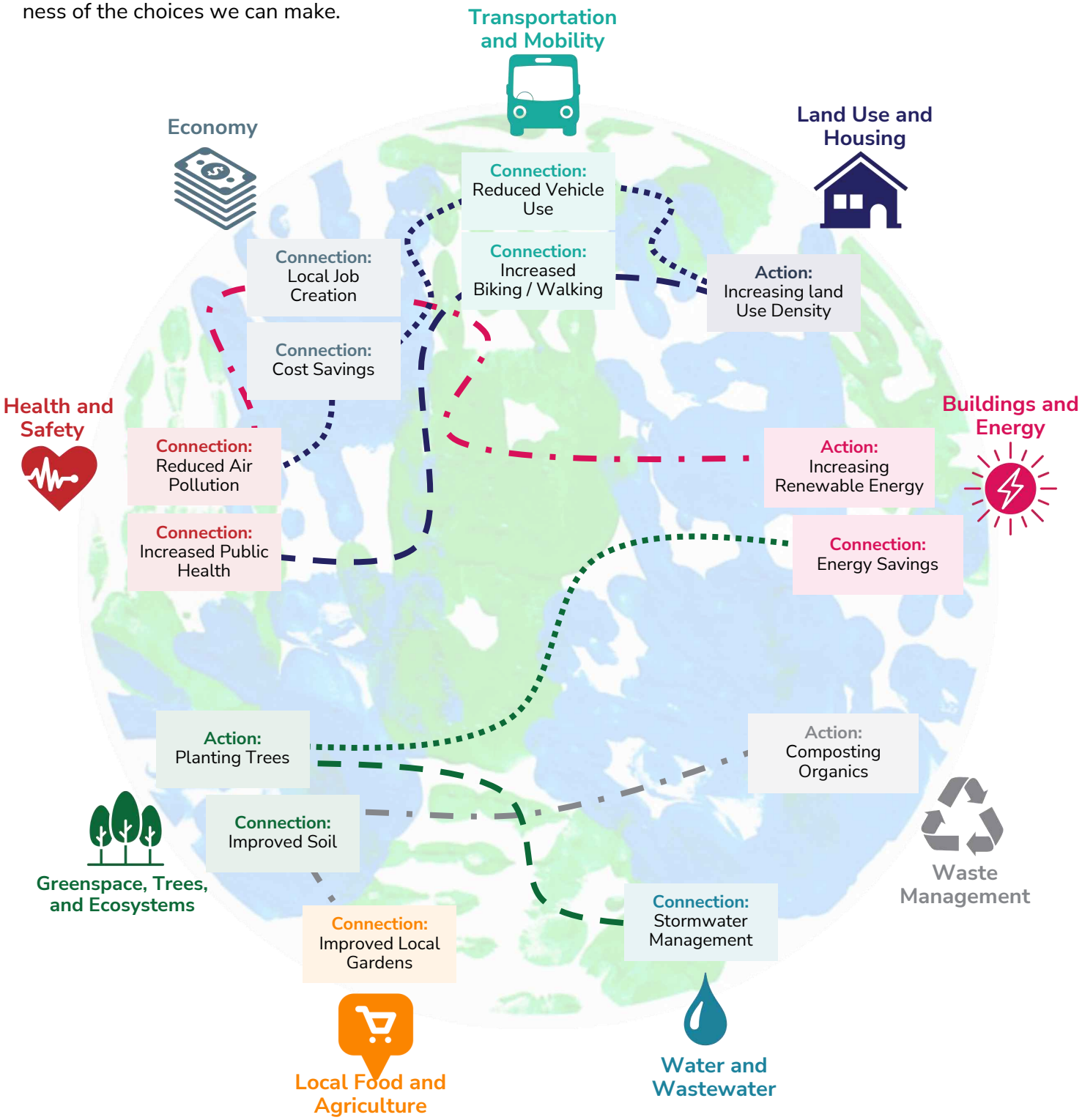
CC 2: Facilitate External Support Needed for Climate Action Plan Implementation.

CC 3: Maintain appropriate funding to support plan implementation.

MAKING CONNECTIONS

Climate Actions Are Interconnected

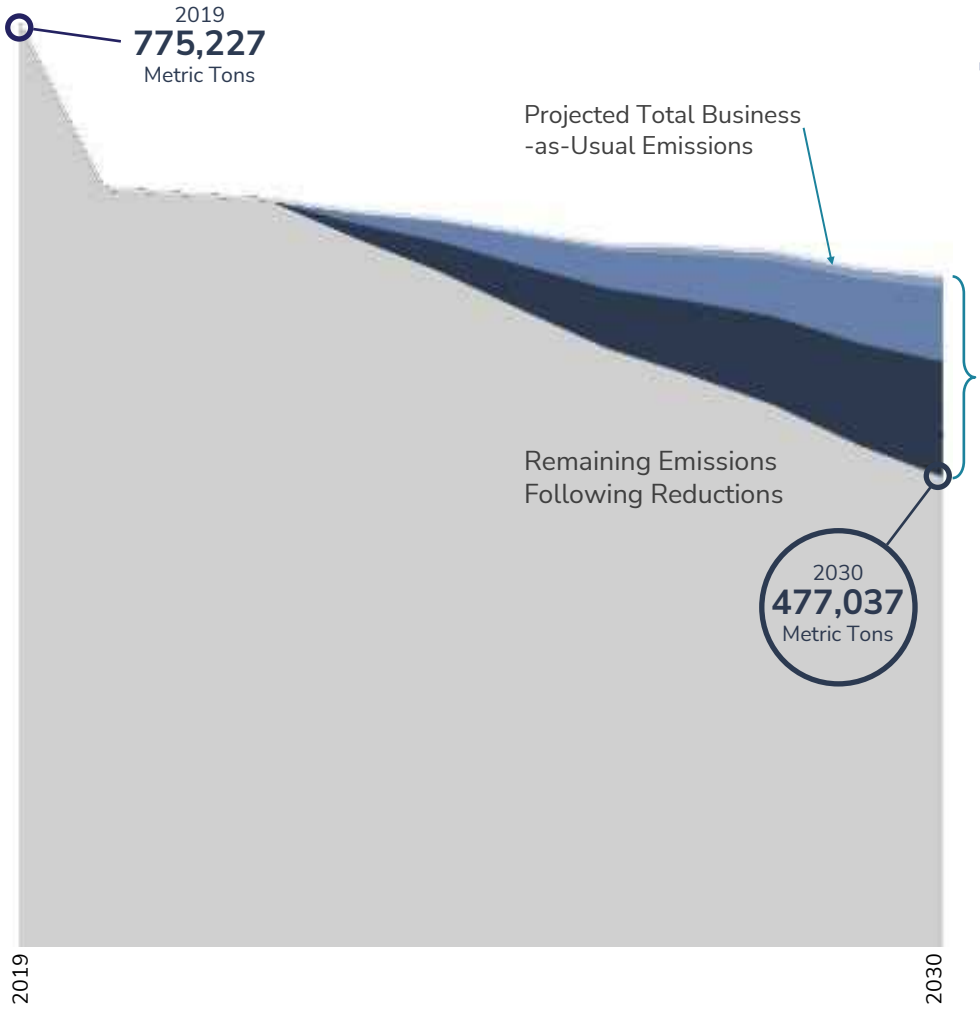
Not only do actions we take to address climate resilience have a range of co-benefits (see page 1-3), they are interconnected. Many times, a climate action taken in one aspect of our life actually returns benefits, improved resilience, or GHG reductions in other aspects. Below are a few examples of the interconnectedness of the choices we can make.



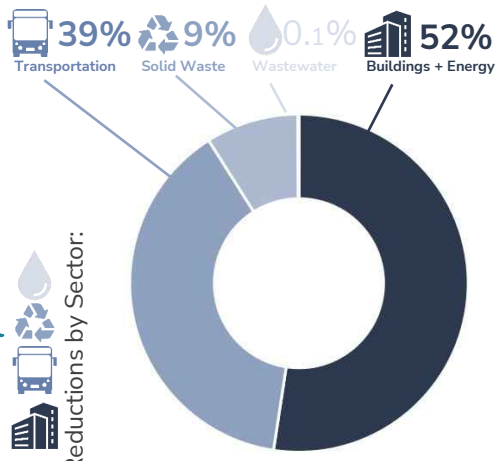
Estimated Community-Wide GHG Reductions Included In This Plan

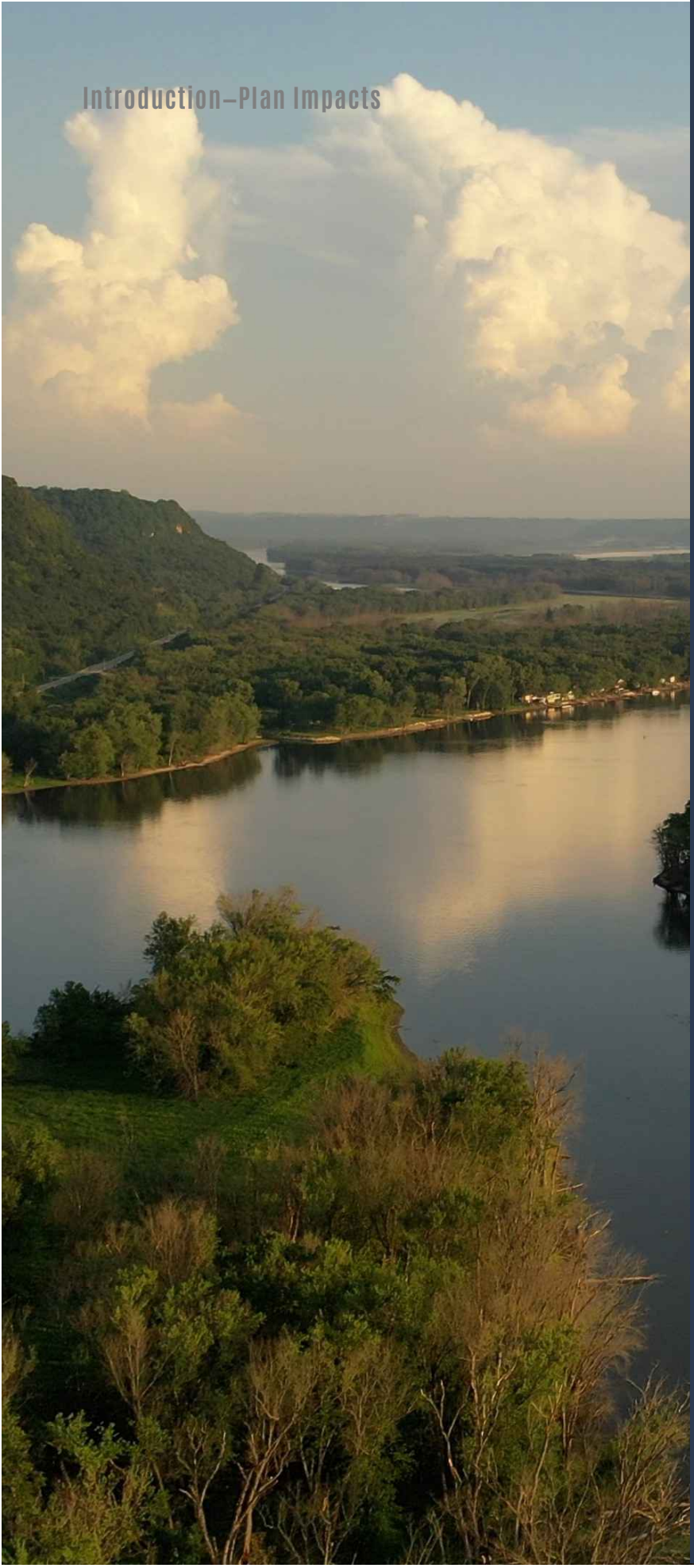
Long-term emission reduction potentials of the strategies and actions included in this plan have been modeled based on projected energy and fuel reductions and adoption rates of renewable energy and low/no emission transportation modes outlined in the strategies and actions. From this modeling, we know that with the successful implementation of this climate action plan, community-wide annual GHG emissions are projected to drop 298,190 metric tons below 2019 levels by 2030. The potential cumulative GHG emissions reductions over the 8 year implementation period are estimated at as much as 1,000,000 metric tons - an elimination of over **19.8 billion cubic feet** of human-made greenhouse gas atmosphere resulting from this climate action plan.

Community-Wide GHG Reductions Wedge Diagram



Community-Wide GHG Reductions by Sector by 2030





Cumulative Economic Savings Potential of Implementing the CAP Through 2030

Transportation Economic Potential*:

Sector Savings: $291,079,847
Sector Cost Increases: -$13,964,002
Potential Sector Net Cost Savings:

$277,115,846

+

Buildings + Energy Economic Potential*:

Sector Savings: $192,021,745
Sector Cost Increases: -$158,952,930
Potential Sector Net Cost Savings:

$33,068,815

+

Waste Reduction Economic Potential*:

Residential Savings: $10,499,340
Commercial Savings: $2,566,505
Potential Sector Net Cost Savings:

$13,379,345

+

Social Cost of Avoided Carbon:

$50,525,494

=

Cumulative Community-Wide Savings Potential:

$361,293,392*

* Value does not include avoided costs associated with extreme weather events, economic potential of job creation, nor new business potential represented in the Climate Action Plan actions. (see Appendix for more)

SECTION 02

Transportation and Mobility

CURRENTLY IN LA CROSSE

34.4%	433,569,000	74.8%	1.6%	77
of community-wide GHG emissions in 2020 from transportation	Vehicle Miles Traveled in 2020	Commuters drive alone	Commuters use public transit	Battery Electric Vehicles (BEV) currently registered

Click here to return to TOC

Why is Transportation and Mobility Important?

Moving ourselves and our goods and services from place to place is energy intensive while the vehicles we use for that mobility are material resource intensive. In addition to transportation vehicles, off-road equipment like construction, recreational and lawn equipment consume significant amounts of fossil fuels for their operation.

In La Crosse, the Transportation and Mobility sector accounts for 34.4% of community-wide GHG emissions and is projected to decrease as the transportation sector electrifies.

Key Climate Considerations

- Impacts of climate change on infrastructure lifespan and need for maintenance and repair
- Potential for transportation disruptions due to direct damage from extreme events
- Impacts of climate change on ease of movement around the community and reliable access to neighborhoods, workplaces, and critical services
- Factors that could cause delays or interruptions in public transportation services or make using public transportation more difficult and less desirable
- Impacts of climate change on the safety and comfort of pedestrians and cyclists of all abilities

Sector Goals

	Transit Use	Vehicle Miles Traveled	Electric Vehicles
	+	-	+
2020[9]	1.6%	433 million	0.1%
2030 Targets	3%	411 million	15%

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Transportation and Mobility sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

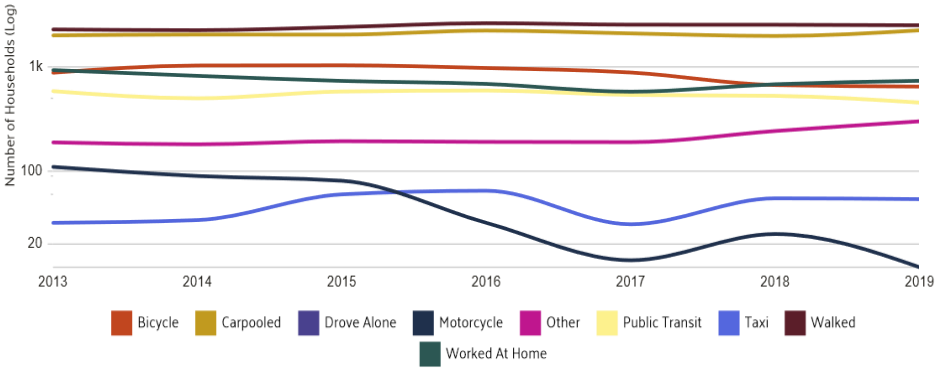
Strategy TM 1

Decrease commuter and community-wide VMT by 5% by 2030.

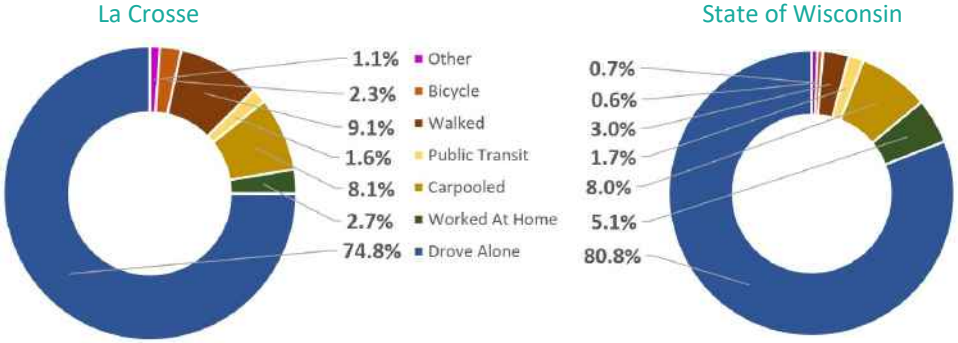
Community-wide vehicle miles traveled (VMT) in La Crosse was 433 million miles in 2020.[7] It is estimated that 11.6% of VMT within city boundaries is interstate traffic and workers commuting from out-of-city, however, it should be noted that La Crosse benefits from this traffic as well. La Crosse has also seen a steady trend in commuter modes with 74.8% commuters driving alone. Decreasing commuters driving alone by 5% would decrease up to 6 million auto miles while decreasing VMT across all uses will eliminate nearly 22 million auto miles. Achieving this goal is estimated to reduce community-wide GHG emissions by over 13,000 MT annually.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

La Crosse Commuter Transport by Mode Since 2013



Commuter Transport Share by Mode 2019



Equity Considerations

- Increased opportunities for public transit and active transportation can help address health disparities for many at-risk populations.
- Affordable and reliable mobility options 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 La Crosse 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. People that rely on public transit service (with fixed routes) or who rent their home will be limited in where they may find housing that meets both needs.

Strategy TM 2

Increase public transit access and commuter ridership from 1.6% to 3% by 2030.

(represents an 88% increase in the number of commuters using public transit over 2019 baseline).

The map to the right illustrates the community area served by transit options and the corresponding "Performance Score."[1] Areas of lighter color have higher performance scores which represent a mixture of overall trips per week, number of jobs accessible, number of weekly commuters using the transit options, and equity of transit system. Efforts to improve efficiency, convenience, frequency, and reliability of bus service, particularly in areas less well served can increase public transit ridership.

According to the UC Census ACS five year estimate, the average one-way commute for La Crosse workers is 25.5 minutes, or approximately 21 miles. AAA estimates that the cost per mile for operating a vehicle is $0.74. Consequently, every 1% increase in commuter utilization of public transit in La Crosse may decrease vehicle miles traveled by 5.2 million miles, saving an estimated $3.8 million and eliminating 2,500 metric tons of GHG emissions annually.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy TM 3

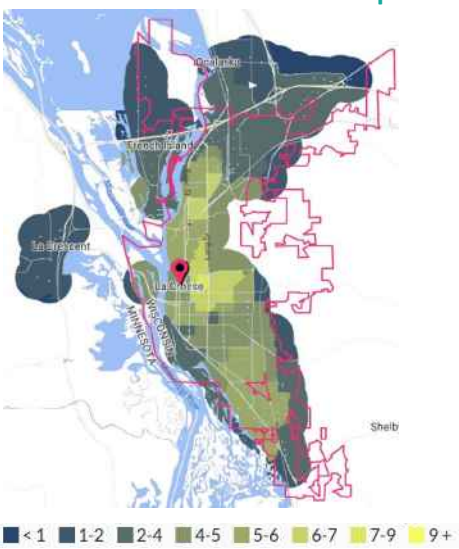
Increase battery electric vehicle (BEV) utilization to 20% of community-wide rolling stock by 2030.

(from approximately 77 vehicles to 11,800 vehicles community-wide)

According to the US Census data there are an estimated 55,500 vehicles total in the community.[4] As of December 2020, La Crosse had 77 battery electric vehicles (BEV), and 56 plug-in electric vehicles (PHEV).[5, 6] Transitioning this rolling vehicle stock from fossil fuel combustion to low and no emission alternative is critical in meeting significant long-range emissions reductions in this sector. For every 1% of vehicles converted to EV 2,000 metric tons of GHG emissions can be eliminated annually (including emissions associated with increased electricity

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Public Transit Performance Map



Overall transit score rating at connectivity, access to jobs, and frequency of service (Source: AllTransit)

AllTransit ™ Performance Score

4.9

Low combination of trips per week and number of jobs accessible enabling few people to take transit to work

On Average Households have:

525	Transit Trips per Week within ½ Mile
4	Transit Routes within ½ Mile
39,753	Jobs Accessible in 30-minute trip
1.90%	Commuters Who Use Transit

Strategy TM 4

Establish viable bio and/or renewable diesel sources to serve community by 2025. Achieve 50% community-wide diesel consumption replacement with bio and/or renewable diesel by 2030.

Electrification of vehicles is a significant climate solution for the transportation sector. Some equipment and vehicles currently powered with diesel fuel have performance requirements or significant infrastructure challenges making electrification of those equipment a longer-term process.[10, 11] This means that for a portion of diesel powered transportation and equipment, transitional solutions are critical in achieving rapid emissions decreases.

Unlike fossil fuel diesel, also known as petrodiesel, biodiesel is made from plant, animal bi-products, and cooking waste biomass oils and can reduce GHG emissions by over 70% compared to petrodiesel.[12] Renewable diesel is typically derived through biochemical and thermochemical technologies which can be powered by renewable electricity sources like solar and wind – making it essentially an energy storage solution for excess renewable electricity. Renewable diesel fuels reduce GHG emissions by 60% to 80% over petroleum diesel.[13,14, 15]

Switching to bio and renewable diesel means we can dramatically reduce La Crosse's climate pollution from equipment while the industry continues its transition to zero emission vehicles.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy TM 5

Improve the comfort and safety of walking and biking within La Crosse.

Increasing opportunities for and safety of bike and walking routes to all uses including schools, retail nodes, services, workplaces, and recreation centers can support reduced vehicle use by replacing those trips with other types of mobility. According to the La Crosse Climate Action Survey, over 65% of respondents indicated they would walk or bike more frequently if they felt safer.[16]

Studies also show that improvements in pedestrian and bicyclist safety not only improve walking environments, but also contribute to urban renewal, local economic growth, social cohesion, improved air quality and reduction in the harmful effects of traffic noise.[17]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

0%
of high speed road in La Crosse have bike facilities.[18]

Average percentage for Gold Bicycle Friendly Community: 35%

Strategy TM 6

Achieve 30% conversion of municipal operations gasoline and e10 gasoline vehicles and equipment within municipal fleet to EV's by 2030. Achieve 100% conversion by 2040.

In 2020, the City of La Crosse municipal vehicle fleet consumed a total of 89,914 gallons of gasoline—just over 35% of the total fleet fuels consumed. Converting 30% of the municipal gasoline vehicle fleet to EV by 2030 will reduce municipal GHG emissions by 216 MT annually.[19]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy TM 7

Increase fuel efficiency of remaining municipal operations combustion engine fleet by 10% by 2030.

Increasing fuel efficiency of the City's remaining gasoline fleet by 10% by 2030 will reduce municipal GHG emissions by an additional 57 MT while saving the City as much as $28,000 annually.[19, 20]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy TM 8

Reduce community-wide off-road and lawn equipment annual emissions.

Off-road equipment comprise a significant portion of fossil fuel consumption nationally while they also typically have higher GHG emissions (per gallon of fuel) than those of on-road vehicles. In fact, 1 hour of gas powered lawn mower use produces 11 times the emissions of driving the average new car for an hour.[21] In addition, 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. [22]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

The City of La Crosse was awarded the Silver Bicycle Friendly Community status by the League of American Bicyclists in 2020.

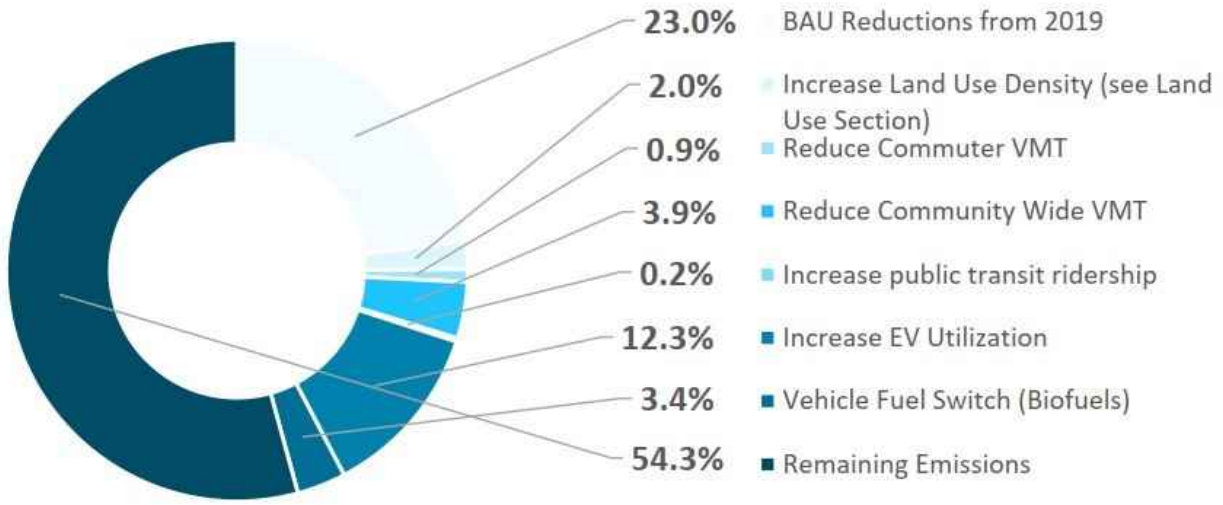
Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the community's annual GHG emissions by 61,375 metric tons (MT) annually by 2030 - a 22.8% reduction from 2019 levels. Changes in business-as-usual impacts over the same period are anticipated to reduce an additional 61,804 metric tons. The result is a total community-wide Transportation and Mobility sector reduction of 45.7% below 2019 levels.

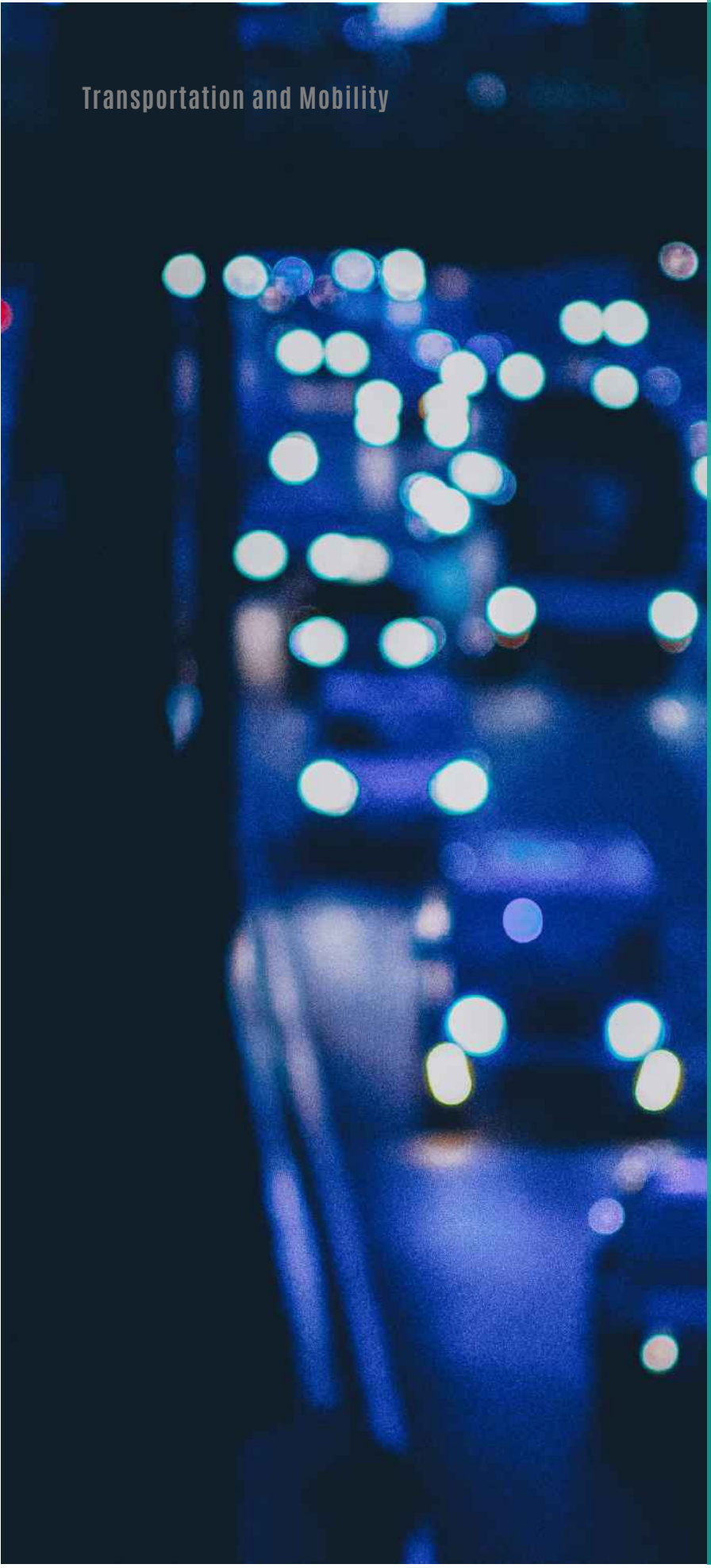
When compared to 2019 emissions, this is equivalent to eliminating over 25,000 of current La Crosse vehicles from the road, or **2.4 billion** cubic feet of human-made greenhouse gas atmosphere annually by 2030.

Sector Emissions Reduction below 2019 by 2030

The total change to sector emissions include CAP reductions and business-as-usual (BAU) emission changes as follows*:



* Includes transportation related reductions associated with Section 03 Land Use and Housing strategies.



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:

Decrease VMT:

$168,054,975
$3,218
per capita

+

Increase public transit use:

$5,993,121
$113
per capita

+

Increase EV utilization:

$113,521,564
$2,155
per capita

=

Estimated Cumulative Savings Potential*

$277,115,846
$5,260
per capita

* Allowances for expenses for EV purchase, and public transit passes are included in calculations.
(see Appendix for more)

SECTION

03 | Land Use and Housing

Why is Land Use and Housing Important?

Land use policies establish the pattern of development and redevelopment of public and private property throughout a community. Policies that guide housing effect accessibility, energy demand, affordability, and access to opportunities for a community's residents. Other land use decisions can impact the balance of biodiversity, access to and consumption of environmental resources, and the climate resilience of a community.

La Crosse's 8,622 acres of developed land supports a population of 51,543, averaging 6.1 residents per acre. Meanwhile, according to the US Department of Energy, an estimated 16.4% of all households (3,500) are required to spend over 6% of their total income to meet their home's energy needs—a condition known as "High Energy Burden" which can greatly exacerbate challenges faced by those living with economic stress.

Sector Goals

	Land Use Density	Energy Poverty
	+	-
2020[3]	6.1 people/acre	16.4% of population
2030 Targets	**6.4** people/acre	**11.4%** of population

Key Climate Considerations

- Identification of land uses and/or locations that might be particularly impacted by climate changes
- Potential for transportation disruptions due to direct damage from extreme events
- Impacts of climate change on the availability and affordability of housing stock, and costs associated with home maintenance, habitation and repair
- Impacts of climate change on the functioning or maintenance requirements of infrastructure necessary for particular land uses, including residential use
- Access to safe and affordable transportation near affordable housing units, and overall community connectedness for pedestrians, bikers, and vehicles

Click here to return to TOC

CURRENTLY IN LA CROSSE

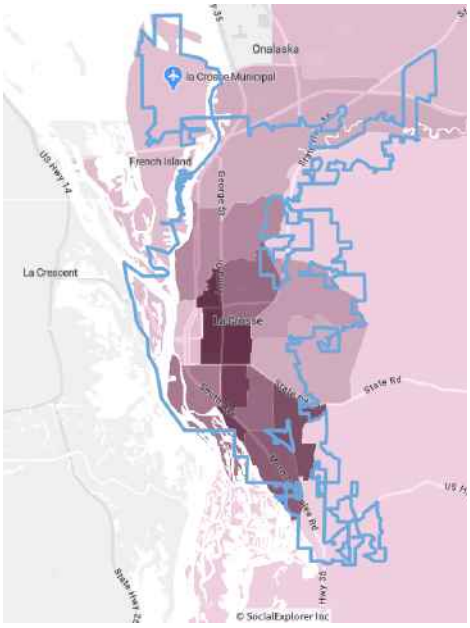
8,622
Acres of developed land

6.1
Residents per developed acre

16.4%
Residents living under "high energy poverty" [1,2]

STRATEGIES

La Crosse Population Density per Acre



The strategies on the following pages guide our path to meeting our climate goals for the Land Use and Housing sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy LH 1

Increase the number of housing units within the 2020 city limits by 5% by 2030 (focusing increases in areas most likely to advance all goals of this CAP including increased public transportation, climate resilience, etc.).

