City of Burnsville
Sustainability Plan 2020

September 2020

Prepared by:

City Of Burnsville

making change personal
paleBLUEdot LLC

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MINNESOTA POLLUTION CONTROL AGENCY

Partial funding for this project was provided through a 2018 State of Minnesota Pollution Control Agency (MPCA) Environmental Assistance Grant supporting the climate adaptation planning portion of this plan.

Executive Summary

As an update to the City of Burnsville's 2009 Sustainability Guide Plan, this plan lays out the foundation for the City's continuing sustainability efforts over the coming decade. The goals, strategies, and actions included in this plan guide continuing improved sustainability for the City of Burnsville's municipal operations as well as citywide sustainability. This plan should be viewed as a living document, with progress on actions and impacts occurring regularly and adjustments to the plan being made based on actionable data. The Sustainability Plan 2020 continues to be aligned with the city's environmental end statement and the Council's commitment to sustainability, which states:

> Burnsville is committed to environmental stewardship through creative and innovative approaches to natural resource conservation.
> - People find Burnsville to be an attractive, clean city and want to preserve that.
> - We value natural water bodies and green spaces and recognize the importance of preserving them.
> - Development occurs in an environmentally sensitive manner, preserving and restoring natural resources.

Our Challenge

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

Our Opportunity

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

Our Vision

The City of Burnsville is committed to long-term environmental sustainability through multiple projects that help reduce greenhouse gases and energy use; protect water sources and nature; and promote the benefits of "being green".

Our Carbon Reduction Goal

To reduce community-wide GHG emissions **40% below 2005 levels by 2030** and **80% below 2005 levels by 2050.**

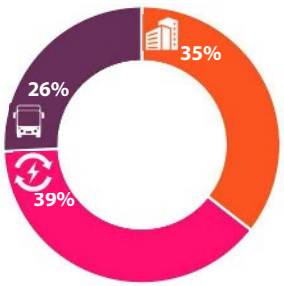
By the 2050's Burnsville Will Likely See…

Increase in Average Annual Temperature:	Days Above 95°F:	Air Conditioning Demand:	Average Rainfall:	Heavy Precipitation Events:	Growing Season:
+6°F	+15 days	+175%	+7%	+10%	+21 days (Time for 3 more generations of mosquitoes)

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

Reduction Share By Sector:

Share of Total 2030 Reductions of Sustainability



Cumulative Potential Cost Savings of Plan Measures Through 2030: $126,047,00

Implementing many of the measures in this plan, such as reduction of energy consumption or single-occupancy auto use, and avoided cost of carbon, can save money for the community.

Share of Potential Cost Savings by Sector:

Executive Summary

Our Sustainability Goals:

Buildings and Energy Efficiency

BE-A: 10% decrease in residential and commercial electric use from 2016 numbers by 2030.

BE-B: 5% reduction in residential and commercial natural gas use over 2016 numbers by 2030.

BE-C: Improve total City owned building energy efficiency by 10% electricity and 7% natural gas by 2030.

BE-D: Achieve a minimum of 1 net zero ready or net zero City owned facility by 2030.

Fleet and Equipment

FE-A: Emissions and fuel reductions – City operations.

FE-B: Reduce fleet size and associated costs - City operations.

FE-C: Influence private sector.

Ground Cover

GC-A: Increase tree cover and civersity (Citywide tree canopy coverage goal of 33% by 2030 and 37% by 2040).

GC-B: Increase the use of Native Species and Pollinator Restorations Areas.

GC-C: Reduce heat island effect.

Local Food

F-A: By 2030, increase total number of community gardens, with a priority given to neighborhoods with limited food access, limited vehicle access, and elevated poverty levels to 6 (9-10 per 100,000 Residents).

F-B: By 2030, increase total number of farmers markets, with a priority given to neighborhoods with limited food access, limited vehicle access, and elevated poverty levels to 2 (3-4 per 100,000 Residents).

Transportation

T-A: Increase Public Transit ridership from 4.5% to 6% of commuters by 2030.

T-B: Increase Walk/Bike Transportation 0.5% by 2030 (of total commute).

T-C: Increase Electric Vehicle Adoption to 10% of Citywide Vehicle share by 2030.

T-D: Achieve a "Bicycle Friendly Community Bronze Level" by 2028.

Community Health

CH-A: Develop a standardized educational program on ways to improve health of citizens, workers and students while promoting a healthier lifestyle.

CH-B: To meet or exceed the goal of reducing greenhouse gas emissions from city operations by 40%, while encouraging the public to reduce emissions and pollutants.

CH-C: Educate employees on current environmental policies and develop new policies in areas that are lacking and enforce those policies.

CH-D: Develop a standardized educational program on ways to improve conservation and pollution reduction.

CH-E: Explore more options to reduce heat island/roof effects and educate public/business about potential effects and areas for improvement.

Land Use

L-A: Increase acres of transit oriented development by 10% by 2030.

L-B: Increase acres of mixed use zoning development by 10% by 2030.

L-C: Openspace land use area (public and public accessible on private land) increase from 4,540 to 4,800 acres by 2030.

Renewable Energy

RE-A: 7.5% on-site solar (or REC purchase) for residential and commercial by 2030.

RE-B: 5% Increase in residential and commercial fuel switch to natural gas alternative (Bio Gas, etc).

RE-C: Achieve 100% renewable energy for all electric use for City owned facilities by 2030.

Solid Waste and Recycling

SW-A: Reduce waste in City operations and work towards an 85% diversion rate .

SW-B: Increase residential recycling and waste reduction.

SW-C: Promote commercial and multi-family recycling.

Water

W-A: Protect ground water resources.

W-B: Meet burnsville TMDL goals for Alimagnet and Keller lakes.

W-C: Encourage water reuse.

W-D: Promote low impact development (LID) and green infrastructure approaches.

Section 01

Introduction

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Introduction

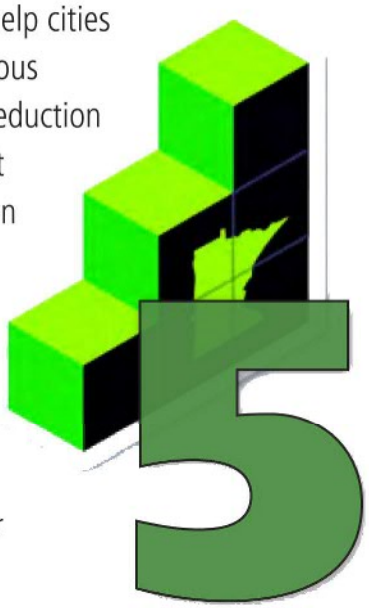
The City of Burnsville has been on the leading edge of critical sustainability planning efforts across the state since 2009 when they executed their first Sustainability Guide Plan. The 2009 Sustainability Guide Plan was a first-of-its-kind effort in the region to understand the city's role in climate change and chart a course for a healthier, more sustainable future. The plan looked at 14 Best Practice Areas (BPAs) from transportation and renewable energy to community health and urban forests. The plan outlined a number of recommended activities and strategies to pursue in each BPA in order to further the goal of sustainability in the city of Burnsville.

After completion of the 2009 Sustainability Guide plan the City of Burnsville worked diligently to pursue many of the strategies outlined in the plan. The results of this were some innovative approaches to education and awareness about sustainability issues and some tangible improvements to citywide sustainability. This Sustainability Plan 2020 is an update and continuation of the 2009 initial planning effort and will guide the City's sustainability initiatives through 2030.

The City employs a part-time sustainability coordinator, Sue Bast, who works year-round to implement sustainability initiatives and best practices across all departments and with private partners in the community. The City also publishes a yearly sustainability update that informs citizens about what is being done to advance sustainability in city operations and in the community at large. Stories about some of those achievements are included throughout this Plan and are designated with this symbol:

MN GreenStep Cities Step 5 Award

Minnesota GreenStep Cities Program is a voluntary recognition program to help cities achieve their sustainability goals. There are 112 cities in the program at various levels. Each city implements actions that focus on cost savings, energy use reduction and that encourage civic innovation. The City of Burnsville implemented best practices and actions, measured and reported our results, and now has shown improvement. Only a few cities have qualified for Step 5.



- ✔ **kBTU per square foot, per year:** reduced from 113.31 in 2014, to 107.17 in 2015, to 103.68 in 2016
- ✔ **Percentage of lighting that uses LED's for streetlights:** increased from 12% to 24%; added 50 street lights in 2016
- ✔ **Increased the net number of new trees planted:** 15 more than last year

Introduction

Burnsville's Vulnerability to Climate Risks:

Climate change is a global phenomenon that creates local impacts. It presents one of the most profound challenges of our time. A broad international consensus exists among atmospheric scientists that the Earth's climate system is being destabilized in response to elevated levels of greenhouse gas emissions in the atmosphere. Two changes to Minnesota's climate are occurring already: shorter winters with fewer cold extremes, and more heavy and extreme precipitation. Increases in the global surface temperature and changes in precipitation levels and patterns are expected to continue and intensify for decades. In turn, these changes in climate have impacts on the economy and health of local communities.

The following highlight the vulnerabilities to climate risks facing Burnsville, excerpted from the 2018 Burnsville Climate Vulnerability Assessment:

Medium | Medium-High | High

Heat Stress
(High)

Warmer temperatures and more extreme heat may lead to higher risk of heat-related illness.

Air Quality
(Medium-High)

Increased heat may result in more days of poor air quality and exposure to allergens, impacting respiratory illnesses.

Vector-Borne Disease
(Medium)

Longer growing seasons and higher temperatures may increase vector-borne diseases like West Nile Virus and Lyme disease.

Mental Health
(Medium-High)

Exposure to increased climate impacts and disasters may lead to increased anxiety and other mental health ramifications.

Housing
(High)

Warmer temperatures will increase demand for air conditioning and weatherization needs. Energy costs may be difficult for vulnerable populations to meet. Heavier rains coupled with higher risk of surface drought conditions may cause more local flooding, particularly "flash flooding" which could cause damage to housing and reduce mobility for portions of the community.

Stormwater Management
(High)

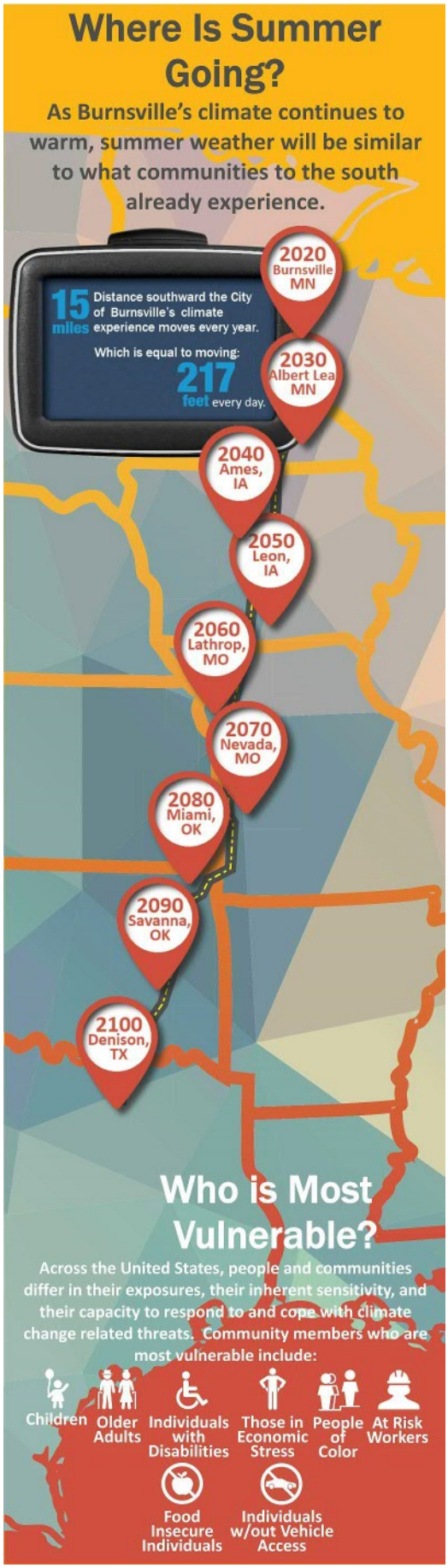
Heavier rains coupled with higher risk of surface drought conditions may significantly increase demand on stormwater management. The city's stormwater infrastructure may not be capable of handling the amount of runoff during more frequent heavy down pours, requiring resources to make needed upgrades..

Trees, Greenspace, and Agriculture

Increased temperatures and changes to precipitation will stress trees, greenspace, and agriculture. Conditions may be more favorable for disease, pests, and invasive species. Trees and crop species which formerly thrived in the area's climate may be less suited for future climate conditions.

Surface Water Quality
(Medium)

Increases to heavy rain events and flooding/flash flooding risk may negatively impact water quality in the city's lakes, streams, and rivers. Increased pollutants and contamination potential, combined with increased annual water temperatures could increase risk to algal and bacterial growth, harming habitats and limiting recreation.



Introduction

Why Create a Sustainability Plan

The creation, and dedicated implementation of a Sustainability Plan is an organized way for a City to contribute to solving environmental challenges while helping its resident and business communities create improved resilience to the current and future impacts and risks of climate change and other environmental stressors.

What is a Sustainability Plan

Sustainability plans are comprehensive road maps that outline the specific Strategies and Actions that a City will implement to address environmental concerns, improve community sustainability, reduce greenhouse gas emissions and build resilience to related climatic impacts. The Burnsville Sustainability Plan addresses broad sustainability goals as well as climate mitigation and climate adaptation actions.

What is Climate Change Mitigation?

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

What is Climate Change Adaptation?

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

The Role of Cities in Sustainability Action

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

Types of Sustainability Plan Actions:

Leading by Example:

Actions the City can apply to city operations or facilities to illustrate actions others can take:

- Install solar on rooftops of public buildings
- Adopt net-zero energy standards for public facilities
- Convert city fleets to EVs

Advocating:

Encourage change in support of meeting CAP goals - these can include lobbying at State/Federal and educating public on actions they can take:

- Lobby for PACE financing legislation
- Promote utility rebate programs
- Provide Net Zero and Solar Ready Guides to Residents and Businesses

Require:

Actions the City can take to require actions within the private sector:

- Require energy efficiency and renewable energy within PUD ordinance
- Adopt an energy benchmarking ordinance
- Require solar pv feasibility assessment with all new building permits

Incentivize:

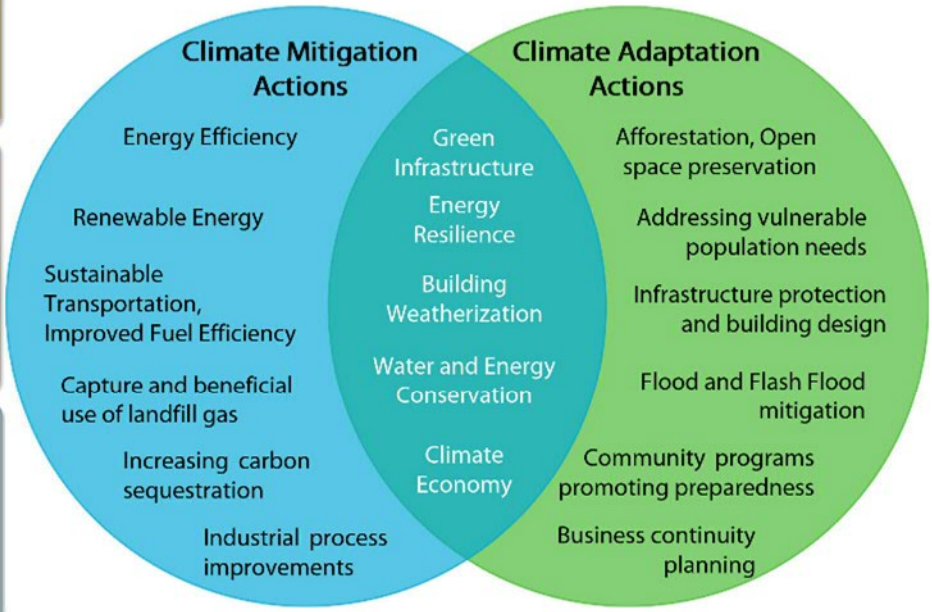
These can include direct economic incentives as well as actions which remove barriers:

- Expedite permitting for clean energy projects
- Offer Net Zero technical assistance
- Establish a Renewable Energy grant program for income qualified residents.

Sustainability Action As A Journey

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

Synergy of Mitigation and Adaptation Actions



Sustainability Plan Framework

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

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

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

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

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

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

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

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

This sector includes the mix of energy generation within the city of Burnsville and focuses on a transition from fossil fuel consumption and a shift in Burnsville's energy supply to cleaner, low and no carbon sources. Strategies in this sector include advancing on-site renewable energy as well as "fuel switching" to transition on-site fossil fuel combustion to non-combustion, renewable energy sources.

This sector area includes the sustainability and emissions of on-road vehicle fleets and fuel consuming equipment like lawn mowers. Strategies in this sector area focus on shifts to cleaner, low and no carbon fuel vehicles and equipment in the city of Burnsville.

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

This sector area focuses on land use patterns which increase the sustainability of Burnsville and support healthy lifestyles and mobility. Strategies in this sector include supporting public transit, inter-modal transportation, walkable communities, and access to greenspace.

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

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

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

Introduction

Benefits of Sustainability Action

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

6 Ways Sustainability Action Can Be Good For Burnsville's Economy

1: Burnsville can lower emissions while growing the economy.
Since 2005, Burnsville's GDP has increased 41% while community wide GHG emissions have fallen over 12%.

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

3. Clean energy jobs already employ about 3.5 million Americans and growing.
The transition to renewable energy is a transition to local energy sources and infrastructure – and retention of more energy expenditures in the local economy. According to a study by the non-profit group MassSolar, every dollar invested in solar creates $1.20 in local economic benefits.

4. CAP focus areas can save Burnsville residents and businesses money.
Energy efficiency improvements, renewable energy adoption, and reduced single occupancy vehicle dependence strategies included in this plan can result in annual savings for Burnsville businesses and households.

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

6. Without action, Burnsville will face increasing economic damage.
According to NOAA Records, extreme weather and climate disasters in Dakota County have increased 46% in the last twenty years, causing an average of $10,000,000 in damages annually. According to a study by the University of California at Berkeley, climate impacts can be expected to increase agricultural damage, death rates, energy costs, and violent and property crime rates in the City of Burnsville. In addition, as annual average temperatures and the number of extreme heat days increase, economic productivity will decrease due to labor efficiency losses. These impacts can be used to establish an estimated minimum "Social Cost of Carbon" - a measure of the economic harm of those impacts from emitting one ton of carbon dioxide into the atmosphere.