The city's developed land use totals 8,662 acres—62% of the total area of the community. According to the US Census, this land supports 21,239 households with 2.21 people per household and 2.45 households per developed land use acre . The community-wide density, including all zoning districts is 3.2 residents per acre. Based on the population changes over the last decade, La Crosse may see a population increase of up to 2.6% by 2030. Studies have found that for every 1% increase in population-weighted urban density, household travel CO_2 emissions reduce by 0.12% to 0.48%.[5, 6] Based on these, establishing zoning ordinances and incentives guiding future growth into options that increase the density of existing developed land will have positive impacts on decreasing total community-wide emissions per household.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Equity Considerations

- In La Crosse, residential buildings account for over 14% of community-wide GHG emissions – representing an important sector in community-wide energy reduction goals, while increasing energy efficiency, particularly within housing serving low-income community members, will result in decreased energy burden, .[19]
- The age, condition, quality, efficiency, and affordability of our housing determines the climate resilience of its occupants. Lower-income people without access to quality, affordable, housing consequently face disproportionate risks from extreme heat and weather exposure.[20]
- Involuntary displacement of people from their homes due to climate-related hazards such as flooding or fire increases vulnerability and is associated with poor health, wellbeing, and socio-economic outcomes. Meanwhile, the likely migration of populations into the La Crosse region due to on-going climate impacts elsewhere will increase the strain on available quality housing for all. [21, 22]

Strategy LH 2

Increase community resilience to increased flooding and flash flooding caused by Climate Change.

According to the US National Climate Assessment, the ten rainiest days can contribute up to 40% of the annual precipitation in the Wisconsin region.[7] By 2080, the La Crosse area can anticipate an increase of up to 15% in total annual precipitation.[8] In addition, the timeframe between rains is expected to continue to increase. Under this scenario, it is likely that certain periods of the year, like spring, may be significantly wetter with storms producing heavier rains. In anticipation of that, it is appropriate to review the areas of the community with flood risk and to review current stormwater management capacity against future extreme rainfall event projections. Increases in impervious cover can dramatically increase the impact of so-called 100-year flood events. Neighborhoods in La Crosse have impervious surface coverage as high as 64%.[9] Consequently, actions that reduce impervious surface coverage are important adaptation avenues.[9]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy LH 3

Update community plans, zoning, and design standards to increase housing and community resilience to the impacts of climate change, including flooding and extreme temperatures.

Historically, State, county, and municipal plans have carefully analyzed historic data to establish effective and appropriate design standards. An example of this is the common standard of road and bride infrastructure having been designed based on the national standards using precipitation estimates based on historical frequency of heavy rainfall events.[10] Climate change, however, is projected to create wider variations in precipitation patterns and an increase in heavy rain events for our area meaning analysis of historic patterns will no longer be sufficient.[8]

Variations in precipitation and heavy rain events are just two of the projected climate changes in store for La Crosse. Increases in extreme heat, extreme weather, vector-borne diseases, air quality impacts, and other risks are anticipated.[8] 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.

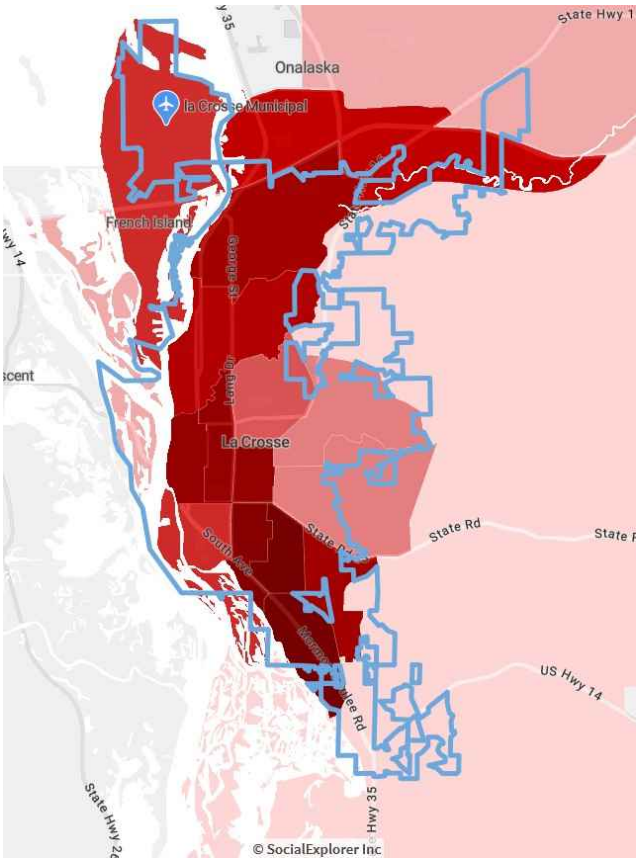
Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy LH 4

Update community plans, zoning, and design standards to mitigate heat island impacts, particularly for populations most vulnerable.

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.[11] Increased heat island effects raise human discomfort and health risk levels in developed areas, especially during heat waves which are projected to become more severe and more common for La Crosse.[12, 3] There is a direct relationship between impervious surface coverage, particularly dark-colored impervious surfaces such as asphalt pavement, of a community and the amount of heat island temperature increase experienced.[13] Heat island impacts in La Crosse are calculated to contribute as much as 10 ° F to perceived extreme heat.[9] Decreasing the amount of dark impervious surfaces will help reduce heat island impacts in La Crosse.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.



Heat Island Contribution of La Crosse Impervious Surfaces (summer values)[9]

Community Average: (excluding tracts 104.1, 105, 106, 107)	**4.5°F**
Census Tract High:	**10.1°F** Tract: 11.01
Census Tract Low:	**1.7°F** Tract: 3

- < 0.9
- 0.9 to 2.1
- 2.1 to 3
- 3 to 3.6
- 3.6 to 4.4
- 4.4 to 5.2
- 5.2 to 5.9
- 5.9 to 6.9
- 6.9 to 7.7
- 7.7 to 8.5
- > 8.5

Strategy LH 5

Reduce share of population living in high energy poverty from 16.4% to 11.4% by 2030.

A household's energy burden—the percentage of household income spent on energy bills—provides an indication of energy affordability. Researchers define households with a 6% energy burden or higher as experiencing a high burden—some of whom may consequently lack needed access to energy, known as "energy poverty".[1] People experiencing energy poverty have increased vulnerability to health issues, particularly those associated with indoor temperature extremes.[14] As the frequency and severity of extreme weather events in La Crosse escalate due to climate change, those living with energy poverty will be increasingly vulnerable to climate change. Energy efficiency and renewable energy can lower energy bills for low-income households while also improving health and climate adaptation outcomes by improving indoor air quality, safety, and resilience.[15] Within La Crosse, the renewable energy potential for rooftop solar on low-income residential buildings alone totals more than 49,000 megawatt hours (MWH) annually.[16]

Nearly 1 in 3 residents in La Crosse are low-income, meaning that increasing equitable access to energy efficiency and renewable energy will not only reduce energy poverty in the community but also represents a notable portion of the emissions reduction potential in the community.[8]

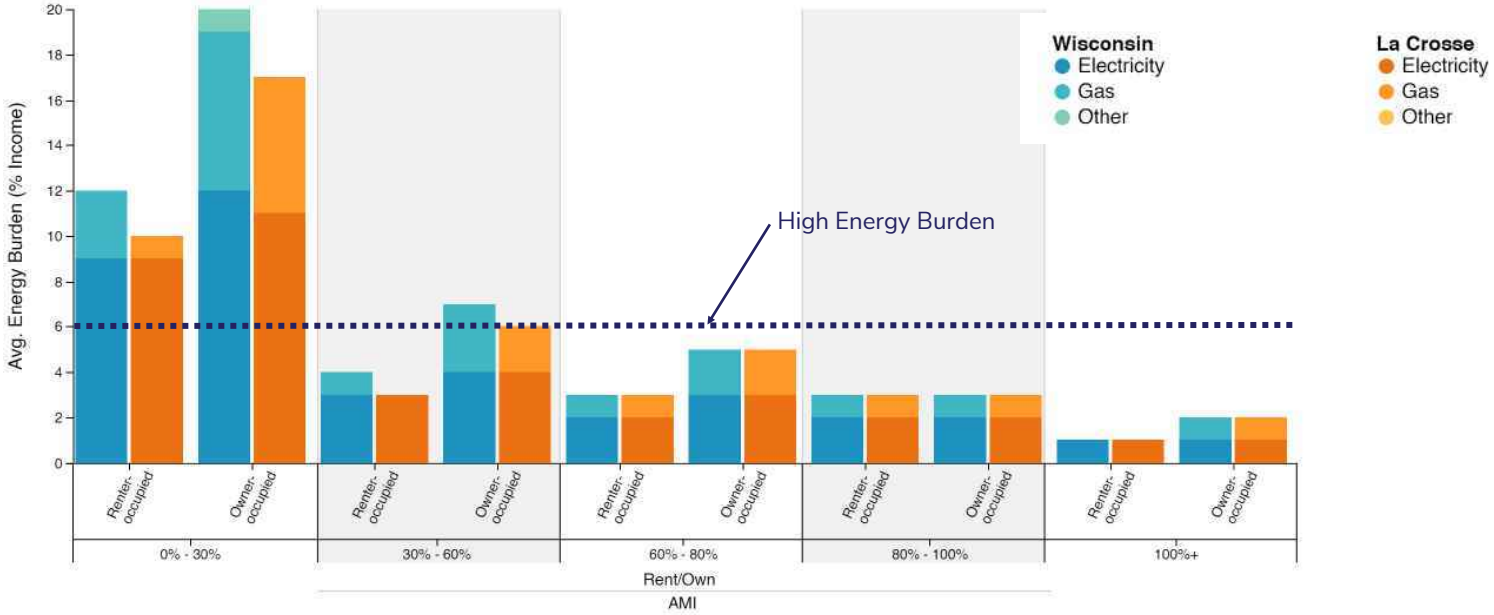
Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

1 in 3
La Crosse residents are low-income.[8]

3,519
La Crosse households experience high energy burden.[3]

$1,200
Average low-income household savings potential of renewable energy in La Crosse.[16]

Energy Burden by Occupant Ownership and Income Level[16]



SECTION 04

Buildings and Energy

CURRENTLY IN LA CROSSE

60.4% of community-wide GHG emissions in 2020 are from this sector

723,000,000 kWh of electricity consumption in 2020

39,461,995 Therms of natural gas consumption in 2020

71% Owner occupied homes built before 1980

59% Renter occupied homes built before 1980

Click here to return to TOC

Why is Buildings and Energy Important?

Building energy use is a major contributor to greenhouse gas (GHG) emissions. Greenhouse gas emissions from this sector come from direct emissions such as fossil fuels burned *on-site* for heating or cooking needs—as well as indirect emissions such as fossil fuels burned *off-site* to supply the building with electricity. Building energy use contributes significantly to greenhouse gas (GHG) emissions. Direct emissions include fossil fuels burned on-site for heating or cooking needs. Indirect emissions can consist of fossil fuels burned off-site to supply the building with electricity. A building's design and maintenance impact how much GHG it emits. Increasing energy efficiency can help reduce GHG emissions, increase comfort, and result in significant cost savings for homes and businesses.

Residential Energy

The residential sector in La Crosse consumes nearly 165 million kWh annually. This is equal to 3,128 kWh per capita, 102.3% of Statewide average. The sector also consumes over 9.5 million therms of natural gas annually, 79.1% of Statewide per capita average.[9,15]

Commercial / Industrial Energy

This sector consumes over 558 million kWh, equal to 3,389 kWh per job—less than 20% of Statewide average—and 30 million therms of natural gas annually, 65% of Statewide average.[9,15]

Key Climate Considerations

- Individual building vulnerability to flooding, extreme weather and other impacts due to factors like age, condition, and design
- Resilience of critical infrastructure serving buildings, including streets, stormwater, and utilities
- Impacts of extreme heat and other climate changes on energy supply and demand and potential for increased power outage
- Ability of a building's insulation and heating and cooling systems to affordably keep occupants safe during extreme temperature events

Sector Goals

	Community-Wide Renewable Energy	Community-Wide Electricity Consumption	Community-Wide Natural Gas Consumption
	+	-	-
2020[9]	0.2%	723 GWH	39.5 MTherms
2030 Targets	5%	615 GWH	33.5 MTherms

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Buildings and Energy sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Equity Considerations

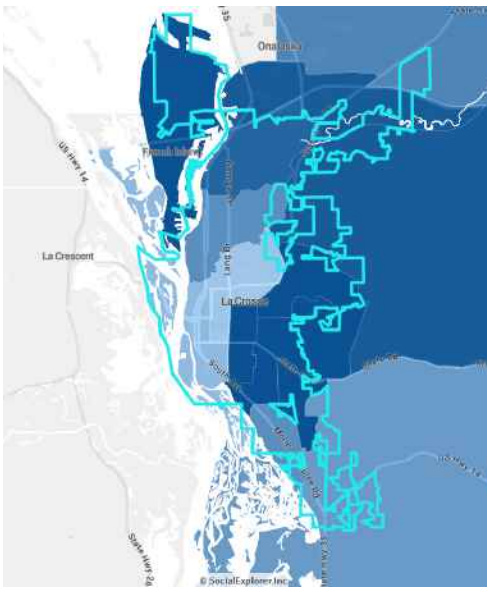
- Often, households that live in properties that are not energy efficient are also those that can least afford high-cost utility bills. These households may lack the ability to pay for energy efficiency improvements or access renewable energy options.
- Renters of both single family homes as well as 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.
- Families with fewer resources must dedicate a disproportionately larger share of their income towards energy costs, which exacerbates other vulnerabilities including exposure to heatwaves and other climate vulnerabilities. These same families are sometimes forced to forego basic access to service altogether. An estimated 137 households in La Crosse go without heating fuel of any type. [14]

Strategy **BE 1**

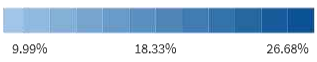
Reduce community-wide residential, commercial, educational, and industrial building energy consumption by 15% by 2030 (electricity and natural gas).

According to the US Energy Information Administration, homes built between 2000 and 2009 used 15% less energy per square foot than homes built in the 1980s, and 40% less energy than homes built before 1950.[1] Consequently, this means that retrofitting older homes with some of these technologies provides ample opportunity to improve energy efficiency throughout the community. The maps below and on the next page illustrate the distribution of owner occupied and renter occupied homes built before 1980 throughout La Crosse.[2] Totaling 71% of owner occupied homes and 59% of renter occupied homes, housing stock built before 1980 alone represents a significant opportunity for reducing community-wide energy consumption particularly within natural gas use.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.



La Crosse Owner Occupied Homes Built Before 1980



Strategy BE 2

Increase adoption of Net Zero construction community-wide to 10% of new residential and commercial construction annually by 2030 (estimated at 13 net zero homes and 8 net zero commercial buildings annually).

High-performance buildings are those which deliver a higher level of energy-efficiency performance—typically 30% better than buildings designed to meet code—while Net Zero buildings are high-performance buildings which also generate as much energy on-site as they consume.[3,4] Based on the City's recent new building permit history (shown to the right), as much as 6% of the community's housing stock and 10-20% of the community's commercial building stock may be renovated or replaced over a 10 year timeframe. This means that a significant portion of the community's building infrastructure could be positively influenced through climate action strategies that guide increased adoption of cost effective high-performance and Net Zero energy building practices.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

3 YEAR CONSTRUCTION PERMIT HISTORY IN LA CROSSE

208

Housing Building Permits
(new + renovation)

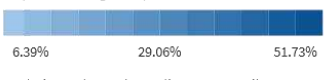
394

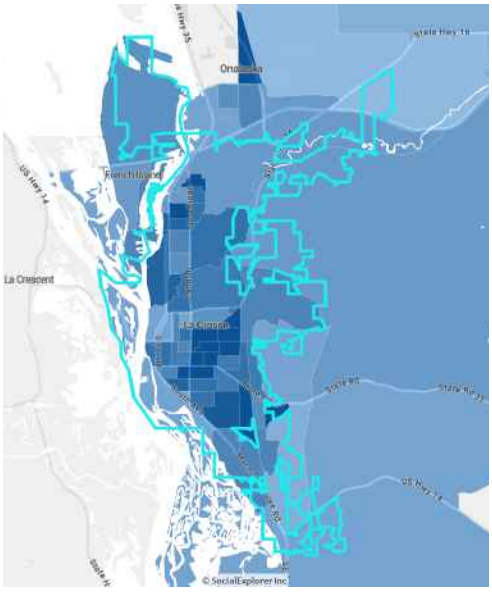
Housing Units
(1.8% of total housing stock)

252

Commercial Building Permits
(new + renovation—an estimated 6% of total commercial building stock)

La Crosse Renter Occupied Homes Built Before 1980





Strategy BE 3

Achieve 10% residential and commercial and industrial building "fuel switching" from on-site fossil fuel combustion to electrification by 2030.

Within La Crosse, approximately 62% of residential heating is provided by natural gas, 29.2% by electricity, 4.2% by propane gas, 2.1% by fuel oil and 1.2% by wood.[2] Approximately 0.5%, or 137 households, have no heat of any type in their home.[2] As La Crosse's electric grid nears carbon neutrality, building heating fuel will become an increasingly important target for emission reductions. Reduction, and ultimately the elimination of all fossil fuel heating (oil, propane, natural gas) will be required to achieve community-wide carbon reductions.[9]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy BE 4

Increase renewable energy from 0.24% to 5% of community-wide residential and commercial electric use by 2030.

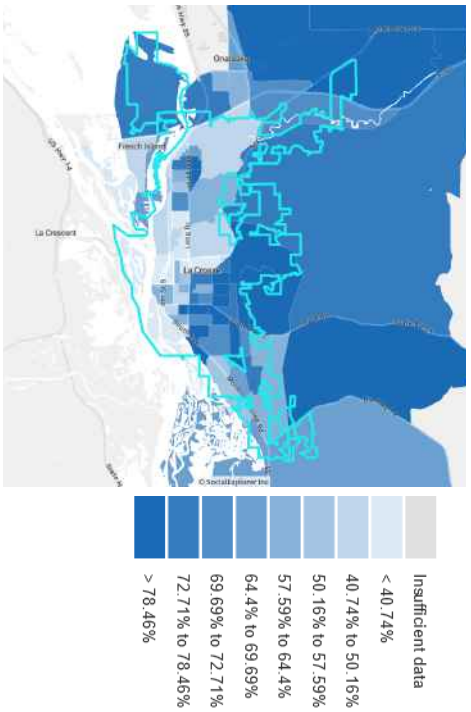
The GHG emissions associated with grid-provided electricity use is anticipated to continue to reduce over the years.[10] Including a focus on consumer driven renewable energy purchases, however, is still a critical need to meet our GHG reduction goals. For residents and businesses that are unable to install on-site solar, purchase of renewable energy through Xcel Energy provides those property owners an opportunity to achieve Net Zero electricity use while supporting an important mechanism in cleaning the State's electric grid.[11,12] Meanwhile, for owners of properties well suited for solar, increasing utilization of on-site renewable energy has multiple benefits for a community beyond GHG emissions reductions. Community benefits of increased on-site renewable energy include energy cost savings and increased energy resilience potential. As of 2020 there were 900 households and 13 businesses purchasing renewable energy through Xcel.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

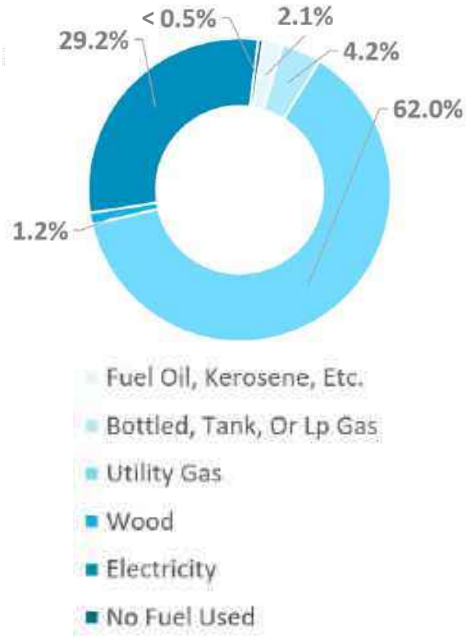
La Crosse's Solar Impact

On-Site Solar Share of Electricity Used	0.24%
Renewable Energy Purchases Share of Electricity Used	0.38%
Households purchasing renewable electricity through utility	900
Businesses purchasing renewable electricity through utility	13

La Crosse Homes with Utility Gas Heat (for year 2019)



La Crosse Residential Heat Fuel Used by Type (for year 2019)



Strategy BE 5

Increase resilience of community-wide building stock to the impacts of climate change.

Currently, climate-related decisions in building design are frequently based on historic climate data and past trends assuming the climate will remain relatively stable in the future. Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Projected climate impacts represent a number of resilience challenges for our building stock, including potential increases in power disruptions due to increased extreme weather events, increased stormwater management needs and flash flooding potential due to increased heavy precipitation, and increased demand for insulation as well as passive and active cooling systems due to extreme heat impacts.[19, 20] Incorporating resilient building design and infrastructure within La Crosse will greatly enhance the community's ability resilience, particularly among the community's vulnerable population.[16, 17, 18, 21]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy BE 6

Improve total municipal building energy efficiency by 15% by 2030

(electricity and natural gas).

City of La Crosse municipal facilities consumed 19.7 million kWh and 578 thousand therms of natural gas in 2020.[9] Cost effective energy efficiency upgrades will provide both GHG reduction as well as annual operating cost savings benefit. A 15% reduction by 2030 will result in a reduction of over 1,200 MT in GHG emissions and an estimated $250,000 in operating expenses annually.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy BE 7

Achieve 10% municipal building thermal “fuel switching" from on-site fossil fuel combustion to electrification by 2030.

On-site natural gas combustion represents over 18% of all City of La Crosse municipal operations GHG emissions annually.[9] Reduction, and ultimately the elimination of all fossil fuel heating (oil, propane, natural gas) will be required to achieve community-wide carbon reductions.[9] Initiating a fuel switching program for City facilities is an important priority to achieve significant City operations emissions reductions.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy BE 8

Increase on-site renewable energy from 0.57% to 7.5% of City operations electricity consumption by 2030.

Through a comprehensive energy savings bundle known as a ”performance contract” the City currently has 526 KW of installed arrays on the public library, municipal service center, city hall and La Crosse Center. Identifying additional solar installation potential can increase the City's renewable energy portfolio. On-site renewable installations may also provide the City an opportunity to explore the development of micro-grid, energy storage, and other strategies to increase the energy resilience of City facilities.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

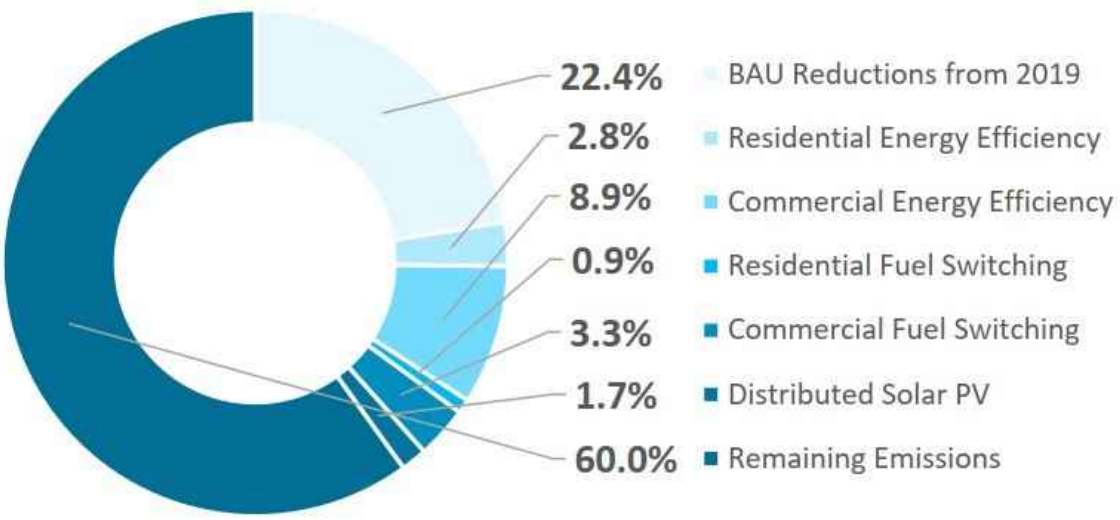
Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the community's annual GHG emissions by 83,267 metric tons (MT) annually by 2030 - a 20.7% reduction from 2019 levels. Changes in business-as-usual impacts over the same period are anticipated to reduce an additional 105,803 metric tons. The result is a total community-wide Buildings and Energy sector reduction of 40% below 2019 levels.

When compared to 2019 emissions, this is equivalent to eliminating over 38,000 of current La Crosse vehicles from the road, or **3.7 billion** cubic feet of human-made greenhouse gas atmosphere annually by 2030.

Sector Emissions Reduction below 2019 by 2030

The total change to sector emissions include CAP reductions and business-as-usual (BAU) emission changes as follows:



Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as increased energy efficiency and renewable energy, can save money for the community. The estimated community savings of the goals for this section include:

Residential Energy Efficiency and Renewable Energy Savings

$7,526,656

$338
per household

+

Commercial Energy Efficiency and Renewable Energy Savings

$25,542,159

$518
per job

=

Estimated Cumulative Savings Potential*

$33,068,815

$611
per capita

* Allowances for expenses for energy efficiency and renewable energy upgrades are included in calculations.
(see Appendix for more)

SECTION 05

Waste Management

Why is Waste Management Important?

Waste management refers to both waste that is sent to a landfill and waste that is recycled or reused. Habitat destruction, global warming, and resource depletion are some of the effects of our materials consumption.

Organic waste and food discards and residuals that decompose in landfills release methane, a green house 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.

Recycling - converting discarded materials into new materials or putting them to beneficial use (which can include organic waste) - is an important approach in mitigating these impacts and reducing the pollution caused by wasting.

La Crosse Solid Waste Per Capita Trends

In 2020, community-wide municipal solid waste (MSW) totaled 67,774 tons. Of the MSW handled an estimated 12.7% were recycled, 0.001% were collected organics, 30.4% were incinerated to produce energy—also known as refuse derived fuel (RDF) - and the remaining 56.9% were landfilled.

Key Climate Considerations

- Climate impact vulnerability of waste management infrastructure
- Extreme weather impacts on waste collection frequency and routes
- Waste pickup equipment GHG emissions contributing to climate change
- Fossil fuel price increases and climate impacts such as extreme weather events will complicate waste management

Sector Goals

	Total MSW	Organics Diversion	Recycling Diversion
	-	+	+
2020[10]	67,774 tons	65 tons	8,590 tons
2030 Targets	64,300 tons	7,000 tons	12,600 tons

Click here to return to TOC

CURRENTLY IN LA CROSSE

4.7%	8,590	65	20,632	37,937
of Community-Wide GHG emissions in 2020 are from this sector	Tons of recycling in 2020	Tons of organics collection in 2020	Tons of waste sent to waste-to-energy facility in 2020	Tons of waste sent to landfill in 2020

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Waste Management sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

State of Wisconsin Waste Management Hierarchy

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.

Strategy WM 1

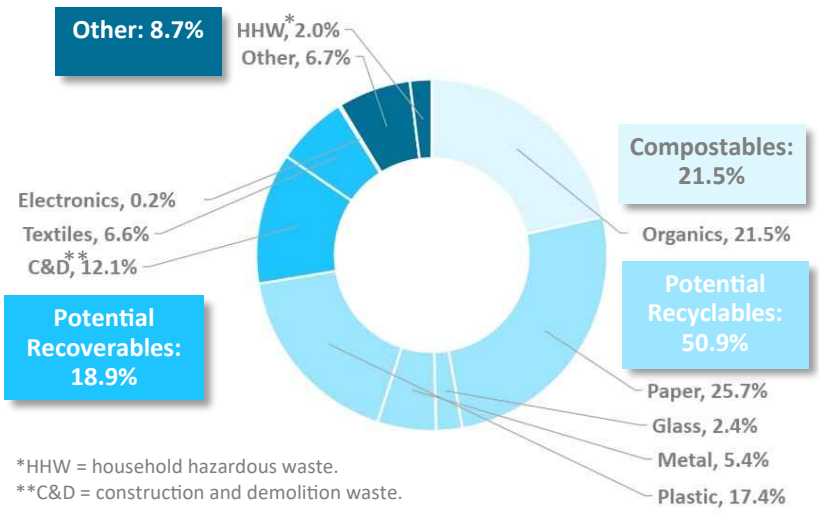
Decrease total per capita municipal solid waste handled by 5% or more by 2030 (3,360 tons or more annually).

The State of Wisconsin's solid waste reduction, recovery, and recycling law has established a waste management hierarchy based on the overall environmental impacts of each approach.[1] Simply put, the less waste we generate by reducing the materials we consume and discard, the less energy is consumed in making those materials and the less greenhouse gas emissions are generated at the landfill. Homes and businesses that reduce their waste can save hundreds of dollars annually.[2,3,4] Continuing to establish policies and operational refinements to advance meaningful landfill diversion and beneficial use of waste streams represents a significant environmental opportunity for La Crosse.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

State of Wisconsin Waste Characterization Study

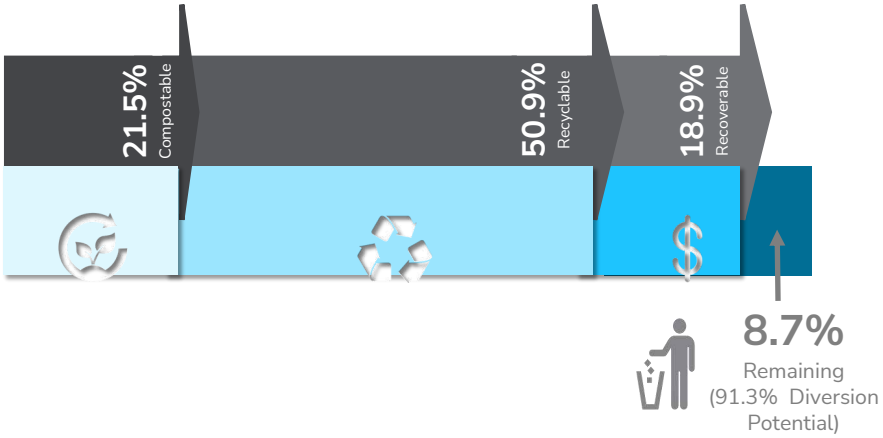
In 2021, the State of Wisconsin conducted a waste characterization study for each region. The graph below shows the findings for the La Crosse area with classifications of waste defined in broad categories based on their diversion potential: Compostables, Potential Recyclables, and Potential Recoverables



*HHW = household hazardous waste.
**C&D = construction and demolition waste.

Waste Diversion Potential

Based on the State of Wisconsin waste characterization study, there may be waste diversion potential of up to 78.7% in the current landfilled materials (idealized maximum). Below is the breakdown of the estimated total maximum potential waste diversion (excluding waste reduction):



The three strategies below seek to capture more of this potential.

Strategy WM 2

Achieve 50% organics landfill waste diversion, including food waste reduction, by 2030 (11% of total MSW, approximately 7,400 tons).

Decomposition of organic compounds is the largest generator of methane in landfills, and at over 20% of mixed waste collection in the community, it represents a significant opportunity for La Crosse.[5,6]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy WM 3

Increase recycling from 12.8% to 20% of total MSW handled by 2030 (from 8,590 tons to 12,600 tons diverted. Calculation assumes achieving strategy WM 1) .