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

Types of Sustainability Action Benefits

Introduction

Estimated Economic Risk of Climate Change to Burnsville by 2100

(in today's dollars)

Annual % Change by Category:

Agriculture	Mortality	Energy	Productivity	Property Crime	Violent Crime
-11%	+3.7%	+7.8%	-1.2%	+2.1%	+4.1%

= $11,812,756

Annual Cost Impact (in 2020 dollars)*

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

Estimated Social Cost of Carbon

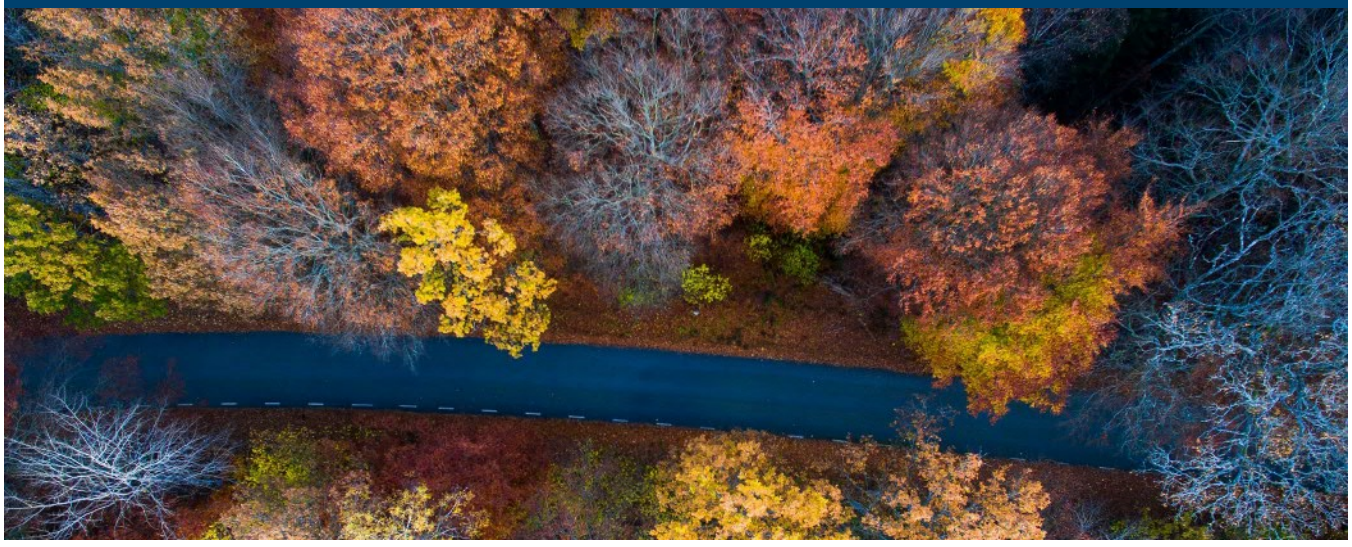
"Social Cost of Carbon" is an effort to properly account for the damages caused by greenhouse gas emissions and the resulting climate change impacts. By including the social cost of carbon in planning efforts, agencies and busineses can properly evaluate policies and decisions that affect greenhouse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

In 2018, the Minnesota Public Utilities Commission established a value range for Minnesota specific Social Cost of Carbon from $9.98 to $47.47 per metric ton of GHG emissions. This report uses the mid-range value of $28.72 for Social Cost of Carbon calculations in this plan. (When compared to the estimated values established by the EPA which range up to $123 per metric ton, this number can be viewed as a conservative value)

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

Household Savings Potential:		Business Savings Potential:		Social Cost of Avoided Carbon:		Cumulative Community-Wide Savings Potential:
$59,674,000	+	$47,044,000	+	$19,329,000	=	$126,047,000*

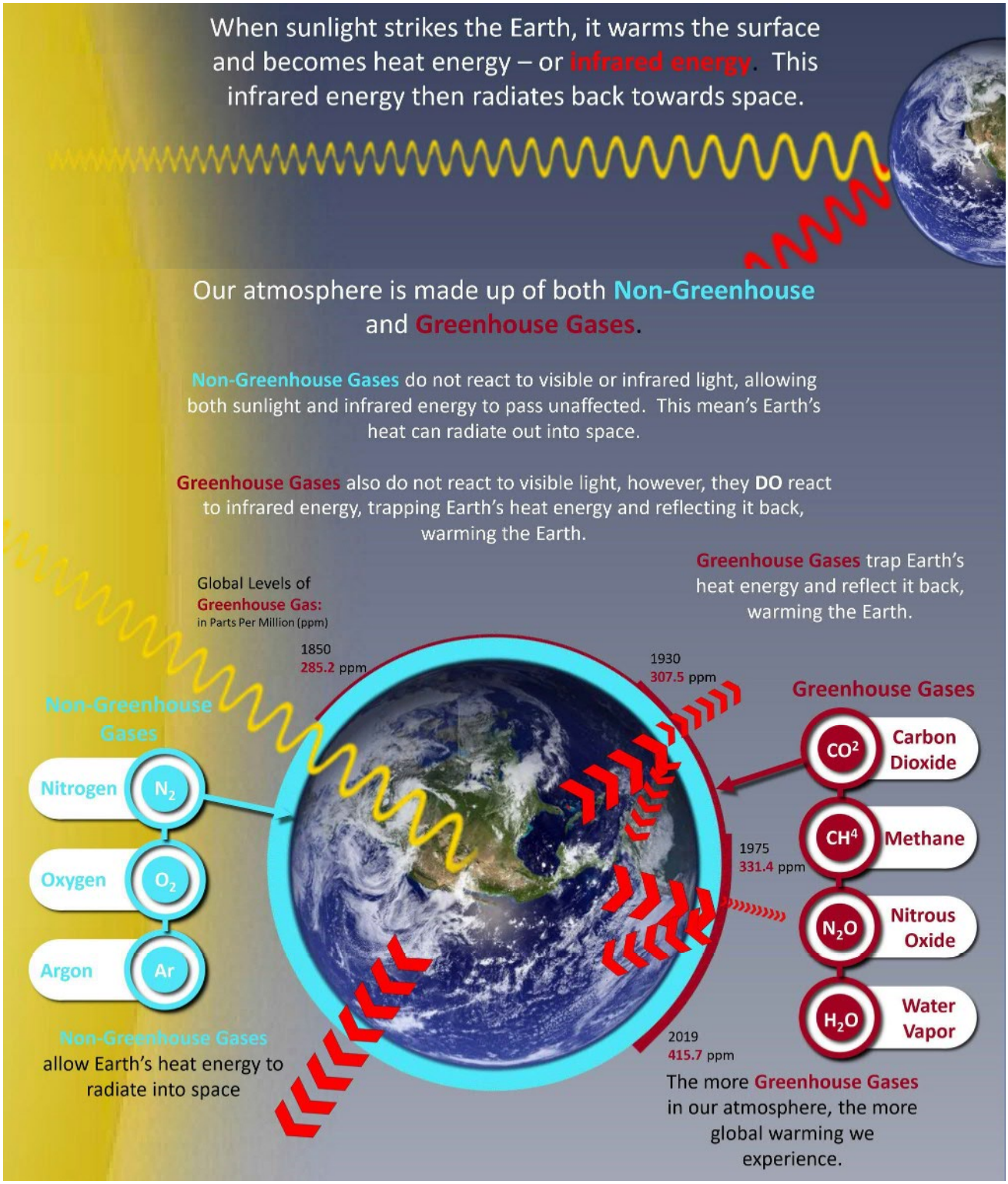
* Value does not include economic potential of job creation and new business potential represented in the Sustainability Plan actions.



Introduction

Greenhouse Gas Emissions (GHG) and Climate Change

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



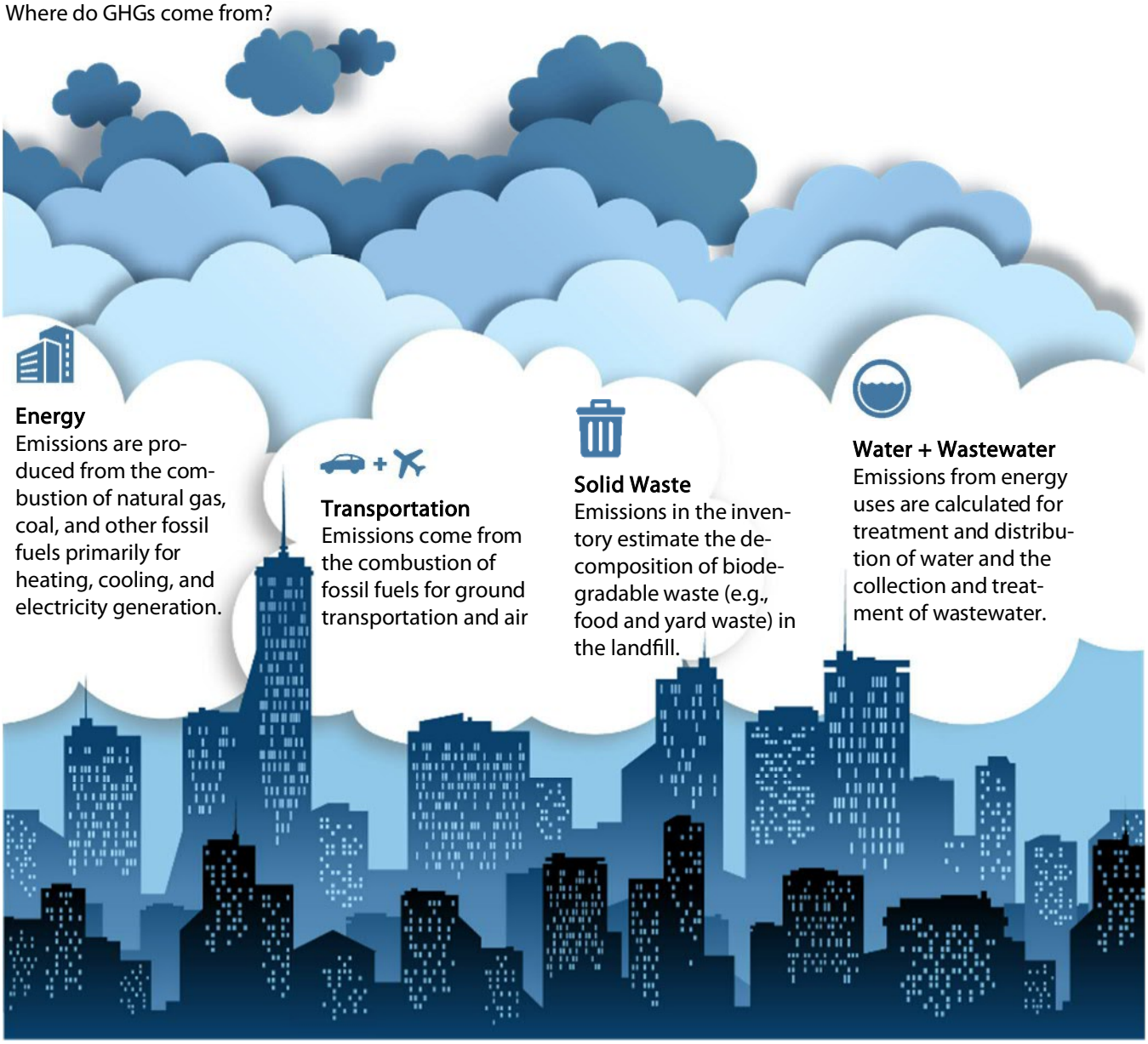
Introduction

What Are GHG's?

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

Greenhouse Gas Sectors

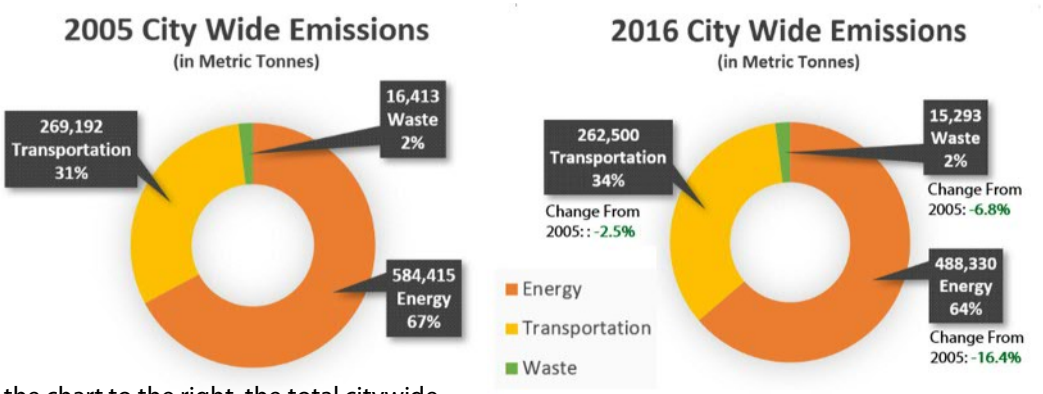
Where do GHGs come from?



Introduction

Citywide GHG Emission History

Overall summaries of total city wide emissions for the categories of Energy, Transportation and Waste are shown below for the Sustainability Plan baseline year of 2005 and for 2016 (most recent year data is available for the city):



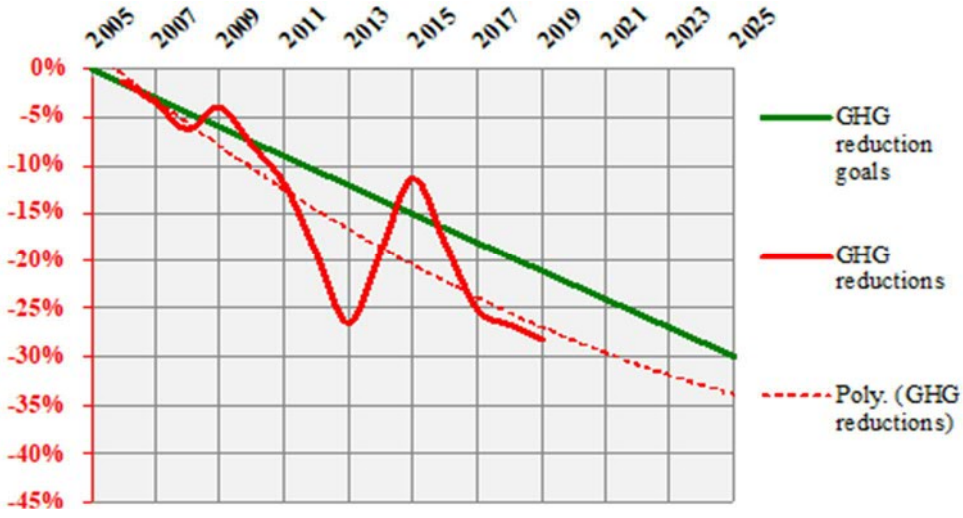
As shown on the chart to the right, the total citywide emissions for Burnsville has reduced 103,897 metric tons, representing an 11.9% decrease between 2005 and 2016. With emissions categories of Energy and Waste decreasing the most, while Transportation emissions having a recent upward trend.

Change 2005-2016	2016 GHG		Difference From 2005	
Energy	488,330	mTonnes	-96,085	-16.4%
Transportation	262,500	mTonnes	-6,692	-2.5%
Waste	15,293	mTonnes	-1,119.88	-6.8%
Total	766,123		-103,897	-11.9%

City Operations GHG Reductions

City Operations Reduction Targets and Accomplishments: In May 2010, the City began a process of identifying a GHG assessment protocol and criteria for setting reduction goals and strategy priorities. In 2011, the City prepared the report, *City of Burnsville GHG Reduction Goals, Implementation Priorities, Baseline Assessment* (March, 2011), which included the following goal: "Make continual progress over time toward the GHG reduction goals of Minnesota Next Generation Energy Act of 2007." The Act established nationally aggressive statewide greenhouse gas reduction goals, using 2005 as a baseline, of 15% by 2015, 30% by 2025, and 80% by 2050.

The City exceeded its 2015 goal of a 15% reduction in the emissions from its governmental operations as early as 2011. By 2019, GHG emissions from City Operations were 30% lower than City Operations emissions in the 2005 Base Year – meaning the City has met its 2025 City Operations GHG reduction goal 5 years ahead of schedule. If the City is able to continue its current City Operations GHG reduction trend, a 38% reduction is possible by 2025

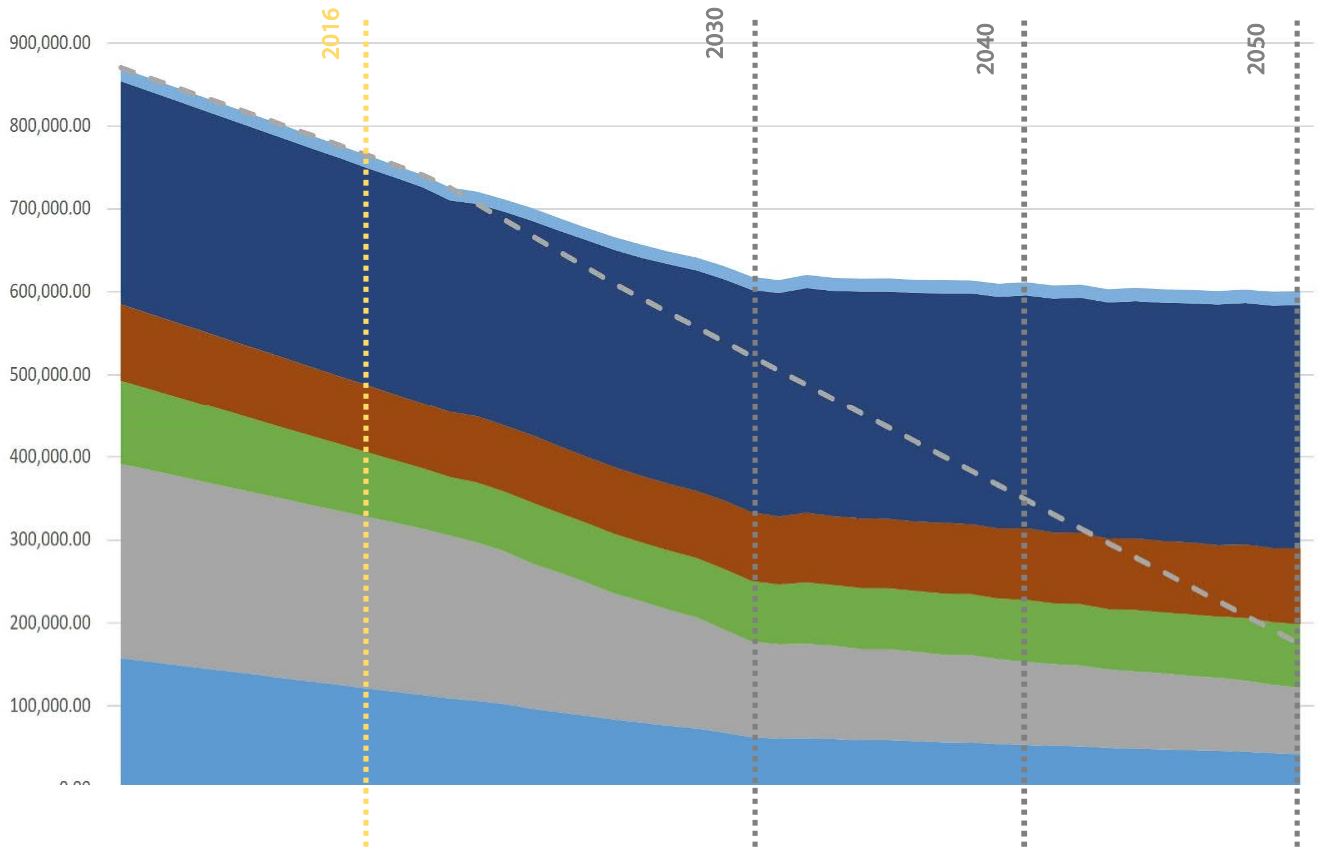


Introduction

Citywide GHG Emission Forecast

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

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



The Business-As-Usual forecast for Burnsville city-wide emissions anticipates a notable reduction in emissions associated with electrical consumption, even though total electric consumption is anticipated to increase. This is due to current electrical utility commitments for the reduction of fossil fuel use for electric generation. Emission projections for natural gas consumption and transportation (vehicle miles traveled) are projected to increase in the coming years.

Introduction

Sustainability Plan GHG Reduction Goal

The GHG emission reduction goals guiding this Sustainability Plan are to reduce community-wide GHG emissions 40% over the 2005 baseline by 2030, and then to achieve an 80% reduction by 2050.