La Crosse residents have a high participation rate for recycling. However, the State waste sort indicates opportunities for increased capture of paper, plastics, and metal.[6]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy WM 4

Increase diversion of reusable materials by 15% by 2030 (decreasing from 18.9% of community mixed waste to 16%).

Diversion of potentially recoverable materials, particularly construction materials and textiles offers an opportunity to reduce pollution, energy, and water consumption through the supply chain serving La Crosse. [6]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

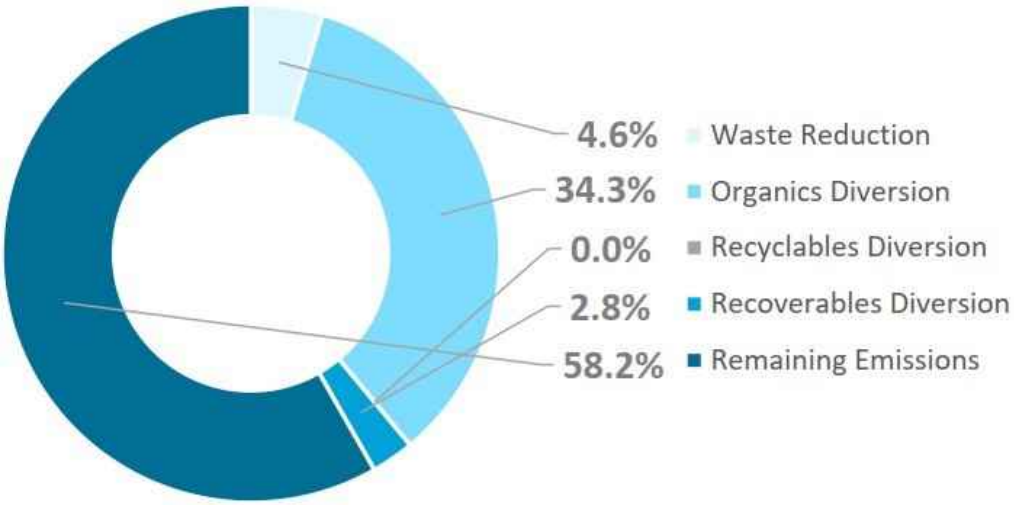
Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the community's annual GHG emissions by 14,058 metric tons (MT) annually by 2030 - a 41.8% reduction from 2019 levels.

When compared to 2019 emissions, this is equivalent to eliminating over 2,800 of current La Crosse vehicles from the road, or **275 million** cubic feet of human-made greenhouse gas atmosphere annually by 2030.

Sector Emissions Reduction below 2019 by 2030

The total change to sector emissions include CAP reductions and business-as-usual (BAU) emission changes as follows:



Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as reduction of food and material waste, and overall consumption, can save money for the community. The estimated community savings of the goals for this section include:

Residential Organics/Food Waste Diversion Savings

$41,997,360
$1,886
per household

+

Commercial/Industrial Waste Reduction Savings

$10,266,021
$208
per job

=

Estimated Cumulative Savings Potential*

$52,576,881
$998
per capita

*(see Appendix for more)

SECTION 06

Water and Wastewater

CURRENTLY IN LA CROSSE

0.5%
of City-Wide GHG emissions in 2020 are from this sector

3.1 billion
Gallons of water consumed in 2020

3.6 billion
Gallons of wastewater processed in 2020

36
Flooding events reported by NOAA for La Crosse since 2000

Click here to return to TOC

Why are Water and Wastewater 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. How we process water is also linked to our greenhouse gas emissions. Water and wastewater related GHG emissions total 3,239 metric tons in La Crosse annually[1].

Water is also at the heart of adaptation to climate change. Over 4,700 households, over 1 in 5 homes, in La Crosse are at moderate risk for flooding today.[2] Climate change will increase the likelihood of drought combined with additional heavy rain events, flooding, and flash flooding.[3] Climate change will 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.

Sector Goals

	Potable Water Consumption	Wastewater Generation
2020[1]	3,115 million gal	3,614 million gal
2030 Targets	2,912 million gal	3,433 million gal

Key Climate Considerations

- Impacts of current and projected future precipitation patterns on water resources, including processes that are critical for maintaining drinking water supplies
- Impacts of extreme events (e.g., heat waves, flooding, drought) on water quality and stormwater management systems
- Water resource conservation measures that are already being implemented in the community, as well as existing and potential areas that could be used for natural floodwater storage

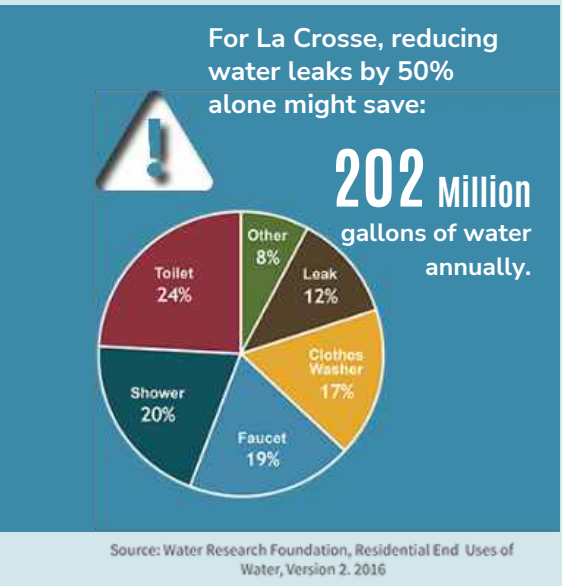
STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Water and Wastewater sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Equity Considerations

- A given cost per gallon takes a larger portion of a lower-income household's available take-home pay. Consequently, water and wastewater rate designs intended to encourage conservation can unintendedly impact low-income households more than wealthier households. Rate designs should be designed carefully to enhance equity while encouraging conservation..
- Low-income households have fewer resources to address maintenance issues such as leaking pipes, resulting in a higher likelihood of living with water leak concerns.

Water Conservation Potential



Source: Water Research Foundation, Residential End Uses of Water, Version 2. 2016

Strategy W 1

Promote increased water conservation community-wide with a targeted reduction of 6.5% by 2030 (202 million gallons conserved annually by 2030).

Water and wastewater treatment is the single most significant GHG emission source for municipal operations. Reduction of water consumption means less energy consumption for municipal operations and results in a reduction of total GHG emissions.

Based on City of La Crosse data, water consumption community-wide decreased an average of 0.65% annually for a total of 8.5% from 2007 to 2020.[1] Though the reported water reduction is significant, there is likely additional water conservation potential. According to the Water Research Foundation, on average, 12-14% of municipal water distribution is lost through leaks in water mains and water pipes on private property.[4] For La Crosse, reducing just 50% of this could represent up to 202 million gallons of water annually.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy W 2

Reduce wastewater generation community-wide with a targeted reduction of 5% by 2030 (180 million gallons reduced annually by 2030).

Wastewater GHG emissions were 2,024 metric tons for processing 3,614 billion gallons of water in 2020. This is equal to 85 pounds per person in 2019.[1] Wastewater emissions can be reduced through use of renewable energy for collection and processing needs as well as through strategies addressing biogenic emissions—release of methane through biological processes.

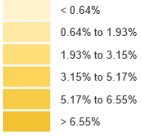
Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

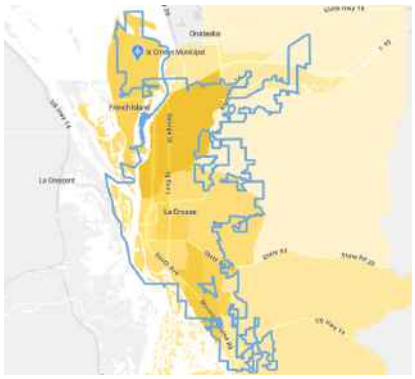
Strategy W 3

Improve the resilience of the community's water, wastewater, and stormwater infrastructure to flooding, particularly in high-risk areas

According to the US National Climate Assessment, the ten rainiest days can contribute up to 40% of the annual precipitation in the Wisconsin region.[5] By 2080, the La Crosse area can anticipate an increase of up to 15% in total annual precipitation.[3] In addition, the timeframe between rains is expected to continue to increase. Under this scenario, it is likely that certain periods of the year, like spring, may be significantly wetter with storms producing heavier rains. In anticipation of this, it is appropriate to review the areas of the community with flood risk and to review current storm water management capacity against future extreme rainfall event projections. Increases in impervious cover can dramatically increase the impact of so-called 100-year flood events. Neighborhoods in La Crosse have impervious surface coverage as high as 64%, highlighting actions reducing impervious surface coverage as one of the important adaptation avenues.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.





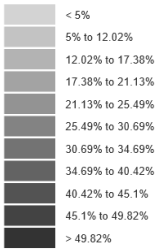
Light Impervious Surface Coverage

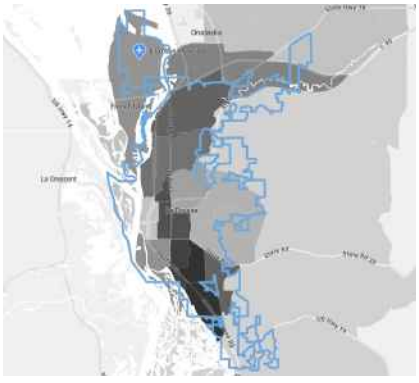
(light colored buildings+pavement made from materials that reflect more light than they absorb such as light colored concrete, white roof membranes, etc)

Community Average: **5.0%**
(excluding tracts 104.1, 105, 106, 107)

Census Tract High: **12.7%**
Tract: 1

Census Tract Low: **1.9%**
Tract: 7





Dark Impervious Surface Coverage

(dark colored buildings+pavement made from materials that absorb more light than they reflect such as asphalt, black roof membranes, etc)

Community Average: **26.6%**
(excluding tracts 104.1, 105, 106, 107)

Census Tract High: **58.8%**
Tract: 240.04

Census Tract Low: **10%**
Tract: 3

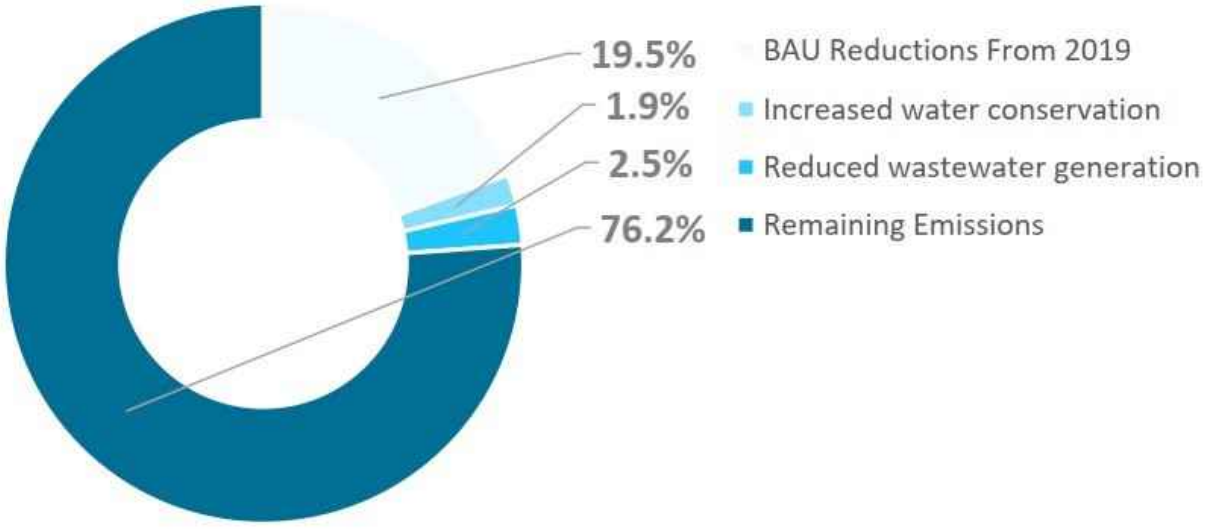
Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the community's annual GHG emissions by 180 metric tons (MT) annually by 2030 - a 20.7% reduction from 2019 levels. Changes in business-as-usual impacts over the same period are anticipated to reduce an additional 800 metric tons. The result is a total community-wide Water and Wastewater sector reduction of 23.8% below 2019 levels.

When compared to 2019 emissions, this is equivalent to eliminating over 200 of current La Crosse vehicles from the road, or **19 million** cubic feet of human-made greenhouse gas atmosphere annually by 2030.

Sector Emissions Reduction below 2019 by 2030

The total change to sector emissions include CAP reductions and business-as-usual (BAU) emission changes as follows:



SECTION 07

Local Food and Agriculture

Photo: La Crosse Farmers Market Association

Why is Local Food and Agriculture Important?

Transporting and refrigerating food across long distances burns GHG emitting fossil fuels. The less transportation and refrigeration needed to supply our food, the more sustainable it becomes.

Buying food from local sources reduces our GHG emissions while also supporting the small business local economy. Studies have indicated that nearly 32 jobs are created for every $1 million in revenue generated by produce from farms involved in a local food market. This is compared to only 10.5 jobs for those involved in wholesale channels exclusively.[1] Meanwhile, community gardens support physical and social activity. Increased gardening in neighborhoods increases social cohesion, provides multigenerational activity, supports outdoor low-impact exercise, and support plant/animal/pollinator habitat. [11]

Our food system is also vulnerable to impacts of climate change like extreme precipitation and heat, climate induced invasive species, and livestock vulnerabilities.[2]

Food insecurity—disruption of nutrition availability because of lack of money, access, or other resources—is inequitably felt. People experiencing low-income are nearly three times more likely to experience food insecurity.[3] We should anticipate that the climate change vulnerabilities of our national food system will exacerbate the inequities of food security in all communities.

Climate Hazards

Hazards to the local food and agriculture system include reduced crop quality and yield, vulnerability to pests, changes in soil moisture from droughts and floods, fluctuation in availability, and food price volatility.

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.

Click here to return to TOC

CURRENTLY IN LA CROSSE

5	2	144,334	-9%	9.4%
Community gardens	Farmers Markets	Acres of agricultural land County-wide[16]	5 year change agricultural land[16]	Food insecurity rate in La Crosse County[17]

STRATEGIES

Community Gardens per 100,000 Residents

United States: 18,000 Total (est)[12]	5.5
City of Madison: 6 Total	2.3
City of Milwaukee: 7 Total	1.2
City of La Crosse: 2 Total	3.9
Farmer's Market Locations in La Crosse:	2

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."
- 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."
- New programs created in local food systems may perpetuate inequities that are defined by the dominant population. These programs often unintentionally leave out the same voices as the industrial food system. People who cannot afford to "buy local" or organic may be excluded.[4]

The strategies on the following pages guide our path in meeting our climate goals for the Local Food and Agriculture sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy LF 1

Increase the production of and access to local food, particularly serving low-income and food insecure individuals.

As a national system, the US agriculture system is also vulnerable to regional climate impacts.[5] Pacific states are particularly sensitive to reduced water supplies, warmer winters, and more variable spring weather. Grain production is vulnerable to more variable weather, warmer winters, heat waves, hot summer nights, and flooding in the Great Plains and the Midwest. Beef, pork, and poultry production is vulnerable to increased frequency and intensity of extreme weather in the Great Plains and the Southeast as well as sensitive to interruptions in feed, water, and power supplies that can occur with extreme weather events and other climate change drivers.

Although all community members may feel effects of climate change impacts on the food system, individuals who are already experiencing low-income or food insecurity will very likely experience these effects more profoundly. Increased local food system capacity can help increase resilience, food security, job creation, and community wealth building benefits.[6,7]

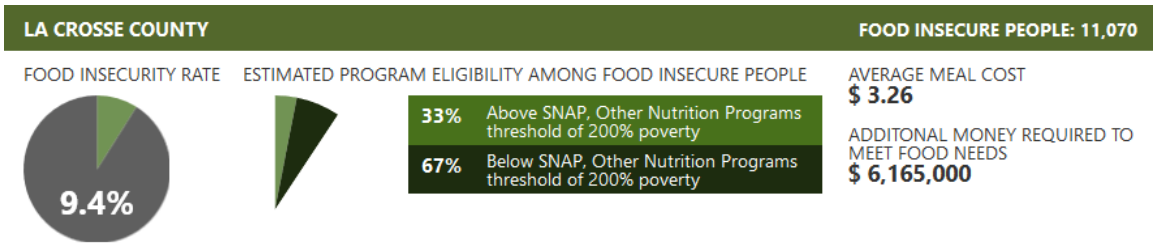
Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy LF 2

Reduce food waste and hunger, achieve a 50% reduction in food insecurity community-wide by 2030.

Nationally, 30-40% of the food supply is estimated to be wasted.[8] There is an estimated 8,700 tons of food waste in La Crosse's solid waste stream annually.[6] In addition to the greenhouse gas emissions generated, this food waste represents an economic loss of over $11 million every year.[9] Beyond reducing economic loss, food that is wasted could have benefited families in need. Climate change is likely to diminish food security through production disruptions that lead to local availability limitations and price increases, interrupted transport conduits, and reduced food safety among other causes. Reduction of food waste supports La Crosse's CAP Waste Management sector goals, improves the overall sustainability of the community, and could reduce food insecurity within the community.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.



Strategy LF 3

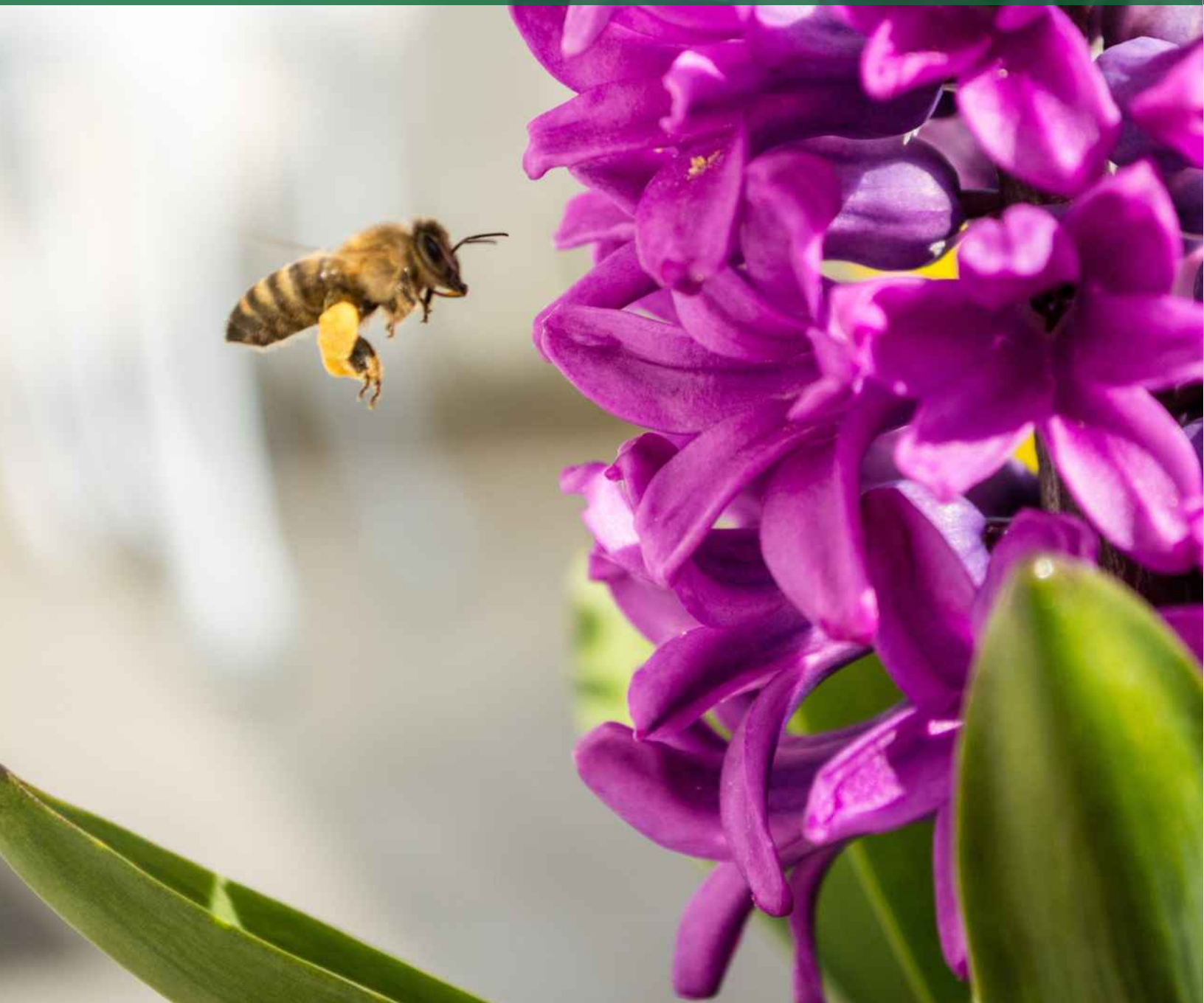
Protect and preserve agricultural land while increasing its resilience to climate shocks.

Regional farms provide the opportunity for increased local food production and resilience, while agriculture and forestry land uses alone could provide as much as 20% to 30% of the mitigation needed to limit global warming to 1.5°C. [22] Unfortunately, climate disruptions to agricultural production have increased over the past 40 years and are projected to rise further, with increasingly negative stressors on agricultural lands and the farmers managing them.[19, 20] These growing stressors are occurring at a time when the United States is losing over 80 acres of farmland to development every hour.[21] Protecting and preserving the region's agricultural land is an important component of supporting the resilience of local food systems.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

SECTION 08

Greenspace, Trees, and Ecosystems



CURRENTLY IN LA CROSSE

30%	11.9%	30%	1.8 °F
Average tree canopy coverage	Impervious surface coverage	Maintained lawn coverage	Hotter than surrounding region due to urban heat island effect

Click here to return to TOC

Why are Greenspace, Trees, and Ecosystems Important?

Trees and natural ground cover play a central role in supporting community physical and mental health, improving air and water quality, helping to reduce building energy use, reducing stormwater runoff, and supporting climate mitigation. Healthy tree and native grass coverage sequester carbon and help reduce the atmospheric GHG emissions that drive climate change. Trees are critical in filtering air and removing harmful pollutants such as carbon monoxide, particulate matter, and ground-level ozone.

Conversely, higher levels of impervious surfaces (pavement and buildings) within a community will increase the heat island effect on the community. Heat island refers to the phenomenon of higher atmospheric and surface temperatures occurring in developed areas than those in the surrounding rural areas due to human activities and infrastructure. Increased heat indices during summer months due to heat island effects raise human discomfort and health risk levels in developed areas, especially during heat waves. There is a direct relationship between the amount of impervious surface coverage of a community and the corresponding degree of heat island temperature experienced—meaning a conscious effort to increase greenspace and tree canopy coverage in areas of higher heat island impacts can lower those impacts. [1]

Sector Goals

	Tree Canopy Cover	Turf Coverage	Dark Impervious Surface Cover
	+	-	-
2020[12]	30%	30%	10.4%
2030 Targets	**32.5%**	**25%**	**8%**

Key Climate Considerations

- Climate impacts on existing parks, conservation areas, and other green spaces, and how that may be altered by changes in temperature and precipitation in coming decades
- Potential impacts of climate change on patterns of use around parks and recreational areas .

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Greenspace Trees and Ecosystems sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Equity Considerations

- Lower-income neighborhoods and neighborhoods with higher proportions of people of color regularly have lower tree canopy coverage, and less of the environmental, economic, and quality-of-life benefits trees support than more affluent neighborhoods. (see chart on page 8-5 for La Crosse specific data)
- Frequently neighborhoods with higher vulnerable populations have the highest heat island impacts.

Strategy **GS 1**

Increase community-wide tree cover from 30% to 32.5% by 2030 and 35% by 2040.*

Our tree canopy reduces storm water runoff, provides clean drinking water, reduces the effects of urban heat islands, decreases energy use in our buildings, sequesters atmospheric carbon dioxide while serving as a long-term carbon sink, and supports increasing economic growth.[1,2,3,4,5] Increasing tree canopy coverage and health provides critical climate adaptation services. Increases should be prioritized to balance the potential for increased tree canopy with the opportunity to improve tree canopy benefit equity, potential to positively impact as many households as possible, and the need for mitigation of heat island impacts. The suggested tree canopy increases by neighborhood shown to the right prioritizes based on the following weighted criteria:[12]

- Potential for new trees: 20%
- Population density: 20%
- Low-income density (equity adjustment): 30%
- Heat island reduction need: 30%

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

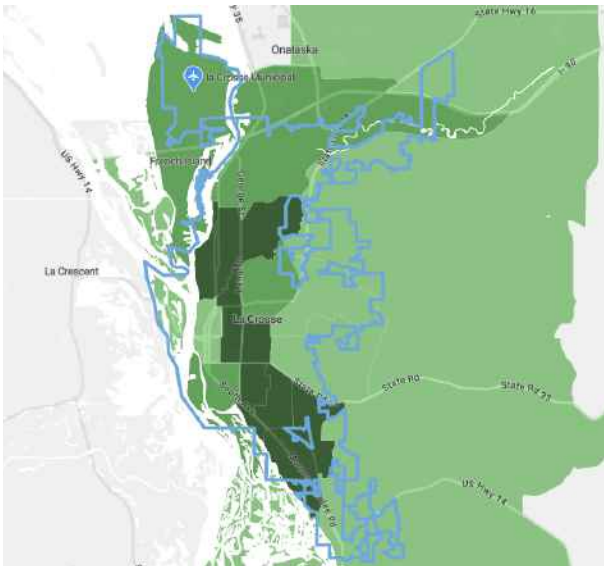
New Tree Planting Projection Meeting Community's Tree Cover Goal[12]

Year	Canopy tree cover (acres)	Goal new planted (trees)	Cover tree canopy (% land)
2023	4,198	2,693	30.3%
2024	4,239	2,672	30.6%
2025	4,279	2,651	30.9%
2026	4,319	2,629	31.2%
2027	4,359	2,608	31.5%
2028	4,400	2,587	31.8%
2029	4,440	2,566	32.1%
2030	**4,480**	**2,545**	**32.5%**

Calculations exclude tracts 104.1, 105, 106, 107

Suggested Tree Canopy Increase by Census Tract

(in absolute land cover percentage):



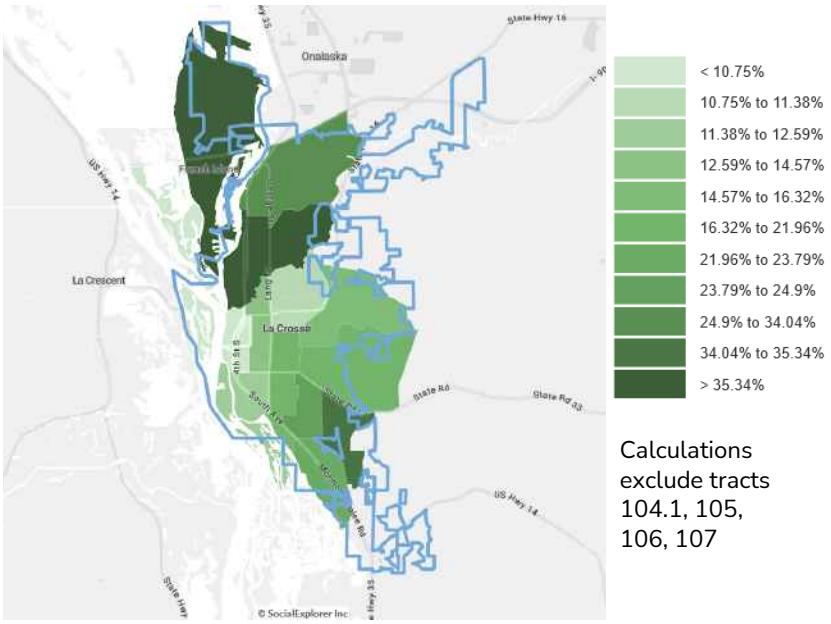
*Goal calculation excludes tracts 104.1, 105, 106, 107

Strategy GS 2

Increase pollinator supportiveness of lawns and grasslands in the community and achieve a 5% turf replacement with native grasses and wildflowers by 2030.*

Replacing lawns with native grasses and wildflowers creates a more authentic, natural American landscape that combats climate change and provides shelter and food for songbirds and other small mammals. Compared to the typical lawn, native grasses improve water quality, reduce air pollution, provide habitat restoration and protection, and increase carbon sequestration.[6,7,8] Nearly 3,800 acres of land in La Crosse (27% of all land) is covered in grasses. 90% of all grass land coverage is manicured, mowed lawns with the remaining 10% being native/prairie grasses.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.



Calculations exclude tracts 104.1, 105, 106, 107

Turf Reduction Potential

90.5% of grass lands in La Crosse are manicured lawns—representing a great opportunity for turf reduction. Turf reduction can increase stormwater uptake, reduce potable water use, and increase soil carbon. The map shows the portion of ground cover that is grass by Census Tract. Areas with higher percentages of grass coverage may offer the greatest potential for turf replacement with native grasses and wild flowers.

Strategy GS 3

Reduce heat island effect through community-wide "dark" impervious surface coverage from 10.4% to 8% by 2030 and 5% by 2040 (280 acres reduced by 2030, 700 acres reduced by 2040). *

Increased heat island effects raise human discomfort and health risk levels in developed areas, especially during heat waves which are projected to become more severe and more common for La Crosse.[9,10] There is a direct relationship between impervious surface coverage of a community and the amount of heat island temperature increase, particularly dark impervious surfaces.[11] Dark impervious surfaces are dark colored building and pavement surfaces made from materials that absorb more light than they reflect such as asphalt, black roof membranes. Decreasing the amount of dark impervious surfaces will help decrease heat island impacts in La Crosse.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Ground Cover Characteristics by Census Tract

Organized by Share of Low-Income Population (LMI)

The bar chart provides a side-by-side comparison of land cover by Census Tract. The trend lines indicate census tracts with more lower-income residents have less tree and grass coverage and more dark impervious surfaces.

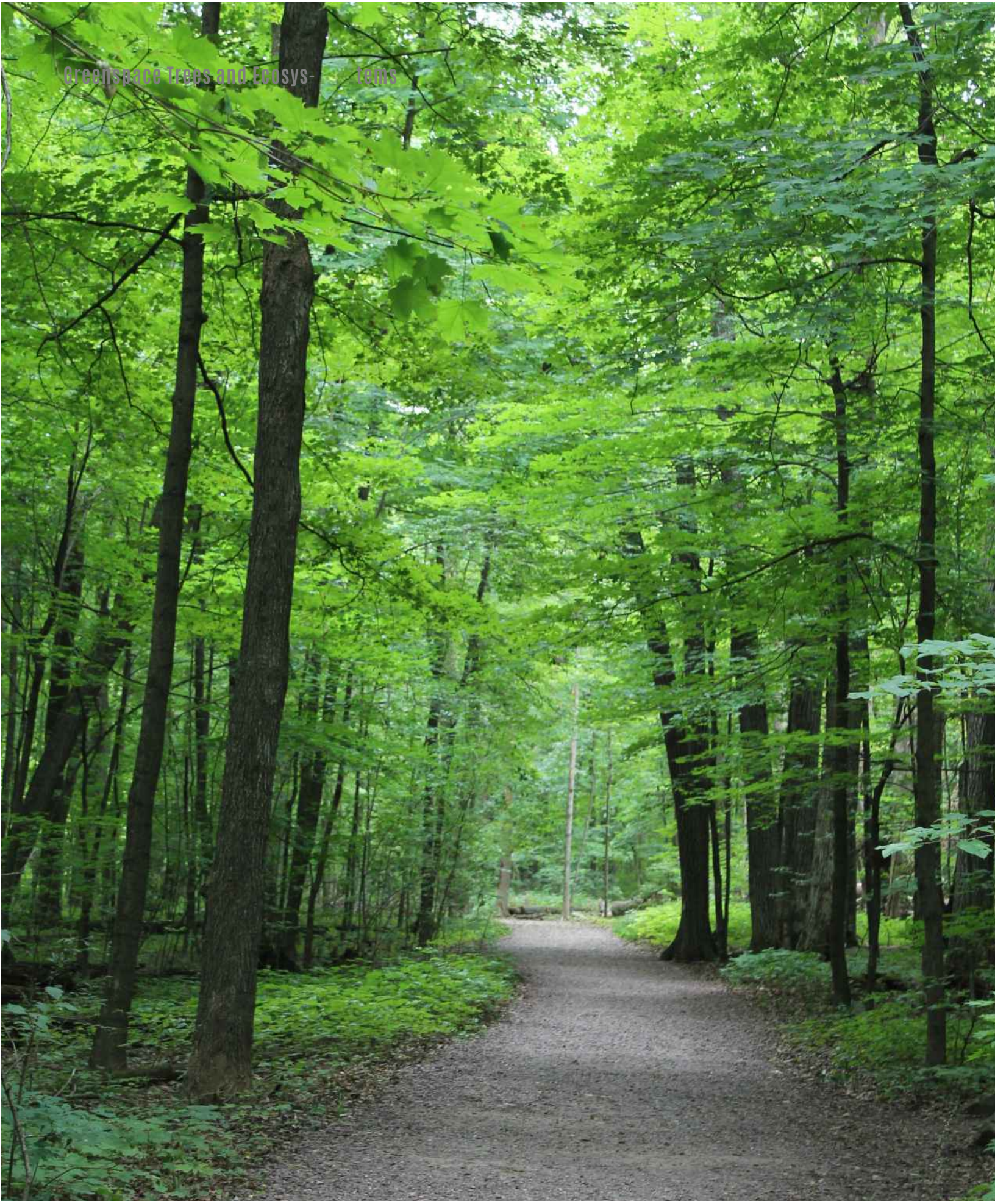
Strategy GS 4

Increase climate resilience of community's parks and open spaces

Greenspaces provide important physical, mental, and emotional health for those who have access, including reducing chronic diseases and associated risk factors.[13, 14] In terms of climate action, greenspaces are critical in helping to mitigate climate change impacts and contribute to increased resiliency for recovering from climate change impacts.[15] Urban greenspaces, in particular, have been shown to be essential for maintaining species richness and biodiversity of modern urban areas—and by extension their surrounding region.[16]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

*Goal calculation excludes tracts 104.1, 105, 106, 107


Greenspace Trees and Ecosys- tems

SECTION 09

Health and Safety

Why is Health and Safety 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. Changes in climate, such as higher average temperatures and increased storm frequency and intensity, can intensify public health stressors.[1] Climate change also increase risks and impacts to public mental health including mild stress and distress, high-risk coping behavior such as increased alcohol use and, occasionally, mental disorders such as depression, anxiety and post-traumatic stress.[11] These 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 promote 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.

Key Climate Considerations

- Emergency, health, and safety resources or services may be affected by changing conditions, particularly those in high-risk areas
- Changes in patterns of demand for emergency and health care services as a result of climate change, including changes in the type, frequency, or location of emergency services required
- Impacts of extreme events that prevent emergency personnel from quickly and safely reaching those in need, or limit operation of emergency systems
- Potential ways that climate change could impact the type of public health programming or outreach/education that is required to meet the needs of the community

Click here to return to TOC

CURRENTLY PROJECTED FOR LA CROSSE

4,700	+4-5°F	+69%	+20-25 days
Properties with risk of flooding	Increase in temperature by 2050	Increased air conditioning demand by 2050	Longer allergy season by 2050

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Health and Safety sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

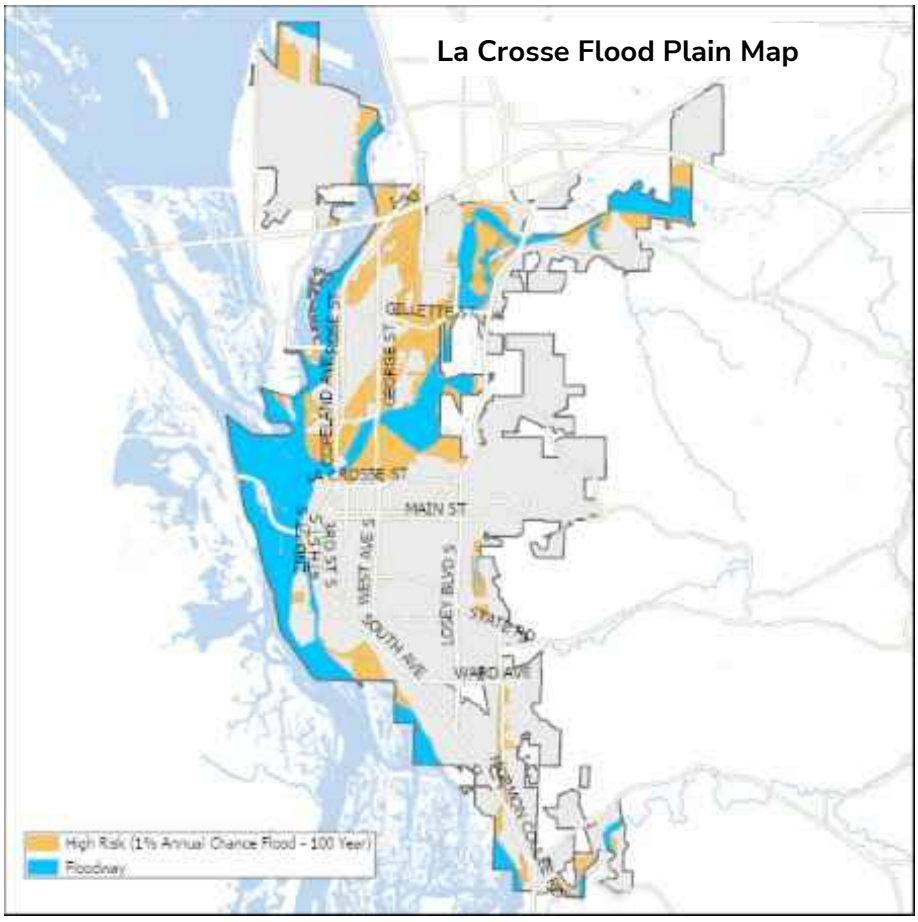
Strategy HS 1

Assist the community's vulnerable population in preparing for and mitigating local climate change impacts.

Across all sectors, storms/flooding and extreme heat emerged as the climate stressors of greatest concern. Key vulnerabilities that were very similar across multiple sectors included

- Increased risk of damage or losses to infrastructure due to flooding
- Shifts in the size and location of floodplains and the loss of areas suitable for certain uses (see flood plain map below)
- Key population vulnerabilities within La Crosse include extreme heat and air quality impacts, power /infrastructure failure risk, and food insecurity

Adaptation efforts that effectively address these key vulnerabilities will not only reduce the negative impacts of climate change on La Crosse but also have the potential to address underlying stressors and inequities that have long been an issue in the community. With careful attention and community willingness to invest time and resources into adaptation as well as mitigation efforts, La Crosse can become more resilient and continue to grow and thrive over the coming decades.



Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy HS 2

Ensure that the City's mission critical, emergency services and health care facilities are prepared for impacts of climate change.

Climate-related hazards pose a direct risk to facilities and personnel. Extreme weather events can cause critical facilities like hospitals to lose primary and backup power, or incur damage that requires them to evacuate patients or even close for an extended period of time.[9] Key infrastructure like telecommunications and power systems can be damaged or disrupted by extreme temperatures, resulting in challenges to emergency communications or availability of cybersecurity systems.[10]

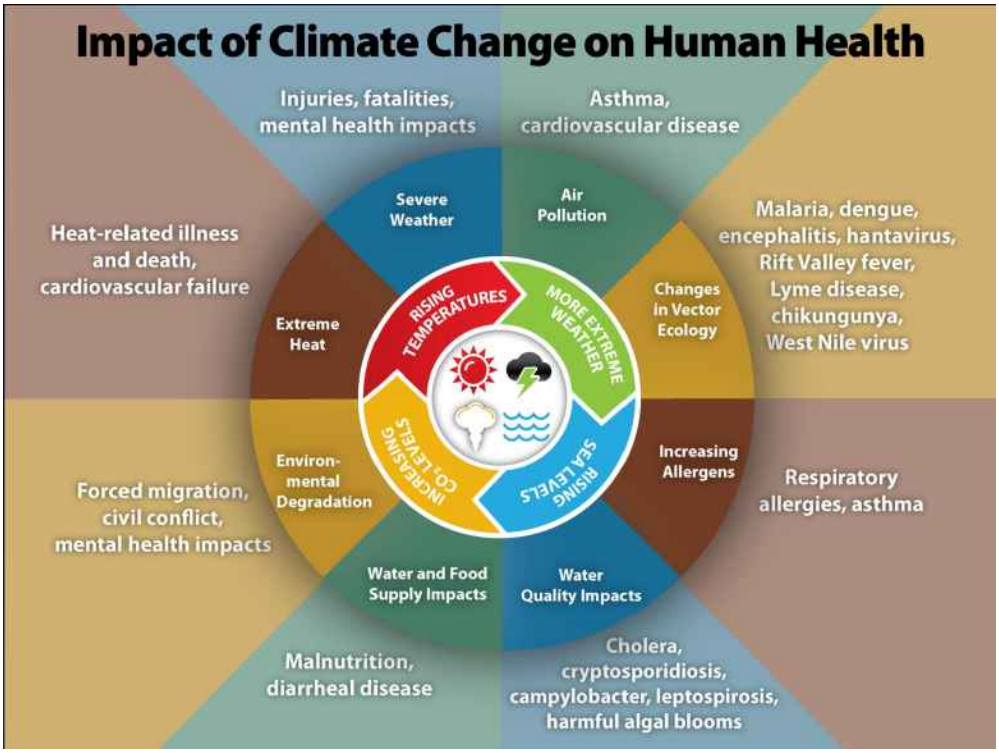
Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy HS 3

Improve community adaptation capacity through strengthened social support networks.

Studies suggest that social networks are important in times of stress. These connections help to facilitate collective action as well as communication.[6] Connected communities have a better chance of acting on climate risk management strategies, coping with severe weather events and seeking out potential benefits from altered conditions. In fact, some research indicates that people helping people may be as important, if not more so, than emergency services.[6] Based on this, the City of La Crosse can help lesson community vulnerabilities to climate impacts through supporting improved social connectivity.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.



SECTION 10

Economy

CURRENTLY IN LA CROSSE

49,316
Jobs in La Crosse

44.5%
Share of employed La Crosse residents working outside community

72%
Share of workers in La Crosse who live outside community

$53,581
Average annual earnings for Renewable Energy and Energy Efficiency jobs in La Crosse[1]

Click here to return to TOC

Why is The Economy Important?

Climate change and the economy are inexorably linked. More frequent and severe heatwaves, floods, droughts, and wildfires in addition to rising sea levels will cost the United States billions of dollars in lost assets, worker productivity, and human health. According to a 2019 study by two EPA scientists, the difference between meeting the Paris Agreement of keeping global warming to less than 2° C and the path our current emissions places us on may account for as much as $224 billion in economic impact annually by 2090.[17]

Carbon pricing is an accounting mechanism designed to represent the link between our economy and the effects of un-abated climate change. Carbon pricing establishes a dollar value for every metric ton of GHG emissions representing its share of our future economic impacts. According to a 2019 World Bank report on trends in carbon pricing, a carbon price range of $40-$80 per ton is necessary as of 2020 to reach the goals set by the 2015 Paris Agreement. In 2020, Wisconsin State legislators proposed an initial cost of carbon in Assembly Bill 766 for the State of Wisconsin at $50. Using the Wisconsin figure, every 1% in La Crosse community-wide emissions reductions will generate over $330,000 in social community benefits alone, not including other economic savings or revenue generation.

Economic Savings

Investments in energy efficiency, public transportation, renewable energy, and many other climate action strategies ultimately result in cost savings for community businesses and residents.[19,20,22] These savings contribute to an increase in the quality of life for residents and will largely be spent within the community on goods and services, providing indirect and induced economic development potential for the community.

Key Climate Considerations

- Impacts of current climate conditions that affect the community's economy and resources that drive it, and consideration of how local business and industry might be affected if these patterns change
- Potential for climate-driven changes in either the supply or demand for products or services that are crucial to the local economy
- Impacts of action to address climate change – or inaction – on various aspects of the local economy, including direct costs or savings, job creation/ employment rates, and vitality of the downtown areas and local businesses

STRATEGIES

The strategies on the following pages guide our path in meeting our climate goals for the Economy sector. Each strategy is supported by a series of detailed actions to be explored and undertaken to carry out the vision and goals.

Climate Action and Economic Development

Rather than weakening the economy, climate action can support economic development. Reducing fossil fuel use, improving public transit systems, and growing local food industries contribute to a transition to local energy and labor sources.

This transition represents an opportunity for communities to reduce the wealth leaving the community and increase the share of the wealth that remains in the form of local jobs. Additionally, many potential careers in Climate Action are in more labor-intensive (but less material resource-intensive) sectors of the economy. This shift supports more significant overall employment combined with less resource utilization.[23]

Strategy E 1

Capture local economic potential of climate action

Globally, we will need to make significant investment in climate action over the next 15 years to successfully address climate goals. These investments are necessary to avoid long-term economic damage. However, these investments can spur growth.

Bold climate action can create a direct economic gain of $26 trillion in the United States through 2030 compared to "business-as-usual."[5] On average, for every $1 in climate action investment, communities yield $4 in benefits.[6] In the wake of the COVID-19 pandemic, research has shown that strong climate action and investments can be effective ways for communities to "build back better" from COVID while helping to secure long-term economic success.[7] These dynamics represent economic development potential for communities, particularly those that strategically plan to capture the potential.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy E 2

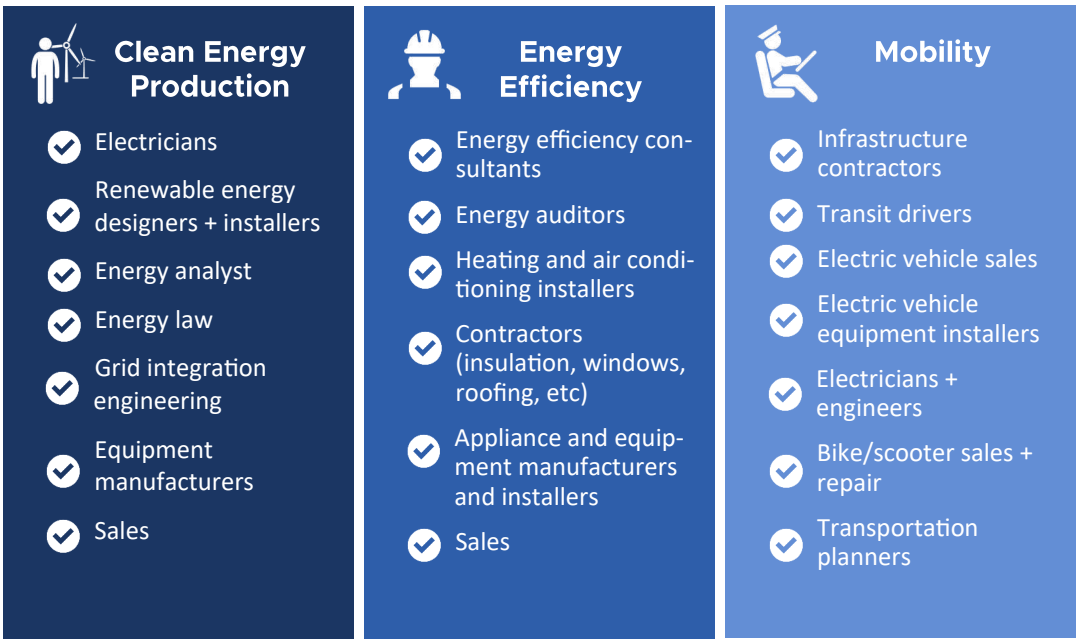
Support the development of the community's workforce to meet the needs and new opportunities of the Climate Economy.

Many of the core strategies of effective climate action – like increasing distributed solar energy and weatherization programs to improve the energy efficiency of our buildings – are inherently local efforts requiring workers "on-the-ground". This means that much of that investment can stay within our community creating quality jobs. Workers in the types of "green" jobs needed to support our transition to a carbon free economy earn higher and more equitable wages when compared to all workers nationally.[8]

"Green" jobs also have lower formal educational barriers to entry - nearly half of workers in these "green" jobs attain no more than a high school diploma while earning higher wages than similarly-educated peers in other industries.[8] Because jobs in this sector tend to require greater scientific knowledge and technical skills than the average American job, these careers often also represent opportunities for workers to gain skills which benefit the local workforce long-term.[8] Ultimately, addressing climate resilience can improve the economic potential for disadvantaged individuals who have continued to confront systemic barriers to opportunity.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Example Jobs Needed in Support of the Climate Economy



Strategy E 3

Support/incentivize local businesses and agricultural operations in building marketplace climate resilience.

The serious effects of the COVID pandemic have shown how easily disruptions can lead to cascading impacts on businesses, workers, and communities. They have also shown the potential for economic impact by significant disruptions. The World Bank calculates that the global economy likely shrank by 4.3% in 2020 (approximately $3.5 trillion).[9]

The potential economic impact of climate change is far greater than what we've experienced with COVID.[10] The best case scenario – one in which the world meets the Paris Agreement climate targets - results in an annual GDP impact by 2050 equal to the impact of COVID. The worst case in which no appreciable emission reductions are achieved results in an annual impact more than four times greater than the COVID pandemic. The world's largest corporations are now including climate risk and resilience in their business planning. Nearly half of them, including Apple, Nestle and The 3M Company have reported climate-related financial risks of just under $1 trillion with half of the financial risk being assessed as likely, very likely, or virtually certain to materialize.[11]

The potential for economic disruption to small and local business is equally important. Small businesses are central to the stability of the national economy – they account for 44% of the total economic activity and create two-thirds of net new jobs. Their importance in La Crosse is no different—the average firm in La Crosse employs less than 20 people.[3] Building climate resilience within the business community will not only benefit business-owners, but also employees, households, and the community at large.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Potential Economic Impact of Climate Change[10]

The expected impact to global GDP by 2050 under different climate change scenarios compared to a world without climate change:

No mitigating actions are taken (3.2°C increase):	-18%
Some mitigating actions are taken (2.6°C increase):	-14%
Moderate mitigating actions are taken (2°C increase):	-11%
Paris Agreement targets are met (below 2°C increase):	-4%

Estimated Global Economic Impact of COVID-19 Pandemic:[9] -4.3%

Strategy E 4

Establish sustainable financing for the City's climate action implementation.

The initial need for resilience and adaptation investments cannot be met by the current fiscal system of state and federal subsidies and conventional local taxing powers.[13] This is not from a lack of inherent investment value. Instead it is that their value does not always fit within the traditional financing model. Many investments in community resilience involve short-term costs while their value materializes over the long-term. Others reduce future climate damage, producing significant future benefits, but do not generate financial returns for private capital. [13]

Some communities have begun to take advantage of new financing tools like climate bonds and community-based public-private partnerships.[9] Other communities have also begun to establish Climate Funds and emissions trading programs to creatively meet the financing needs of robust community climate resilience.[14]

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

Strategy E 5

Prepare for climate change immigration/migration.

In the United States alone, within just a few decades, hundreds of thousands of households will be critically impacted by climate change. Chronic flooding alone will impact hundreds of communities on US coasts. According to a study by the Union of Concerned Scientists, over 170 communities in the United States will be chronically inundated from sea level rise by the end of this decade.[24] More than half of these 170 communities are currently home to socioeconomically vulnerable neighborhoods.

Human migration is a natural response to these climate change pressures. The impacts of climate migration will cause accelerated changes for many inland areas, causing them to have much higher levels of migrants than they otherwise would. It is projected that 86% of all communities with populations of over 10,000 will be impacted with climate migration this century. These changes may cause tighter labor markets, increased housing prices, and impacts on income inequality. This climate migration can also have positive impacts such as improved productivity, broadened skill-sets within the labor force, and expanded human capital. Proactively preparing for climate migration can help La Crosse maximize the benefits of climate migration.

Go to **Section 11 Climate Actions and Implementation** for all supporting actions.

SECTION 11

Climate Actions and Implementation

The first few years after plan adoption are critical to its success. Establishing roles and identifying funding will help establish the implementation phase of the plan and ensure the community is on track to achieve its goals. This plan includes robust goals for significant GHG emission reductions and addressing climate resilience. This vision requires commitment and integration of the CAP into City operations, functions, and services. Ultimately, however, successful implementation of this Climate Action Plan will require the support and commitment of La Crosse residents and businesses.

Implementation is For Everyone

The causes and impacts of climate change are broad. Solving it must be equally broad. Some actions will need to be led by City Council, City departments, and/or the business community. In addition, there are steps that households and individuals can take to make an impact. Ultimately, achieving the visionary goals outlined in this plan will require engagement and a sense of responsibility not only by the City of La Crosse leadership and staff, but by the community as well. It is critical for all to remain engaged and active, advancing and advocating for actions you feel are important.

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Strategies as Minimum Goals
As an aspirational guiding plan, the La Crosse Climate Action Plan's goals and strategies should be understood as minimums. The intent, ideally, is that implementation of the climate action plan will ultimately exceed the goals set forth in the plan.

Climate Action Implementation is a Journey

It is not possible at the beginning to have all of the detailed answers on a decade's worth of actions. Both the Climate Action Plan and its implementation are a journey. Although the actions outlined in the CAP are designed to demonstrate a pathway for La Crosse to achieve its climate goals, there is much uncertainty in predicting future technologies, costs, and regulations. For this reason, a full cost-benefit analysis of every action is not possible at this time.

We anticipate that refinement of detailed actions will occur while they are rolled out. Accordingly, actions are designed to provide guidance on intent but flexibility of details and design. Actions which may modify/ create policy or ordinances or which may have City expenses incurred should be anticipated to go through the City Council process for approval.

Climate Actions and Implementation Plan

The following are the proposed detailed actions in support of each strategy outlined within each section. The implementation plan includes a "Phase" indicator. This designation identifies a suggested initial anticipated timeframe of the action:*

Phase 1: action initiation anticipated within 0-3 years of CAP approval
Phase 2 action initiation anticipated within 2-5 years of CAP approval
Phase 3 within 3-7 years of CAP approval

*Phasing is intended to be finalized in collaboration with the City's CAP Team at initiation of plan implementation (see strategy CC1).

Implementation Support Tools

To support the City in its initial implementation phase, the paleBLUEdot team has created a number of tools including:

Implementation and Monitoring Matrix

Climate Action Guides

- Net Zero Energy Building Guide
- Solar Ready Guide
- Electric Vehicle (EV) Ready Guide
  https://palebluedot.llc/lacrosse-climate-action-guides

Example Climate Action Policies and Ordinances

The paleBLUEdot team has assembled example policies and ordinances supporting some of the strategies and actions included in the La Crosse Climate Action Plan. The examples can be found on the following webpage: https://palebluedot.llc/lacrosse-cap-policy-examples

CAP ACTIONS

Strategy / Action

Phase

Cross-Cutting Actions

CC 1: Continue to Build Internal Capacity for Support of Climate Action Plan Implementation.

CC 1- 1	The Mayor will work with staff to develop a year 1 implementation plan that specifies a work sequence and timeline for implementation tasks, estimates necessary funding and staffing resources, and outlines an accountability process, to be presented to the Climate Action Plan Steering Committee for comment by the end of May 2023. Progress updates will be reported to the Climate Action Plan Steering Committee (or other designated commission) and City Council on a semi-annual basis.	1
CC 1- 2	Establish clear guidance and direction for the participation in and support of the CAP implementation actions by all City of La Crosse departments. Encourage continuing education of municipal staff relevant to the Climate Action Plan. For example, encouraging traffic engineers to earn continuing education credits related to bicycle infrastructure.	1
CC 1- 3	Establish a City "CAP Team" comprised of staff representatives from all key City departments. The task of the CAP Team should be to meet regularly to support the initial and on-going prioritization and implementation of annual implementation actions and projects and to support reporting and progress updates. CAP Team to request resources, guidance, or assistance, if needed to make planned progress.	1
CC 1- 4	Establish and implement a policy to review existing and future City of La Crosse policy and ordinance changes as well as building and zoning variance requests against the goals, strategies, and actions of this Climate Action Plan to ensure alignment of changes with this plan.	1
CC 1- 5	Fund and support sustainability staffing required to: •Facilitate discussion among large users to reduce emissions through business and industrial strategies. •Participate in technical resource programs as they are available through County, Regional, State, Federal, and non-profit provider partners. •Support City of La Crosse department managers and staff as they implement CAP actions within their service area or area of expertise. •Convene the internal City of La Crosse CAP Team. •Ensure the establishment and maintenance of a City of La Crosse Climate Action webpage supporting CAP resources for the community. •Coordinate and organize volunteer groups and events. •Engage City boards and commissions to ensure the CAP is integrated into their work plans.	1
CC 1- 6	Review Climate Action Plan implementation progress and impacts on a regular basis (1-2 year cycle). Review should include development of an updated community-wide and municipal operations GHG inventory. Strategies and actions should be reviewed for implementation progress and for continued appropriateness. Based on the review, adjust, add, and remove detailed CAP actions as appropriate.	1

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Strategy / Action		Phase
Cross-Cutting Actions		
	CC 2: Facilitate External Support Needed for Climate Action Plan Implementation.	
CC 2- 1	Identify an existing commission or establish a commission to act as a primary community member body to support the implementation of the CAP. Commission's annual work plans should include support of the implementation of the Climate Action Plan; supporting City staff in any relevant departments; receiving updates on City CAP projects and progress; being provided with opportunity to comment on identification of annual CAP implementation priorities, projects, and budgets; and providing input on plan adjustments as needed.	1
CC 2- 2	Establish a designated City Council representative and commission representative participant in the City's internal CAP Team in support of CAP implementation.	1
CC 2- 3	Establish a coordinated communication and education campaign supporting the communication and educational needs of each of the CAP sections. The campaign should also look to help community members: •Understand climate change in general, anticipated impacts, and the function and importance of implementing a Climate Action Plan. •Understand why change at the individual, community, City, and business level needs to occur, •The role of individuals, households, and businesses in making change •How to make those changes correctly, and •What the benefit/incentive to them might be; for example, articulating that switching to solar energy and or an electric bus fleet might help reduce bills	1
CC 2- 4	Continue and expand sustained outreach and engagement efforts that seek to build and maintain direct relationship with under-resourced, traditionally marginalized, and climate vulnerable communities within La Crosse.	1
CC 2- 5	Establish jurisdictional partnerships that advance CAP strategies to advance and accelerate action. This can include government entities like the La Crosse County, the State of Wisconsin; utilities like Xcel Energy; institutions like La Crosse Public Schools; La Crosse businesses, and community groups.	1
	CC 3: Maintain appropriate funding to support plan implementation.	
CC 3- 1	Maintain a budget and identify funding sources for staff dedicated to the implementation of the CAP.	1
CC 3- 2	Identify a budget necessary to support projects on an annual basis as per the detailed actions outlined in the Climate Economy section of the plan and climate actions.	1
CC 3- 3	Utilize no-cost technical assistance offerings as available.	1

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Strategy / Action		Phase
02 Transportation and Mobility		
	TM 1: Decrease commuter and community-wide VMT by 5% by 2030.	
TM 1-1	Create a "Sustainable Transportation Coordinator" role in the city to ensure coordination of CAP Transportation Sector actions and manage associated incentives and funding.	1
TM 1-2	Work with providers like Drift Cycle to actively promote and expand access and use of bike sharing throughout the city.	1
TM 1-3	Solicit existing car share service provider or establish a car share program for the La Crosse area. Prioritize car sharing providers or programs that focus on EV utilization. Seek models or examples and trial local, neighborhood or apartment/housing development car and/or bike sharing. Existing car share service providers include Zipcar or Hourcar. Person to person carsharing programs include Turo and Get around.	1
TM 1-4	Establish a parking cash out program, where municipal employees who do not drive to work can cash out their parking space, or receive a comparable transit benefit. Provide guidance for other businesses and organizations to implement their own parking cash out program. Goal: 10 New organizations establishing programs annually.	1
TM 1-5	Assist large employers with developing transportation demand management (TDM) plans. Goal: 24 New organizations making commitments annually.	1
TM 1-6	Establish a Guaranteed Ride Home Program, ensuring that employees who commute via transit or bicycle are able to get a ride share or taxi home and not be left at work if a situation arises.	2
TM 1-7	Establish/increase ordinance requirements and design review requirements for street level, secure bike parking for every residential unit in residential zones and appropriate high-density bike parking facility requirements for commercial and public use zones.	2
TM 1-8	Enable “Parking Benefit Districts” where a portion of parking revenues can be collected and reinvested to fund transportation-related enhancements. This may entail developing a fee structure and adding meters where parking is in high demand, setting off-street parking maximum requirements, incentivizing the replacement of off-street parking with infill development, and creating residential parking passes.	2
TM 1-9	Create and promote incentives for employers to provide incentives such as transit passes, covered and secure bicycle parking, bicycle sharing stations, carpool parking, shuttle services, fleet vehicle carsharing for personal use, and pedestrian facilities. implementation should be prioritized for improved equity.	2
TM 1-10	Create and promote incentives supporting adoption of alternative mobility such as bike and eBike ownership and/or sharing. Incentive implementation should be prioritized for improved equity.	2
TM 1-11	Conduct a review of and implement strategies to minimize stoppage, idling, and fuel wastage. Strategies may include traffic light timing and implement modifications, smart traffic light technology, public education and communication on climate impacts of idling and ways community members can eliminate idling such as avoidance of drive throughs etc.	2

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Strategy Action

Phase

02 Transportation and Mobility

	TM 2: Increase public transit access and commuter ridership from 1.6% to 3% by 2030 (represents an 88% increase in the number of commuters using public transit over 2019 baseline).	
TM 2- 1	Use La Crosse Area Planning Committee's Local Studies Program to assess options for funding for public transit improvements and service increases to meet the goals of this CAP. Study to assess options and provide recommendations for implementation.	1
TM 2- 2	Increase bus frequency. At a minimum, extend 30-minute service on weekdays by one hour until 6:42 pm on routes 1, 2, 4, 5, and 6 to provide flexibility to employees who work into the evening.	1
TM 2- 3	Increase transit-oriented requirements in commercial design standards.	1
TM 2- 4	Provide transit passes to all youth, households with low-incomes, and individuals with restricted mobility.	1
TM 2- 5	Create a transit-oriented development plan for the downtown/South Ave corrido and include re-design of bus stops to increase transit use.	2
TM 2- 6	Partner with sports and entertainment organizations for free bus rides to/from events.	2
	TM 3: Increase battery electric vehicle (BEV) utilization to 20% of community-wide rolling stock by 2030 (from approximately 77 vehicles to 11,800 vehicles community-wide).	
TM 3- 1	Coordinate with La Crosse County and State of Wisconsin to establish an annual auto registration reporting process to monitor the adoption rate of electric vehicles (BEV and PHEV) in the City to maintain an awareness of progress towards the goals of this plan.	1
TM 3- 2	Implement the La Crosse Energy Action Plan's community-wide EV strategies.	1
TM 3- 3	Assist private fleet operators who with grant applications for EVs and EV infrastructure; require they set EV goals of 30% by 2030 and 100% by 2040 in order to qualify for assistance. Goal: 10 New organization commitments annually.	1
TM 3- 4	Adopt an EV and EV charger technology guide. Include ADA compliant charger siting information.	1
TM 3- 5	Establish an EV charger permit on-line application and a utility notification protocol to streamline process.	1

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		Phase
	02 Transportation and Mobility	
TM 3-6	Share information on EV's, EV technology, and Federal, State, Utility, County, and City EV programs and incentives available to community members.	1
TM 3-7	Incentivize electric vehicle sales by providing low/no cost charging at city owned parking lots and working with employers to provide workplace charging and multi-family property owners to provide rental housing charging.	2
TM 3-8	Establish a detailed municipal facility/site EV charging infrastructure implementation plan and budget for EV charging station installation and upkeep for municipal properties.	2
TM 3-9	Establish an EV Ready Ordinance requiring new developments to have wiring capacity to charge electric vehicles and reserve a percentage of new parking spots for exclusive EV use.	2
TM 3-10	Identify equitable locations for installing Level II chargers in commercial and residential areas.	2
TM 3-11	Collaborate with the electric utility to provide incentives for EV charger installation at multi-family residences and small and medium-sized businesses, with a priority on areas that promote equity.	2
TM 3-12	Implement pilot projects to evaluate advanced charging infrastructure technologies including, bi-directional charging, inductive/wireless charging, streetlight integration, smart cable technologies.	2
TM 3-13	Provide low or no-interest loans for electric bicycle (ebike) purchases. Establish a bulk purchase program to reduce ebike cost. Goal: one ebike available to every household.	2
TM 3-14	Advocate for state law that permits: (1) local governments to own/operate public EV charging stations; (2) public charging stations utilizing energy sources other than utilities (e.g., off-grid solar panels)	2
	TM 4: Establish viable bio and/or renewable diesel sources to serve community by 2025. Achieve 25% community-wide diesel consumption replacement with bio and/or renewable diesel by 2030.	
TM 4-1	Identify viable no/low diesel vehicle fuel alternatives, sources, and outlets for increasing no/low emission fuel alternative availability and utilization. Study to include analysis of efficiency chain and impact on land use and other communities. Study may include exploration of existing supply chains as well as potential new sources such as through a locally operated biodiesel plant, renewable diesel produced through renewable energy and electrolyzer plant, and plasma gasification plant producing hydrogen or renewable diesel.	1
TM 4-2	Convert all municipal operations diesel fuel utilization to bio and/or renewable diesel fuel by 2027.	2
TM 4-3	Identify and engage partners to establish adequate bio and/or renewable diesel supply chain for community.	3

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Phase

02 Transportation and Mobility

TM 5: Improve the comfort and safety of walking and biking within La Crosse.