GHG Emission Reduction Goal in Global Context

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

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

Fair Share Citywide Emission Reductions To Meet Global Need

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

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

Sustainability Plan Approach to Emissions Reduction

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

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

2030 Citywide GHG Emissions Goal:

522,198
Metric Tons

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

555,670
Metric Tons
25% below 2018

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

333,400
Metric Tons
55% below 2018

"Fair Share" Model Review of Sustainability Plan 2030 Goal:

Introduction

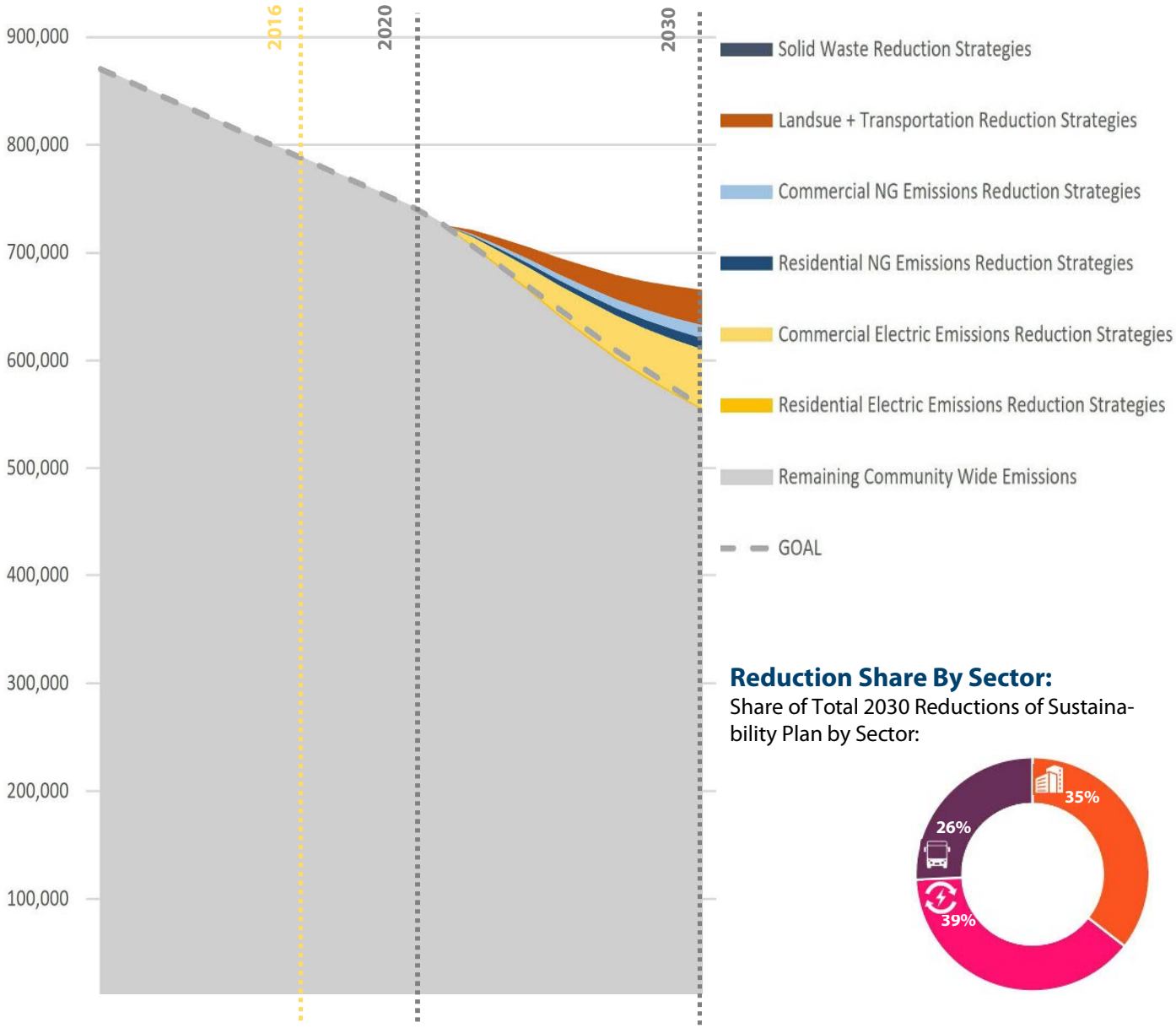
Estimated Citywide GHG Reductions Included in This Plan

Compared to the 2016 citywide GHG emissions, the total estimated emissions citywide reductions included in the initial implementation actions of this plan are projected to total 242,492 metric tons annually. These estimated reductions are projected to result in total citywide GHG emissions of 521,935 metric tons. The potential cumulative GHG emissions reductions over the 10 year implementation period are estimated at over 658,465 metric tons - an elimination of over **12,9 Billion** cubic feet of man made greenhouse gas atmosphere annually.

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

Citywide GHG Emission Reductions Wedge Diagram

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



Reduction Share By Sector:

Share of Total 2030 Reductions of Sustainability Plan by Sector:

Section 02

Buildings and Energy Efficiency

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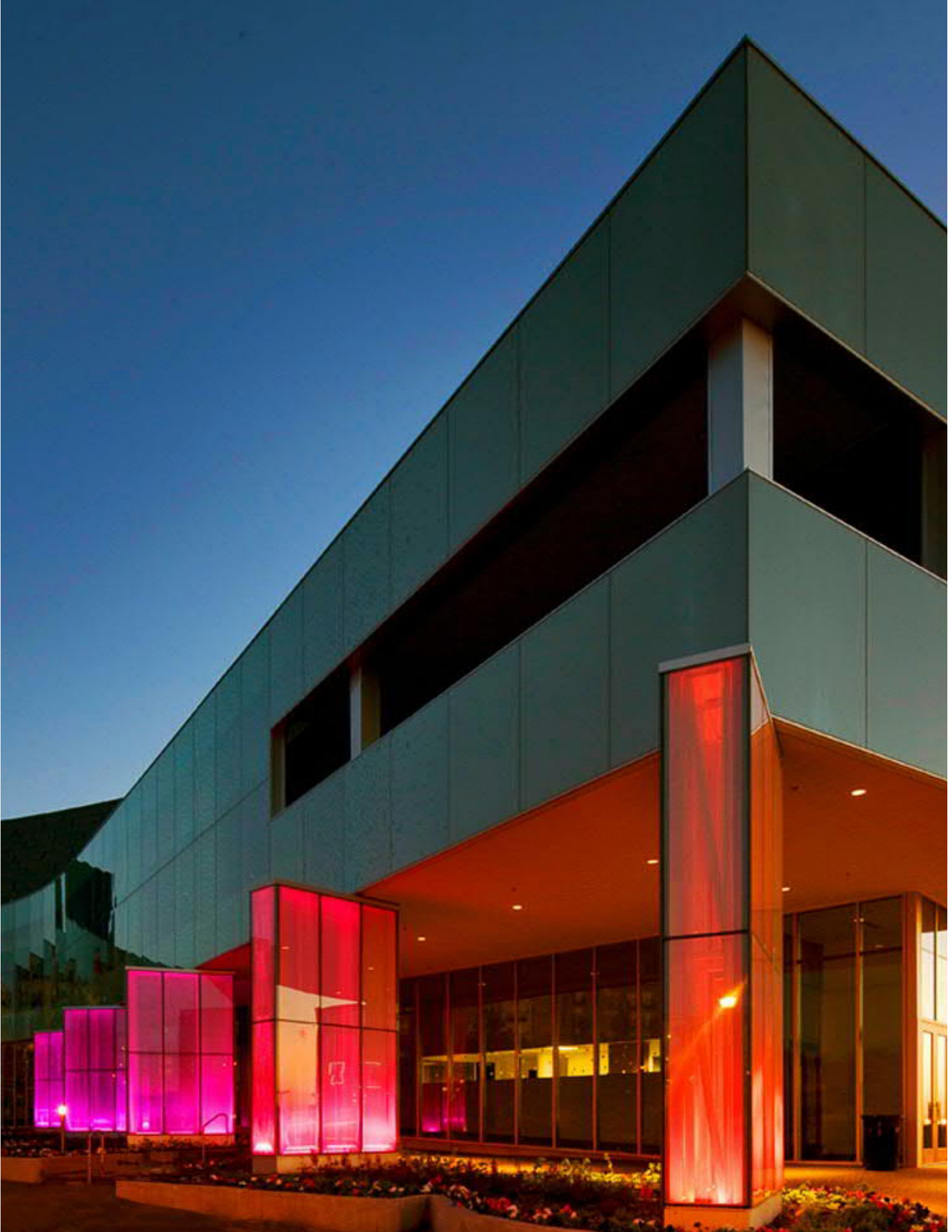


Buildings and Energy Efficiency

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

Building energy use is a major contributor to greenhouse gas (GHG) emissions, and building design plays a large role in determining the future efficiency and comfort of facilities. Increasing energy efficiency can help reduce GHG emissions and result in significant cost savings for both homes and businesses. The Burnsville community can also achieve environmental, social, and economic benefits through enhancements to the built environment.

Equity Considerations:

- Often, families that live in properties that are not energy efficient are also those that can least afford high-cost utility bills. These households may lack the ability to pay for energy efficiency improvements or access renewable energy options.
- Renters of both single family homes as well as multi-family housing do not have the ability to implement energy efficiency measures within their housing to gain the benefits of energy efficiency. Energy efficiency retrofits are typically in the hands of the landlord while the costs associated with the resulting energy use are usually paid by the resident.

Burnsville Sustainability Accomplishments

The City of Burnsville promotes development in the community in two ways. The first, and most obvious, is to spur economic opportunities. The second, and probably most important, is to emphasize the protection and restoration of the natural environment during these projects.

Community well-being – both for businesses and residents – depends on the ability to meet the needs of the present without compromising the future. This Sustainability Update details some of the projects and initiatives that are helping Burnsville meet its "green goals."

City Property Conservation Measures

Obsolete and worn-out equipment is being replaced with the most energy efficient available.

New Fixtures	Kwh Saved	Cost	Annual Savings	Rebates Earned
422	126,458	$118,926	$11,045	$21,784

$32,829 SAVED

Did You Know?

Improvements to City building, and facilities have already reduced the city building greenhouse gas emissions by 28% Since 2005!

5,342 Metric Tons

Of greenhouse gasses saved by City of Burnsville buildings and facilities annually.

Buildings and Energy Efficiency

Burnsville Building Stock

The measure of a community's existing building stock, certified high performance buildings, and housing characteristics provides a basis for determining the current and potential energy efficiency gains for the community. Energy and water efficiency upgrades are one of the simplest and most effective ways to conserve resources, save money, and reduce greenhouse gas emissions. New building technology has increased energy efficiency significantly in recent decades. Although newer U.S. homes are 30 percent larger, they consume a similar amount of total energy as older homes - meaning they are more energy efficient per square foot of space. Consequently, this means that retrofitting older homes with some of these technologies provides ample opportunity to improve energy efficiency throughout the community.

National benchmarking and certification tools can help measure as well as promote energy efficiency of buildings in a community. The US EPA ENERGY STAR program, for instance, certifies high performing buildings. On average, ENERGY STAR certified buildings use 35% less energy than typical buildings nationwide. LEED certification is another measure of energy efficiency. Energy Benchmarking data from Washington, D.C. are the first to show that LEED-certified office buildings demonstrate decreased energy use (site or source) of 15 percent, on average, compared with other D.C. office buildings. Finally, the New Buildings Institute certifies Net Zero buildings, buildings which generate as much on-site renewable energy as they consume in a year, and all Net Zero buildings eliminated all greenhouse gas emissions associated with their energy consumption.

Existing High Performance Buildings in Burnsville

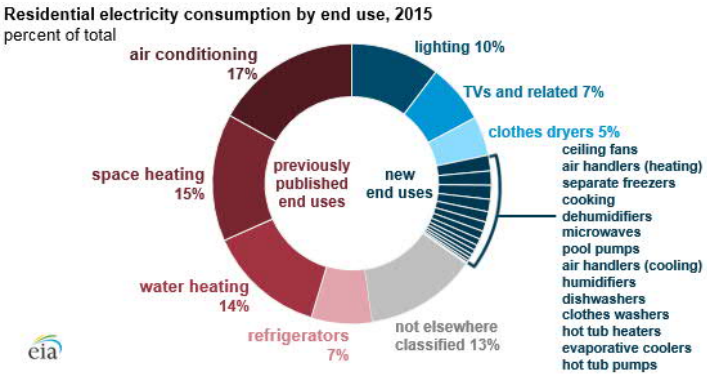
ENERGY STAR Certified Buildings:	8
LEED Certified Buildings:	1
LEED Silver Buildings:	0
LEED Gold / Platinum Buildings:	0
Certified Net Zero Buildings:	0

Sources: US EPA ENERGY STAR, US Green Building Council, New Buildings Institute

Green Roofs in Burnsville

Existing Green Roofs, Known:	1

Sources: Greenroofs.com, Rooftop Sedums LLC



City of Burnsville Total Building Stock

Building Type	2019 Count
Single Family Residential	17,870
Apartment Buildings	212
Commercial	579
Industrial	355
Utility	32
Cabins	0
Total	**19,048**

Source: US Census

City of Burnsville Housing Stock

Housing Breakdown	Total		2010+		2000-2009		1980-1999		1960-1979		1940-1959		1939-Earlier	
2017														
Total Occupied Housing Units	**24,553**		554	2.3%	1766	7.4%	10824	45.1%	9989	41.6%	1010	4.2%	410	1.7%
Owner Occupied	**15,710**	65.5%	72	0.0%	1070.0	60.6%	6554	60.6%	7185.0	71.9%	672	66.5%	157	38.3%
Renter	**8,843**	36.9%	482	0.0%	696.0	39.4%	4270	39.4%	2804.0	28.1%	338	33.5%	253	61.7%

Source: US Census

Buildings and Energy Efficiency

Energy Efficiency Potential of City of Burnsville Housing Stock

According to the 2017 U.S. Census, 93% of single family homes in the City of Burnsville were built prior to 2000, and over half were built prior to 1980. According to the National Association of Home Builders, homes built prior to 1980 consume an average of 20%-35% more than homes built after 2000.

In the Midwest, the average single family detached home uses 10,400 Kwh annually compared with 6,000 Kwh annually for the average apartment. Based on these numbers, we can estimate that of the total annual residential electric use of 186,000,000 Kwh, single family homes consume approximately 75% and apartments 25%.

If all single family homes in Burnsville were renovated to achieve the energy efficiency level of those built after 2000, an estimated 14.3 million Kwh could be saved annually totaling nearly 8% of all residential electric use in the City. Renovating apartments to achieve the same energy efficiency could save an additional 3.5 million Kwh, for an additional 2% reduction in all residential electric use.

Home Energy Efficiency Improvements in Burnsville Since 2010

XCEL Home Energy Squad Visits

2013: 7
2014: 9
2015: 10
2016: 7
2017: 48
2018: 48
2019: 39 (six months)

Total: 168

Estimated Resulting Annual Kwh Savings:

110,000 KWh

Sources: Center for Energy and Environment

Energy Efficiency Programs For Residents

Commercial electricity use in Burnsville increased from 320 million Kwh in 2010 to 336 million in 2016, an increase of 5%. During the same timeframe, residential electric use decreased 9% from 205 million Kwh to 186 million Kwh annually.

Commercial natural gas use in Burnsville increased 11% between 2010 and 2016 from 136,000 Therms to 152,000 therms. Meanwhile, residential natural gas use in Burnsville decreased 6.5% from 157,000 Therms to 147,000 Therms.

There are already energy efficiency programs and resources available in the City of Burnsville. As an example, Xcel Energy costumers can increase their home's energy efficiency through a Home Energy Squad visit. Homes participating in this type of home energy efficiency tune up can typically reduce their annual energy consumption by 650 to 900 Kwh - a reduction of 6-10%. Since 2010, Xcel has provided 168 Home Energy Squad visits, resulting in an estimated energy reduction of 110,000 Kwh annually.

Residential Energy Efficiency Potential	Total	% of Res Use	Annual Participating Units Needed
Total Occupied Housing Units	**24,553**		
Owner Occupied	**15,710**		
Renter	**8,843**		
Total Residential Electricity Use	185,966,152		
Potential HES Annual Energy Reduction			
100% Participation in 10 years			
Owner Occupied	17,281,000		1571
Renter	7,737,625		884
Total	25,018,625	13.5%	2455
50% Participation in 10 years			
Owner Occupied	8,640,500		786
Renter	3,868,813		442
Total	12,509,313	6.7%	1228
25% Participation in 10 years			
Owner Occupied	4,320,250		393
Renter	1,934,406		221
Total	6,254,656	3.4%	614
10% Participation in 10 years			
Owner Occupied	1,728,100		157
Renter	773,763		88
Total	2,501,863	1.3%	246

Buildings and Energy Efficiency

2030 Buildings and Energy Efficiency Goals

BE-A: 10% decrease in residential and commercial electric use from 2016 numbers by 2030.

BE-B: 5% reduction in residential and commercial natural gas use over 2016 numbers by 2030.

BE-C: Improve total City owned building energy efficiency by 10% electricity and 7% natural gas by 2030.

BE-D: Achieve a minimum of 1 net zero ready or net zero City owned facility by 2030.

Strategies

Strategy BE1 Improve total City owned building energy efficiency by 10% Electricity and 7% Natural Gas by 2030.
How We'll Measure it:
City facility annual Electricity and Natural Gas use reported.

Strategy BE2 Achieve a minimum of 1 Net Zero ready or Net Zero City Owned facility by 2030.
How We'll Measure it:
Select city facility on-site annual energy generation equal to or greater than facility's reported annual Electricity and Natural Gas use.

Strategy BE3 Improve total Community wide residential building energy efficiency by 10% Electricity and 5% Natural Gas by 2030.
How We'll Measure it:
Community wide residential annual Electricity and Natural Gas use reported.

Strategy BE4 Improve total Community wide commercial building energy efficiency by 10% Electricity and 7% Natural Gas by 2030.
How We'll Measure it:
Community wide Commercial building annual Electricity and Natural Gas use reported.

Strategy BE5 Increase ENERGY STAR certified buildings within the community to 20 by 2030.
How We'll Measure it:
Certified buildings within City of Burnsville reported by US EPA ENERGY STAR.