TM 5- 1	Provide additional earmarked funding and/or prioritization to projects with clear safety and VMT reduction goals and benefits.	1
TM 5- 2	Update City's existing Complete Streets ordinance to reflect current best practices and Federal Highway Administration guidance; see Local Policy Workbook and Best Complete Streets documents.	1
TM 5- 3	Create bicycle and bike safety and bicyclist rights education opportunities for all ages through public workshops and web content.	1
TM 5- 4	Establish a public safety policy of increased enforcement of traffic laws and ordinances supporting bicyclist rights and safety.	1
TM 5- 5	Partner with School District, Park & Recreation, and neighborhoods organizations to expand bike safety education for students through public workshops and web content.	1
TM 5- 6	Update the 2012 Bicycle and Pedestrian Master Plan.	2
TM 5- 7	Adopt a bike parking equipment list and design parameters to ensure quality and effectiveness. Install additional bike parking, focusing on shopping and business districts and high-density residential areas.	2
TM 5- 8	Improve safety for pedestrians and alternative modes of transportation by restoring two-way traffic to one-way streets.	2
TM 5- 9	Explore approaches to measuring walking and biking (such as through bike counters) at key locations in the City. Example: City of Madison.	2
TM 5- 10	Identify streets where a “road diet" (a reduction in the number of travel lanes and/or effective street width) would achieve systemic improvements; then, implement road diets.	2
TM 5- 11	Convert Pearl Street into a “shared street”—a street shared by all modes of transportation with very low vehicle speed limits and without formal distinctions between spaces dedicated to pedestrians, cyclists, and motorized vehicles. Consider days or hours when closing the street to motor vehicles would be beneficial.	2
TM 5- 12	Implement recommendations of the 2020 Safe Routes to School Plan.	2
TM 5- 13	Improve City's 'Bicycle Friendly Community' rating by implementing 'Key Steps to Gold' recommendations on report card.	2

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02 Transportation and Mobility

	TM 6: Achieve 30% conversion of municipal operations gasoline and e10 gasoline vehicles and equipment within municipal fleet to EV's by 2030. Achieve 100% conversion by 2040.	
TM 6- 1	Implement the La Crosse Energy Action Plan's municipal operations EV strategies.	1
TM 6- 2	Identify opportunities for electrifying, right-sizing, and improving overall efficiency of vehicles. Incorporate EV's through right-timing purchases or leases with a planned vehicle-replacement schedule.	1
TM 6- 3	Require new light-duty City fleet vehicles to be electric or use no/low carbon alternative fuels by 2030; require new medium and heavy-duty city fleet vehicle purchases to be electric, use no/low carbon alternative fuels, or meet high-efficiency standards by 2040.	1
	TM 7: Increase fuel efficiency of remaining municipal operations combustion engine fleet by 10% by 2030.	
TM 7- 1	Work with vehicle lease partners to identify fuel-efficient ICE vehicle lease options achieving a minimum 10% increase in fuel efficiency by 2030 where EVs are not available/practical.	1
	TM 8: Reduce community-wide off-road and lawn equipment annual emissions.	
TM 8- 1	Replace municipal off-road vehicles and lawn equipment with electric and low-carbon fuel alternative options. Establish emissions standards, testing, and biofuel preference for any combustion vehicles remaining in the equipment fleet. Encourage other institutions to implement their own policies.	2
TM 8- 2	Develop an incentive program to convert fuel-burning lawn equipment such as gas-powered lawn mowers and blowers to electric. Incentive should focus on increasing community equity. Work with electric utility on creation and promotion of incentives.	2

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CAP ACTIONS

Strategy / Action

Phase

03 Land Use and Housing

LH 1: Increase the number of housing units within the current city limits by 5% by 2030.

LH 1- 1	Engage underrepresented community members in identifying underused paved areas and coming up with ideas for their conversion to sustainable green space or infill development that will mitigate heat islands or address affordable housing needs.	1
LH 1- 2	Focus on increasing housing units in targeted areas within the city that most advance this plan's goals, including increased public transportation, climate resilience, etc.	1
LH 1- 3	Include land use strategies to advance mobility alternatives in City's redevelopment initiatives - wider sidewalks, bike lanes, reduced off-street parking, and transit-oriented development.	1
LH 1- 4	Conduct a Development Study to identify and prioritize available sites for redevelopment and infill development (particularly affordable housing) to advance City's walkability, bike ability, and transit utilization. Study should include a review of under utilized surface parking infrastructure capable of being redeveloped.	1
LH 1- 5	Revise community development plans to integrate mixed use development and infill development close to neighborhoods to provide walkable destinations for daily needs, i.e. "15-minute neighborhoods."	1
LH 1- 6	Promote affordable and accessible housing development along existing and planned bus routes.	1
LH 1- 7	Advocate that the State repeal its preemption against inclusionary zoning.	1
LH 1- 8	Strengthen and enforce existing development design standards that make biking, walking, and busing easier than driving.	2
LH 1- 9	Incentivize the redevelopment of brownfields, vacant land, and abandoned buildings within the City. Identify unused industrial-zoned areas and explore rezoning to increase viability of development opportunities.	2
LH 1- 10	Incentivize infill and mixed-use development which result in increased density and improved mobility through alternative code compliance, fee waivers, density bonuses, investment prioritization, development impact fees, TIF financing, etc.	2
LH 1- 11	Revise zoning codes to allow and encourage Accessory Dwelling Units (ADUs) and accessory commercial units (ACUs).	2
LH 1- 12	Reduce or eliminate residential parking minimums. Then, require real estate developers and property managers to “unbundle” parking (separate the cost to rent a parking space from the cost of renting an apartment.	2

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Phase

03 Land Use and Housing

LH 2: Increase community resilience to increased flooding and flash flooding caused by Climate Change.

LH 2- 1	Protect and restore natural systems that protect the community from flooding, including parks, wetlands, riparian areas, and natural drainage ways/swales.	1
LH 2- 2	Require and/or incentivize the use of green infrastructure such as bioswales, permeable pavement, rain gardens, rain water catchment areas, and other pervious surface strategies to reduce flood risk and minimize sediment entry into creeks from trails and roads.	1
LH 2- 3	Conserve and restore natural areas that slow or store floodwaters, including forests, floodplains, and riparian areas.	1

LH 3: Update community plans, zoning, and design standards to increase housing and community resilience to the impacts of climate change, including flooding and extreme temperatures.

LH 3- 1	Develop and use a transparent and inclusive decision-making framework designed to achieve climate, equity, safety, health and prosperity goals when making major infrastructure, transportation, land use, community development and project development plan and investment decisions. Consider existing systems, like STARS and MOSAIC, as models.	1
LH 3- 2	Prevent the development of new infrastructure not essential to marsh restoration, maintenance, or trail access within the La Crosse Marsh and other floodplain areas.	1
LH 3- 3	Establish a preparedness education program and an emergency alert system that help protect the community from flooding and extreme heat events.	2
LH 3- 4	Rezone areas of the city that are at a high risk of flooding in future climate projections. The Floodplain Zoning Ordinance is based on existing risks.	2
LH 3- 5	Enhance stormwater system plans and infrastructure to handle an increase in severe weather events based on climate change projections rather than historic trends.	2

LH 4: Update community plans, zoning, and design standards to mitigate heat island impacts, particularly for populations most vulnerable.

LH 4- 1	Based on the City's Ground Cover, Tree Canopy, Heat Island, and Carbon Sequestration Study, identify vulnerable urban tree canopy and street tree sections and develop policies to incentivize, encourage, or require strategic tree planting for heat island mitigation (e.g., around heat islands and in areas that need air conditioning such as schools or city facilities).	1
LH 4- 2	Add or modify park and boulevard plantings with a priority focus on areas with high heat island potential and those currently underserved by park and green space.	1
LH 4- 3	Decrease impervious surfaces to mitigate heat island effects, especially in neighborhoods with a high proportion of vulnerable populations.	1
LH 4- 4	Increase maintenance to sustain mature tree canopy, decrease tree hazards and delay tree replacement needs.	2
LH 4- 5	Establish a local ordinance requiring that a specific percentage of parking lot pavement is shaded by trees to reduce heat island effects and encourage tree preservation and/or planting.	2

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03 Land Use and Housing		
	LH 5: Reduce share of population living in high energy poverty from 16.4% to 11.4% by 2030.	
LH 5- 1	Develop renewable energy programs that increase on-site and community renewable energy, and create benefits for low-income community members. Example programs include the City of Dubuque Low Income Solar Renewable Energy Credit (SREC), Leech Lake Band of Ojibwe Community Solar for Community Action, and the Texas Energy Poverty Research Institute Community Solar Program Model. Goal: 10,000 MWh of clean energy delivered through programs annually by 2030.	1
LH 5- 2	Fund an income-based payment system for low- and fixed-income residents to participate in energy efficiency and weatherization program(s) at little to no cost.	2
LH 5- 3	Finance energy efficiency retrofits and renewable energy projects for all residential buildings. Establish a tiered incentive based on percent improvement to energy efficiency and income qualifications for applicants.	2

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Strategy Action

Phase

04 Buildings and Energy

BE 1: Reduce community-wide residential, commercial, educational, and industrial building energy consumption by 15% by 2030 (electricity and natural gas).

BE 1-1	Implement the La Crosse Energy Action Plan's community-wide EE strategies.	1
BE 1-2	Modify City-funded housing programs to include energy efficiency improvements and renewable energy upgrades.	1
BE 1-3	Contract with an organization to reduce the cost for low-income residents to receive professional home energy audits and recommendations for energy use reduction and monitoring. Develop a program to identify and implement measures that increase the durability, safety, and efficiency of their homes. Goal: 500 households annually, each achieving 15% energy reductions.	1
BE 1-4	Promote existing commercial and industrial energy efficiency audit and upgrade programs. Develop energy efficiency programs for businesses that don't own their own building. Use the Minnesota Chamber of Commerce's Energy Smart program as a model. Goal: 15% of commercial/industrial buildings by 2030 achieving a 20% efficiency increase per location.	1
BE 1-5	Revive/expand Mayor's Home Energy Challenge to increase weatherization projects.	1
BE 1-6	Develop an energy benchmark reporting program for large commercial and multifamily residential buildings using Energy Star Portfolio Manager; automate Water Utility and Recycling and Refuse billing for easy uploading to Portfolio Manager.	2
BE 1-7	Communicate available energy efficiency incentives to residents, focusing on low-income and minority residents.	2
BE 1-8	Inform businesses of financing opportunities for energy efficiency improvements, focusing on women- and minority-owned businesses. Information campaigns may include Focus on Energy programs, energy efficiency performance contracting, Property-Assessed Clean Energy (PACE) financing; Clean Energy Credit Unions; and Federal, State, County, Utility, and City incentive programs.	2
BE 1-9	Create loans to homeowners to finance energy and water efficiency retrofits to expand the availability of funding beyond the City's Housing Rehab Loan Program.	2
BE 1-10	Develop and adopt a rental housing energy efficiency policy by 2027 requiring multi-family housing to report energy efficiency to qualify for rental licensing. Program to include an energy efficiency rating system (ENERGY STAR or HERS).	2
BE 1-11	Expand the City's on-line "Energy Resources" to include tools and resources to support residents and businesses in identifying energy efficiency opportunities. Resources should include the DOE Home Energy Saver, EPA Home Energy Yardstick, ENERGY STAR Home Advisor, and the City's Net Zero Energy Guide.	2
BE 1-12	Adopt a performance ratings/labeling program for all homes listed for sale so that prospective buyers can make informed decisions about energy costs and carbon emissions. Rating program to require Energy Audit/Energy Efficiency Program participation.	2

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		Phase
	04 Buildings and Energy	
BE 1- 13	Create an on-line "one-stop shop" for building and development energy efficiency and renewable energy information and resources as an expansion to the City's existing "Energy Resources" web-site content. Resource should include the City's anticipated Net Zero Energy Guide and checklist, Solar Ready Guide as well as content connecting residents and businesses with resources for energy efficient products, costs, rebates, incentives, contractors, etc.	2
BE 1- 14	Capture and use waste heat from industrial/commercial processes.	3
BE 1- 15	Identify and engage in opportunities to assist with accessing funding, feasibility assessments, information/educational content or other technical resources for businesses and organizations to support and promote micro-grid, and district heating and cooling projects, especially where 'waste' energy or geothermal can be utilized.	3
	BE 2: Increase adoption of Net Zero construction community-wide to 10% of new residential and commercial construction annually by 2030 (estimated at 13 net zero homes and 8 net zero commercial buildings annually).	
BE 2- 1	Require City-financed projects and projects receiving PUD, CUP or other zoning action to be built to meet or exceed an energy efficiency standard, like Sustainable Buildings 2030 (SB2030), LEED Gold, Enterprise Green Communities, the 24 National Green Building Standard ICC/ ASHRAE 700, or an equivalent certification.	1
BE 2- 2	Launch a platform to share best practices, providing training, and promote the City's Net Zero Energy Guide and Checklist and Solar-Ready Guide, holding regular workshops with building owners, designers, and contractors on green building best practices.	1
BE 2- 3	Identify and secure support required to build homes under the City Replacement Housing Pro-gram to a Net Zero or Net Zero Ready standard. Promote projects as an example for community. Encourage Habitat for Humanity and other housing entities to meet the same standard.	2
BE 2- 4	Develop competitive Request for Proposals (RFP) for effective and innovative Net Zero pilot pro-jects. Focus on "Net zero building in every neighborhood" to establish visibility of strategies within the community. RFPs should encourage redevelopment on infill properties and existing surface parking lots along development corridors. RFP's should focus on equity, affordability, livability, and compliance/support of Climate Action Plan goals.	2
BE 2- 5	Assemble a database drawing from successful energy efficiency and renewable energy projects completed by the City and other institutions and businesses in the community. Establish a com-munication and education program to share lessons learned through these case studies to sup-port broader scale adoption.	2

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Phase

04 Buildings and Energy

BE 3: Achieve 10% residential and commercial and industrial building "fuel switching" from on-site fossil fuel combustion to electrification by 2030.

BE 3- 1	Coordinate an annual group purchase program to help reduce the costs of energy-efficient heating systems such as heat pumps. Goal: 80 households annually.	1
BE 3- 2	Educate contractors, installers, and homeowners about benefits of electrification and other on-site fossil fuel combustion reduction strategies, currently available technology such as heat pumps, and manufacturer resources for installation training and support. Collaborate with Focus on Energy to establish electrification resources website and workshops.	1
BE 3- 3	Share and promote Focus on Energy's electrification resources and information with public.	1
BE 3- 4	Promote incentives for low-income residents to electrify their homes. Goal: Target 10% residential market conversion (250 households annually) and 5% commercial/industrial market conversion (an estimated 25 commercial businesses, 10 industrial businesses annually) by 2030 (TBD).	2
BE 3- 5	Create heat pump grant to incentivize fuel switching. Incentive could be coordinated or combined with energy efficiency / weatherization incentives.	2
BE 3- 6	Collaborate with other municipalities to actively lobby and advocate for the elimination of the State's preemption of local natural gas bans.	2

BE 4: Increase renewable energy from 0.24% to 5% of community-wide residential and commercial electric use by 2030.

BE 4- 1	Implement the Energy Action Plan’s Energy Efficiency Strategies.	1
BE 4- 2	Organize annual Residential Solar Group Purchase program for La Crosse, supported by a program administrator such as MREA or others experienced in solar group purchase programs. Goal: 70 participants and 750 KW installed Annually.	1
BE 4- 3	Identify the top privately owned Solar PV sites within the City (including rooftop, ground mounted, and "carport" site potential). Effort should include the development of a Solar PV Site Assessment for identified with estimated installation costs, and projections for energy generation and economic payback over a minimum 20 year period. Assessments, along with a summary highlighting the economic potential should be provided to property owners. This strategy could be coordinated with the Commercial property and Industrial property Solarize program. "Solar Top 50" assessment effort could be repeated annually, particularly through 2025.	1
BE 4- 4	Organize an annual Commercial property and Industrial property group purchase program. Coordinate program with City's "Solar Top 50" effort. Goal: 30 participants with 3,000 KW installed annually.	1
BE 4- 5	Promote green power purchase options such as those provided by Xcel Energy's "Renewable Connect". Collaborate on promotion and education of available options. Goal: 220 additional households and 50 additional businesses signed on annually.	1
BE 4- 6	Support the development of community solar projects that benefit all residents, particularly communities of color and low-income populations. Advocate for passage of bill SB 490.	2

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	04 Buildings and Energy	
BE 4- 7	Develop and expand financing tools such as Greenbank and commercial Property Assessed Clean Energy that are broadly accessible.	2
BE 4- 8	Collaborate with La Crosse county to remove financial barriers to renewable energy projects and energy efficiency and educate property owners about the impact that renewable energy and energy efficiency projects would have on their property tax.	2
BE 4- 9	Share solar ready best practices, providing training, and promote the City's Solar-Ready Guide and Net Zero Energy Guide and Checklist, holding regular workshops with building owners, designers, and contractors on renewable energy building best practices.	2
BE 4- 10	Require on-site renewable energy for all projects receiving TIF financing. Explore establishment of a Renewable Energy TIF District specifically identifying TIF financing potential for properties receiving redevelopment which include on-site renewable energy.	2
BE 4- 11	Collaborate with other municipalities to actively lobby and advocate for improved State policies to expand solar including: - WI community solar legislation - SB490 currently tabled, back in fall - enable 3rd party power purchase agreements (PPA) and Solar Leases in WI - improved net metering policy requiring retail rate compensation for solar arrays up to 100KW, applicable to all electric utilities. - establish Community Choice Aggregation enabling legislation - establish a renewable energy portfolio carve-out requirement - improved interconnection standards - establish shared renewable energy enabling legislation like virtual net metering	2
BE 4- 12	Address time-of-use issues associated with renewable energy generation by increasing storage capacity. Support local energy storage projects to improve local grid resilience and help ensure power is available when it is needed. Help property owners address hurdles to implementation of energy storage infrastructure including collaboration to develop incentive programs and permit streamlining if determined to be a significant constraint. Explore partnerships with US Department of Energy, NREL, LNBL, SolSmart and other resources.	3
	BE 5: Increase resilience of community-wide building stock to the impacts of climate change.	
BE 5- 1	Map critical community infrastructure and operations and identify opportunities to upgrade energy systems that would enable these sites to sustain operations during periods of power grid disruption, prioritizing solar systems.	1
BE 5- 2	Create "safe haven" sites to act as hubs that provide community access to basic services during periods of power system failure, Provide solar-plus-storage energy generation at safe haven sites to power through renewable energy.	1
BE 5- 3	Collaborate with other municipalities to actively lobby and advocate for State to update building and energy codes (e.g., insulation, permeable surfaces, energy efficiency, renewable energy integration, water recycling) to better address current and future environmental conditions including extreme heat and flooding. Advocate for updated energy efficiency policy modeled after MN Energy and Conservation Act update to IECC 2021 or 90.1-2019 for minimum energy codes.	2
BE 5- 4	Incentivize adoption of building improvements and strategies that better address current and future environmental conditions including extreme heat and flooding.	2

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	04 Buildings and Energy	
BE 5- 5	Use green infrastructure and other nature-based approaches (e.g., floodplain restoration) to reduce the vulnerability of buildings to flooding, with particular focus on critical facilities (e.g., hospitals, schools, police/fire stations, etc.)	2
	BE 6: Improve total municipal building energy efficiency by 15% by 2030 (electricity and natural gas).	
BE 6- 1	Implement Energy Action Plan's municipal EE strategies.	1
BE 6- 2	Require all new and existing municipal buildings to be built to meet or exceed an energy efficiency standard, like Sustainable Buildings 2030 (SB2030), LEED Gold, Enterprise Green Communities, the 24 National Green Building Standard ICC/ASHRAE 700, or an equivalent certifications. Require new and existing municipal buildings without solar PV installations in place or planned to install cool roof or green roofing. Policy to require all new municipal construction projects to meet Solar Ready standards and use City's Net Zero Energy Guide and Checklist and Solar Ready Guide.	1
BE 6- 3	Complete conversion of all Streetlights to LED by 2027. Maximize appropriate use of motion-detection street or path lighting.	1
BE 6- 4	Establish a policy requiring energy benchmarking and reporting of all municipal buildings and sites by 2025.	1
BE 6- 5	Conduct a City Facilities Energy Audit on all buildings and sites (including outdoor lighting conversion to Dark Sky approved LED lighting). Use results from City Facilities Energy Audit to prioritize City Facilities Capital Improvement Plans (CIPS) and maintenance improvements to achieve energy efficiency goals. Establish a timeline for improvements with implementation occurring within 5 years of completion of energy audits.	1
BE 6- 6	Require all new private construction or major renovation projects over 30,000 square feet to use the City's Net Zero Energy Building Guide and Checklist to explore opportunities to advance towards Net Zero Energy as a part of the City's building permitting process (note, requirement is to use the guide and checklist illustrating evaluation of options, implementation of specific options to be voluntary). Invite County, School District, and other public agencies located within the City to participate in City's energy efficiency policy effort.	2

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Phase

04 Buildings and Energy

	BE 7: Achieve 10% municipal building thermal "fuel switching" from on-site fossil fuel combustion to electrification by 2030.	
BE 7- 1	Identify and assess City facilities to prioritize for electrification and schedule improvements in collaboration with the utility provider.	1
BE 7- 2	Require all new municipal buildings to be 100% electric (or zero onsite fossil fuel combustion by 2030.	2
	BE 8: Increase on-site renewable energy from 0.57% to 7.5% of City operations electricity consumption by 2030.	
BE 8- 1	Implement Energy Action Plan's municipal RE strategies.	1
BE 8- 2	Conduct a City Facility Solar Feasibility and Renewable Energy Master Plan study to explore the feasibility of on-site solar for all city facilities. Study should explore a range of ownership options including purchase and third party ownership (such as Power Purchase Agreements) and should include exploration of micro-grid and solar+storage options for improved facility resilience. Study should also identify strategies such as community solar subscriptions combined with Renewable Energy Credit purchases, to achieve renewable energy at sites determined to be inappropriate for on-site solar to achieve 100% renewable energy by 2030.	1

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Phase

05 Waste Management

	WM 1: Decrease total per capita municipal solid waste handled by 5% or more by 2030 (3,360 tons or more annually)**.**	
WM 1-1	Incrementally scale trash collection rates to reflect a more consistent cost per gallon across all containers.	1
WM 1-2	Make refuse and recycling a separate fee for households similar to Stormwater Utility fees and educate residents on the benefits of making this hidden cost visible.	1
WM 1-3	Communicate information on waste reduction, recycling, and organics collection options available for residents. This information should be collected from and based on content shared by regional waste collecting, recycling, composting, and reuse organizations. Models include the City of Portland's Be Cart Smart, and the City of Fayetteville's Solid Waste Diversion and Recycling Education Plan.	1
WM 1-4	Require waste reduction plans with applications to host community events at City facilities.	1
WM 1-5	Establish Zero Plastic and Zero Waste policies for municipal operations. Outline annual increases in waste reduction goals toward eliminating plastic use and waste. Advocate for similar policies at the County, School District, and other public agencies.	1
WM 1-6	Require all property owners to provide recycling and compost collection; exclude any compostable plastics containing harmful chemicals, such as PFAS.	1
WM 1-7	Coordinate a system for large item and demolition salvage pick-up with reuse and waste diversion organizations, such as the Exchange and Habitat for Humanity's ReStore.	2
WM 1-8	Promote and host "collaborative consumption" community programs, including tool libraries, repair cafes, fix it fair, and other product reuse resources.	2
	WM 2: Achieve 50% organics landfill waste diversion, including food waste reduction, by 2030 (11% of total MSW, approximately 7,400 tons).	
WM 2-1	Pilot an organics collection program at municipal facilities and worksites.	1
WM 2-2	Collaborate with compost processing facilities to expand curbside compost pickup, community drop sites, and provision of composting bins.	1
WM 2-3	Pilot an organic waste collection program for commercial property. Incentivize participation.	1
WM 2-4	Establish requirements for organics and recycling collection in commercial design standards; ensure diversion is as convenient as garbage.	1
WM 2-5	Establish requirements for organics and recycling collection in multifamily residential design standards; ensure diversion is as convenient as garbage.	2
WM 2-6	Support the establishment and growth of commercial organic waste collection services, especially among women- and minority-owned businesses.	2

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	05 Waste Management	
WM 2-7	Require retailers and restaurants to donate, reduce, reuse, or compost their unsold food. Policies may include the creation of "zero-waste sections" where products are sold close to their expiration dates, designation of "zero-waste managers" to educate staff and help manage products reaching the end of their marketable life, donation of edible unsold products, and collection of organic waste for composting.	2
WM 2-8	Require organics collection at all residential properties.	2
WM 2-9	Conduct a pilot project using anaerobic digestion or plasma gasification to generate energy from organic waste.	3
WM 2-10	Require municipally-funded construction projects to use compost as a soil amendment to improve water infiltration.	3
	WM 3: Increase recycling from 12.8% to 20% of total MSW handled by 2030 (from 8,590 tons to 12,600 tons diverted. Calculation assumes achieving strategy WM 1).	
WM 3-1	Coordinate with local recycling haulers and processors to increase processing capacity, maintain quality sortation capabilities, and provide space for additional material types to be recycled, including e-waste, mattresses, cartons and household hazardous wastes.	1
WM 3-2	Increase recycling collection to weekly instead of every other week.	1
WM 3-3	Require easily-accessible recycling and composting receptacles at all properties.	1
WM 3-4	Offer quarterly curbside bulky-items pickup; coordinate with institutions to expand university dumpster diversion.	2
WM 3-5	Develop a waste audit and diversion assistance program, helping businesses establish tracking and reporting waste streams; identify reduction, diversion, and beneficial use opportunities; and identify financing.	2
WM 3-6	Coordinate and collaborate on community cleanup and dumpster diversion events in the spring to avoid overlap, improve cross-promotion, and increase participation.	2
WM 3-7	Host community forums and outreach to citizens on repairing, reducing, reusing, and recycling materials, including available resources.	2

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05 Waste Management

WM 4: Increase diversion of reusable materials by 15% by 2030 (decreasing from 18.9% of community mixed waste to 16%).

WM 4- 1	Require that developers who receive City funds or special zoning approval adhere to a higher standard of recycling and reuse, such as LEED requirements.	1
WM 4- 2	Partner with deconstruction companies, such as Habitat's ReClaim, on City-led projects with Habitat's ReClaim Program.	1
WM 4- 3	Advocate for La Crosse County to adopt construction and demolition requirements, modeled after Dane County.	1
WM 4- 4	Include deconstruction inspection as part of the demolition requirements for residential and commercial buildings.	2
WM 4- 5	Identify and promote reuse and repair businesses, such as tailors, cobblers, electricians, wood smiths, metal smiths, etc.	2
WM 4- 6	Require the reuse of salvageable construction and demolition materials; phase the implementation starting on larger projects.	3

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06 Water and Wastewater

	W 1: Promote increased water conservation community-wide with a targeted reduction of 6.5% by 2030 (202 million gallons conserved annually by 2030)**.**	
W 1- 1	Establish progressive conservation-oriented rate structure. Include utility services and capacity support to implement income-based payment plan. Explore lawn irrigation conservation rate structures.	1
W 1- 2	Require fixtures certified as very water efficient through the EPA WaterSense program for new construction and renovation for all Municipal buildings and City-funded projects.	1
W 1- 3	Establish a program to facilitate reduction of water use by top water customers through an annual opt-in program. Partner with County, State, Federal, and regional water efficiency resources to offer free technical resources to large institutions and businesses to identify specific opportunities for employees or customers to conserve water and incorporate water efficiency into internal operations. Goal: 20 large consumer accounts achieving 10% water reduction annually.	1
W 1- 4	Evaluate opportunities for real-time water metering and smart metering to help customers better understand and reduce their water consumption.	1
W 1- 5	Promote WaterSense fixture adoption community-wide. 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.	2
W 1- 6	Conduct a Water Conservation campaign challenging participants to reduce water consumption through water use behavior change strategies, irrigation system utilization, and replacement of fixtures like shower heads with WaterSense certified fixtures.	2
W 1- 7	Reduce landscaping water use by requiring water-efficient irrigation systems, grass replacement, and planting native and drought-resistant trees and vegetation.	2
W 1- 8	Expand water conservation outreach and incentive programs for residents and businesses.	2
	W 2: Reduce wastewater generation community-wide with a targeted reduction of 5% by 2030 (180 million gallons reduced annually by 2030)**.**	
W 2- 1	Require rainwater collection systems and Water Sense water efficient fixtures and appliances at all City facility projects and all projects receiving $50,000 or more in City funding.	1
W 2- 2	Install rainwater collection systems at City facilities for grey-water uses, and reuse at existing and new City facilities and properties.	1
W 2- 3	Expand the use of grey-water systems and water conservation measures in public and private buildings.	2
W 2- 4	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).	2

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06 Water and Wastewater

W 3: Improve the resilience of the community's water, wastewater, and stormwater infrastructure to flooding, particularly in high-risk areas.

W 3- 1	Increase the use of permeable pavement and other green infrastructure (e.g., swales, rain gardens, urban tree canopies) to reduce overland flow and increase detention and infiltration that address stormwater before it enters the sewer system, and prioritize the use of these strategies in areas at higher risk of flooding.	1
W 3- 2	Identify lead pipes within City's water distribution network and establish a plan and timeline for replacement.	1
W 3- 3	Prepare a flash flood risk map to identify areas within the City that are particularly vulnerable to the impacts of flooding, including details such as tree canopy, impervious surface, heat islands, critical community infrastructure (water wells, wastewater treatment and pump houses, emergency response, power generation, fresh water supply, hospitals, etc.), and vulnerable populations. Based on risk mapping and assessments, create and implement a risk reduction and response plan. Share and promote the information developed by the flash flood risk map, particularly among vulnerable populations and neighborhoods.	1
W 3- 4	Strengthen local ordinances/regulations to better protect riparian areas, streams, and wetlands that store and filter floodwaters, and strengthen enforcement of those policies.	2
W 3- 5	Update the City's Stormwater Master Plan to incorporate projected increases in precipitation and extreme weather events and address the development/redevelopment of properties currently exempted from stormwater management requirements.	2
W 3- 6	Reduce barriers to the movement of water in and around streams and wetlands (e.g., inadequately-sized culverts) to reduce flood risks during extreme precipitation events and allow natural shifting of these systems in response to disturbances.	2

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07 Local Food and Agriculture

LF 1: Increase the production of and access to local food, particularly serving low-income and food insecure individuals.