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Buildings and Energy Efficiency

Detailed Implementation Actions

Benefits Key

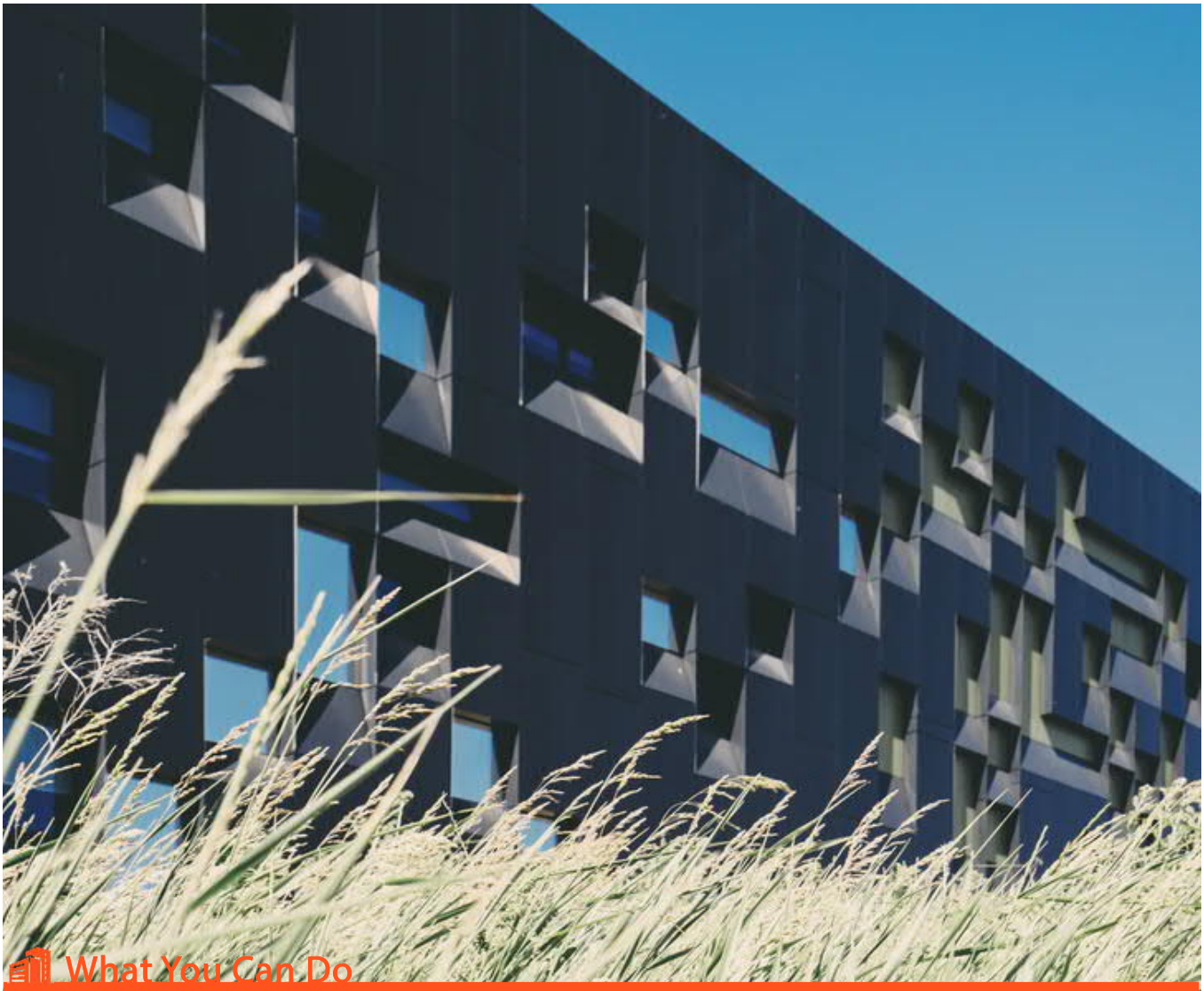
- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Buildings And Energy Efficiency					
Strategy BE1	**Improve total City owned building energy efficiency by 10% Electricity and 7% Natural Gas by 2030**					
BE1- 1	Water Department to continue rewarding rebates for the installation of Smart Controllers on residential building to decrease the amount of irrigation water used. This reduces the energy used at the Water Treatment Plant	1	City Facilities Energy Audit and Energy Efficiency Master Plan	$	●	●
BE1- 2	**Conduct a City Facilities Energy Audit on all buildings within the next 3 years. Use results from City Facilities Energy Audit to prioritize City Facilities Capital Improvement Plans (CIPS) and maintenance improvements.**	**1**	City Facilities Energy Audit and Energy Efficiency Master Plan	$	●	
BE1- 3	Continue to track 11 City Buildings Energy Use through B3 Benchmarking	1	ENERGY STAR Program		○	
BE1- 4	Create a policy, to be part of assigned duties and presented during new employee orientation, that City employees shall turn off lights and equipment when they are done using them	2	Staff Sustainability Handbook and Training	$	●	
BE1- 5	**Conduct a occupancy and plug load energy efficiency study of primary city owned facilities and establish a "Plug Load and Occupancy Energy Eficiency Guide" outlining operational practices to advance the City's energy efficency goals for City facilities. Provide training to all existing city employees and provide on-going training to all new city hires.**	**2**	City Facilities Energy Audit and Energy Efficiency Master Plan	$	○	
BE1- 6	Continue and expand the City's Sustainability Fund to encourage City Departments to be more energy efficient	2	City Facilities Energy Audit and Energy Efficiency Master Plan		●	
BE1- 7	Establish a policy that the City will look at the most energy efficient products When replacing equipment.	2		$	●	
BE1- 8	Evaluate the use of low-carbon concrete and/or recycled asphalt shingles on City buildings	3	City Facilities Energy Audit and Energy Efficiency Master Plan		●	
Strategy BE2	**Achieve a minimum of 1 Net Zero ready or Net Zero City Owned facility by 2030** (Net Zero is defined as a building which generates as much energy on-site as it consumes in a year)					
BE2- 1	Following the completion of an energy audit overview of all City facilities, identify potential sites for Net Zero retrofit/renovation.	1	City Facilities Energy Audit and Energy Efficiency Master Plan		●	●
BE2- 2	Establish a policy requring all future new construction City owned facilities to meet high performance energy efficiency levels and to be constructed to meet "Moving Towards Net Zero Ready" guidelines.	3		$	●	●
Strategy BE3	**Improve total Community wide residential building energy efficiency by 10% Electricity and 5% Natural Gas by 2030**					
BE3- 1	Encourage homeowners to sign up for the City of Burnsville Customer portal on the City Website. The new water meter customer portal will allow people to track their usage, set goals, set notifications when they reach a certain amount of gallons, and they will be notified if they have higher than normal usage.	1			○	●
BE3- 2	The City will partner with local utilities to promote energy efficiency programs and rebates	2		$	●	●
BE3- 3	Partner with Dakota County CDA to promote programs for seniors, residents and 1st time home buyers.	3		$	●	●
BE3- 4	Partner with local community organizations serving under-resourced households to promote energy audits for low-income residents	3		$	●	●
BE3- 5	Explore a cool roofs policy for new residential development with air conditioning that applies the voluntary standards established by CalGreen.	3		$	●	●

Buildings and Energy Efficiency

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
BE3- 6	Establish a cost subsidy for Home Energy Squad visits, particularly for vulnerable, at-risk, and low income residents.	3		$		
Strategy BE4	**Improve total Community wide commercial building energy efficiency by 10% Electricity and 7% Natural Gas by 2030**					
BE4- 1	**Create and advertise a building energy disclosure program for all public buildings and all commercial buildings that are greater than 75,000 square feet.**	1	ENERGY STAR Program	$		
BE4- 2	Promote grants offered by other agencies and utility companies through City Website and promotional material.	1	ENERGY STAR Program	$		
BE4- 3	Engage and recruit large commercial business stakeholders to support this effort; identify companies with energy/climate goals to be leaders	2	ENERGY STAR Program			
BE4- 4	Provide training to residents and businesses on strategies for weatherizing buildings and reducing energy consumption and costs	2	ENERGY STAR Program	$		
Strategy BE5	**Increase ENERGY STAR certified buildings within the community to 20 by 2030.**					
BE5- 1	Expand city-hosted Doing Business webpage, with additional resources about home energy options for residents, including available energy programs and where to purchase ENERGY STAR appliances	1	ENERGY STAR Program	$		
BE5- 2	Encourage commercial and industrial properties including multifamily buildings to track energy, water and waste through the Energy Star Portfolio manager	1	ENERGY STAR Program	$		
BE5- 3	Encourage Energy Star certification for eligible facilities and Include a link to Energy Star Portfolio Manager on city's Small Business Resources page	1	ENERGY STAR Program	$		
BE5- 4	Encourage all Planned Unit Developments and Conditional Use Permits, and all projects receiving public financing support to meet LEED or ENERGY STAR Certification requirements.	3	Sustainability Considerations for Zoning Actions	$		
BE5- 5	Incentivize local businesses to participate in ENERGY STAR Portfolio Manager and ENERGY STAR Certificaiton by offering free ENERGY START Certification review support	3	ENERGY STAR Program	$		
BE5- 6	Recognize businesses and organizations that document progress towards reducing energy usage in Energy Star Portfolio Manager	3	ENERGY STAR Program			
BE5- 7	Create, distribute, and promote a guide for building construction and renovation projects outlining voluntary GHG and sustainability impact offset measures building owners and builders can implement. Guide to provide recommended options and proportions based on project size – ie. Plant x trees per acre, established ratios of tree canopy coverage per parking spot, x EV charging stations per parking spots, etc.	3		$		



What You Can Do

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

Section 03

Community Health

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Community Health

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. Sustainability is the ability to meet our present needs without compromising future generations to meet their own needs (Brundtland Commission 1987), and it has three components: environmental conservation, social responsibility, and economic development. By definition, sustainability aims to promote healthy, viable, and equitable communities.

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

In addition, as outlined in the City's 2018 Population Vulnerability Assessment and Climate Adaptation Framework report, changes in climate, such as higher average temperatures and increased storm frequency and intensity, can intensify public health stressors. These stressors include decreased air and water quality, accidental exposure to chemicals, health hazards of extreme weather events, rapid weather variability, and extreme heat.

Equity Considerations:

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

Burnsville Sustainability Accomplishments

Minnesota River Greenway

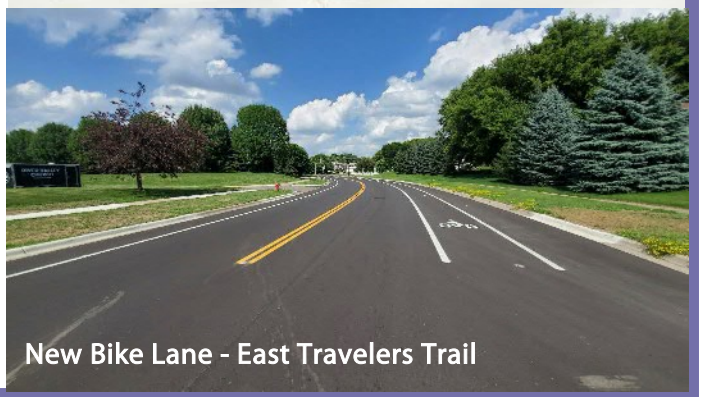
The Black Dog segment of the Minnesota River Greenway (also known as the Big Rivers Regional Trail) is a trail segment that goes along the Minnesota River from I-35W on the west to TH-77 on the east. The segment is approximately 3.75 miles and was constructed in 2015 and 2016. The project was lead by the City of Burnsville, but the City partnered with Dakota County, received easements from and coordinated with Xcel Energy, and partial funding was provided by a Federal Grant.


Minnesota River Greenway

New Dedicated Bike Lanes

In 2018, the City completed an On-Street Bike Lane study. In fulfillment of that study, the City has several on-street bike lane projects currently in development, including three new dedicated bike lanes established in 2020.

Additional projects are planned including the Lake Marion Greenway, South Segment, with construction kicking off in 2020 and, the Cliff Road trail from TH-13 to the Eagan border under construction in 2021.


New Bike Lane - East Travelers Trail

Community Health

Burnsville Resilience Indicators - Health

The potential magnitude of the population climate risks outlined in section 6 "Local Climate Risks" can be anticipated by understanding current community resilience indicators. Resilience indicators which are higher locally than State or National averages may imply a potential weakness which could be exacerbated by the risks posed by projected climate change.

On the other hand, it should be understood that these community resilience indicators are usually only available at the granularity of County level. This means that the City should carefully consider potential implications for any community resilience indicator even if the local demographic appears "stronger" (lower percentage/value/percentile) than State or National levels.

	State	County
Poor/Fair Health	12%	10%
Uninsured	7%	6%
Asthma emergency department visits (per 10,000)	40.1	30.9
Pulmonary Disease Hospitalizations (COPD per 100,000)	15.8	12.1
Heart attack hospitalizations (per 100,000)	26.7	25.0

Burnsville Resilience Indicators - EPA Environmental Justice Screen

EJSCREEN is an environmental justice mapping and screening tool that provides EPA with a nationally consistent data set and approach for combining environmental and demographic indicators. All of the EJSCREEN indicators are publicly-available data. EJSCREEN simply provides a way to display this information and includes a method for combining environmental and demographic indicators into EJ indexes. Below are the EJSCREEN results for the City of Burnsville. All values circled in orange are values in the upper 50 percentile for the State of Minnesota.

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	9.91	9.27	66	10.1	39	9.14	68
Ozone (ppb)	35.5	35.8	49	37.6	16	38.4	19
NATA* Diesel PM (µg/m^3)	1.07	0.755	76	0.932	60-70th	0.938	60-70th
NATA* Cancer Risk (lifetime risk per million)	42	36	69	34	80-90th	40	50-60th
NATA* Respiratory Hazard Index	2.8	2.2	68	1.7	90-95th	1.8	80-90th
Traffic Proximity and Volume (daily traffic count/distance to road)	430	350	83	370	79	590	75
Lead Paint Indicator (% Pre-1960 Housing)	0.043	0.32	18	0.39	11	0.29	24
Superfund Proximity (site count/km distance)	0.22	0.18	80	0.13	88	0.13	87
RMP Proximity (facility count/km distance)	0.51	0.74	54	0.81	56	0.73	61
Hazardous Waste Proximity (facility count/km distance)	0.097	0.12	64	0.091	73	0.093	73
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.015	0.077	87	4.2	76	30	82

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

RMP Proximity represents the potential for chemical accident based on the number of Risk Management Plan sites in area.

Community Health

2030 Community Health Goals

CH-A: Develop a standardized educational program on ways to improve health of citizens, workers and students while promoting a healthier lifestyle.

CH-B: To meet or exceed the goal of reducing greenhouse gas emissions from city operations by 40%, while encouraging the public to reduce emissions and pollutants.

CH-C: Educate employees on current environmental policies and develop new policies in areas that are lacking and enforce those policies.

CH-D: Develop a standardized educational program on ways to improve conservation and pollution reduction.

CH-E: Explore more options to reduce heat island/roof effects and educate public/business about potential effects and areas for improvement.

Strategies

Strategy CH1 Develop a standardized educational program on ways to improve health of citizens, workers and students while promoting a healthier lifestyle.
How We'll Measure it:
Educational Program curricula and number of events held.

Strategy CH2 Meet or exceed the goal of reducing greenhouse gas emissions from city operations by 40%, while encouraging the public to reduce emissions and pollutants.
How We'll Measure it:
GHG Emissions as reported by City Operations and Citywide GHG inventories, air pollutant levels as reported by the US EPA.

Strategy CH3 Educate employees on current environmental policies and develop new policies in areas that are lacking and enforce those policies.
How We'll Measure it:
City employee policy education events held.

Strategy CH4 Explore more options to reduce heat island/roof effects and educate public/business about potential effects and areas for improvement.
How We'll Measure it:
Community education material distribution coverage, "heat island contribution coefficient" by census tract as calculated by ground cover assessment (see Burnsville Tree Survey and Carbon Sequestration Study) or as estimated by Metropolitan Council Extreme Heat Map Tool.

Strategy CH5 Expand climate adaptation capacity and preparedness within the community.
How We'll Measure it:
Social, health, and environmental resilience indicators reported. Number of established and maintained climate adaptation partnerships.

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Community Health

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Community Health					
Strategy CH1	**Develop a standardized educational program on ways to improve health of citizens, workers and students while promoting a healthier lifestyle**					
CH1- 1	Plant shade trees to limit the need for indoor cooling and reduce temperatures at parks, playgrounds, and other outdoor spaces.	1	Ground Cover Improvement Plan	$		
CH1- 2	Increase the amount of bike racks around the city to advocate for more bicycle use.	1	Multi-Modal and Compete Streets Plan			
CH1- 3	Review and enhance the City's public health procedures, information and messaging to encourage local gardening, composting, leaving leaves, and reducing chemical fertilizers and pesticides.	2	Local Agriculture and Nutrition Security Study and Plan			
CH1- 4	Train K-12 teachers on climate change science and curriculum.	3				
CH1- 5	Increase outreach to diverse populations about climate change and health, natural hazards, and emergency preparedness via broadcast, print, bus ads, social media, and other forms of communication in multiple languages and accessible to individuals with disabilities to ensure that emergency preparedness planning reaches all City residents	3				
CH1- 6	Work with unions, businesses and other stakeholders to protect workers in extreme weather	3				
CH1- 7	Engage leading employers in a dialogue on climate action, for example, by organizing and facilitating roundtables.	3				
CH1- 8	Post information about the City pesticide policy at City properties, include the policy in the City's annual mailing to landscapers, and encourage voluntary steps to reduce pesticides.	3				
CH1- 9	Increase community participation in health and wellness, exercise and nutrition programs.	3				
CH1- 10	Create more neighborhood gardens for citizens to have access to locally sourced food. Plant hardy, perennial fruit bearing trees and shrubs to have low maintenance food source.	3	Local Agriculture and Nutrition Security Study and Plan	$		
CH1- 11	Conduct education and outreach on the health impacts of vector-borne disease and strategies for avoidance	3				
Strategy CH2	**Meet or exceed the goal of reducing greenhouse gas emissions from city operations by 40%, while encouraging the public to reduce emissions and pollutants**					
CH2- 1	Add bike racks around neighborhood businesses and community gathering places to reduce vehicle exhaust from driving and idling.	1	Multi-Modal and Compete Streets Plan			
CH2- 2	Add free EV charging stations at public parking facilities to promote EV in community.	2	EV Roadmap	$		
CH2- 3	Install roadside vegetation that creates effective barriers to prevent drifting of air pollutants to adjacent schools and residences	3	Ground Cover Improvement Plan			
CH2- 4	Reduce generation of waste heat from mobile sources by promoting and incentivizing public transit, biking and walking	3	Multi-Modal and Compete Streets Plan			

	Strategy / Action	Priority	Economic Benefits	GHG Reduction	Climate Adaptation
CH2- 4	Add bike racks around neighborhood businesses and community gathering places to reduce vehicle exhaust from driving and idling.	2			
Strategy CH3	**Educate employees on current environmental policies and develop new policies in areas that are lacking and enforce those policies.**				
CH3- 1	Develop a standardized educational program on ways to improve conservation and pollution reduction	1			
CH3- 2	Develop, promote and implement a local green business recognition program	1			
CH3- 3	Promote online citizen services (such as permitting and bill payment) to reduce paper use and car trips	1			
CH3- 4	Provide training and other capacity building opportunities to staff to facilitate creative, climate positive innovations in operations, project design and implementation. GREEN-INFRASTRUCTURE POLICY	1			
CH3- 5	Adopt policies with incentives to building owners to increase the resilience of existing and new buildings with resilience strategies such as elevated HVAC and electrical off basement floor, installation of backflow preventers, tree maintenance, permeable pavements, energy conservation and on-site renewable energy generation, and safe rooms	1			
CH3- 6	Ensure environmental policies remain current and are being enforced. Add training bulletins or information blasts about these policies	2			
Strategy CH4	**Explore more options to reduce heat island/roof effects and educate public/business about potential effects and areas for improvement**				
CH4- 1	Explore re-vegetation, tree preservation planting and maintenance, de-paving and porous pavement, green infrastructure like eco-roofs and site development performance standards.	1			
CH4- 2	Explore community/county-based programs that will provide check-ins on vulnerable populations during extreme weather events.	1			
CH4- 3	Promote the expansion of tree canopy in urban heat islands or areas that need air conditioning such as schools.	2	$		
CH4- 4	After weather-related emergency events, assess response to identify effectiveness, deficiencies and resources needed to build future resilience.	2			
Strategy CH5	**Expand climate adaptation capacity and preparedness within the community**				
CH5- 1	Explore, with partners like the MPCA, MDH, and Dakota County Health creating a volunteer home health and climate adaptation assessment program. Program could provide home assessments for vulnerable populations to identify what specific actions can be done to improve the health and safety of a home including reduction of heat island impacts, flood resistance, etc.	1	$		
CH5- 2	Conduct a City Climate Migration Study and Plan to identify the likely impacts of climate migration on the City and establish actions to minimize negative impacts and guide positive outcomes. References https://www.nature.com/articles/nclimate3271.epdf: https://www.citylab.com/environment/2020/02/climate-change-migration-map-sea-level-rise-coastal-cities/605440/	1	$		

What You Can Do

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

Section 04

Fleet and Equipment

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Fleet and Equipment

Cars and other equipment consume a lot of energy in both their manufacture and their use. Automotive and equipment production has a significant sustainability footprint because materials like steel, rubber, glass, plastics, paints, and many more must be created and each have a significant supply chain prior to them being assembled into a final piece of equipment. Cars and equipment also have significant impacts on our greenhouse gas emissions. In City of Burnsville, the transportation sector is the second largest contributor to greenhouse gases, producing over 262,000 metric tons (5.1 billion cubic feet) of atmospheric greenhouse gas annually.

Creating a sustainable fleet program - whether for a large or small fleet - is one of the best contributions an organization can make to improve its sustainability and reduce their greenhouse gas emissions. Fleet management's role in organizational sustainability initiatives is often critical to achieving goals in cutting energy consumption, reducing greenhouse gas emissions, and supporting good "corporate citizenship."

Equity Considerations:

- Global warming emissions and climate change hit low-income communities and communities of color first and worst because these communities disproportionately live near busy roads and freeways, exposing them to dangerous levels of emissions. This leads to higher rates of asthma, cancer, and other pollution-related illnesses, increased health costs and more missed school and work days.
- Underserved communities (communities of color, in particular) are necessary in accelerating EV adoption and can benefit the most from the clean air and cost-saving benefits of EVs.
- The availability of charging infrastructure presents a significant EV equity challenge. People who live in apartment buildings or other multifamily typically do not have ready access to vehicle charging units are at a distinct disadvantage to single family residents.

Burnsville Sustainability Accomplishments

FLEET ELECTRIC VEHICLE

In addition to eight hybrid Toyota Prius fleet vehicles, the City now has a plug-in electric vehicle. The City purchased a Mitsubishi Outlander PHEV to help reduce fuel usage and costs while increasing environmental sustainability efforts.

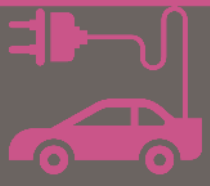
ELECTRIC LINE MARKING ROBOT

- Burnsville Parks department now uses an electric *TinyLineMarker* to stripe athletic fields.
- The robot-striper replaced a gas operated machine, and uses about 60 percent less paint while using less energy. This results in a reduction in emissions as well as putting less latex paint on the ground.
- Labor costs are also reduced. It takes one employee instead of four to stripe the fields

Did You Know?

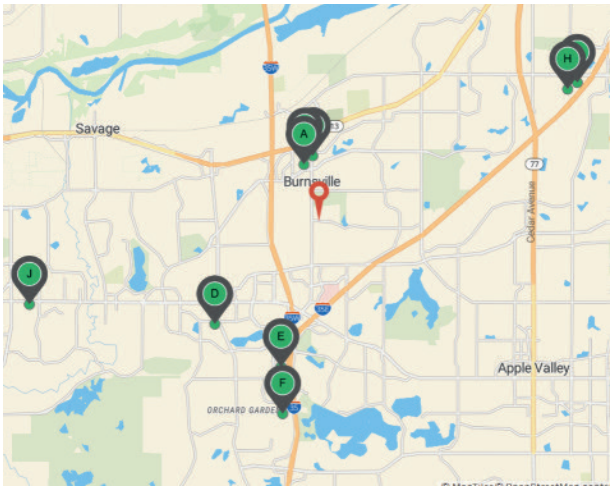
80% of the energy in an electric vehicle (EV) battery is transferred directly to powering the car.

In a gasoline powered vehicle it is only **15%**



41,898 Cubic Feet

Of greenhouse gasses are saved annually for every gas car replaced by an EV in Burnsville.



Existing EV Infrastructure in Burnsville

The map above shows the existing public EV charging infrastructure available in Burnsville. There are 7 charging stations with a total of 16 Level 2 ports and 1 DC Fast Charge port.
(Source: US Department of Energy, Alternative Fuels Data Center)

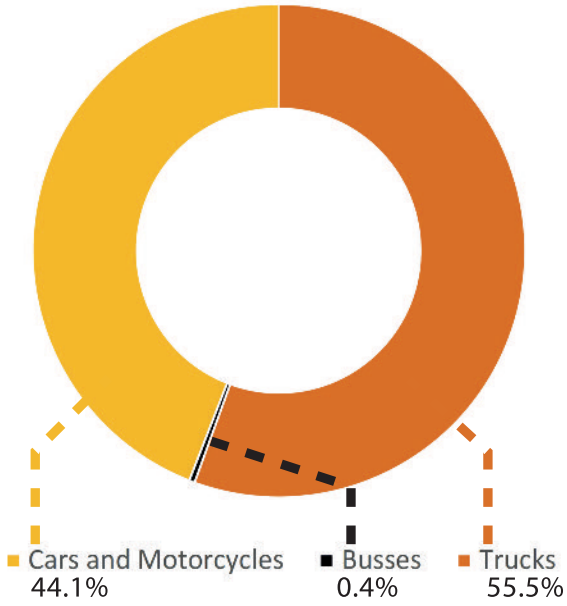
Projected EV Infrastructure Needed in Burnsville - 2030

According to the Edison Foundation, Electric Vehicle stock in the United States is projected to reach 18.7 million in 2030, up from slightly more than 1 million at the end of 2018. This means EV's will make up at least 7% of the vehicles on the road by that time.

For Burnsville, that means an anticipated 3,500 EV's owned and operated by Burnsville residents by 2030. These EV's will require a minimum of 150 public level 2 charging ports, 225 workplace level 2 charging ports, and 18 public CD Fast Charging ports.
(Source: US Census, Edison Foundation "Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030" report).

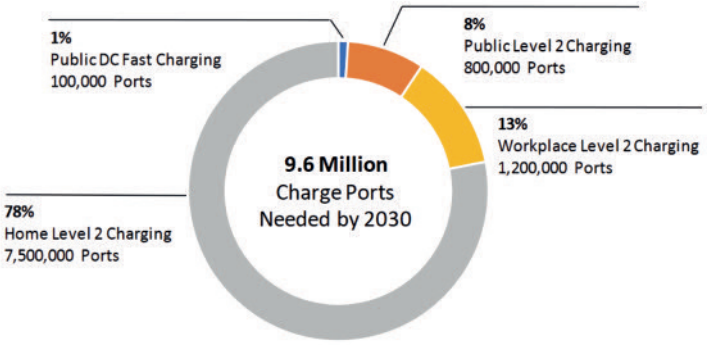
Share of Vehicles Statewide

(Source: US Office of Highway Policy Information)



EV Charging Infrastructure Required in the US by 2030

(serving 18.7 million EV's in use)



(Source: Edison Foundation "Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030" report).

Fleet and Equipment

Cars and Trucks in Service in Vehicle Fleets Nationally

(Source: Bobit Fleet Group)

Commercial

	LEASED	OWNED
CARS	431,000	204,000
TRUCKS	727,000	1,860,000

Government

	LEASED	OWNED
CARS	22,000	1,195,000
TRUCKS	48,000	1,730,000

Rental

CARS	1,780,000
TRUCKS	475,000
TOTAL	2,255,000

38%
of Fleet Owners Nationally

35.4%
of Fleet Owners Nationally

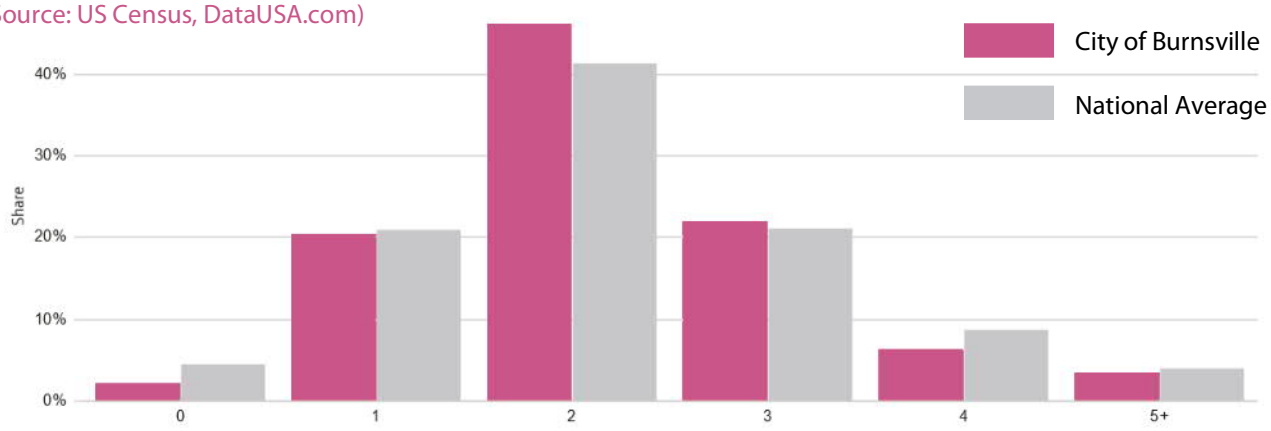
26.6%
of Fleet Owners Nationally

Share of Fleets by Vehicle Type

(Source: Bobit Fleet Group)

Car Ownership in Burnsville

(Source: US Census, DataUSA.com)



Fleet and Equipment

2030 Fleet and Equipment Goals

FE-A: Emissions and fuel reductions – City operations.

FE-B: Reduce fleet size and associated costs - City operations.

FE-C: Influence private sector.

Strategies

Strategy FE1 Emissions and Fuel Reductions – City Operations.
How We'll Measure it:
City operations fleet and equipment fuel use in gallons.

Strategy FE2 Electrify 50% of the City's Vehicle and Equipment fleet by 2030 (measured by fuel consumption).
How We'll Measure it:
Number of electric vehicles and equipment, fleet and equipment fuel use in gallons.

Strategy FE3 Influence Private Sector.
How We'll Measure it:
Number of electric vehicles registered in City of Burnsville.

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Fleet and Equipment

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

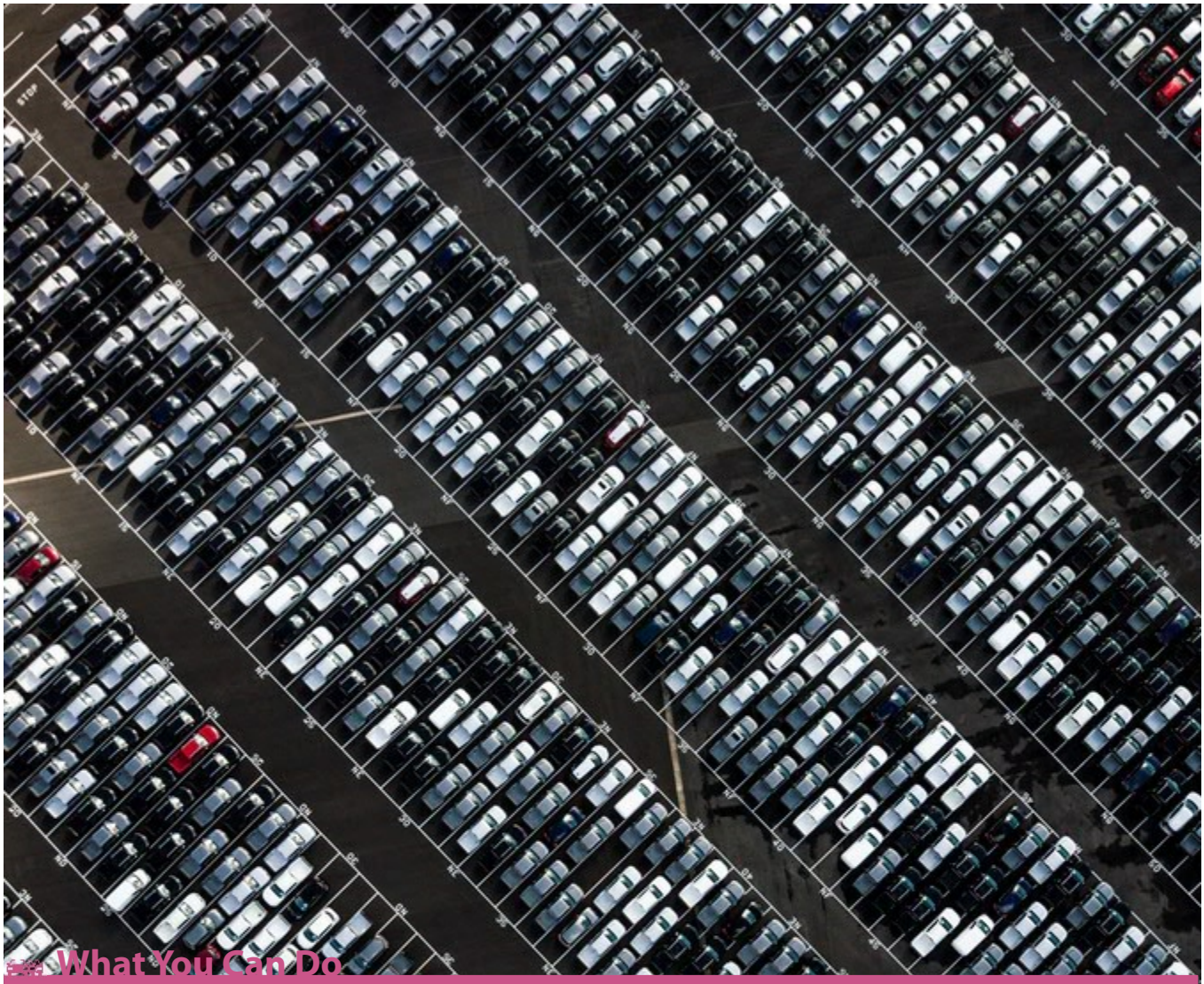
	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Fleet and Equipment					
Strategy FE1	**Emissions and Fuel Reductions – City Operations**					
FE1- 1	Establish a Fuel Economy Target for citywide internal combustion engine (ICE) fleet. Target should exceed US Energy Information Agency projecitons (https://www.eia.gov/todayinenergy/detail.php?id=31332).	1	City Fleet Plan	$	●	●
FE1- 2	**Conduct a Fleet and Equipment Use and Operations Assessment to analyze city fleet and equipment use and to provide a guide for the right vehicle/equipment for City functions, with a focus on advancing EV and high fuel efficiency features (like auto-off). Assessment to identify most economical ways of operating which minimize emissions and fuel consumption (i.e. mowing patterns and schedules, street plowing efficiency study, policy patrol efficiency study, etc) Study to include recommendations on:** **•Emissions/Fuel Reductions** **•Alternative Fuel Types** **•Vehicle Type** **•Pooling System •Assess city diesel fleet and identify opportunities for conversion to Clean/Bio Diesel and opportunities to leverage the EPA Midwest Clean Diesel Program Funding. Particular focus should be made to convert all pre-2006 diesel engines**	1	City Fleet Plan	$		
FE1- 3	Update City Operations anti-idling policy and increase enforcement	1	City Fleet Plan	$	●	●
FE1- 4	Meet or Exceed State Wide Air Reduction Goals for City Operations.	2	City Fleet Plan			●
FE1- 5	Education of (New) employees. Compile an "Ecodriving Guide" and distribute to all employees and include in new employee training. Example: https://www.fs.fed.us/sustainableoperations/documents/TheEcoDriversManual.pdf	3	Staff Sustainability Handbook and Training	$	●	●
FE1- 6	Explore the use of Carbon Credit/Offset purchases for fleet emissions reductions, particularly in transitionary years prior to significant electrification of City's fleet.	3	City Fleet Plan		●	
Strategy FE2	**Move Towards Electrification of City's Fleet (**Target: Electrify 50% of the City's Vehicle and Equipment fleet by 2030 measured by fuel consumption).					
FE2- 1	Develop and implement an Electric Vehicle "EV Ready" strategy plan for City operations to establish an implementation plan for conversion of City Fleet and equipment to EV and to establish a charging station implementation plan for City facilities. Plan should also include exploration of solar powered EV charging for city fleets.	1	City Fleet Plan	$		
FE2- 2	Strategically increase Electric Vehicles within the City's fleet. Update City vehicle purchasing policy/budget process to default to alternative fuel with traditional internal combustion engine (ICE) as optional requiring proof of need. Policy to take emissions/fuel reductions into account when purchasing vehicles/equipment. Focus on small vehicles as well as large vehicles for alternative fuels. EV replacement to be prioritized for high mileage vehicles. Action to be coordinated with the Fleet Size and Purchasing Guideline and Goalsetting Study effort	1	City Fleet Plan		●	●
FE2- 3	Establish an Electric Equipment purchasing policy for a range of equipment types including: Generators, Weed Whips, Chain Saws, Etc Action to be coordinated with the Fleet Size and Purchasing Guideline and Goalsetting Study effort	1	City Fleet Plan		●	●
FE2- 4	Expand Sustainability Fund – Cover Additional Capital Costs to Purchase Greener Equipment	2	City Fleet Plan		●	●

Fleet and Equipment

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
Strategy FE3	**Influence Private Sector**					
FE3- 1	**Create a citywide EV Roadmap. Plan should create citywide and city facility electric vehicle (EV) charging station study and masterplan to map existing infrastructure, determine the current and future demand for EV charging stations, Establish public EV parking regulation, and to identify options for increasing number of electric charging stations in public parking areas (e.g., schools, parks, libraries, City-owned parking garages, near City Hall) and in commercial and high-density residential areas. Plan should include implementation strategies to meet citywide EV charging demand and promote adoption of EVs withing the community.**	1	EV Roadmap	$		
FE3- 2	City to help private or other government agencies convert Fleets to electric by promoting and sharing Xcel and Dakota Electric Transition Planning tools, or create and promote a City of Burnsville transition tool	1	EV Roadmap			
FE3- 3	Create an anti-idling ordinance to reduce idling emissions of vehicles community-wide. (http://www.ci.minneapolis.mn.us/environment/air/airquality_antiidling_home ; https://www.pca.state.mn.us/featured/warming-your-engine-no-need)	1	EV Roadmap	$		
FE3- 4	Assemble info on advantages and cost savings of EV fleets as well as information on resources and share with public and targeted businesses	2	EV Roadmap			
FE3- 5	Create a recognition program " Burnsville Green Fleets!" promoting businesses and organizations that advance electrification of their fleets.	2				
FE3- 6	Develop an incentive program to convert fuel-burning lawn equipment such as gas-powered lawn mowers and blowers to electric. Coordinate with Dakota Electric and Excel Energy rebate programs to promote electric yard equipment.	2		$		
FE3- 7	Develop, promote, and provide educational opportunities to advance more sustainable fleets and equipment. Explore grant opportunities to support educational content as well as to support advancement of more sustainable fleets and equipment.	2				
FE3- 8	Encourage/Incentivize utilization of Electric/Lesser Polluting Vehicles	2				
FE3- 9	Produce a Case Study report and promotional material outlining the City's actions and strategies for fleet efficiency, size reduction, and electrification. Distribute and promote the case study with businesses and institutions throughout city.	3				
FE3- 10	Organize and promote an electric vehicle (EV) Group Purchase campaign for City fleets, business fleets within Burnsville, and interested Burnsville residents annually to partner with local dealerships to offer limited-time discounted pricing on EVs to help reduce the costs of EV purchase through volume purchasing power.	3	EV Roadmap	$		
FE3- 11	Incentive and reduce costs for charging stations for businesses and residents ■Create and lead an EV group purchase campaign ■Exp	3	EV Roadmap	$		
FE3- 12	Deve chan EV cl			$		

Develop an incentive program to convert fuel-burning lawn equipment such as gas-powered lawn mowers and blowers to electric. Coordinate with Dakota Electric and Excel Energy rebate programs to promote electric yard equipment.