LF 1-1	Revise local zoning ordinances to increase permitted food production activities (e.g., front yard and rooftop vegetable gardens, community gardens, urban farms, beekeeping, and poultry keeping), and communicate changes to residents.	1
LF 1-2	Establish baseline measurements and regular updates for metrics to measure progress for this strategy. Recommended metrics for measure of progress include land area used for gardening, as well as annual and total number of permits for chickens and bee hives.	1
LF 1-3	Integrate food production, such as edible landscaping food forests, and gardens, into park plans (and core values of the parks board).	1
LF 1-4	Encourage schools to replace lawns with community food gardens and food forests for example pilot projects.	1
LF 1-5	Create policies and procedures for the prioritization of climate-friendly, locally-sourced food purchased for City-sponsored meetings, events, and facilities; advocate for these policies and procedures at other organizations.	1
LF 1-6	Map potential community garden and farm sites in close proximity to minority and low-income populations.	1
LF 1-7	Advocate for EBT matching token program like Minnesota's Hunger Solutions Market Bucks program.	1
LF 1-8	Incentivize the inclusion of gardens in new development.	1
LF 1-9	Support the creation of a garden tool lending program and garden bounty exchange program.	2
LF 1-10	Provide guidance for neighbors or organizations to create temporary community gardens on vacant land.	2
LF 1-11	Enable home-based or cottage food businesses, and incentivize those owned by minorities and those that serve low-income populations and communities of color.	2
LF 1-12	Collaborate with organizations that educate on the benefits of a low-carbon diet.	2
LF 1-13	Update code to require developers to preserve topsoil.	2

LF 2: Reduce food waste and hunger, achieve a 50% reduction in food insecurity community-wide by 2030.

LF 2-1	Establish baseline measurements and regular updates for metrics to measure progress for this strategy such as quantity of food given to food shelves and quantity of food distributed from food shelves.	1
LF 2-2	Establish a communication and education campaign promoting healthy, low-carbon food choices and food waste reduction.	1
LF 2-3	Advocate for continued assistance for residents enrolling in the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) Program and other food assistance programs.	1

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07 Local Food and Agriculture		
LF 2-4	Help find a safe, clean, affordable, and visible location for the Winter Farmers Market (November -December) on Saturday mornings and close to downtown.	1
LF 2-5	Support the creation of neighborhood food-buying clubs and coops for existing organizations and vulnerable communities.	2
LF 2-6	Support training programs for residents on how to grow, process, and market local foods; focus on low-income and minority residents.	2
	LF 3: Protect and preserve agricultural land while increasing its resilience to climate shocks.	
LF 3-1	Advocate for increased use of cover crops and no-till methods to control agricultural runoff, conserve water, and prevent soil erosion and sedimentation.	1
LF 3-2	Incentivize the use of soil best management practices for urban lawns, gardens, parks, open spaces, prairies, environmentally-sensitive areas, and agricultural lands.	1
LF 3-3	Advocate for the use of regenerative agriculture systems (e.g., perennial groundcover, alley cropping, silvopasture, succession planting, rotational grazing practices) .	1
LF 3-4	Use extraterritorial jurisdiction to deny new development in areas outside the city limits with USDA prime soil.	1
LF 3-5	Advocate for the development of a carbon credit program to compensate farmers for demonstrating increases in carbon sequestration.	2
LF 3-6	Encourage mapping of existing and potential crop varieties against future climate projections such as extreme heat, drought, and flood risk to support the selection of those that are better-adapted to future conditions.	2
LF 3-7	Advocate for low-emissions crop nutrient management practices, such as precision agriculture, reduced nutrient application, manure and compost utilization, nitrogen stabilizers/inhibitors, carbon amendments, mulching, and gypsum amendments.	3

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08 Greenspace, Trees, and Ecosystems

GS 1: Increase community-wide tree cover from 30% to 32.5% by 2030 and 35% by 2040 (350 acres added by 2030, 700 acres added by 2040).

GS 1- 1	Review city ordinances and zoning, including boulevard tree requirements, to identify impediments to tree planting and for opportunities to increase tree requirements or encourage tree planting.	1
GS 1- 2	Plant shade trees around municipal buildings to reduce indoor cooling needs, and around parks, playgrounds, and other outdoor spaces to reduce outdoor temperatures.	1
GS 1- 3	Update the City's approved street tree guide and landscape design standards for new development to highlight tree species most suited for future local climate conditions.	1
GS 1- 4	Revise parking lot guidelines to require planting islands, with a mix of canopy trees, shrubs, and groundcovers appropriate to the lot and its surroundings.	1
GS 1- 5	Increase street tree planting along bicycle routes to provide comfortable, shaded travel, especially in low-income and minority neighborhoods. See the City's 2020 Ground Cover, Heat Island and Carbon Sequestration Study for priority areas. Set a percentage maximum of each City-planted tree species to improve diversity, with an emphasis on species that are well-suited to future climate conditions (may include oak, hickory, hackberry, serviceberry, American hornbeam, American sycamore, linden, black gum, and disease-resistant chestnut hybrid).	1
GS 1- 6	Identify public property that could be converted to forest instead of lawns; establish educational "Climate Action Forest Projects" by planting fast-growing, zone-appropriate, high carbon-storing trees like silver maple, swamp oak, horse chestnut, black walnut, red mulberry, etc.	1
GS 1- 7	Develop neighborhood tree goals and create guidance and training to increase community stewardship of trees (e.g., opportunities for residents to learn about and take care of their neighborhood trees).	1
GS 1- 8	Adopt a tree preservation ordinance that requires obtaining a permit for tree removal on private property (with exceptions for diseased and nuisance trees), and develop a fee structure that does not place a burden on low-income property owners.	1
GS 1- 9	Establish codes that minimize removal of soil, ground cover, native shrubs, and require planning on-site solar utilization in a manner that minimizes conflict with existing trees.	2
GS 1- 10	Create and/or update a comprehensive street tree/urban forest management plan focused on increasing canopy cover, tree species diversity, and equitable distribution of urban forest benefits as well as promoting carbon sequestration and resilience to future climate impacts.	2
GS 1- 11	Establish incentives to encourage the use of green infrastructure and greenspace by property owners, while ensuring that these policies do not conflict with efforts to increase the city's density.	2

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08 Greenspace, Trees, and Ecosystems

	GS 2: Increase pollinator supportiveness of lawns and grasslands in the community and achieve a 5% turf replacement with native grasses and wildflowers by 2030 (175 acres reduced by 2030).	
GS 2- 1	Require and/or incentivize developers to plant shade and water-absorbing trees, and replace turf landscaping with native prairie, wild flower, and savanna plantings.	1
GS 2- 2	Promote “Carbon Gardening” and "landscaping for absorption" practices among residents for lawns, ornamental gardens, and produce gardens. Strategies include native moisture tolerant perennial plantings and shrubs, elimination of synthetic fertilizer and pesticide use, high mow deck settings, use of biochar amendments, and polyculture lawn mixture.	1
GS 2- 3	Require integrated pest management practices and non-petrochemical fertilizer use on City-owned land.	1
GS 2- 4	Educate community on integrated pest management practices and non-petrochemical fertilizer use.	1
GS 2- 5	Establish ‘demonstration yards’ on City-owned property to exhibit strategies for pollinator-friendly landscaping, native plantings, and permaculture.	1
GS 2- 6	Set a percentage maximum of each City-planted tree species to improve diversity, with an emphasis on species that are well-suited to future climate conditions (may include oak, hickory, hackberry, serviceberry, American hornbeam, American sycamore, linden, black gum, and disease -resistant chestnut hybrid).	1
GS 2- 7	Conduct a park and city facility turf analysis and conversion study to identify lesser maintenance turf and ground cover types, to determine Native Plant and Pollinator Restoration Opportunities, and to establish a conversion master plan and turf replacement implementation schedule.	1
GS 2- 8	Commit to sustained participation in the Mayors Monarch Pledge to support pollinators, promote native plant landscaping, and discourage the use of pesticides.	1
GS 2- 9	Provide or promote workshops on the roles that gardening, landscaping, and composting have in mitigating and adapting to the stresses of climate change.	2
GS 2- 10	Incentivize the conversion of traditional lawns and non-native landscaping into pollinator friendly food gardens, permaculture, wildflowers, or native grasses to support endangered native pollinators.	2
	GS 3: Reduce community-wide “dark” impervious surface coverage from 26.4% to 8% by 2030 and 5% by 2040 (280 acres reduced by 2030, 700 acres reduced by 2040).	
GS 3- 1	Require all commercial development projects receiving City-funding, PUD approval, and/or Conditional Use Permitting to implement heat island mitigation strategies including cool surfaces, solar-friendly landscape shading strategies, impervious surface reduction, and breeze capture.	1
GS 3- 2	Promote and require urban design and redevelopment approaches that incorporate natural systems and green infrastructure into site improvements, rights of way, green corridors and other infrastructure facilities.	1

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	08 Greenspace, Trees, and Ecosystems	
GS 3- 3	Create a demonstration green roof, green/live wall, and/or vertical garden project, and include these categories in projects that qualify for stormwater fee credit.	1
GS 3- 4	Reduce concrete on parklands (encourage construction of water permeable park lots and walkways), and encourage the most sustainable surface material.	1
GS 3- 5	Expand and connect green spaces so they are welcoming and within walking distance of all residents, especially in underserved communities where there is a high proportion of impervious surfaces.	2
GS 3- 6	Incentivize/award projects that reduce heat islands, prioritizing areas with the highest heat island coefficients as identified in the City's 2021 Ground Cover, Tree Canopy, and Carbon Sequestration Study. Incentives might include below-market loans, product rebates, grants, and giveaways. Awards can reward exemplary work, highlight innovation, and promote solutions across the public and private sectors.	2
	GS 4: Increase climate resilience of community's parks and open spaces.	
GS 4- 1	Incorporate consideration of climate change impacts into forest management plans and practices to increase climate resilience, retain biodiversity, and ensure continued ecosystem function and services.	1
GS 4- 2	Map and protect natural areas throughout the City through improved public lands management/ ownership and promotion of conservation easements and private open spaces, with an emphasis on conservation of areas that provide ecosystem services such as wetlands and late-successional forests.	1
GS 4- 3	Use education programs and incentives to promote the use of native plants and trees on public and private property.	1
GS 4- 4	Develop a list of harmful invasive plants (i.e., those known to reduce biodiversity or alter ecosystem processes) commonly used in landscaping and provide native alternatives to each non-native species. Publicize the list widely and encourage plant nurseries and landscapers to provide the native alternatives.	1
GS 4- 5	Identify multiple biological indicators of climate change sensitivity and response to monitor high-risk assets for intervention as well as to measure ongoing improvements in resilience.	2
GS 4- 6	Protect and connect floodplains and other habitats that support high biodiversity, including birds and wildlife species needing to alter their range.	2
GS 4- 7	Conduct scenario planning exercises focused on land management under novel future conditions to ensure that management decisions reflect the full range of potential impacts and are based on the best available science.	2

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09 Health and Safety

HS 1: Assist the community's vulnerable population in preparing for and mitigating local climate change impacts.

HS 1- 1	Advocate for the inclusion of a climate preparedness element in public health programs aimed at vulnerable populations.	1
HS 1- 2	Advocate for increased funding to meet greater demand for public health services for at-risk populations.	1
HS 1- 3	Deploy point-in-time alert systems (e.g., Rave Alert, Nixle) to notify people of extreme weather events, periods of dangerous heat/cold, poor air or water quality, and other public health concerns, and refer them to resources on symptoms and prevention of climate-related illness.	1
HS 1- 4	Incorporate climate change and CAP goals into the Community Health Improvement Plan and Health Impact Assessments.	1
HS 1- 5	Include climate change's health impacts and risks in Health Impact Assessments and annual reporting.	1
HS 1- 6	Ensure there are specific procedures in emergency response and recovery plans that address citizens most vulnerable to weather-related emergencies. These citizens may include those who require mobility assistance; are disproportionately affected by extended power outages, flooding, etc.; and are non-English speakers and readers.	1
HS 1- 7	Create an Emergency Response Toolkit offering tips and suggestions for residents to increase their emergency preparedness, and make it widely available to City residents.	1
HS 1- 8	Develop a City-based program to support individuals and families who cannot afford to purchase supplies for household emergency preparedness kits.	1
HS 1- 9	Collaborate with community residents to co-create educational materials and activities that increase awareness of climate change impacts and emphasize the need for household and neighborhood preparation.	1
HS 1- 10	Educate citizens about the hazards of air pollution (including indoor air quality) and steps to take to reduce exposure to those hazards.	1
HS 1- 11	Assist residents in signing up for state utility and heating bill assistance programs and home weatherization programs.	1
HS 1- 12	Adapt public facilities and develop new ones to serve as resiliency hubs (community centers that can provide resources before, during, and after climate disasters and emergencies) following guidance from the Urban Sustainability Directors Network (USDN).	2
HS 1- 13	Conduct targeted outreach to ensure that vulnerable populations are signed up for alert systems that notify them of dangerous conditions and where/how to seek shelter or other resources.	2
HS 1- 14	Aid populations vulnerable to financial strain caused by climate hazards (e.g., low-income populations, communities of color, older adults and people with disabilities), including helping with and reducing utility costs.	2
HS 1- 15	Organize a Mobility as a Service program to ensure equitable access to necessities and services for vulnerable populations and those without sufficient access to transportation.	2

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		Phase
	09 Health and Safety	
HS 1- 16	Incentivize building owners to increase the resilience of existing and new buildings, such as elevating HVAC and electrical equipment off basement floor, installing backflow preventers, maintaining shade trees, installing permeable pavement, conserving energy, generating renewable energy onsite, and building safe rooms. Ensure that incentive programs prioritize multi-family dwellings and improvements that benefit vulnerable populations.	2
HS 1- 17	Incentivize the use of strategies that improve air quality by reducing commercial emissions, particulate matter emissions, or other harmful pollutants. Within this incentive program, prioritize neighborhoods or census blocks with high percent of low-income and minority populations.	2
HS 1- 18	Nurture community-lead initiatives for equitable climate action that reduce resident's carbon footprint and increase climate resilience, such as transportation without cars (biking, walking, transit), tree planting, and climate friendly yards.	2
HS 1- 19	Establish cooling centers in air-conditioned public facilities (e.g., senior centers, libraries), with an emphasis on locations that maximize accessibility by vulnerable populations (i.e., those with limited mobility or lack of access to private vehicles).	2
HS 1- 20	Ensure that vulnerable residents are aware of and able to access the City's cooling centers during periods of extreme heat.	2
	HS 2: Ensure that the City's mission critical, emergency services and health care facilities are prepared for impacts of climate change.	
HS 2- 1	Create a map of key infrastructure that is vulnerable to climate change.	1
HS 2- 2	Plan and establish alternative / on-site power supply with capacity to operate during grid failure.	2
HS 2- 3	Ensure that facilities that serve vulnerable populations (e.g., senior centers, libraries, hospitals and clinics) are resilient to climate hazards and have established best practices for responding to emergencies such as flooding, power outages, and extreme heat.	2
	HS 3: Improve community adaptation capacity through strengthened social support networks.	
HS 3- 1	Support existing community networks and connections led by and/or geared towards populations vulnerable to extreme weather events, including people who are elderly, homebound, disabled, isolated, or those likely to need financial assistance.	1
HS 3- 2	Make grants available to community organizations for assistance reaching, communicating with, and supporting vulnerable community members - particularly in association with extreme weather events.	1
HS 3- 3	Advocate for including climate change mitigation and adaptation in science curricula in grade schools.	1
HS 3- 4	Support the creation of call trees and block networks to check on neighbors during/after extreme weather events, particularly when they involve grid disruption.	2
HS 3- 5	Collaborate to form and maintain a public health and climate change working group, with a focus on networks for community support, adaptation, and education.	2
HS 3- 6	Enhance the coordination between local natural resource agencies and vector control programs to ensure populations of mosquitos, ticks, rodents, and other potential disease vectors are managed in a way that protects human health and ensures ecological integrity and vitality.	2

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Strategy Action	CAP ACTIONS	Phase
	10 Economy	
	E 1: Capture local economic potential of climate action.	
E 1- 1	Identify economic benefits derived from the implementation of the CAP, especially those which can provide opportunity for the city's vulnerable populations.	1
E 1- 2	Work with the UW-L Small Business Development Center (SBDC) on the creation of a business incubator for increasing climate mitigation and adaptation.	1
E 1- 3	Prioritize local businesses when contracting for City-financed energy efficiency and renewable energy projects, with special consideration given to businesses owned by women and minorities.	1
E 1- 4	Collaborate with local and regional governments and universities to establish incentives, policies (purchasing, facility standards, etc.) and regulation to promote local research, development, and production of green technology and products.	2
E 1- 5	Collaborate with large institutions on purchasing policies and facility performance standards that will stimulate local research, development, and production of green technology and products.	2
	E 2: Support the development of the community's workforce to be well-positioned to pivot towards the shifting needs and new opportunities of the Climate Economy.	
E 2- 1	Develop workforce training capacity to assess, train, and place laborers that can take on energy efficiency and renewable energy projects.	1
E 2- 2	Collaborate with local educational institutions to create and implement a curriculum for green skills—the knowledge, abilities, values, and attitudes needed to live in, develop, and support a sustainable and resource-efficient society.	1
E 2- 3	Provide job skills training, focused on low-income individuals, for alternatives to traditional building demolition such as relocation, deconstruction, and salvage.	1
E 2- 4	Provide job skills training, focused on low-income individuals, supporting increased local agriculture to grow, harvest, market and prepare local, climate-friendly food.	1
E 2- 5	Establish a Green Jobs apprenticeship and internship program. Promote and subsidize internship placement with local employers.	2
E 2- 6	Work with local partners to develop a community green jobs electronic bulletin board promoting local green job opportunities.	2
	E 3: Support/incentivize local businesses and agricultural operations in building marketplace climate resilience.	
E 3- 1	Explore the development of "Green Zones" (a place-based policy initiative aimed at improving health and supporting economic development using environmentally-conscious efforts in communities that face the cumulative effects of environmental pollution, as well as social, political, and economic vulnerability).	1
E 3- 2	Integrate climate change-related risks to local supply chains in development and implementation of the City's economic and business development strategies.	1
E 3- 3	Create a "buy local/buy green" campaign to enhance resilience of small local businesses, particularly those with products, services, and operational policies in line with the goals of this CAP.	1

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CAP ACTIONS

Strategy	Action		Phase
10 Economy			
E 3- 4	Ensure redundancy in telecommunications and broadband networks to protect commerce and public safety in the event of natural or manmade disasters.		1
E 3- 5	Assist industry-specific organizations in identifying economic impacts they face due to climate change and developing economic resilience and funding strategies.		2
E 3- 6	Work with distribution, retail establishments, and other large refrigeration users in La Crosse to voluntarily phase out refrigerants with high ozone depletion and global warming potential in advance of US EPA phaseout. Explore rebates for improving refrigeration efficiency.		2
	E 4: Establish sustainable financing for the City's climate action implementation.		
E 4- 1	Establish a Climate Action Fund for the reinvestment of local funds into local projects that reduce GHG missions.		1
E 4- 2	Advocate for municipalities to be able to dedicate all, or a portion, of their Utility Franchise Fees to special use funds for relevant climate action plan implementation.		1
E 4- 3	Establish a policy that accounts for all energy efficiency, fuel efficiency, and renewable energy operational cost savings of City buildings and fleets. All savings achieved outside of a performance contract to be invested into a Climate Action Fund as one source of financing for the City's climate action efforts.		1
E 4- 4	Collaborate with other municipalities to actively lobby and advocate State for climate action related funding, including support of new state multimodal transportation funding and statewide carbon tax or carbon cap generating new decarbonization funding sources.		2
E 4- 5	Develop private, public, and microfinancing loans for renewable energy and energy efficiency improvements.		2
E 4- 6	Develop a Carbon Impact Fee that would generate funds to be used for climate mitigation and adaptation implementation.		2
	E 5: Prepare for climate change immigration/migration.		
E 5- 1	Identify affordable housing needs anticipating potential climate immigration and migration. Prioritize transit-oriented development; increased energy efficiency, renewable energy, and electrification strategies; and integration of climate adaptation, ground cover, and tree canopy considerations.		1
E 5- 2	Identify potential sustainable economic and community development opportunities for and with climate immigrants/migrants. Establish a proactive communication and marketing campaign.		2
E 5- 3	Develop strategies for keeping the cost of living low in the face of possible increased demand due to change migration.		2

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APPENDIX A

Supporting Research

Climate Action Baseline Study

To support the City of La Crosse Climate Action Plan planning team members, the paleBLUEdot team assembled the Climate Action Baseline Study. This document provided a review of a wide range of community wide metrics, data, and comparisons against regional peer communities for each of the climate action plan sectors included in this report. The document also included preliminary sector specific draft strategic goal recommendations for the Climate Action Plan planning team to consider, discuss, and revise at the beginning of the planning team effort.

Click on the link below to access the document:
https://view.publitas.com/palebluedot/la-crosse-climate-baseline-and-recommendations-report/

Climate Vulnerability Assessment

At the beginning of the Climate Action Planning effort, the paleBLUEdot team, lead by EcoAdapt, developed a Climate Vulnerability Assessment for the City of La Crosse. The assessment included the identification of vulnerable populations within the community and possible impacts and risks associated with projected climate change for the region. paleBLUEdot mapped the vulnerable populations within the City as well as existing City infrastructure and resources which may be capable of supporting climate adaptation strategies. These assessments provided a basis for understanding vulnerabilities and resources which supported the decision making process needed for identifying and prioritizing climate adaptation measures to be included in the final Climate Action Plan. The Assessment focused on City-Wide vulnerabilities with a particular focus on climate vulnerable populations to ensure all populations benefit from proposed implementation measures.

Click on the link below to access the document:
https://view.publitas.com/palebluedot/city-of-la-crosse-climate-change-vulnerability-assessment/

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Community Wide GHG Inventory

The paleBLUEdot team compiled a Community Greenhouse Gas Inventory. The assessment included collection of raw data and calculation of greenhouse gas emissions for each of the primary emissions sectors included in this Climate Action Plan. The inventory included both community-wide emissions as well as municipal operations. The report included community-wide emissions comparisons against communities within the State and region.

Click on the link below to access the document:
https://view.publitas.com/palebluedot/la-crosse-community-ghg-inventory-2020/

Community Wide Ground Cover, Tree Canopy and Carbon Sequestration Study

paleBLUEdot conducted a baseline assessment of City-Wide ground cover and tree canopy extent. This baseline expanded on information available through the City's owned and boulevard tree survey and covered City-wide conditions. The study identified ground cover conditions (grass, water, wetland, tree canopy) City-wide as well as by neighborhood/census tract. Based on the groundcover data, calculations were made for annual carbon sequestration rates, carbon stock, tree canopy/green space economic value, and pollution absorption rates (CO, O3, NO2, SO2, particulate pollution).

Included in this assessment was an assessment of City-Wide heat island characteristics and conditions. The study identified impervious surface conditions and coverage (sidewalks, roadway, parking, and building) and compiled data in subcategories of light reflective and light absorbent conditions. Baseline calculations were made for overall heat island contribution coefficient by neighborhood (expressed as summer night time degrees F above natural conditions, calculations based on research and formulas compiled by the University of Minnesota and Minnesota State University).

Click on the link below to access the document:
https://view.publitas.com/palebluedot/la-crosse-ground-cover-survey-and-sequestration-study/

Community Wide Renewable Energy Potentials Study

In support of development of effective renewable energy goalsetting and to establish strategies addressing renewable energy development, paleBLUEdot conducted a Community-Wide solar pv potentials study including economic and environmental benefits. This effort included:

1) Collect Village-wide satellite data (NREL, NOAA, and NASA data).
2) Determine building roof stock characteristics and solar suitable buildings, calculate total suitable areas by roof configuration/orientation.
3) Calculate total rooftop solar capacity and annual energy generation by roof configuration/orientation.
4) Identify cost efficient annual energy generation potential.
5) Research solar market at national, State and regional levels. Identify low, medium, and high solar market absorption rates and Village-wide solar pv goals.
6) Identify environmental and economic benefit of solar including economic development and job creation potential. (NREL JEDI model)
7) Develop City-Wide Renewable Solar Energy Potentials report.

Click on the link below to access the document:
https://view.publitas.com/palebluedot/la-crosse-renewable-potentials-study/

APPENDIX **B**

La Crosse Climate Infographics

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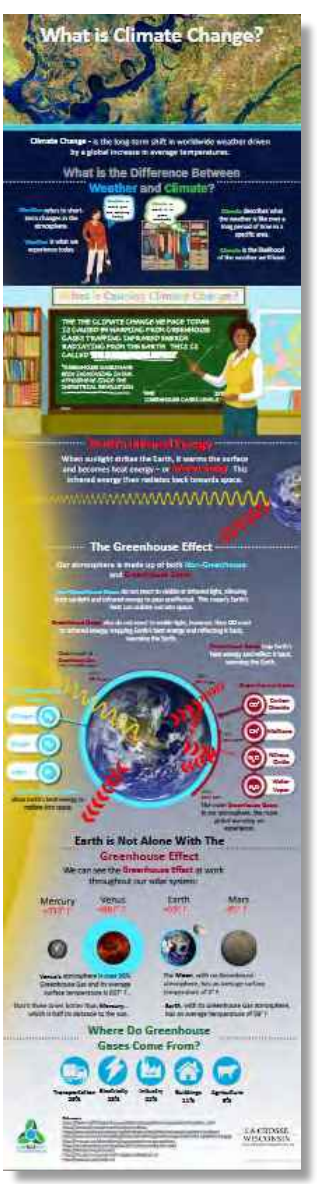
Below are infographics developed during the Climate Action Plan planning effort in support of the City's communications.

Click on the link below to access the infographics:
https://palebluedot.llc/la-crosse-climate-infographics



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APPENDIX C

Cumulative Potential Cost Savings Assumptions

The following document the calculations and source references used for estimating the potential cumulative community-wide cost savings of the actions included in the Climate Action Plan

Summary of Estimated Cumulative Savings of Modeled Reductions

City of La Crosse

Notes

Transportation

VMT Reductions (public transit, bike, walk, etc)

Formula:

Cumulative vehicle miles saved x Average vehicle operation cost per mile = Gross VMT savings

	VMT saved (year 10)	44,801,110
	Cumulative vehicle miles saved:	246,406,107
1	Average vehicle operating cost per mile:	$0.688
	Gross VMT savings	**$169,527,402**

1 Savings per VMT based on AAA estimates https://exchange.aaa.com/automotive/driving-costs/#.YGUQZD9OlPY , https://www.slashgear.com/aaa-says-it-costs-about-74-cents-per-mile-to-drive-23496316/ https://www.thesimpledollar.com/save-money/is-it-really-cheaper-to-ride-the-bus/

Increased Public Transit Use (commuter)

Formula:

Cumulative increased public transit mileage x Average public transit cost per mile (commuter) = Increased spending on public transit

	Increased public transit miles (year 10)	8,475,886
	Cumulative increased public transit miles:	46,617,380
2	Average public transit cost per mile	$0.127
	Increased spending on public transit	**$5,933,121**

2 Cost per commuter public transit mile calculated using cost of monthly transit pass divided by average monthly commuter miles. https://www.census.gov/programs-surveys/sis/resources/data-tools/quickfacts.html https://www.transitchicago.com/passes/

EV and Alt Fuel Conversions

Formula:

Cumulative VMT converted to EV/alt fuel x Average vehicle operation cost savings per mile = Gross EV VMT savings - Gross EV purchase spending difference = Net EV VMT Savings

	VMT converted to EV/Alt fuel (year 10)	123,999,112
	Cumulative VMT converted to EV/alt fuel	681,995,115
3	Average fuel savings per mile:	$0.138
4	Average vehicle maintenance savings per mile:	$0.040
	Gross EV VMT savings	$121,552,445
5	Spending difference per vehicle on EV purchase vs ICE purchase (anuali	-$1,120.600
	New electric vehicle purchases	1,303
	Gross EV purchase spending difference	-$8,030,881
	Net EV VMT savings	**$113,521,564**

3 Fuel Savings per VMT based on average reported gasoline costs (https://gasprices.aaa.com/state-gas-price-averages/) divided by current average MPG (Federal Highway Administration: https://www.fhwa.dot.gov/policyinformation/quickfinddata/qftravel.cfm) compared against average fuel cost per mile using current kWh rate (https://www.electricitylocal.com/) and average kWh/100 mile data (https://www.fueleconomy.gov/feg/PowerSearch.do?action=noform&path=1&year1=2017&year2=2019&vtype=Electric)

4 Maintenance savings per mile based on US Department of Energy FOTW #1190, June 14, 2021: Battery-Electric Vehicles Have Lower Scheduled Maintenance Costs than Other Light-Duty Vehicles: https://www.energy.gov/eere/vehicles/articles/fotw-1190-june-14-2021-battery-electric-vehicles-have-lower-scheduled

5 Average EV purchase price increse per vehicle on Kelly Blue Book average EV purchase price compared to average gasoline vehicle purchase price (https://mediaroom.kbb.com/2021-05-18-Average-New-Vehicle-Prices-Continue-to-Climb,-up-2-2-Year-Over-Year-for-April-2021,-According-to-Kelley-Blue-Book) divided by assumed average lifespan of 10 years

Potential Total Cumulative Transportation Cost Savings

Formula:

Transportation sector savings - Transportation sector cost increases = Potentail Total Cumulative Transportation Cost Savigns

Transportation Sector Savings

Gross VMT savings	$169,527,402
Gross EV VMT savings	$121,552,445
Total Gross Transportation Savings	$291,079,847

Transportation Sector Cost Increases

Increased spending on public transit	-$5,933,121
Gross EV purchase spending difference	-$8,030,881
Total Gross Transportation Cost Increases	-$13,964,002

Potentail Total Cumulative Transportation Cost Savings **$277,115,846**

Summary of Estimated Cumulative Savings of Modeled Reductions

City of La Crosse

Notes

Energy - Residential

Residential Savings - grid electricity to solar

Formula:

Cumulative kWh converted to solar x Average cost savings per kWh = Residential solar savings

	Residential kWh converted (year 10)	9,307,142
	Cumulative residential kWh converted	51,189,279
	Average solar cost savings per solar kWh	$0.057
6a	Average solar installation cost per KW	$2,740.00
7	Average kWh produced annually per solar pv KW installed	1,287
	Estimated installed solar PV KW installed (year 10)	7,232
	Estimated total solar installation costs	$19,814,738.213
8	Est average lifespan kWh produced per solar pv KW installed	38,429
8	Estimated cumulative lifespan kWh produced	277,905,432
9	Estimated value of cumulative lifespan kWh produced	$38,890,241.655
	Average solar cost savings per kWh produced	$0.069
	Residential solar savings	**$2,938,265**

6 Recent average cost per KW is 1000x the per watt cost reported by Solar Reviews https://www.solarreviews.com/solar-panel-cost/minnesota

7 Calculations are based on the geographic energy production factor (https://www.nrel.gov/docs/fy04osti/35297.pdf) multiplied by an average performance ratio of 78% (https://www.nrel.gov/docs/fy13osti/57991.pdf)

8 Based on an assumed average useful life of 32.5 years according to NREL research (https://www.nrel.gov/analysis/tech-footprint.html) with an average degradation rate of 5% (https://www.nrel.gov/state-local-tribal/blog/posts/stat-faqs-part2-lifetime-of-pv-panels.html)

9 Svings per kWh based on average electricity cost per kWh (https://www.electricitylocal.com/) calculated to year 10 using an average electrical cost inflation of 2% annually

Residential Savings - electrical energy efficiency

Formula:

Cumulative kWh saved from energy efficiency x Average cost per kWh = Gross Residential electrical energy efficiency savings - Residential Efficiency Upgrade Costs = Net Residential Electrical Energy Efficiency Savings

	Residential kWh saved (year 10)	35,195,073
	Cumulative residential kWh saved	193,572,904
11	Average cost per kWh	$0.115
	Gross Residential electrical energy efficiency savings	$22,222,169
12	Residential Electrical Efficiency Upgrade Costs	$19,555,509
	Net Residential Electrical Energy Efficiency Savings	**$2,666,660**

11 Energy efficiency savings per kWh saved based on average electricity cost per kWh: https://www.electricitylocal.com/

12 Assumed energy efficiency upgrade costs are calculated assuming an average ROI of12% (https://www.aceee.org/blog/2019/05/existing-homes-energy-efficiency)

Residential Savings - natural gas energy efficiency

Formula:

Cumulative therms saved from energy efficiency x Average cost per therm = Gross Residential natural gas energy efficiency savings - Residential Natural Gas Efficiency Upgrade Costs = Net Residential Electrical Natural Gas Efficiency Savings