What You Can Do

- Turn off your car if you are idling for more than 30 seconds.
- The best way to warm up your car in the winter time is by driving it. No more than 30 seconds of idling is needed.
- Refuel your car and mow your lawn after 7pm, which helps prevent ground-level ozone.
- Keep your personal vehicle well-tuned and tires inflated properly, saving up to 20% in gasoline use.
- Drive an electric, hybrid or low-emission vehicle.
- Replace gas-powered yard equipment with electric alternatives.

Section 05

Ground Cover

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Ground Cover

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

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

Equity Considerations:

- Lower income neighborhoods and neighborhoods with higher proportions of people of color regularly have lower tree canopy coverage; and the environmental, economic, and quality of life benefits trees support; than more affluent neighborhoods.
- A growing body of research points to "intra-urban" heat islands, or areas within a city that are hotter than others due to the uneven distribution of heat-absorbing buildings and pavements, and cooler spaces with trees and greenery. Frequently neighborhoods with higher vulnerable populations have the highest heat island impacts.

Burnsville Sustainability Accomplishments

Oak Savanna Restoration

Burnsville received a grant from the Minnesota Department of Natural Resources to restore a 26-acre portion of **Terrace Oaks Park** oak savanna. It is a more beneficial habitat for wildflowers and wildlife, and it provides good conditions for young oaks to flourish.

Did You Know?

Burnsville's tree canopy covers 31.5% of the city's total land area. The city's trees and grasslands sequester a over 25,000,000 pounds of carbon annually.

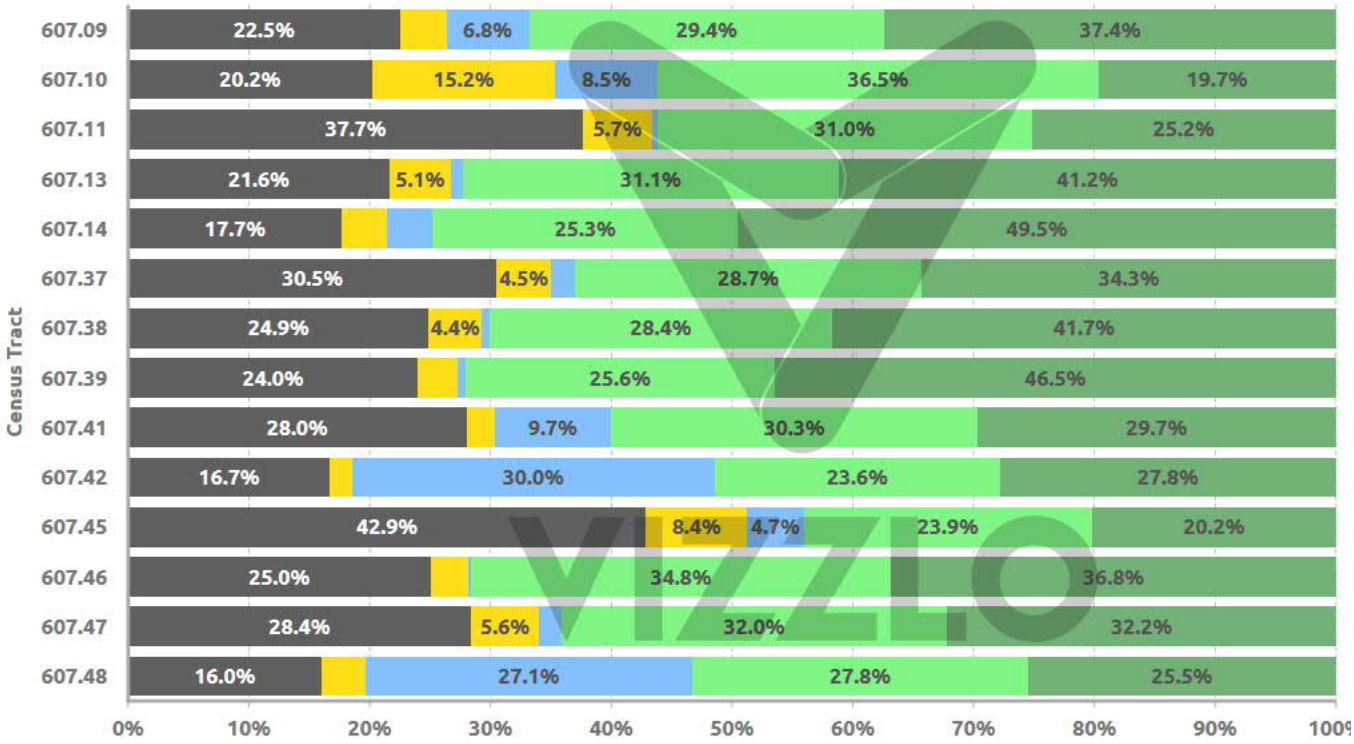
$9,094,113

Annually is the value of the environmental and energy savings provided by the trees within the city.
(See the 2019 Tree Survey and Carbon Sequestrtaiono Study for more information)

Ground Cover

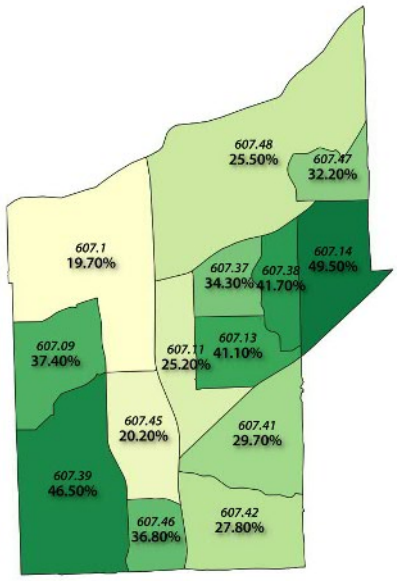
Side-By-Side Comparison

The bar chart below provides a side-by-side comparison of the of land cover throughout the City, by Census Tract. Neighborhoods with lower tree canopy coverage and higher impervious surface coverage will experience summer heat more acutely and will be more likely to have higher stormwater runoff quantities during high rain events.



Burnsville Tree Canopy Coverage

City Average:	31.51%
Comparison Cities Average:	36.7%
Twin City Metro:	27.0%
National City Average:	27.1%
Census Tract High:	49.5% Tract 607.14
Census Tract Low:	19.7% Tract 607.1



Ground Cover

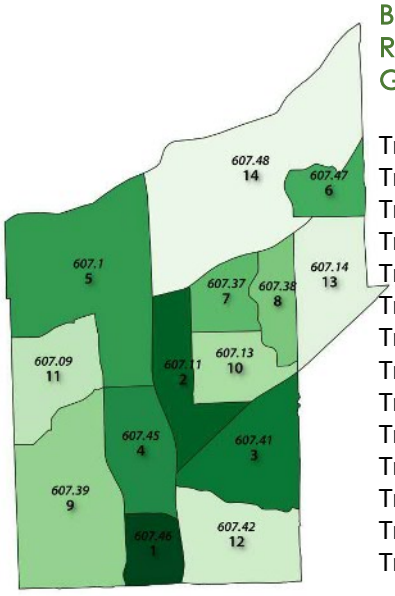
City Comparison

The research team has reviewed recent tree canopy data for 13 Minneapolis/St Paul metropolitan cities. These Cities represent comparable community size, demographics, and relationship to the greater metropolitan region. Though the data collection methods and analytic procedures vary between studies and therefore limit accurate and reliable comparisons between cities, results from these studies provide an opportunity to make general comparisons of Burnsville's estimated tree canopy coverage and those of other metropolitan cities.

As outlined below, the City of Burnsville's estimated total tree canopy coverage is in the 43rd percentile of the cohort of 14 metropolitan communities. The City's tree coverage per resident is also in the 43rd percentile of the cohort. For purposes of tree canopy increase goalsetting, the City's tree canopy coverage would need to increase by 16.5% to achieve 50th percentile ranking within the cohort of cities, 25.4% to achieve 60th percentile ranking, and 35.4% to achieve 75th percentile ranking.

City	County	Population	City Area (Sq Miles)	Est % Tree Coverage*	Cohort Percentile	Tree Area Per Capita	Cohort Percentile
Apple Valley	Dakota	53,429	17.7	27.8%	14	0.059	14
Blaine	Anoka	66,667	34.0	39.5%	64	0.129	86
Brooklyn Park	Hennepin	81,679	26.6	29.6%	29	0.062	21
Burnsville	**Dakota**	**62,657**	**26.9**	**31.5%**	**43**	**0.086**	**43**
Coon Rapids	Anoka	63,899	23.3	42.4%	79	0.099	50
Eagan	Dakota	68,347	33.5	35.3%	50	0.111	71
Eden Prairie	Hennepin	63,456	35.3	45.0%	93	0.160	93
Edina	Hennepin	52,535	16.0	43.4%	86	0.084	36
Lakeville	Dakota	64,334	37.9	28.8%	21	0.109	64
Maple Grove	Hennepin	66,903	35.1	30.9%	36	0.104	57
Minnetonka	Hennepin	53,713	29.1	58.4%	100	0.202	100
Plymouth	Hennepin	78,351	35.5	40.3%	71	0.117	79
St. Louis Park	Hennepin	48,910	10.8	38.1%	57	0.054	7
Woodbury	Washington	70,840	35.7	22.1%	7	0.071	29

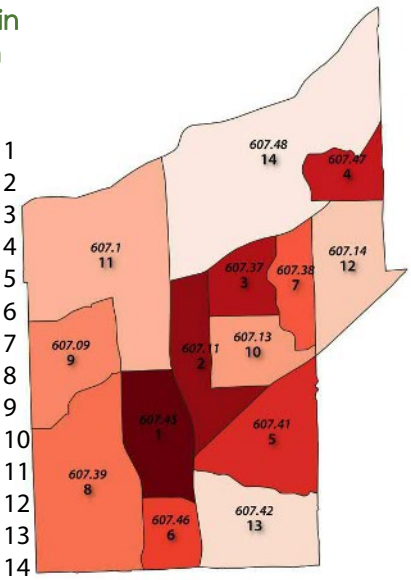
Burnsville - Census Tract Ranking for Increases in Green Infrastructure



Tract 607.46	1
Tract 607.11	2
Tract 607.41	3
Tract 607.45	4
Tract 607.10	5
Tract 607.47	6
Tract 607.37	7
Tract 607.38	8
Tract 607.39	9
Tract 607.13	10
Tract 607.09	11
Tract 607.42	12
Tract 607.14	13
Tract 607.48	14

Burnsville - Census Tract Ranking for Increases in Heat Island Reduction Strategies

Tract 607.45	1
Tract 607.11	2
Tract 607.37	3
Tract 607.47	4
Tract 607.41	5
Tract 607.46	6
Tract 607.38	7
Tract 607.39	8
Tract 607.09	9
Tract 607.13	10
Tract 607.10	11
Tract 607.14	12
Tract 607.42	13
Tract 607.48	14



Ground Cover

Translating Tree Canopy Coverage Goal To New Tree Planting - New Tree Planting Annual Target (CN)

Using the new planting requirement calculation method (CB + CG - CM + CN = CT) with the previously defined values for existing tree canopy (CB), growth rates (CG), mortality rates (CM), and the 2040 Tree Canopy (CT) goals by neightborhood the required number of new trees to be planted to meet that goal can be identified.

The map to the right shows the annual new tree count required to meet the 2040 tree canopy goals for each neighborhood.

Annual Path to 2040 Tree Canopy Cover Goal

The chart below shows the City wide average values for year beginning canopy cover (CB), annual growth rate (CG), mortality rate (CM), the new tree planting targets (CN) and the year end tree canopy goal (CT) for each year through the 2040 goal.

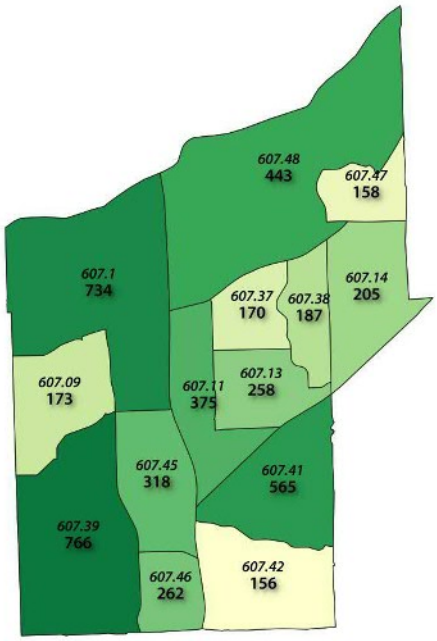
New Tree Planting Annual Target to Meet 2040 Tree Canopy Goal (CN)

City of Burnsville Total:
Note, Acreage represents the canopy coverage at year of planting, with an assumed new tree crown radius of 5'.

4,762 Trees Annually

20 Acres Annually

Year	CB (acres)		CG (acres)		CM (acres)		CN (acres)		CT (acres)	Canopy Cover %
2019	5429	+	136	-	116	+	20	=	5469	31.7%
2020	5469	+	137	-	117	+	20	=	5509	32.0%
2021	5509	+	138	-	118	+	20	=	5549	32.2%
2022	5549	+	139	-	118	+	20	=	5590	32.4%
2023	5590	+	140	-	119	+	20	=	5630	32.7%
2024	5630	+	141	-	120	+	20	=	5671	32.9%
2025	5671	+	142	-	121	+	20	=	5711	33.1%
2026	5711	+	143	-	122	+	20	=	5752	33.4%
2027	5752	+	144	-	123	+	20	=	5793	33.6%
2028	5793	+	145	-	124	+	20	=	5835	33.9%
2029	5835	+	146	-	124	+	20	=	5876	34.1%
2030	5876	+	147	-	125	+	20	=	5918	34.3%
2031	5918	+	148	-	126	+	20	=	5959	34.6%
2032	5959	+	149	-	127	+	20	=	6001	34.8%
2033	6001	+	150	-	128	+	20	=	6043	35.1%
2034	6043	+	151	-	129	+	20	=	6085	35.3%
2035	6085	+	152	-	130	+	20	=	6128	35.6%
2036	6128	+	153	-	131	+	20	=	6170	35.8%
2037	6170	+	154	-	132	+	20	=	6213	36.1%
2038	6213	+	155	-	133	+	20	=	6256	36.3%
2039	6256	+	156	-	133	+	20	=	6299	36.6%
2040	6299	+	157	-	134	+	20	=	6342	36.8%
2041	6342	+	159	-	135	+	20	=	6385	37.1%



Ground Cover

2030 Ground Cover Goals

GC-A: Increase tree cover and civersity (Citywide tree canopy coverage goal of 33% by 2030 and 37% by 2040).

GC-B: Increase the use of Native Species and Pollinator Restorations Areas.

GC-C: Reduce heat island effect.

Strategies

Strategy GC1 Increase Tree Cover and Diversity (Citywide Tree Canopy coverage goal of 33% by 2030 and 37% by 2040).
How We'll Measure it:
Measured citywide tree canopy coverage.

Strategy GC2 Increase the use of Native Species.
How We'll Measure it:
Calculated reduction in lawn coverage citywide and by census block.

Strategy GC3 Reduce Heat Island Effect.
How We'll Measure it:
Calculated heat island contribution / heat index citywide and by census block (see Tree Canopy and Carbon Sequestration Study) .

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Ground Cover

Detailed Implementation Actions (continued)

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Ground Cover			$		
Strategy GC1	**Increase Tree Cover and Diversity** (Citywide Tree Canopy coverage goal of 33% by 2030 and 37% by 2040)					
GC1- 1	Promote the proactive replacement of declining ash trees with a diverse mix of species to build urban forest resiliency and maintain canopy cover	1				●
GC1- 2	Update Woodland Redevelopment Worksheet. In support of worksheet update: •Explore altering zoning codes to promote diversity of native tree cover, to establish minimum tree coverage for developments, and to require planting islands in parking lots, with a mix of canopy trees, shrubs, and groundcovers appropriate to the lot and its surroundings. Use data in 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study to identify targeted tree coverage minimums. •Ecplore requiring new developments to meet site plan review illustrating their capacity to meet tree canopy coverage goal (city wide average 44.4%) as well as on-site solar utilization in a manner that minimizes conflict between solar and trees	1			○	●
GC1- 3	The City will explore a program to give away trees on an annual basis for residents to plant on their property. Potenial program concept: grow seedlings and give to homeowners once per year, or sell at a discount (do run a tree sale program already) 200+ per year	1				●
GC1- 4	Update Natural Resources Master Plan	1				○
GC1- 5	Update the citywide urban tree canopy assessment every five years and maintain a current street tree inventory to develop targets and goals for tree canopy cover and identify strategies to achieve them	1			○	○
GC1- 6	Increase tree canopy by planting additional trees on City Parks and land.	1	Ground Cover Improvement Plan			○
GC1- 7	Continue to use the Forestry Fund to conduct programs for control of invasive species and diseases	2				○
GC1- 8	Require soil profile rebuilding at all building project sites or compacted soil conditions to reduce erosion and runoff contaminated with fertilizers, increase soil carbon stores, support long-term soil building, and improve new tree survival and growth rates.	2				●
GC1- 9	Perform outreach into the community to increase the knowledge of the mitigating effects of trees on climate change and promote the additional planting of trees on private property	3			○	○
Strategy GC2	**Increase the use of Native Species and Pollinator Restorations Areas**					
GC2- 1	Expand prairie restoration/conversion in pre-buckthorn areas through grant funded programs	1	Ground Cover Improvement Plan			
GC2- 2	Continue to leverage budget by obtaining grants from sources like SWCD and MN DNR.	1				
GC2- 3	Require the use of local finished compost in topsoil for city projects and coordinate with The Open Door, The Mulch Store in Burnsville, the Burnsville City Compost Site, and the Mdewakanton Sioux community to explore opportunities to expand compost programs to increase use of compost in residential and community garden sites. Explore piloting/specifying use of food derived compost in certain earth work projects to support food waste composting markets.	1				
GC2- 4	Analyze private property for unused turf and impervious areas, do outreach and incentives for native conversion (start program by 2025)	1	Ground Cover Improvement Plan			
GC2- 5	**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.**	1	Ground Cover Improvement Plan			○

Ground Cover

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
GC2- 6	**Complete land conversion opportunity study. Analyze private property for unused turf and impervious areas, do outreach and incentives for native conversion (start program by 2025)**	1	Ground Cover Improvement Plan			
GC2- 7	Continue natural vegetation conversion for passive park areas. Add 110 Acres of native plant and pollinator restoration area on City Property by 2040.	1	Ground Cover Improvement Plan			
GC2- 8	Continue Education and incentive programs for native and pollinator friendly plantings on residential lots; Hold annual workshops	1				
GC2- 9	Promote the use of climate adaptive plants and high carbon sequestering species in landscaping projects. Options for promoting climate-friendly plant species include 1) educating the public and professional landscapers and 2) working regionally with partners to develop and promote a planting guide. A planting guide could include information on climate-adaptive plants, applying compost, mulching, and reducing synthetic fertilizers to support soil health, store more water in the ground, and store carbon in soil, plants, and trees.	3	Ground Cover Improvement Plan			
Strategy GC3	**Reduce Heat Island Effect**					
GC3- 1	Add urban and street trees with a distribution focus in line with the "New Tree Planting Annual Target to Meet 2040 Tree Canopy Goal" recommendation from the 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study	1	Ground Cover Improvement Plan	$		
GC3- 2	**Conduct an Impervious Surface Conversion study. Study to provide particular focus on reduction of impervious surface coverage witin neighborhoods with the highest existing coverages (see 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study)**	1	Ground Cover Improvement Plan			
GC3- 3	Analyze the use of pervious pavers in non-salt, low winter use, summer lots	1	Ground Cover Improvement Plan			
GC3- 4	Explore more permeable surface options and potential implementation in all new city parking areas.	2				
GC3- 5	Explore requiring the planting of shade trees on the south and west facings sides of new residential and commercial development with ecological considerations. Note: dwarf tree varieties and other strategies to ensure rooftop solar resources are preserved should be included.	2	Ground Cover Improvement Plan	$		
GC3- 6	Explore adding more rain gardens to parking areas that cannot be otherwise converted.	2	Ground Cover Improvement Plan			
GC3- 7	Create pilot project to test a solar reflective cool pavement product which is designed to lower surface temperatures and decrease ambient temperatures to combat the urban heat island effect, while also preserving the integrity of the pavement and extend its lifecycle	3		$		
GC3- 8	Partner with utilities to develop an education and rebate program to encourage green/cool roofs	3		$		
GC3- 9	Create pilot project to demonstrate Greenroof technology and benefits	3		$		
GC3- 10	Evaluate on-going pilot programs for cool paving materials (examples include Chula Vista, Chicago) to determine whether the City should establish a cool paving policy.	3				

What You Can Do

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

Section 06

Land Use

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Land Use

It is estimated that the human footprint has affected 83% of the global terrestrial land surface and has degraded about 60% of the ecosystems services in the past 50 years alone. Land use and land cover change has been the most visible indicator of the human footprint and the most important driver of loss of biodiversity and other forms of land degradation.

As the human global population grows toward a projected 9 billion in 2050, a focus on sustainable land use is becoming imperative for sustainability communities. How we use our land determines much about how sustainable our communities and lives are. Compact community development reduces energy consumption, fuel use for vehicles, and material use. Ample inclusion of green space improves community health and well being as well as reduces impacts of extreme heat and extreme weather. Successful parks are markers of healthy communities: children play; families spend time together; people of all ages exercise and relax; and the environment adds to the beauty, security, and economic value of the neighborhood.

Sustainability in land use focus on planning practices that create and maintain efficient infrastructure, ensure close-knit neighborhoods, preserve natural systems, and encourage a sense of community.

Equity Considerations:

- According to Dakota County Public Health Department, low-density development patterns disproportionately impact young people, older adults, and people living in poverty. Higher percentages of people in these groups do not drive and are reliant on public transportation, which makes access to healthcare services, jobs, grocery stores and financial institutions inconvenient and time consuming.
- A growing body of research shows affluent White neighborhoods have higher quality park systems, more acres of parks and more park facilities than low-income ethnic minority communities in many communities in the United States.

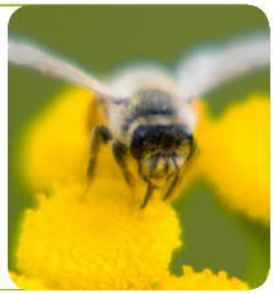
Burnsville Sustainability Accomplishments

Recertified Audubon Golf Course

Birnamwood Golf Course was designated as a Certified Audubon Cooperative Sanctuary in 2002 and has now been recertified. It is one of 894 courses in the world to be designated as such. To reach certification, a course must demonstrate that it is maintaining a high degree of environmental quality in a number of areas, including environmental planning; wildlife/habitat management; outreach and education; chemical use reduction and safety; water conservation; and water quality management. Birnamwood Golf Course has shown a strong commitment to its environmental program by protecting the local watershed and providing a sanctuary for wildlife on the golf course property.

Partnership to Protect Pollinators

The City of Burnsville and Xcel Energy are working together to develop pollinator habitat in Burnsville that benefits the monarch butterflies, bees and other insects that pollinate. Nearly three acres of native prairie plantings have been put in the Xcel Energy right-of-way next to Tennisioux Park. The City of Burnsville is actively promoting native prairie management and educational programs for residents interested in pollinators.



Land Use

According to Burnsville's 2010 Sustainability Guide Plan:

> "Burnsville will strive to adopt land use policies that provide incentives to reduce sprawl, preserve open space, expand and enhance green corridors as redevelopment occurs and to create a walk-able community."

The City's 2040 Comprehensive Plan establishes the following vision for land use within the City:

> VISION: People find Burnsville a balanced city of residential and business development enhanced by redevelopment.
>
> Burnsville's future land use mix, patterns and density, including existing and new development as well as redevelopment, promotes an economically and environmentally resilient community of thriving neighborhoods, businesses, schools, civic places, recreation facilities and entertainment opportunities that provide an outstanding quality of life and physical environment. Burnsville's future land use plan will culminate in a healthy, vibrant, and resilient community long-term.

Future Land Use Guide Plan Acreages

The chart below, from the City's 2040 Comprehensive Plan, illustrates the future land use guide for the City of Burnsville:

Land Use Category		Net Acres	% of Total (Net Acres)
RR	Rural Residential	541.74	3.13%
LDR	Low Density Residential	4,388.47	25.35%
MDR	Medium Density Residential	625.95	3.62%
HDR	High Density Residential	668.02	3.86%
HOC	Heart of the City	129.99	0.75%
MIX	Mixed Use	380.15	2.20%
BUS	Business/Retail/Office	915.08	5.29%
CRB	Commercial Recreation Business	59.55	0.34%
IND	Industrial/Office	739.90	4.27%
IND/LB	Industrial/Office/Limited Business	23.73	0.14%
MRQ	Minnesota River Quadrant	1,310.63	7.57%
PR	Park & Recreation	1,167.36	6.74%
OS	Open Space	650.52	3.76%
ROW	Right-of-Way	2,886.49	16.67%
WA	Open Water	1,049.50	6.06%
Wetland		1,774.25	10.25%
Total		**17,311.33**	

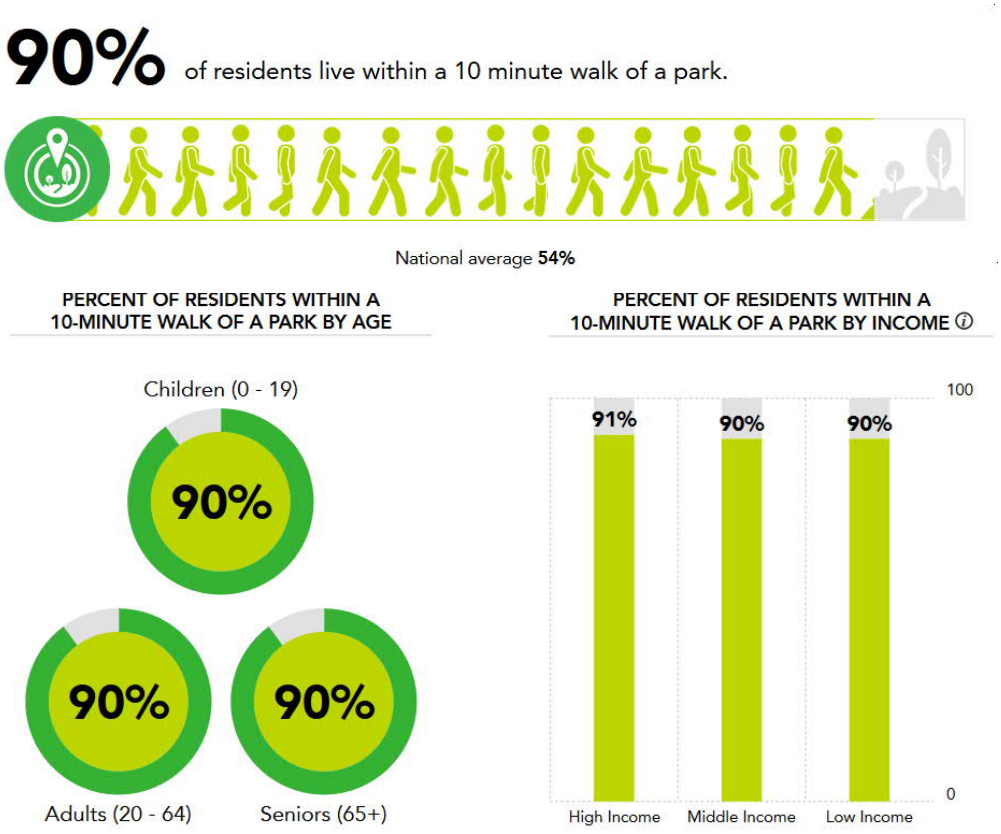
Source: HKGi 2017

Park Space

Studies show that high-quality parks provide a wide range of benefits to cities and their residents. Park space, and ready access to them, provide physical and mental health benefits by providing opportunities to be physically active and to interact with nature. Parks provide economic benefits by boosting business and helping to revitalize neighborhoods as well as community-building benefits by providing opportunities for neighbors to interact with each other and work together to improve their surroundings. The environmental benefits of park space includes removal of air pollution, cooling the air and combating heat island effects, improved water quality, and flood resilience.

The Trust for Public Land has established visionary goals for communities to benchmark themselves against, including percentage of city land dedicated to parks/open space, and achieving 100% of city residents within a 10 minute walk to a park.

Accessibility of Park Space in Burnsville



Source: The Trust for Public Land

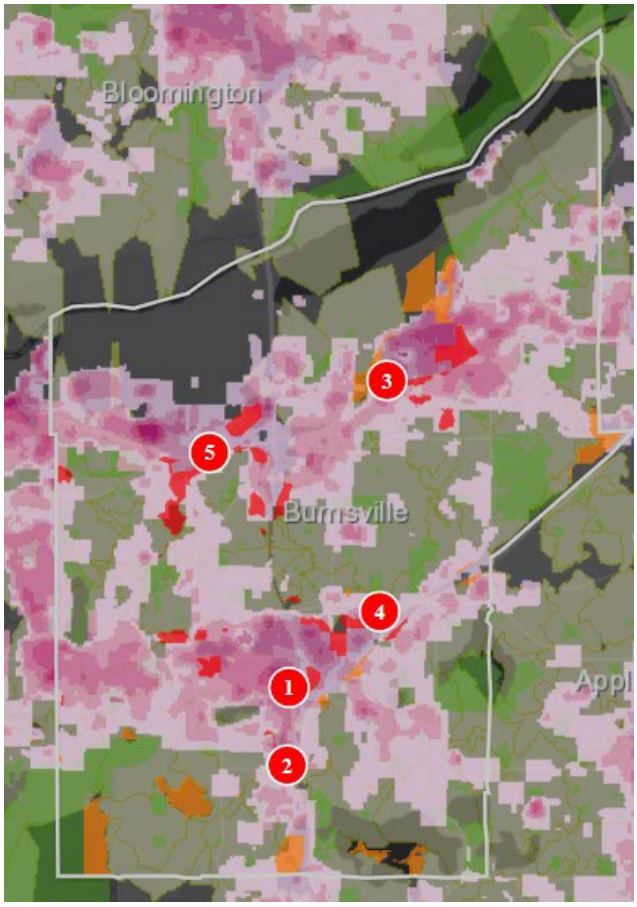
Quantity of Park Space in Burnsville

Source: The Trust for Public Land

Land Use

Priorities for Increased Park Space in Burnsville

The map to the right shows the top 5 Heat Island optimized points for additional park space in the City of Burnsville. Heat Island influenced optimized points are locations for a new park, ranked based the 10-minute walk of a park criteria and proximity to urban heat islands. Circle encompasses a 1/4 mile radius.
(Source: The Trust for Public Land)



(Source: The Trust for Public Land)

Land Use Density Comparison

The research team has reviewed land use data for 13 Minneapolis/St Paul metropolitan cities. These Cities represent comparable communities to Burnsville in size, demographics, and relationship to the greater metropolitan region. Results from this study provides an opportunity to make general comparisons of Burnsville's land use and those of other metropolitan cities.

As outlined below, the City of Burnsville's Residential Density (residents per acre of residential land use) is in the 86th percentile. Burnsville's Jobs Density (workers per acre of commercial land use) is in the 50th percentile and and the City's Park/Open Space land use is in the 57th percentile of the cohort of 14 metropolitan cities.

The City could explore refining land use goals through this comparison. For example, the City's density of commercial land use / jobs per commercial acre would need to increase by 27.2% while area of park/open space land use would need to increase by 11.3% to achieve 70th percentile ranking in each of these categories. Burnsville's Comprehensive Plan and Parks Master Plans utilize other measures and criteria for the purposes of establishing community need for various facilities. The City is not actively searching out additional parkland.

City	County	Population	Jobs	City Area (Sq Miles)	Residential Land Use (acres)	Residential Density (res/acre)	Residential Density Percentile	Commercial Land Use (acres)	Job Density (job/acre)	Jobs Density Percentile	Park/Open Space Land Use (acres)	Park/Open Space Share of Total	Cohort Percentile
Apple Valley	Dakota	53,429	15689	17.7	6487	8.2	50	1755	8.9	43	2304	20.6%	29
Blaine	Anoka	66,667	26986	34.0	7997	8.3	57	3888	6.9	36	8622	39.6%	100
Brooklyn Park	Hennepin	81,679	28669	26.6	9102	9.0	93	6006	4.8	29	3471	20.4%	21
Burnsville	**Dakota**	**62,657**	**35910**	**26.9**	**7133**	**8.8**	**86**	**3474**	**10.3**	**50**	**4540**	**26.3%**	**57**
Coon Rapids	Anoka	63,899	25850	23.3	7510	8.5	71	2347	11.0	57	3778	25.3%	50
Eagan	Dakota	68,347	51862	33.5	8635	7.9	43	4036	12.9	64	6381	29.8%	79
Eden Prairie	Hennepin	63,456	53686	35.3	8303	7.6	29	4172	12.9	71	7098	31.6%	93
Edina	Hennepin	52,535	47198	16.0	6140	8.6	79	1519	31.1	100	1855	18.1%	14
Lakeville	Dakota	64,334	15777	37.9	8745	7.4	21	6746	2.3	7	7306	30.1%	86
Maple Grove	Hennepin	66,903	34257	35.1	8736	7.7	36	8486	4.0	21	6448	28.7%	71
Minnetonka	Hennepin	53,713	44277	29.1	10076	5.3	7	2273	19.5	86	4098	22.9%	36
Plymouth	Hennepin	78,351	52110	35.5	10862	7.2	14	3881	13.4	79	5423	24.0%	43
St. Louis Park	Hennepin	48,910	37726	10.8	3717	13.2	100	1419	26.6	93	1244	18.0%	7
Woodbury	Washington	70,840	21725	35.7	8478	8.4	64	6787	3.2	14	6414	28.1%	64

Cohort Performance Level			Increase Required for Burnsville to Match			Increase Required for Burnsville to Match			Increase Required for Burnsville to Match
Average		8.3	**-5.7%**		10.7	**3.3%**	4457	25.8%	**-1.8%**
70th Percentile		8.5	**-2.9%**		13.1	**27.2%**	5053	29.3%	**11.3%**
90th Percentile		11.1	**26.0%**		28.8	**178.9%**	17267	35.6%	**35.3%**

Land Use

2030 Land Use Goals

L-A: Increase acres of transit oriented development by 10% by 2030.

L-B: Increase acres of mixed use zoning development by 10% by 2030.

L-C: Openspace land use area (public and public accessible on private land) increase from 4,540 to 4,800 acres by 2030.

Strategies

Strategy L1 Expand and Promote Walkability in Burnsville.
How We'll Measure it:
Measured citywide walking and biking paths, percentage of households within ¼ mile of bike trail, citywide vehicle miles traveled.

Strategy L2 Expand Access to Public Parks and Open Space.
How We'll Measure it:
Total park and open space land use (public and private), calculated ParkScore (https://www.tpl.org/parkscore).

Strategy L3 Expand Sustainable Building and Infrastructure.
How We'll Measure it:
Percentage of city streets which are "Complete Streets", citywide average residential land use density, citywide commercial land use density.

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

See next page for Detailed Implementation Actions list

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Land Use			$		
Strategy L1	**Expand and Promote Walkability in Burnsville**					
L1- 1	Consider establishing bike parking standards for public and private land uses. (Short Term 1 – 3 Years)	1	Multi-Modal and Compete Streets Plan		✓	
L1- 2	Through Development Review process work with applicants to incentivize bike usage by increasing the availability of bike racks and lockers, bike share programs, shower facilities etc. (Short Term 1 – 3 years)	1	Sustainability Considerations for Zoning Actions	$	✓	○
L1- 3	Make a brochure that can be used by landlords to give info to their residents to assure developers and apartment owners help residents know about park locations, bike/walk/transit info, sustainability goals and resources, trash and recycling opportunities, renewable energy options, incentives, etc. Brochure can be distributed as a part of the Rental Licensing program in addition to other avenues. Brochure should link to the most up-to-date information maintained on the www.burnsvillemn.org website.	2			✓	✓
L1- 4	Collaborate with Transit providers to evaluate and enhance coverage and availability of public transit systems, take into account a GIS spatial analysis identifying dead-zones in which bus routes are greater than a half-mile away and promote expanded service into these areas, prioritizing areas with greater populations and greater poverty	2		🚶	✓	✓
L1- 5	Work with rail line owners to convert rails to trails particularly underutilized lines and lines that divide neighborhoods and passages below or over busy streets	3	Multi-Modal and Compete Streets Plan	🚶	✓	✓
Strategy L2	**Expand Access to Public Parks and Open Space**					
L2- 1	Support the implmentation of the Minnesota River Quadrant Plan and the Center Village Plan	1				
L2- 2	Maintain Burnsville's quality park service to community by continuing to explore opportunities to improve equality and overall service	1			○	✓
L2- 3	Acquire additional park land in Heart of the City (near Pleasant Ave South and Gateway Blvd.) (Long Term 10+ years)	3			○	✓
Strategy L3	**Expand Sustainable Building and Infrastructure**					
L3- 1	Minnesota River Quadrant: Support the "dig and move" option for the Freeway Landfill and Dump to maximize open space and allow for sustainable redevelopment in the MRQ. (Short Term 1 – 3 years)	1			○	✓
L3- 2	Support Dredge Management and maximize use of the Minnesota River for freight transportation. (Short Term 1 – 3 years)	1			○	
L3- 3	Minnesota River Quadrant: Work with private sector to develop a plan for a potential district energy or loop system in the MRQ to provide heat, power, cooling, water distribution, irrigation and other sustainable energy development and generation. (Medium Term 5 – 10 Years)	2		$ 🚶	✓	✓
L3- 4	Minnesota River Quadrant: Update land use and public infrastructure plans based on Freeway Landfill (Superfund site) and Dump remediation plans once approved by state and/or federal agencies. (Long Term 10+ Years)	3			○	○
L3- 5	Explore bonding to acquire land ahead of redevelopment and steer towards projects that meet city goals	3			○	○
L3- 6	Minnesota River Quadrant: Enact Closed Landfill Overlay zoning district over closed landfills as directed by MPCA. (Long Term 10+ Years)	3				

Section 07

Local Food

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Local Food

Local food is food grown close to where its bought and consumed. The biggest difference is that it doesn't travel too far before it reaches your plate. Transporting food across long distances burns fossil fuels and emits greenhouse gases. In addition, the extended period of time of long-distance transport increases the need for refrigeration. Refrigeration is carbon-intensive. The main chemicals in refrigeration are hydrofluorocarbons (HFCs), and they are 12,000 times more carbon-intensive than CO2. The less transportation and refrigeration needed to supply us our food, the more sustainable it becomes.

By buying food from local sources also supports your small business local economy. Studies have shown that the financial impacts of selling into regional markets are greater for smaller fruit and vegetable farms and make them more likely to earn positive net farm income and increased farm viability. Studies have indicated that nearly 32 jobs are created for every $1 million in revenue generated by produce farms involved in a local food market, compared to only 10.5 jobs for those involved in wholesale channels exclusively.

Increased local food systems also increase community resilience. A robust local food system establishes additional supply chains and resilience to distribution disruptions. Healthy local food systems can also play a critical role in addressing food access vulnerability and food insecurity within neighborhoods of higher vulnerability. Increased local food systems also tend to increase diversity and long-term food system resilience in food crops cultivated.