13	Residential therms saved (year 10)	2,534,128
13	Cumulative residential therms saved	13,937,705
14	Average cost per therm	$1.149
	Gross Residential natural gas energy efficiency savings	$16,014,423
13,15	Residential Natural Gas Efficiency Upgrade Costs	$14,092,692
	Net Residential Electrical Natrual Gas Efficiency Savings	**$1,921,731**

13 Includes fuel switching from fossil fuel heat to electric

14 Energy efficiency savings for natural gas is based on average natural gas cost per therm https://naturalgaslocal.com/

15 Assumed energy efficiency upgrade costs are calculated assuming an average ROI of12% (https://www.aceee.org/blog/2019/05/existing-homes-energy-efficiency)

Potential Total Cumulative Residential Energy Cost Savings

Formula:

Residential solar savings + Residential community solar savings + Residential electrical efficiency savings + Residential natural gas energy efficiency savings - Residential increased electrical costs = Potential Total Cumulative Residential Energy Savings

Residential solar savings	$2,938,265
Residential community solar savings	$0
Residential electrical efficiency savings (net)	$2,666,660
Residential natural gas energy efficiency savings (net)	$1,921,731
Potentail Total Cumulative Residential Energy Savings	**$7,526,656**

Summary of Estimated Cumulative Savings of Modeled Reductions

City of La Crosse

Notes

Energy - Commercial

Commercial Savings - grid electricity to solar

Formula:

Cumulative kWh converted to solar x Average cost savings per kWh = Commercial solar savings

	Commercial kWh converted (year 10)	58,697,983
	Cumulative residential kWh converted	322,838,904
	Average solar cost savings per kWh	$0.026
6b	Average solar installation cost per KW	$1,720.00
7	Average kWh produced annually per solar pv KW installed	1,287
	Estimated installed solar PV KW installed (year 10)	45,608
	Estimated total solar installation costs	$78,446,410.192
8	Estimated average lifespan kWh produced per solar pv KW installed	38,429
8	Estimated cumulative lifespan kWh produced	1,752,685,072
9	Estimated value of cumulative lifespan kWh produced	$186,517,613.027
	Average solar cost savings per kWh produced	$0.062
	Commercial solar savings	**$8,455,151**

6b Recent average cost per KW is 1000x the per watt cost reported for commercial solar arrays by NREL https://www.nrel.gov/docs/fy21osti/77324.pdf

7 Calculations are based on the geographic energy production factor (https://www.nrel.gov/docs/fy04osti/35297.pdf) multiplied by an average performance ratio of 78% (https://www.nrel.gov/docs/fy13osti/57991.pdf)

8 Based on an assumed average useful life of 32.5 years according to NREL research (https://www.nrel.gov/analysis/tech-footprint.html) with an average degradation rate of 5% (https://www.nrel.gov/state-local-tribal/blog/posts/stat-faqs-part2-lifetime-of-pv-panels.html)

9 Svings per kWh based on average electricity cost per kWh (https://www.electricitylocal.com/) calculated to year 10 using an average electrical cost inflation of 2% annually

Commercial Savings - electrical energy efficiency

Formula:

Cumulative kWh saved from energy efficiency x Average cost per kWh = Gross Commercial electrical energy efficiency savings - Commercial Efficiency Upgrade Costs = Net Commercial Electrical Energy Efficiency Savings

	Commercial kWh saved (year 10)	224,264,721
	Cumulative commercial kWh saved	1,233,455,967
4	Average cost per kWh	$0.087
	Gross Commercial electrical energy efficiency savings	**$107,680,706**
8	Commercial Electrical Efficiency Upgrade Costs	$94,759,021
	Net Commercial Electrical Energy Efficiency Savings	**$12,921,685**

4 Energy efficiency savings per kWh saved based on average electricity cost per kWh: https://www.electricitylocal.com/

8 Assumed energy efficiency upgrade costs are calculated assuming an average ROI of12% (https://www.aceee.org/blog/2019/05/existing-homes-energy-efficiency)

Commercial Savings - natural gas energy efficiency

Formula:

Cumulative therms saved from energy efficiency x Average cost per therm = Gross Commercial natural gas energy efficiency savings - Commercial Natural Gas Efficiency Upgrade Costs = Net Commercial Electrical Natural Gas Efficiency Savings

	Commercial therms saved (year 10)	9,518,999
	Cumulative commercial therms saved	52,354,497
9	Average cost per therm	$0.663
	Gross Commercial natrual gas energy efficiency savings	**$34,711,032**
8	Commercial Natural Gas Efficiency Upgrade Costs	$30,545,708
	Net Commercial Natural Gas Energy Efficiency Savings	**$4,165,324**

9 Energy efficiency savings for natural gas is based on average natural gas cost per therm https://naturalgaslocal.com/

8 Assumed energy efficiency upgrade costs are calculated assuming an average ROI of12% (https://www.aceee.org/blog/2019/05/existing-homes-energy-efficiency)

Potential Total Cumulative Commercial Energy Cost Savings

Formula:

Commercial solar savings + Commercial community solar savings + Commercial electrical efficiency savings + Commercial natural gas energy efficiency savings - Commercial increased electrical costs = Potentail Total Cumulative Commercial Energy Savings

Commercial solar savings	$8,455,151
Commercial community solar savings	$0
Commercial electrical efficiency savings	$12,921,685
Commercial natural gas energy efficiency savings	$4,165,324
Potentail Total Cumulative Commercial Energy Savings	**$25,542,159**

Potential Total Cumulative Energy Cost Savings (Residential + Commercial)

Formula:

Energy sector savings - Energy sector cost increases = Potentail Total Cumulative Energy Cost Savigns

Energy Sector Savings	
Total solar energy savings	$11,393,416
Total community solar energy savings	$0

Total energy efficiency savings - electricity		$129,902,875
Total energy efficiency savings - natrual gas		$50,725,454
	Total Gross Energy Savings	$192,021,745

Energy Sector Cost Increases	
Total solar PV installation costs	(included in estimated Total Solar Energy Savings)
Total energy efficiency upgrade costs - electricity	-$114,314,530
Total energy efficiency upgrade costs - natrual gas	-$44,638,400
Total Gross Energy Cost Increases	-$158,952,930

Potentail Total Cumulative Energy Cost Savings	**$33,068,815**

Summary of Estimated Cumulative Savings of Modeled Reductions

City of La Crosse

Notes

Solid Waste - Residential

Residential savings - Food Waste Reduction

Formula:

Cumulative tons of food waste reduced and diverted x Average cost savings per ton = Residential food waste savings	
Residential food waste reduced (year 10)	773
Cumulative residential food waste reduced	4,252
11 Average cost savings per ton reduced	$2,469
Residential food waste savings	**$10,499,340**

11 Value per ton of residential food waste avoided is based on average for Prevent and Recover strategies by ReFED "A ROADMAP TO REDUCE U.S. FOOD

Potential Total Cumulative Residential Solid Waste Reduction Cost Savings

Residential food waste savings	**$10,499,340**

Notes

Solid Waste - Commercial

Commercial savings - Solid Waste Reduction

Formula:

Cumulative participant/years x Average reported cost savings per participant/year = Commercial solid waste savings	
Participating businesses (year 10)	120
Cumulative participant/years	660
12 Average cost savings per participant/year	$475
Commercial solid waste savings	**$313,500**

12 Savings per business engaged in waste reduction programs are based on MN WasteWise reported average business savings ($431) escallated to 5

Commercial savings - Food Waste Reduction

Formula:

Cumulative tons of food waste reduced and diverted x Average cost savings per ton = Commercial food waste savings	
Commercial food waste reduced (year 10)	945
Cumulative residential food waste reduced	5,197
13 Average cost savings per ton reduced	$494
Commercial food waste savings	**$2,566,505**

813waste/ .

Potential Total Cumulative Solid Waste Savings

Formula:

Residential Food Waste Savings + Commercial Solid Waste Savings + Commercial Food Waste Savings = Potentail Total Cumulative Solid Waste Savings

Residential Food Waste Savings	$10,499,340
Commercial Solid Waste Savings	$313,500
Commercial Food Waste Savings	$2,566,505
Potentail Total Cumulative Solid Waste Savings	**$13,379,345**

APPENDIX D

Abbreviations and Glossary of Terms

The following is a glossary of climate action, resilience, and sustainability terms used in this Climate Action Plan

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Abbreviations

BAU	Business as usual
BEV	Battery electric vehicle
BIPOC	Black, Indigenous, People of Color
C&D	Construction and demolition
CAP	Climate Action Plan
CE	Carbon Equivalent
CDP	Carbon Disclosure Project
CFC	Chlorofluorocarbons
CH_4	Methane
CHP	Combined Heat and Power
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CSG	Community Solar Garden
DOE	U.S. Department of Energy
EMS	Emergency medical services
EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
EVSE	Electric vehicle supply equipment
FEMA	Federal Emergency Management Agency
FTE	Full-time equivalent
GCoM	Global Covenant of Mayors
GDP	Gross Domestic Product
GHG	Greenhouse gas
GWP	Global warming potential
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt-hour
LEV	Low emission vehicle
MWH	Megawatt hour – 1,000 Kilowatt-hours
MSW	Municipal Solid Waste
MT	Metric ton equivalent to 1,000 kg (also known as Metric Tonne)
MMT	Million Metric tons
MTCO2e	Metric tons of carbon dioxide equivalent
N_2O	Nitrous Oxide
NO_x	Nitrogen Oxides
NZE	Net-Zero Emissions
O_3	Ozone
ODS	Ozone Depleting Substances
PACE	Property Assessed Clean Energy
PFC	Perfluorocarbons
PHEV	Plug-in hybrid electric vehicle
PM2.5	Particulate matter of 2.5 micrometer diameter or less
POC	People of Color
PPA	Power Purchase Agreement
PUB	Public Utilities Board
REC	Renewable Energy Credit
SO_2	Sulfur Dioxide
SF_6	Sulfur Hexafluoride
SULEV	Super ultra-low emission vehicle
t	Ton equivalent to 2,000 lbs (United States)
TOG	Total Organic Gasses
USGS	U.S. Geological Survey
VMT	Vehicle miles traveled
VHT	Vehicle hours traveled
ZEV	Zero emission vehicle

A

Action
Actions are detailed items that should be completed to carry out the vision and strategies identified in the plan.

Activity Data
Data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time. Data on energy use, metal production, land areas, management systems, lime and fertilizer use and waste arisings are examples of activity data. (IPCC)

Adaptation
See "Climate Adaptation or Resilience"

Adaptive Capacity
The social, technical skills, and financial capacities of individuals and groups to implement and maintain climate actions.

Aerosols
A collection of airborne solid or liquid particles, with a typical size between 0.01 and 10 micrometer that reside in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. Aerosols may influence climate in several ways: directly through scattering and absorbing radiation, and indirectly by acting as cloud condensation nuclei or modifying the optical properties and lifetime of clouds. (IPCC2)

Afforestation
Planting of new forests on lands that historically have not contained forests. (IPCC2)

Air Pollutant
Any man-made and/or natural substance occurring in the atmosphere that may result in adverse effects to humans, animals, vegetation, and/or materials. (CARB)

Anthropogenic
The term "anthropogenic", in the context of greenhouse gas inventories, refers to greenhouse gas emissions and removals that are a direct result of human activities or are the result of natural processes that have been affected by human activities. (USEPA2)

Atmosphere
The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium and radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio) and ozone. In addition, the atmosphere contains the greenhouse gas water vapor, whose amounts are highly variable but typically around 1% volume mixing ratio. The atmosphere also contains clouds and aerosols. (IPCC2)

B

Baseline Emissions
A baseline is a measurement, calculation, or time used as a basis for comparison. Baseline emissions are the level of emissions that would occur without policy intervention or without implementation of a project. Baseline estimates are needed to determine the effectiveness of emission reduction programs (also called mitigation strategies).

Base Year
The starting year for the inventory. Targets for reducing GHG emissions are often defined in relation to the base year.

BAU
See "Business As Usual Forecast"

Biogenic
Produced by the biological processes of living organisms. Note that we use the term "biogenic" to refer only to recently produced (that is non-fossil) material of biological origin. IPCC guidelines recommend that peat be treated as a fossil carbon because it takes a long time to replace harvested peat.

Biogeochemical Cycle
Movements through the Earth system of key chemical constituents essential to life, such as carbon, nitrogen, oxygen, and phosphorus. (NASA)

Biomass
Either (1) the total mass of living organisms in a given area or of a given species usually expressed as dry weight; or (2) Organic matter consisting of or recently derived from living organisms (especially

regarded as fuel) excluding peat. Includes products, by-products and waste derived from such material. (IPCC1)

Biomass Waste
Organic non-fossil material of biological origin that is a byproduct or a discarded product. "Biomass waste" includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural crop byproducts, straw, and other biomass solids, liquids, and gases; but excludes wood and wood-derived fuels (including black liquor), biofuels feedstock, biodiesel, and fuel ethanol. Note: EIA "biomass waste" data also include energy crops grown specifically for energy production, which would not normally constitute waste. (EIA)

BIPOC
“Black, Indigenous, and People of Color” this is a term specific to the United States, intended to center the experiences of Black and Indigenous groups as representative of or shaping the socio-economic dynamics experienced by all people of color.

Black Carbon
Operationally defined aerosol species based on measurement of light absorption and chemical reactivity and/or thermal stability; consists of soot, charcoal and/or possible light absorbing refractory organic matter (Charlson and Heintzenberg, 1995, p. 401). (IPCC2)

Blue Carbon
Carbon sequestered and stored by wetlands and other coastal ecosystems helping to mitigate the effectsof climate change.

Business As Usual Forecast
The Intergovernmental Panel on Climate Change (IPCC) defines a
“business-as-usual” forecast as the level of emissions that would result if future development trends follow those of the past and no changes in policies take place. A BAU forecast assumes that no emission-reduction actions will be undertaken beyond those already in place, mandated by State or Federal policy, or committed to in the base year.

C

Carbon Cycle
All parts (reservoirs) and fluxes of carbon. The cycle is usually thought of as four main reservoirs of carbon interconnected by pathways of exchange. The reservoirs are the atmosphere, terrestrial biosphere (usually includes freshwater systems), oceans, and sediments (includes fossil fuels). The annual movements of carbon, the carbon exchanges between reservoirs, occur because of various chemical, physical, geological, and biological processes. The ocean contains the largest pool of carbon near the surface of the Earth, but most of that pool is not involved with rapid exchange with the atmosphere. (NASA)

Carbon Dioxide (CO_2)
A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1. (IPCC2)

Carbon Dioxide Equivalent (CO_2e)
A metric used to compare emissions of various greenhouse gases. It is the mass of carbon dioxide that would produce the same estimated radiative forcing as a given mass of another greenhouse gas. Carbon dioxide equivalents are computed by multiplying the mass of the gas emitted by its global warming potential.

Carbon Disclosure Project (CDP)
An international organization that administers a platform for organizations and cities to publicly disclose their environmental impacts, such as climate risk. CDP is one of the approved disclosure platforms utilized by GCoM.

Carbon Emissions
The release of carbon dioxide into the atmosphere. Primary human sources of the release of carbon dioxide occur from burning oil, coal, and gas for energy use.

Carbon Equivalent (CE)
A metric measure used to compare the emissions of the different greenhouse gases based upon their global warming potential. Carbon equivalents can be

calculated from to carbon dioxide equivalents by multiplying the carbon dioxide equivalents by 12/44 (the ratio of the molecular weight of carbon to that of carbon dioxide). The use of carbon equivalent is declining in GHG inventories.

Carbon Intensity
The amount of carbon by weight emitted per unit of energy consumed. A common measure of carbon intensity is weight of carbon per British thermal unit (Btu) of energy. When there is only one fossil fuel under consideration, the carbon intensity and the emissions coefficient are identical. When there are several fuels, carbon intensity is based on their combined emissions coefficients weighted by their energy consumption levels. (EIA)

Carbon Neutrality
"Carbon neutrality" means annual zero net anthropogenic (human caused or influenced) CO2 emissions by a certain date. By definition, carbon neutrality means every ton of anthropogenic CO2 emitted is compensated with an equivalent amount of CO2 removed (e.g. via carbon sequestration).

Carbon Offsets
A carbon offset is a reduction or removal of emissions of carbon dioxide or other greenhouse gases made to compensate for emissions made elsewhere. Offsets are measured in metric tonnes of carbon dioxide-equivalent. Offsets are bought and sold to address direct and indirect emissions associated with an organization's operations.

Carbon Sinks
A forest, ocean, or other natural environment viewed in terms of its ability to absorb carbon dioxide from the atmosphere.

Carbon Sequestration
This refers to the capture of CO_2 from the atmosphere and its long term storage in oceans (oceanic carbon sequestration), in biomass and soils (terrestrial carbon sequestration) or in underground reservoirs (geologic carbon sequestration).

Chlorofluorocarbons (CFCs)
Greenhouse gases covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Because they are not destroyed in the lower atmosphere, CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone. These gases are being replaced by other compounds, including hydrochlorofluorocarbons and hydrofluorocarbons, which are greenhouse gases covered under the Kyoto Protocol. (IPCC3)

Circular Economy
An alternative to a traditional linear economy (make, use, dispose) in which an economy is a regenerative system where resource input and waste are minimized. This is achieved through long-lasting product design, repair, reuse, remanufacturing, and recycling. Circular economy strategies are often cited as systems level approaches to reducing waste generation through product and system design.

Climate
Climate in a narrow sense is usually defined as the "average weather" or more rigorously as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These relevant quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. (IPCC2)

Climate Adaptation or Resilience
The capacity of a natural environment to prevent, withstand, respond to, and recover from a disruption. The process of adjusting to new climate conditions to reduce risks to valued assets. Adaptation is achieved through actions taken to increase resilience to climate change impacts by reducing vulnerability.

Climate Change
Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. (IPCC2)

Climate Hazard
An extreme climate event or condition that can harm human health, livelihoods, or natural resources. It can include abrupt changes to the climate system such as extreme precipitation, storms, droughts, and heat waves.

Climate Migration
Movement of people due to the impacts of climate change on their livelihoods or erosion of quality of life, such as shifts in water availability and crop productivity, or to factors such as sea level rise or storm surge.

Climate Model
A quantitative method to simulate interactions of the important drivers of climate—including atmosphere, oceans, land, and ice—to develop projections of future climate.

Climate Scenario
A coherent, internally consistent, plausible description of possible climatic conditions

Climate Risk
The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability and hazard. (IPCC):

Climate Vulnerability
Is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity, and its capacity to adapt.
Vulnerability = potential impact (sensitivity x exposure) – adaptive capacity (IPCC):

Climate Vulnerability Assessment
A report used to identify and define the risks posed by climate change and inform adaptation measures needed to combat climate change. Reports can be about a wide range of fields including food security, poverty analysis, and extreme weather events.

Co-Benefit
Indirect benefits to the community (e.g., public health, economic, equity) caused by climate adaptation and mitigation strategies, actions, and policies.

Co-generation
Co-generation is an industrial structure, installation, plant, building, or self-generating facility that has sequential or simultaneous generation of multiple forms of useful energy (usually mechanical and thermal) in a single, integrated system. (CARB)

Community Choice Aggregation (CCA)
CCA programs, also known as "Municipal Power Aggregation" or "Community Power Aggregation", allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission and distribution service from their existing utility provider. Typically, enabling legislation at the State level is required in order to assemble a CCA program for a community. See EPA's CCA webpage for more: https://www.epa.gov/green-power-markets/community-choice-aggregation

Combined Heat and Power (CHP)
Combined heat and power is the simultaneous production of both electricity and useful heat for application by the producer or to be sold to other users with the aim of better utilization of the energy used. Public utilities may utilize part of the heat produced in power plants and sell it for public heating purposes. Industries as auto-producers may sell part of the excess electricity produced to other industries or to electric utilities. (IPCC)

Community Power Aggregation
See "Community Choice Aggregation"

Community Solar / Community Solar Garden (CSG)
Solar facilities shared by multiple community subscribers who receive credit on their electricity bills for their share of the power produced. Community solar allows members of a community to share the benefits of solar power on their property without installing it on their own property. Electricity generated by the community solar farm typically costs less than the price from utility companies.

Complete Streets
A "complete street" is a design approach that requires streets to be designed to support safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.

Consistency
Consistency means that an inventory should be internally consistent in all its elements over a period of years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks. (IPCC)

Continuous Emission Monitor (CEM)
A type of air emission monitoring system installed to operate continuously inside of a smokestack or other emission source. (CARB)

Cool Roof
Roof surfaces designed to reflect radiation from the sun, reducing heat transfer into the building or the building's surrounding area.

Cool Pavement
Pavement surfaces designed to reflect radiation from the sun, reducing heat transfer into the road's surrounding area.

Criteria Air Pollutant
An air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Examples include: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM10 and PM2.5. The term "criteria air pollutants" derives from the requirement that the U.S. EPA must describe the characteristics and potential health and welfare effects of these pollutants. The U.S. EPA and CARB periodically review new scientific data and may propose revisions to the standards as a result. (CARB)

D
Deforestation
Those practices or processes that result in the change of forested lands to non-forest uses. This is often cited as one of the major causes of the enhanced greenhouse effect for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present and contributing to carbon storage. (UNFCC)

Distillate Fuel Oil
A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in on-highway diesel engines, such as those in trucks and automobiles, as well as off-highway engines, such as those in railroad locomotives and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation. (EIA)

E
Eco-System Services
Contributions of ecosystems to human well-being. For example, ecosystems produce resources used by humans such as clean air, water, food, open space, flood control, climate mitigation, and other benefits**.**

Emissions
The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere. (USEPA1)

Emission Factor
A coefficient that quantifies the emissions or removals of a gas per unit activity. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions. (IPCC)

Emission Inventory
An estimate of the amount of pollutants emitted into the atmosphere from major mobile, stationary, area-wide, and natural source categories over a specific period of time such as a day or a year. (CARB)

Emission Rate
The weight of a pollutant emitted per unit of time (e.g., tons / year). (CARB)

Energy Tariff
An Energy Tariff, or utility tariff, governs how an energy provider (electric or natural gas) charges the customer for their energy and natural gas usage. Electric and natural gas vendors must submit their tariffs to the government for approval.

Environmental Justice
The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies

Equity
The state or quality of being just and fair in the way people are treated. Equity recognizes that each person has different circumstances and allocates the exact resources and opportunities needed to reach an equal outcome. According to the World Health Organization, Equity is "the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or geographically" while the US Center for Disease Control defines Equity as "when everyone has the opportunity to be as healthy as possible." Within the context of climate change, climate equity means both protection from climate change and environmental hazards as well as access to climate resilience and environmental benefits for all, regardless of income, race, and other characteristics.

Estimation
Estimation is the assessment of the value of an unmeasurable quantity using available data and knowledge within stated computational formulas or mathematical models.

F
Fluorocarbons
Carbon-fluorine compounds that often contain other elements such as hydrogen, chlorine, or bromine. Common fluorocarbons include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). (UNFCC)

Flux
Either (1) Raw materials, such as limestone, dolomite, lime, and silica sand, which are used to reduce the heat or other energy requirements of thermal processing of minerals (such as the smelting of metals). Fluxes also may serve a dual function as a slagging agent. (2) The rate of flow of any liquid or gas, across a given area; the amount of this crossing a given area in a given time. (e.g., "Flux of CO2 absorbed by forests"). (IPCC)

Fossil Fuel
Geologic deposits of hydrocarbons from ancient biological origin, such as coal, petroleum and natural gas.

Fuel Combustion
Fuel combustion is the intentional oxidation of materials within an apparatus that is designed to provide heat or mechanical work to a process, or for use away from the apparatus. (IPCC)

Fugitive Emissions
Fugitive emissions are unintentional leaks emitted from sealed surfaces, such as packings and gaskets, or leaks from underground pipelines resulting from corrosion or faulty connections.

G
Geologic Carbon Sequestration
It is the process of injecting CO_2 from a source, such as coal-fired electric generating power plant, through a well into the deep subsurface. With proper site selection and management, geologic sequestration could play a major role in reducing emissions of CO_2. Research efforts to evaluate the technical aspects of CO_2 geologic sequestration are underway. (USEPA4)

GHG
See "Greenhouse Gas"

Global Warming
Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities. Also see Climate Change (USEPA1)

Global Warming Potential (GWP)
An index, based upon radiative properties of well-mixed greenhouse gases, measuring the radiative forcing of a unit mass of a given well-mixed greenhouse gas in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide. The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing thermal infrared radiation. The Kyoto Protocol is based on GWPs from pulse emissions over a 100-year time frame. (IPCC2)

GCoM Global Covenant of Mayors:
GCoM is the largest global alliance for city climate leadership, built upon the commitment of over 10,000 cities and local governments. The alliance's mission is to mobilize and support climate and energy action in communities across the world.

Green Streets
A "green street" is a stormwater management approach that incorporates vegetation, soil, and engineered systems to slow, filter, and cleanse stormwater runoff from impervious surfaces.

Greenhouse Effect
Trapping and build-up of heat in the atmosphere (troposphere) near the earth's surface. Some of the heat flowing back toward space from the earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase. (UNFCC)

Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories:
A robust, transparent and globally-accepted framework that cities and local governments can use to consistently identify, calculate and report on city greenhouse gas emissions.

Greenhouse Gas
Greenhouse Gas (GHG) is any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). (UNFCC)

Greenhouse Gas Reduction
Actions taken to reduce the number and severity of potential future climate impacts compared to un-checked greenhouse gas emissions.

Green Infrastructure
An approach to managing precipitation by reducing and treating stormwater at its source while delivering environmental, social, and economic benefits. Stormwater runoff can carry trash, bacteria, and other pollutants and is a major cause of water pollution in urban areas.

Green Roof
A green roof is a layer of vegetation planted over a waterproofing system that is installed on top of a flat or slightly–sloped roof. Green roofs are also known as vegetative or eco–roofs. They fall into three main categories—extensive, intensive, and semi–intensive. Green roofs have been shown to decrease heat island contributions of buildings and decrease stormwater runoff while increasing overall vegetative land coverage.

Green wall
A green wall is similar to a green roof but applied to exterior wall surfaces.

Gross Domestic Product (GDP)
The sum of gross value added, at purchasers' prices, by all resident and non-resident producers in the economy, plus any taxes and minus any subsidies not included in the value of the products in a country or a geographic region for a given period, normally one year. It is calculated without deducting for depreciation of fabricated assets or depletion and degradation of natural resources. (IPCC3)

Groundwater
Water that occurs beneath the water table in soils and geologic formations that are fully saturated.

H
Halocarbons
A collective term for the group of partially halogenated organic species, including the chlorofluorocarbons (CFCs),

hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), halons, methyl chloride, methyl bromide, etc. Many of the halocarbons have large Global Warming Potentials. The chlorine and bromine-containing halocarbons are also involved in the depletion of the ozone layer. (IPCC2)

Hazard
The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury,or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources.

Heat Island
A heat island is an urban or large-scale area characterized by temperatures higher than those of the surrounding due to human activities. The difference in temperature between urban and less-developed rural areas has to do with how well the surfaces in each environment absorb and hold heat. See also "Micro Heat Island"

Hydrocarbons
Strictly defined as molecules containing only hydrogen and carbon. The term is often used more broadly to include any molecules in petroleum which also contains molecules with S, N, or O An unsaturated hydrocarbon is any hydrocarbon containing olefinic or aromatic structures. (IPCC)

Hydrofluorocarbons (HFCs)
Compounds containing only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are powerful greenhouse gases with global warming potentials ranging from 140 (HFC-152a) to 11,700 (HFC-23). (USEPA1)

I
ICLEI Local Governments for Sustainability:
A membership organization for local governments to pursue reductions in carbon pollution and improvements in advancing sustainable urban development. ICLEI's members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

Impact
An effect of climate change on the structure or function of a system: for example, environmental consequences of climate change, such as extreme heat waves, rising sea levels, or changes in precipitation resulting in flooding and droughts.

Intergovernmental Panel on Climate Change
The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national greenhouse gas emission inventories. (USEPA1)

K
Kilowatt Hour (kWh):
A measure of electrical energy equivalent to a power consumption of 1,000 watts for one hour.

Kyoto Protocol
The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1997 in Kyoto, Japan, at the Third Session of the Conference of the Parties (COP) to the UNFCCC. It contains legally binding commitments, in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (most Organisation for Economic Cooperation and Development countries and countries with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (carbon

dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005. (IPCC2)

L

Land Use and Land Use Change
Land use refers to the total of arrangements, activities and inputs undertaken in a certain land cover type (a set of human actions). The term land use is also used in the sense of the social and economic purposes for which land is managed (e.g., grazing, timber extraction and conservation). Land use change refers to a change in the use or management of land by humans, which may lead to a change in land cover. Land cover and land use change may have an impact on the surface albedo, evapotranspiration, sources and sinks of greenhouse gases, or other properties of the climate system and may thus have a radiative forcing and/or other impacts on climate, locally or globally. (IPCC2)

Living Streets
A "living street" combines the concepts of complete streets and green streets while putting additional focus on quality of life aspects for City residents.

LULUCF
Acronym for "Land Use, Land Use Change and Forestry", a category of activities in GHG inventories.

M

Megawatt Hour (MWH):
A measure of electrical energy equivalent to a power consumption of 1,000,000 watts for one hour.

Methane (CH_4)
A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO_2). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. The GWP is from the IPCC's Fourth Assessment Report (AR4).

Metric Ton
The tonne (t) or metric ton (MT), sometimes referred to as a metric tonne, is an international unit of mass. A metric ton is equal to a Megagram (Mg), 1000 kilograms, 2204.6 pounds, or 1.1023 short tons.

Micro Heat Island
Micro heat islands are smaller scale hot spots within developed areas which experience higher temperatures than surrounding areas due to how well the surfaces in the location absorb, reflect, and hold heat. These occur in areas such as poorly vegetated parking lots, non-reflective roofs and asphalt roads. Micro urban heat islands are strongly affected by micro climate factors and localized conditions of the built environment. See also "Heat Island"

Million Metric Tons (MMT)
Common measurement used in GHG inventories. It is equal to a Teragram (Tg).

Mitigation:
Actions taken to limit the magnitude or rate of long-term global warming and its related effects. Climate change mitigation generally involves reductions in human emissions of greenhouse gases.

Mobile Sources
Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes. (CARB)

Mode Share
The percentage of travelers using a particular type of transportation. Modal share is an important component in developing sustainable transport within a city or region because it reveals the level of utilization of various transportation methods. The percentage reflects how well infrastructure, policies, investments, and land-use patterns support different types of travel.

Model
A model is a quantitatively-based abstraction of a real-world situation which may simplify or neglect certain features to better focus on its more important elements. (IPCC)

Municipal Power Aggregation
See "Community Choice Aggregation"

Municipal Solid Waste (MSW)
Residential solid waste and some non-hazardous commercial, institutional, and industrial wastes. This material is generally sent to municipal landfills for disposal. (USEPA1)

N

Natural Sources
Non-manmade emission sources, including biological and geological sources, wildfires, and windblown dust. (CARB)

Net Energy Metering, (NEM)
Net Energy Metering (NEM), also known as Net Metering, allows residential and commercial customers who generate their own electricity from solar power to sell the electricity they aren't using back into the grid. The NEM rate schedule (energy tariff) determines how much you are paid for the electricity you sold to the grid. Many states have passed net metering laws. In other states, utilities may offer net metering programs voluntarily or as a result of regulatory decisions. Differences between state legislation, regulatory decisions and implementation policies mean that the mechanism for compensating solar customers varies widely across the country.

Net Zero Emissions (NZE)
Refers to a community, business, institution, or building for which, on an annual basis, all greenhouse gas emissions resulting from operations are offset by carbon-free energy production. An NZE building or property is one which generates or offsets all energy consumed. If a City develops a NZE building code, this definition will have to be refined to provide additional guidance on calculating emissions and offsets to achieve net-zero emissions.

Nitrogen Fixation
Conversion of atmospheric nitrogen gas into forms useful to plants and other organisms by lightning, bacteria, and blue-green algae; it is part of the nitrogen cycle. (UNFCC)

Nitrogen Oxides (NO_x)
Gases consisting of one molecule of nitrogen and varying numbers of oxygen molecules. Nitrogen oxides are produced in the emissions of vehicle exhausts and from power stations. In the atmosphere, nitrogen oxides can contribute to formation of photochemical ozone (smog), can impair visibility, and have health consequences; they are thus considered pollutants. (NASA)

Nitrous Oxide (N_2O)
A powerful greenhouse gas with a global warming potential of 298 times that of carbon dioxide (CO_2). Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, manure management, fossil fuel combustion, nitric acid production, and biomass burning. The GWP is from the IPCC's Fourth Assessment Report (AR4).

O

Ozone (O_3)
Ozone, the triatomic form of oxygen (O_3), is a gaseous atmospheric constituent. In the troposphere, it is created both naturally and by photochemical reactions involving gases resulting from human activities (smog). Tropospheric ozone acts as a greenhouse gas. In the stratosphere, it is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2). Stratospheric ozone plays a dominant role in the stratospheric radiative balance. Its concentration is highest in the ozone layer. (IPCC2)

Ozone Depleting Substances (ODS)
A compound that contributes to stratospheric ozone depletion. Ozone-depleting substances (ODS) include CFCs, HCFCs, halons, methyl bromide, carbon tetrachloride, and methyl chloroform. ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete ozone. (IPCC)

P

Perfluorocarbons (PFCs)
A group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly CF_4 and C_2F_6) were introduced as alternatives, along with hydrofluorocarbons, to the ozone depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are also used in manufacturing. PFCs do not harm

the stratospheric ozone layer, but they are powerful greenhouse gases: CF_4 has a global warming potential (GWP) of 7,390 and C_2F_6 has a GWP of 12,200. The GWP is from the IPCC's Fourth Assessment Report (AR4).

Photosynthesis
The process by which plants take carbon dioxide from the air (or bicarbonate in water) to build carbohydrates, releasing oxygen in the process. There are several pathways of photosynthesis with different responses to atmospheric carbon dioxide concentrations. (IPCC2)

POC
"People of Color" or "Person of Color" is a general umbrella term that collectively refers to all non-white demographic groups.

Point Sources
Specific points of origin where pollutants are emitted into the atmosphere such as factory smokestacks. (CARB)

Power Purchase Agreement (PPA)
A power purchase agreement (PPA), or electricity power agreement, is a contract between two parties; one party generates electricity (the seller) and the other party looks to purchase electricity (the buyer). Individual customers and organizations may enter into PPAs with individual developers or may join together to seek better prices as a group. PPAs can allow longer term commitments to renewable energy as well as a form of "direct" investing in new renewable energy generation.

Property-Assessed Clean Energy (PACE)
A program created for financing energy efficiency and renewable improvements on private property. Private property can include residential, commercial or industrial properties. Improvements can include energy efficiency, renewable energy and water conservation upgrades to a building.

Process Emissions
Emissions from industrial processes involving chemical transformations other than combustion. (IPCC)

R

Radiative Forcing
A change in the balance between incoming solar radiation and outgoing infrared (i.e., thermal) radiation. Without any radiative forcing, solar radiation coming to the Earth would continue to be approximately equal to the infrared radiation emitted from the Earth. The addition of greenhouse gases to the atmosphere traps an increased fraction of the infrared radiation, reradiating it back toward the surface of the Earth and thereby creates a warming influence. (UNFCC)

Reforestation
Planting of forests on lands that have previously contained forests but that have been converted to some other use. (IPCC2)

Regeneration
The act of renewing tree cover by establishing young trees, naturally or artificially - note regeneration usually maintains the same forest type and is done promptly after the previous stand or forest was removed. (CSU)

Renewable Energy
Energy resources that are naturally replenishing such as solar, wind, hydro and geothermal energy.

Renewable Energy Credits (RECs)
A market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource. The single largest category of reductions in Evanston's emissions has been through the purchase of RECs.

Residence Time
Average time spent in a reservoir by an individual atom or molecule. Also, this term is used to define the age of a molecule when it leaves the reservoir. With respect to greenhouse gases, residence time usually refers to how long a particular molecule remains in the atmosphere. (UNFCC)

Resilience
The ability to anticipate, prepare for, respond to, and recover quickly from climate change hazards with

minimum damage to social well-being, the economy, and the environment.

Reservoir
Either (1) a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored; or (2) Water bodies regulated for human activities (energy production, irrigation, navigation, recreation etc.) where substantial changes in water area due to water level regulation may occur. (IPCC)

Respiration
The process whereby living organisms convert organic matter to carbon dioxide, releasing energy and consuming molecular oxygen. (IPCC2)

Retro-commissioning
The systematic process to improve an existing building's performance ensuring the building controls are running efficiently and balancing the designed use and the actual use of the building.

Ride-share
The practice of sharing transportation in the form of carpooling or vanpooling. It is typically an arrangement made through a ride-matching service that connects drivers with riders.

S
Scope 1:
Scope 1 includes emissions being released within the city limits resulting from combustion of fossil fuels and from waste decomposition in the landfill and wastewater treatment plant.

Scope 2:
Scope 2 includes emissions produced outside the city that are induced by consumption of electrical energy within the city limits.

Scope 3:
Scope 3 includes emissions of potential policy relevance to local government operations that can be measured and reported but do not qualify as Scope 1 or 2. This includes, but is not limited to, outsourced operations and employee commute.

Short Ton
Common measurement for a ton in the United States. A short ton is equal to 2,000 lbs or 0.907 metric tons. (USEPA1)

Sink
Any process, activity or mechanism that removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere. (IPCC2)

Social Cost of Carbon
The social cost of carbon is a measure of the economic harm from climate change impacts, expressed as the dollar value of the total damages from emitting one ton of carbon dioxide into the atmosphere.

Solar Radiation
Electromagnetic radiation emitted by the Sun. It is also referred to as shortwave radiation. Solar radiation has a distinctive range of wavelengths (spectrum) determined by the temperature of the Sun, peaking in visible wavelengths. (IPCC2)

Source
Any process, activity or mechanism that releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol into the atmosphere. (IPCC2)

Stationary Sources
Non-mobile sources such as power plants, refineries, and manufacturing facilities which emit air pollutants. (CARB)

Strategy / Strategic Goal
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.

Sulfur Dioxide (SO_2)
A compound composed of one sulfur and two oxygen molecules. Sulfur dioxide emitted into the atmosphere through natural and anthropogenic processes is changed in a complex series of chemical reactions in the atmosphere to sulfate aerosols. These aerosols are believed to result in negative radiative forcing (i.e., tending to cool the Earth's surface) and do result in acid deposition (e.g., acid rain). (UNFCC)

Sulfur Hexafluoride (SF_6)
A colorless gas soluble in alcohol and ether, slightly soluble in water. A very powerful greenhouse gas with a global warming potential most recently estimated at 22,800 times that of carbon dioxide (CO_2). SF_6 is used primarily in electrical transmission and distribution systems and as a dielectric in electronics. This GWP is from the IPCC's Fourth Assessment Report (AR4).

T
Terrestrial Carbon Sequestration
It is the process through which carbon dioxide (CO_2) from the atmosphere is absorbed by trees, plants and crops through photosynthesis, and stored as carbon in biomass (tree trunks, branches, foliage and roots) and soils. The term "sinks" is also used to refer to forests, croplands, and grazing lands, and their ability to sequester carbon. Agriculture and forestry activities can also release CO_2 to the atmosphere. Therefore, a carbon sink occurs when carbon sequestration is greater than carbon releases over some time period. (USEPA3)

Therm:
A unit of measure for energy that is equivalent to 100,000 British Thermal units, or roughly the energy in 100 cubic feet of natural gas. Often used for measuring natural gas usage for billing purposes.

Total Organic Gases (TOG)
Gaseous organic compounds, including reactive organic gases and the relatively unreactive organic gases such as methane. (CARB)

Transparency
Transparency means that the assumptions and methodologies used for an inventory should be clearly explained to facilitate replication and assessment of the inventory by users of the reported information. The transparency of inventories is fundamental to the success of the process for the communication and consideration of information. (IPCC)

Trend
The trend of a quantity measures its change over a time period, with a positive trend value indicating growth in the quantity, and a negative value indicating a decrease. It is defined as the ratio of the change in the quantity over the time period, divided by the initial value of the quantity, and is usually expressed either as a percentage or a fraction. (IPCC)

U
Urban Tree Canopy
Describes the makeup and characteristics of trees within the urban environment.

V
VMT Vehicle Miles Traveled:
A unit used to measure vehicle travel made by private vehicles, including passenger vehicles, truck, vans and motorcycles. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle.

Vision Zero:
Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.
https://visionzeronetwork.org/

Vulnerability
The degree to which a system is susceptible to or unable to cope with, adverse effects of climate change. Vulnerability consists of the following:

- Exposure: The presence of people, ecosystems, or assets in places and settings that could be adversely affected by climate change impacts
- Sensitivity: The degree to which people, ecosystems, or assets are affected by climate change
- Adaptive capacity: The ability of assets, systems or people to adjust to an adverse impact

W
Water Vapor
The most abundant greenhouse gas; it is the water present in the atmosphere in gaseous form. Water vapor is an important part of the natural greenhouse effect. While humans are not significantly increasing its concentration, it contributes to the enhanced greenhouse effect because the warming influence of greenhouse gases leads to a positive water vapor feedback. In addition to its role as a natural greenhouse gas, water vapor plays an important role in regulating the temperature of the planet because clouds form when excess water vapor in the atmosphere condenses to form ice and water droplets and precipitation. (UNFCC)

Weather
Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season. Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. A simple way of remembering the difference is that climate is what you expect (e.g. cold winters) and 'weather' is what you get (e.g. a blizzard). (USEPA1)

Z

Zero Emission Vehicles (ZEV)
A vehicle that does not emit harmful emissions during operation. Harmful emissions can have a negative impact on human health and the environment. Electric (battery-powered) cars, electric trains, hydrogen-fueled vehicles, bicycles, and carriages are considered to produce zero emissions.

Zero Waste
The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.

APPENDIX E

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The following are source and additional information references used in this Climate Action Plan

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APPENDIX F

Funding Climate Action Memo

This memo is intended to provide a starting point for the City of La Crosse in identifying funding solutions for implementation of the Climate Action Plan initiatives. The optimal funding approach appropriate will fit well within the City's existing revenue structure, resources, political opportunities, and limitations.

The following is an overview of a range of funding strategies including bonding, tax, municipal fee structures, federal grants, and strategies supporting the private sector.

Click here to return to TOC

Type of Funding	Explanation	Example Projects	Links
Green Bonds	Specifically targeted for funding environmentally and socially responsible projects in areas such as renewable energy, energy efficiency, clean transportation or responsible waste management.	**Where**: District of Columbia Water and Sewer Authority along with institutional investors Goldman Sachs Urban Investment Group and Calvert	https://www.worldbank.org/en/news/feature/2021/12/08/what-you-need-to-know-about-ifc-s-green-bonds
		When: 2014	
		What: Issued a tax-exempt Environmental Impact Bond that utilizes a performance-based contract between a public entity and the private sector where payment is based on performance of Green Infrastructure projects funded. The success of this program led to an expansion of their green bonds program in 2015 and	https://www.dcwater.com/whats-going-on/news/dc-water-announces-successful-sale-350-million-green-century-bonds
Climate Bonds	Use-of-proceeds bonds where the issuer promise to the investors that all the raised funds will only go to specified climate-related adaptation or mitigation programs and assets.[7]	**Where**: City of Hampton, VA along with Quantified Ventures in partnership with the Chesapeake Bay Foundation	https://www.climatebonds.net/files/files/Green%20City%20Playbook.pdf
		When: 2020	
		What: Provided the City with a $12 million bond to mitigate chronic flooding in the city. The bond is attached to three projects that will add storage capacity to alleviate the volume of stormwater in	https://hampton.gov/CivicAlerts.aspx?AID=4714&ARC=9297
Resiliency Bonds	Rebate structure that funds risk reduction by linking insurance premiums to resilience projects. These bonds create incentives for cities to invest in resilience, reducing human and financial costs of catastrophes as a result.	**Where**: Various cities including the City of Norfolk, VA	https://gca.org/what-are-resilience-bonds-and-how-can-they-protect-us-against-climate-crises/
		When: 2015	
		What: The RE.invest initiative has partnered with a number of cities on a range of infrastructure projects to provide flood protection, using catastrophe modeling to estimate risk reduction for bond issuance.	https://www.refocuspartners.com/wp-content/uploads/pdf/RE.invest_Norfolk-City-Report.pdf

Type of Funding	Explanation	Example Projects	Links
General Taxing and Fee Powers	Levy additional costs on undesired activities or consumption then reinvest funds in policy objectives	**Where**: City of Portland, OR	https://www.portland.gov/revenue/ces
		When: 2019	https://www.portland.gov/
		What: Created specific retail tax on larger retailers	https://www.portland.gov/revenue/ces
Excise Tax on Fuel	In lieu of a carbon tax, if not politically feasible, a fuel tax can also help raise funds for climate actions with the right support. This tax can be levied on energy providers which will likely pass onto consumers, providing additional incentive to reduce energy use and enhance energy savings potential of projects.	**Where**: Montgomery County, MD	
		When: 2022	https://www.montgomerycountymd.gov/finance/taxes/excise.html
		What: Raised a fuel tax on any person or entity transmitting or distributing energy into the County, including delivered fuels and electricity. While the County currently uses this funding for the General Fund (accounts for over 4% of revenue annually), a pending bill would use a small but significant portion of it towards climate actions.	
Carbon Tax	Add a cost through the City's own utility to gas delivery and consumption, and allocate those costs to a fund for climate action. Such a tax could also be applicable across other Municipality energy consumption (buildings and transportation) for similar purposes, or extended to a subsect of private consumers such as industry or other high uses.	**Where**: British Columbia, CA	https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-005-tax-rates-fuels.pdf
		When: 2008	https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-005-tax-rates-fuels.pdf
		What: Carbon tax applies to the purchase and use of fossil fuels and covers approximately 70% of provincial greenhouse gas emissions.	https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-005-tax-rates-fuels.pdf

Type of Funding	Explanation	Example Projects	Links
Energy Improvement District	The EID is operated under a Board with bonding authority, providing a revenue option for specified public purpose projects. Such a district and bonding authority could be created for specific climate action activities, particularly those projects that align with bonded capital, i.e., infrastructure or revenue-generating projects. EIDs may be used to enter into contracts, to buy or lease energy facilities, to increase energy efficiency, and to make it easier and cheaper for energy efficiency and renewable energy businesses to operate in the	**Where**: Bridgeport: CT	https://www.bridgeportct.gov/content/341307/347097/347109.aspx
		Where: 2020	https://www.bridgeportct.gov/content/341307/347097/347109.aspx
		What: Established an Energy Improvement District (EID) to promote the planning, development, and funding of energy-related development.	https://www.bridgeportct.gov/content/341307/347097/347109.aspx
Existing Tax Increment Funds	Establish a policy to apply all future funds generated from Tax Increment Funds to initiatives aligned with the sustainability or climate plan. For municipalities with existing Tax Increment Funds set to sunset the funds generated by as they terminate may be used for initiatives aligning with the municipality's plan decreasing the need to increase rates elsewhere.	**Where**: Miami Beach, FL	https://www.miamibeachfl.gov/wp-content/uploads/2019/12/SFY-2020-24-Adopted-Capital-Budget-Book-Online-Version.pdf
		Where: 2022	https://www.miamibeachfl.gov/wp-content/uploads/2019/12/SFY-2020-24-Adopted-Capital-Budget-Book-Online-Version.pdf
		What: Establish policy to use $100 million generated by a Tax Increment Financing (TIF) district that is set to sunset in 2022 for underground stormwater projects.	https://www.miamibeachfl.gov/wp-content/uploads/2019/12/SFY-2020-24-Adopted-Capital-Budget-Book-Online-Version.pdf

Type of Funding	Explanation	Example Projects	Links
"Resilience Penny" Tax	Adopt a property tax increase of $.01 per $100 assessed value dedicated for sustainability and resilience efforts – a "resilience penny" increase. The revenue can be used to directly fund initiatives, or as a repayment source for bond issues. This strategy may be particularly well suited for communities which have not increased property tax rates in many years as it reflects the increased costs and demands placed on municipalities due to emerging resilience	**Where**: Norfolk, VA	shorturl.at/hoBRU
		When: 2015	shorturl.at/hoBRU
		What: City adopted a $0.01 increase in property tax that generates about $1.8 million a year applied to City sustainability and resilience initiatives.	shorturl.at/hoBRU

Municipal Fee Structures

The City's revenue profile, like all municipalities, is diverse. Meanwhile, a number of the City's planned projects—such as road and side walk improvement projects, building mechanical system replacements, vehicle purchases—inherently include aspects related to the initiatives and goals of the Climate Action Plan.

To the extent possible, starting with the largest expenditures, all investments should be evaluated and re-oriented to ensure they serve the City's climate action policy goals. Future budgeting policy should incorporate a mechanism or review within the budgeting process to support the alignment of new capital budgets with the City's climate action initiatives.

Additionally, many municipal fee structures may be redesigned to support enhanced revenue potential for the City while also encouraging community choices which align with the plan's goals. These "progressive" fee structures may serve as a revenue-neutral approach to incentivizing residential and commercial investments that will result in reduced GHG emissions or improved resilience.

Type of Funding	Explanation	Example Projects	Links
Enhanced Stormwater Fees and Program Expansion	Depending on tax powers of the Municipality, a separate tax or fee could be levied on specific uses such as stormwater fees. The level of fees could be adjusted, or a temporary fee added, to fund additional climate actions - such as providing stormwater credits for installation of green infrastructure, green roofs, etc. This may involve a more aggressive application for state stormwater permits and fee collection capability.	**Where**: City of Minneapolis, MN	https://www.minneapolismn.gov/resident-services/utility-services/stormwater/ https://www.minneapolismn.gov/resident-services/utility-services/stormwater/residential-stormwater-credits/
		When: 2005	https://www.minneapolismn.gov/resident-services/utility-services/stormwater/ https://www.minneapolismn.gov/resident-services/utility-services/stormwater/residential-stormwater-credits/
		What: Created stormwater utility fee and stormwater credit system.	https://www.minneapolismn.gov/resident-services/utility-services/stormwater/

Type of Funding	Explanation	Example Projects	Links
Carbon Fund Ordinance	A Carbon Fund Ordinance establishes a Carbon Fee to be charged to all development projects. A municipality may make exceptions to the fund as appropriate for the community (for example, exemptions for single family residential alterations, new Accessory Dwelling Units, temporary buildings, and/or building area that is not used as conditioned space). The municipality may also establish the fund on a "sliding scale" providing for discounts and credits for projects meeting the community's energy goals. The goal of a Carbon Fund Ordinance is to encourage the implementation of renewable energy and/or energy efficiency in development projects. The money collected from the Carbon Fund Fee can then be used for community-wide greenhouse gas reduction projects.	**Where**: City of Watsonvill, CA	https://www.cityofwatsonville.org/1765/Carbon-Fund-Ordinance
		When: 2014	https://www.cityofwatsonville.org/1765/Carbon-Fund-Ordinance
		What: Carbon Fee charged to all development projects with proceeds used to support communit-wide actions.	https://www.cityofwatsonville.org/1765/Carbon-Fund-Ordinance
Utility Franchise Fee Allocation	Establish a policy to expend franchise fee revenue on projects and initiatives associated with the municipality's sustainability or climate plan. Policy may also include an incremental increase in the franchise fee in support of the increased renewable energy and energy efficiency initiatives of the municipality. Alternatively, some municipalities are able to use the franchise fee negotiation to directly leverage increased renewable energy service from the electric utility provider (see City of Ann Arbor example: shorturl.at/myHK1)	**Where**: City of Minneapolis, MN	https://energynews.us/2017/09/12/utility-fee-increase-in-minneapolis-could-help-fund-efficiency-outreach/
		When: 2017	https://energynews.us/2017/09/12/utility-fee-increase-in-minneapolis-could-help-fund-efficiency-outreach/
		What: Increased its existing franchise fee on utility customers, directing the fee revenue toward initiatives to reduce energy bills and GHG emissions.	https://energynews.us/2017/09/12/utility-fee-increase-in-minneapolis-could-help-fund-efficiency-outreach/

Grants

There are a number of state and federal funding opportunities that support sustainability, resilience, and climate initiatives for local governments. Many of the grant opportunities seek to directly fund relative strategies like improved energy efficiency, renewable energy, low/no emission vehicle adoption and infrastructure, and climate resilience. In addition, a number of long-standing grants—like those from the US Department of Transportation, or the US EPA Brownfields Grant—do not fund sustainability and climate initiatives directly but can indirectly support these projects as the grant's goals are well aligned.

Grant funding can often be used to support the establishment of a municipal program, resource, or even staffing position. Unlike municipal tax or fee structure strategies, however, grants do not provide a long-term or permanent funding solution.

Consequently, grants may best be viewed as a project-specific funding source, or in conjunction with other funding strategies when supporting long-term initiatives.

This review is intended to illustrate a few high profile and important recent funding laws that have or will be resulting in significant grant opportunities of which municipalities with sustainability and climate plans can take advantage. The grant examples illustrated here are far from exhaustive. We recommend the municipality subscribe to new grant opportunities through Grants.gov and review availability on a regular basis: https://www.grants.gov/help/html/help/Connect/SubscribeToAllNewOpportunities.htm

Federal Grants

Federal Government Justice40 Initiative

In January 2021, President Biden signed Executive Order 14008 – Tackling the Climate Crisis at Home and Abroad. The executive order established Justice40 as a whole-of-government approach to grant funding. Through this initiative, grants from the federal government are guided to ensure 40% of benefits flow to disadvantaged communities. For communities with one or more area designated as qualifying for Justice40 consideration are likely to have improved competitiveness for grant awards.

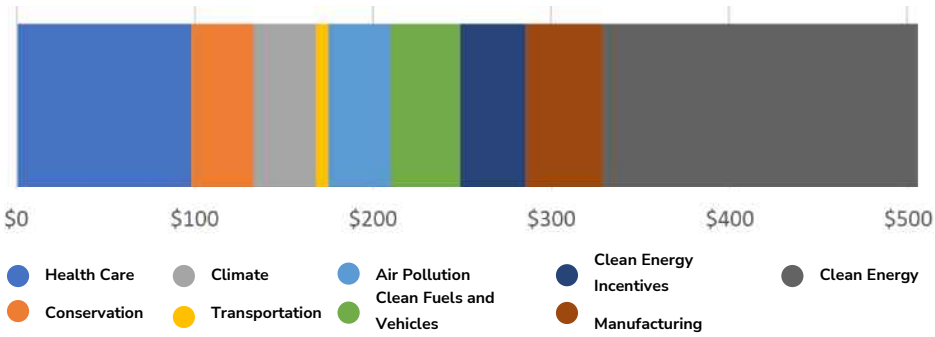
According to the Climate and Economic Justice Screening Tool, the City of La Crosse may have portions of the community qualifying for Justice40 consideration. The tool, created by the White House Council on Environmental Quality, uses publicly-available, nationally-consistent datasets to identify disadvantaged communities. For a detailed description of the methodology used go here: https://screeningtool.geoplatform.gov/en/methodology#4.22/42.84/-88.95

See the map below shows the areas designated as qualifying for this consideration in La Crosse:

Federal Grants

The Inflation Reduction Act (IRA) was signed into law by President Joe Biden on August 16, 2022. The law, as passed, authorizes $391 billion in spending on energy and climate change. The funding priorities include investment in climate change mitigation and adaptation, incentives for renewable energy installations and manufacturing, electric vehicle infrastructure, and home energy efficiency.

The law represents the largest investment into addressing climate change in United States history. According to several independent analyses, the law is projected to reduce 2030 U.S. greenhouse gas emissions to 40% below 2005 levels. The chart below shows the breakdown of the IRA spending budget (in $ billions):



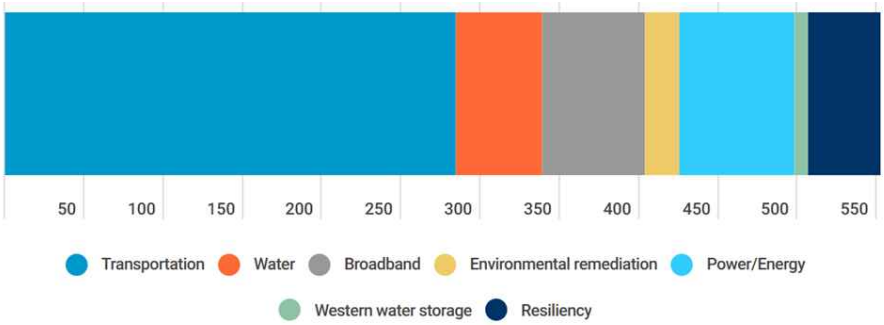
IRA Funding For Municipalities

IRA funds that will support municipal sustainability and climate action includes:

- **$27 billion** to fund the Greenhouse Gas Reduction Fund, a national green bank to fund GHG reduction projects and to help municipalities start their own green banks.
- **$250 million** in grants and technical assistance to support municipalities in implementing their sustainable procurement initiatives.
- **$5 billion** for greenhouse gas air pollution reduction planning and implementation grants.
- **$4.75 billion** in competitive implementation grants awarded to states, air pollution control agencies, municipalities, or tribes to reduce overall air pollution .
- **$3 billion** in environmental and climate justice block grants for community-led air pollution remediation initiatives such as health risks from urban heat islands, extreme heat, wood heating system emissions, wildfire, and other climate resiliency and adaptation initiatives.
- **$330 million** in grants to assist states and municipalities to support the adoption of latest building energy codes.
- **$1.8 billion** in grants for construction projects to improve walkability, safety, and affordable transportation access.
- **$1 billion** in rural energy grants supporting infrastructure and providing technical assistance.
- **$500 million** in biofuel infrastructure and agriculture product market expansion grants.

Federal Grants

The Infrastructure Investment and Jobs Act (IIJA), aka Bipartisan Infrastructure Law (BIL)**,** was signed into law by President Biden on November 15, 2021. The law authorizes $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. Funding from the IIJA is expansive in its reach, addressing energy and power infrastructure, all modes of transportation, water, environmental remediation, public lands, broadband and resilience. Some of the new programs funded by the bill could provide the resources needed to address a variety of infrastructure needs at the local level. The chart below shows the breakdown of the $550 billion budgeted in the IIJA for new investments (in $billions):



Current Federal Grant Programs Supporting Municipal Action (partial list)

US Department of Energy

Energy Efficiency & Conservation Block Grant Program

Cities, towns and villages with a population of at least 35,000 are eligible to apply to and receive grants directly from the U.S. Department of Energy (DOE). Funding is also available from this grant through state managed programs. Municipal efforts this grant can support include:

- Developing and implementing an energy efficiency and conservation strategy
- Conducting residential and commercial building energy audits
- Establishing financial incentive programs for energy efficiency improvements
- Developing and implementing energy efficiency and conservation programs for buildings and facilities
- Developing and implementing programs to conserve energy used in transportation (e.g. flex time for employees; satellite work centers; zoning guidelines or requirements that promote energy efficient development; infrastructure, such as bike lanes, pathways and pedestrian walkways; and synchronized of traffic signals)
- Developing and implementing building codes and inspection services to promote building energy efficiency
- Developing, implementing and installing on or in any government building onsite renewable energy technology that generates electricity from renewable resources, such as solar and wind energy, fuel cells and biomass

US Department of Transportation

Raise Discretionary Grants

The Rebuilding American Infrastructure with Sustainability and Equity, or RAISE Discretionary Grant program, is one of several ways communities can secure funding for projects under the Bipartisan Infrastructure Law's competitive grant programs. The grant is available for planning and capital investments that support roads, bridges, transit, rail, ports, or intermodal transportation.

Federal Grants

Strengthening Mobility and Revolutionizing Transportation (SMART) grant program
The SMART Grants Program funds purpose-driven innovation to build data and technology capacity and expertise for state, local, and tribal governments. The focus of the grant is to support demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety. Eligible projects fall into a broad range of categories including Safety and reliability; equity and access; climate and resiliency; and technology integration. The grant has $100 million appropriated annually for fiscal years (FY) 2022-2026.

example grant uses:
https://www.transportation.gov/grants/smart/smart-illustrative-use-cases

Surface Transportation Block Grant
The Surface Transportation Block Grant program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

Charging and Refueling Infrastructure Grant Program
The IIJA provides $2.5 billion for competitive grants. The U.S. Department of Transportation will administer the competitive grants for installation of electric vehicle charging infrastructure, hydrogen fueling infrastructure, propane fueling infrastructure, or natural gas fueling infrastructure that is directly related to the charging or fueling of a vehicle. The competitive grants are divided into two categories, Community Charging and Corridor Charging. Eligible entities include state or political subdivision of a state, metropolitan planning organization, local government, special purpose district or public authority with a transportation function, Indian tribe, and territory. Grants available under this program include:

Community Grants providing $1.25 billion to install electric vehicle charging and alternative fuel in locations on public roads, schools, parks, and in publicly accessible parking facilities. These grants will prioritize rural areas, low-and moderate-income neighborhoods, and communities with low ratios of private parking, or high ratios of multiunit dwellings.

Corridor Charging
Corridor Grants providing $1.25 billion to deploy publicly available electric vehicle charging and hydrogen/propane/natural gas fueling infrastructure along designated alternative fuel corridors.

In the City of La Crosse, I-90 is a designated corridor.

Alternative Fuel Corridors
To be eligible for funding, EV infrastructure under the NEVI Program and the competitive Corridor Charging Grant Program must be located on a designated Alternative Fuel Corridor.

In the City of La Crosse, I-90 is a designated corridor.

Strategies Supporting The Private Sector

Strategies focusing on support of sustainability and climate action within the private sector increase the depth of action within a community by leveraging public and private investments.

Type of Funding	Explanation	Example Projects	Links
Facilitating Private Investment in Community Projects	Property Assessed Clean Energy (PACE) programs allow a municipality to lend its tax collection enforcement power to a public funder, giving them additional assurance when lending for a specified purpose or investment. PACE has been used for energy upgrades in buildings, transportation upgrades, and resiliency investments. PACE for Commercial entities is a more straightforward program. Residential programs come with additional challenges due to lien	**Where**: Columbus, OH	https://www.columbus.gov/sustainable/cap
		When: 2020	https://www.columbus.gov/sustainable/cap
		What: The latest draft of the City of Columbus Climate Action Plan proclaims the City will receive $250 million in average annual PACE investments to support its plan's goals, and to establish a green bank by 2025.[21]	https://www.columbus.gov/sustainable/cap
Revolving Loan Fund	Supports energy project needs with projected cost savings, such as energy efficiency projects or where other fuel costs can be reduced. The fund will be replenished and used for additional projects over time, ideally, under an energy performance contract (working with a third party to manage energy use for savings). Funding will consider future reduced operations and maintenance, energy savings, insurance savings, and even certain non-energy benefits in the cost-savings analysis to determine project eligibility. However, tangible financial savings are required to replenish the fund.	**Where**: Montpelier, VT	
		When: 2018	https://www.vtenergydashboard.org/stories/montpelier-launches-revolving-loan-fund-for-energy-saving-projects
		What: Provided $20,000 from its Reserve Fund as initial seed money for their Net Zero Revolving Loan Fund, with a $10,000 match from their partners with Efficiency Vermont. The City tracks savings from sustainability projects and reinvests part of those savings for subsequent projects and pays marginal costs of energy improvements	

Strategies Supporting The Private Sector

Type of Funding	Explanation	Example Projects	Links
Green Bank	Green banks help fund improvements in buildings and transportation, as well as other resiliency measures such as flood prevention, essentially anything that could be categorized as a public benefit in the legislation. Green banks can come in various forms from a department within the state or municipality, or a separate nonprofit.[24]	**Where**: Ann Arbor, MI	https://www.a2gov.org/departments/sustainability/Documents/A2Zero%20Climate%20Action%20Plan%20_3.0.pdf
		When: 2021	
		What: The City's Climate Action Plan intends to create a $1 million loan loss reserve fund to provide credit enhancements for residents with lower credit scores and expand capacities to undertake energy efficiency and renewable energy improvements to low-income residents.	https://coalitionforgreencapital.com/

APPENDIX G

Acknowledgements

We are deeply grateful for the community collaboration and input that went into this plan. Below are some of the main contributors that made La Crosse's first Climate Action Plan possible:

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Jenasea Hameister	District 5
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