Equity Considerations:

- People in low-income neighborhoods may have limited access to full-service supermarkets or grocery stores. Over 7% of Dakota County households are food insecure – and nearly half of those with incomes above assistance program thresholds.
- Studies have also shown that communities with fewer resources often have more outlets that promote unhealthy dietary behaviors such as fast food restaurants, and little access to affordable nutritious food.

Burnsville Sustainability Accomplishments

Beekeeping Ordinance

On May 2, 2017, the **City Council** approved an ordinance to allow beekeeping within R-1A one-family rural residential zoning district. Beekeeping is allowed as long as the hives meet the accessory structure setbacks for the zoning district. Beekeepers are responsible for managing the hives, providing an on-site water source, adequate living space, land management of any unusual aggressive behavior or swarming of the honey bees. **Beekeeping is a practice that is highlighted as a sustainability goal with the Green Step Cities program**. Many surrounding communities currently allow beekeeping.

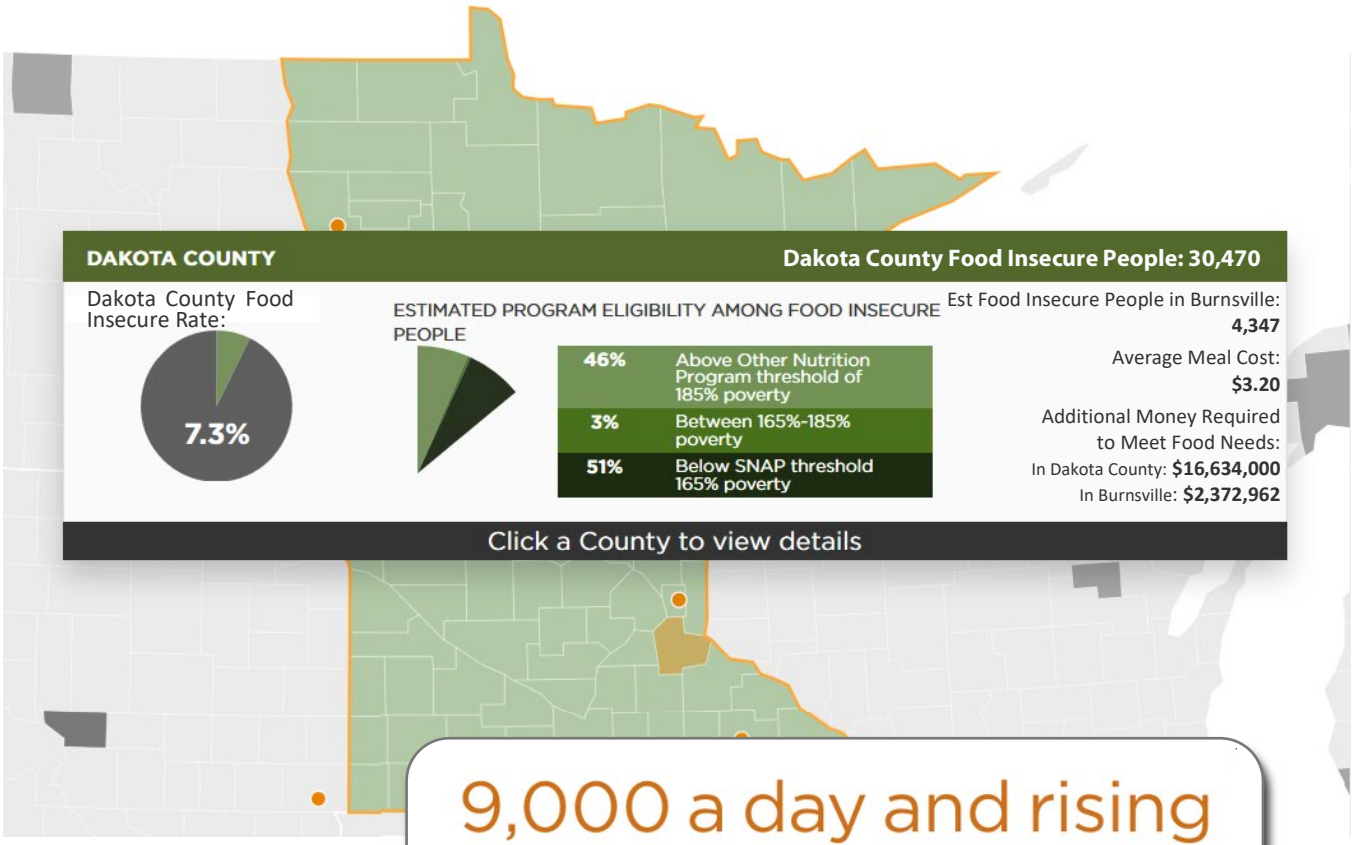
Did You Know?

Shifting just 20% of food purchases in the City of Burnsville to local food sources would add 260 local jobs.

$15,900,000

Could be added to the local economy by shifting just 20% of food purchases to local sources.

(Localized Burnsville numbers based on metrics included in the study "The economic Impacts of Localizing Michigan's Food System")



Graphic source: Feeding America https://map.feedingamerica.org/

9,000 a day and rising

In 2014, there were 3.34 million visits to 300 food shelves across the state. That is 9,000 people a day seeking food assistance. This represents a 4% increase over 2013.

WHO VISITS FOOD SHELVES?

- 38% — Children
- 54% — Adults
- 8% — Seniors

(Source: Hunger Solutions Minnesota)

Fruit and Vegetable Consumption in Minnesota

Only 11.6% of adults meet the daily fruit intake recommendation [2]

Only 8.1% of adults meet the daily vegetable intake recommendation [2]

(Source: CDC State Indicator Reports on Fruits and Vegetables, 2018)

Local Food

Food Access

On the map to the left, highlighted sections represent low-income census tracts (tracts where 20% or more of the population is at or below poverty, or where family median incomes are 80% or less of State median) where a significant number (at least 500 people) or share (at least 33 percent) of residents are distant from the nearest supermarket. In sections which are green, residents are more than 1 mile (urban) or 10 miles (rural), while in orange sections residents are more than ½ mile (urban) or 10 miles (rural) from nearest supermarket.

Vehicle Access

On the map to the left, highlighted sections represent Low-income census tract where more than 100 housing units do not have a vehicle and are more than ½ mile from the nearest supermarket in urban/suburban areas, or a significant number (at least 500 people) or share (at least 33 percent) of residents are more than 20 miles from the nearest supermarket in rural areas.

- Community Garden
- Farmers' Market

Access to Local Food

The map on the left shows community garden and farmers market locations. The City of Burnsville currently has two community garden locations and two farmers market locations. According to the USDA Local Food Directory, the Burrnsville Farmers Markets do not except Federal Nutrition Benefits such as WIC, WIC to cash, SNAP, or Senior Farmers Market Nutrition Program.

Community Gardens Per 100,000 Residents

United States: 18,000 Total (est)	5.0
Twin Cities Metro: 600 Total	18.3
City of Minneapolis: 300 Total	71.1
City of Burnsville: 2 Total	3.2

(Sources: American Community Gardening Association, Star Tribune, City of Minneapolis, City of Burnsville)

Local Food

2030 Local Food Goals

F-A: By 2030, increase total number of community gardens, with a priority given to neighborhoods with limited food access, limited vehicle access, and elevated poverty levels to 6 (9-10 per 100,000 Residents).

F-B: By 2030, increase total number of farmers markets, with a priority given to neighborhoods with limited food access, limited vehicle access, and elevated poverty levels to 2 (3-4 per 100,000 Residents).

Strategies

Strategy F1 Increase production of local food.
How We'll Measure it:
Count of small scale farms in community, Count of local farmers markets and vendors in community, prevalence of urban agriculture/back yard agriculture in community.

Strategy F2 Increase Access to Community Gardening.
How We'll Measure it:
Number of community garden sites, number of community garden plots and participants.

Strategy F3 Ensure that there are no neighborhoods that are food deserts. (Future Land Use Guide Plan).
How We'll Measure it:
Measure of food access based on food and nutrition access mapping, USDA Food Access Research Map.

Strategy F4 Reduce food waste and hunger.
How We'll Measure it:
Organics/Food Waste share of municipal solid waste as reported by handlers, sites, and Minnesota SCORE reporting; hunger, food access, and nutrition survey data

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Local Food

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits		
				Economic Benefits	GHG Reduction	Climate Adaptation
	Local Food			$ 🚶		
Strategy F1	**Increase production of local food**					
F1- 1	Consider allowing small scale farming on capped landfills (Minnesota River Quadrant)	2	Local Agriculture and Nutrition Security Study and Plan	🚶	●	●
F1- 2	Continue to allow small scale farming and community gardening in floodplains (Minnesota River Quadrant)	1	Local Agriculture and Nutrition Security Study and Plan		●	●
F1- 3	Use permaculture (examining and following nature's patterns) in landscaping. Explore opportunities for pilot projects using City land or Right of Way areas (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	$	●	●
F1- 4	Consider special use permits for food collection or vegetation harvest in wetland systems (Wetlands Protection and Management Plan)	2	Local Agriculture and Nutrition Security Study and Plan	$ 🚶		●
F1- 5	Continue implementation of ordinances and/or zoning district standards that permit Urban Agriculture and local food producers. (Future Land Use Guide Plan)	1	Local Agriculture and Nutrition Security Study and Plan	$ 🚶		●
F1- 6	Promote Farmer's markets (Neighborhoods and Housing Plan)	2	Local Agriculture and Nutrition Security Study and Plan	🚶	●	●
F1- 7	Allow additional permaculture neighborhood gardens on city park turf areas to reduce intensive maintenance (Natural Environment Plan)	2	Ground Cover Improvement Plan	$	●	●
F1- 8	Work with county and Met Council to develop an entrepreneurship program for commercial urban farming	2	Local Agriculture and Nutrition Security Study and Plan	🚶		
F1- 9	Encourage aquaponics and other sustainable practices (Cliff Road Business Park)	2	Local Agriculture and Nutrition Security Study and Plan	🚶		
F1- 10	Encourage local/cottage food industries. (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	🚶	●	●
F1- 11	Establish incentives to neighborhood food production (bees, chickens, goats, etc.) (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	$ 🚶	●	●
F1- 12	Support Aquaculture as a potential land use (Minnesota River Quadrant)	2	Local Agriculture and Nutrition Security Study and Plan	🚶		
F1- 13	Support programs that support and incentivize urban agriculture (UA) and local food production and businesses. (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	🚶		
F1- 14	Facilitate Community Engagement on local food systems (Community Enrichment Plan)	2	Local Agriculture and Nutrition Security Study and Plan			
F1- 15	Support growing, harvesting, selling and delivery of locally-grown produce. (Community Enrichment Plan)	3	Local Agriculture and Nutrition Security Study and Plan	🚶	●	●
F1- 16	Establish a policy to serve local food at all City events	3	Local Agriculture and Nutrition Security Study and Plan	🚶	●	●

Local Food

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
Strategy F2	**Increase Access to Community Gardening**					
F2- 1	Update code to provide incentives or require developers to preserve topsoil and provide space for backyard or community gardens	2			✓	
F2- 2	Promote Community Gardens to replace turf grass areas (Natural Resources Management Plan)	2	Ground Cover Improvement Plan	$	✓	
F2- 3	Coordinate with City GIS Mapping servcies to identify potential sites for community garden sites or community farm sites (similar to Dubuque Rescue Mission Community Farm (http://dbqrescue.org/)	2	Local Agriculture and Nutrition Security Study and Plan	$		
F2- 4	Continue to allow for community gardens. Compile, distribute, and promote information on how to start a community garden. (Neighborhoods and Housing Plan)	1	Local Agriculture and Nutrition Security Study and Plan			
F2- 5	Establish community gardens at unused city owned space and consider identification of additional publicly-owned sites that may be suitable for community gardens and urban farms, work with advocacy groups to make these sites available. (Community Enrichment Plan)	2	Local Agriculture and Nutrition Security Study and Plan	$	✓	✓
F2- 6	Encourage / create community gardens and encourage private developers to do so	2	Local Agriculture and Nutrition Security Study and Plan	$	✓	✓
F2- 7	Encourage multi-family properties developers to establish land for community gardens	3		$		
Strategy F3	**Explore Ways to Reduce Food Deserts Within Community. (Future Land Use Guide Plan)**					
F3- 1	Work with Dakota County to identify areas with limited access to traditional food markets. (Community Enrichment Plan)	2	Local Agriculture and Nutrition Security Study and Plan			✓
F3- 2	Identify, map and prioritize food insecure areas and populations.	2	Local Agriculture and Nutrition Security Study and Plan			✓
F3- 3	Attract and promote grocery store and food market investment in food desert sections of the City. Explore successful strategies used in other communities to attract grocery stores into food desert locations and implement best practices. Collaborate with neighboring communities to maximize coverage. (Major priority)	2	Local Agriculture and Nutrition Security Study and Plan		✓	✓
F3- 4	Continue to allow farmers markets (Heart of The City)	2	Local Agriculture and Nutrition Security Study and Plan		✓	✓
Strategy F4	**Reduce food waste and hunger**					
F4- 1	Explore development of a mobile food pantry with a focus on local, organic, and whole foods to increase access to high quality nutrition in underserved areas of City	3	Local Agriculture and Nutrition Security Study and Plan	$	✓	✓
F4- 2	Explore options and partners for promoting and increasing food donation	3	Local Agriculture and Nutrition Security Study and Plan	$		✓

What You Can Do

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

Section 08

Renewable Energy

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Renewable Energy

Fossil fuels have served mankind for many decades. They have been credited with the increase in gross domestic product and as one of the drivers of the increase in quality of living. Fossil fuels, however, are a finite resource and will vanish from use. Moreover, fossil fuel use has been shown to have serious environmental impacts related to their extraction, processing, and use in terms of resource depletion, air quality impacts, and contributions to global warming and climate change. In addition, for communities which do not produce fossil fuels, energy derived from fossil fuels means that all dollars spent on that energy is being exported to other regions or countries.

Renewable energy - energy from a source that is not depleted when used, such as wind or solar power - will not suffer the same extinction fate as energy derived from finite resources. Renewable energy also has a number of environmental and economic benefits, including:

- Generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution
- Diversifying energy supply and reducing dependence on imported fuels
- Potential to create local economic development and jobs in manufacturing, installation, and maintenance.

Equity Considerations:

- Families in America with the least means pay disproportionately more for their electricity, sometimes lacking basic access to service altogether. This energy access inequity exacerbates other vulnerabilities including exposure to heatwaves and other climate vulnerabilities.
- Air pollution associated with fossil energy use disproportionately impact low income and communities of color. On average, African Americans are exposed to 61% more air pollution while Asian Americans breathe 73% more and Latinos 75% more.

Burnsville Sustainability Accomplishments

City of Burnsville Achieves "SolSmart Bronze"

The City of Burnsville has been designated a "Bronze Community" from the national SolSmart program for making it faster, easier, and more affordable for homes and businesses to go solar. This designation recognizes Burnsville for taking bold steps to encourage solar energy growth and remove obstacles to solar development. For companies looking to expand, a SolSmart Bronze designation is a signal that [City/County] is "open for solar business."

Solar Energy In August 2015, Burnsville participated in a Met Council-led collaboration of local governments to explore the use of solar energy. The project helped identify solar vendors who could meet the energy needs of cities. The Burnsville City Council authorized contracts to provide solar energy for approximately 50 percent of the City's energy use in the Xcel Energy territory. Participation in the community solar garden is projected to result in $2,750,000 savings over 25 years. Over the last 16 months, it has produced approximately $10,000 in energy savings!

Renewable Energy

Solar In Minnesota

As of March, 2017, Minnesota has a total of 431.6 megawatts (431,600,000 watts) of solar capacity installed statewide. Over 32% of that capacity went 'on-line' in the first three months of 2017 alone. As of June 2016, there are a total of 1,500 rooftop solar installations in the State. As of the end of 2016 the State of Minnesota ranked 16th nationally for total solar energy production capacity.

The State's solar installation total is enough to power 57,000 homes. The share of the State's total electricity use that comes from solar power, however, is less than 0.2%. This indicates great potential for growth throughout the State. Current solar growth projections for the State equal an additional 1,214 MW over the next 5 years - a growth rate that ranks 21st nationally.

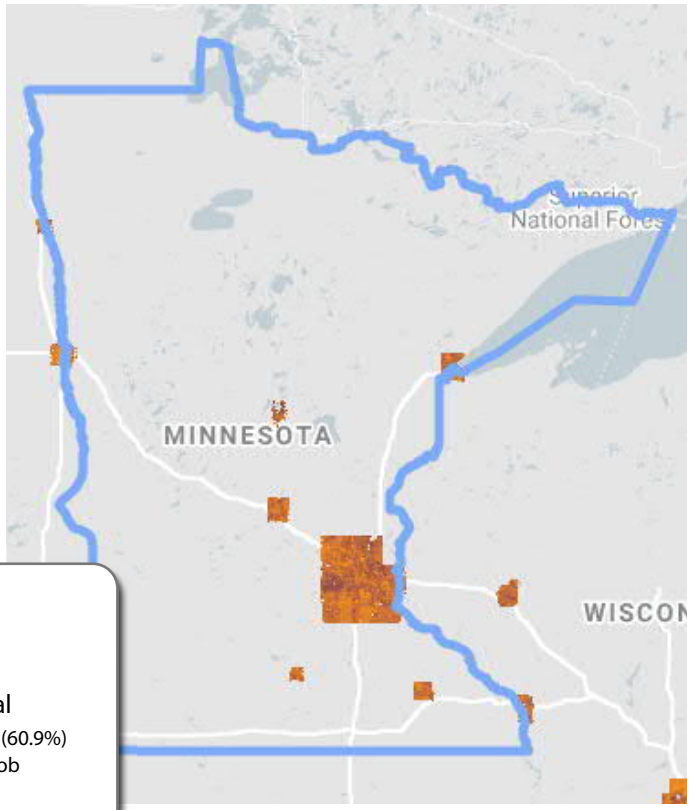
Costs for Solar PV installation in the State have declined 64% since 2012. Price declines have been accompanied with increasing rate of investment in solar energy. A total of $461,430,000 has been invested in Solar PV installations with $336,490,000 in 2016 alone. The industry currently employs 2,872 people in 159 companies Statewide. Minnesota employment figures for Solar PV rank 25th nationally, again indicating a potential for employment growth.

(source: Solar Energy Industries Association)

Solar In Minnesota - By The Numbers

Based on 54% data coverage over buildings throughout the State, 71% of all buildings in Minnesota are solar-viable. Generation potential estimates are based on buildings viable for solar panels. Panels included in energy generation calculations receive at least 75% of the maximum annual sun in the county. For Minnesota, the average value of the threshold is 985 kWh/kW.

(source: Project Sunroof)



Citywide Electric Use

2010 Electric Use

Total:	Residential	Commercial
525.6 Gwh	205.3 Gwh (39.1%)	320.4 Gwh (60.9%)
	3,399 Kwh/Resident	10,527 Kwh/Job

2016 Electric Use

Total:	Residential	Commercial
521.7 Gwh	185.9 Gwh (39.1%)	335.7 Gwh (60.9%)
	3,026 Kwh/Resident	9,349 Kwh/Job
	11% reduction	11% reduction

(Source: Regional Indicators Initiative, US Census OnTheMap)

Optimized Generation Capacity In Burnsville

Though the total energy generation outlined previously is reasonably feasible, for purposes of establishing City-Wide potentials expectations it is appropriate to modify the total generation to reflect the likely most cost efficient installation potentials given current technologies and cost parameters. Solar PV installations which have less than ideal orientations capture less light per panel and therefore generate less energy per dollar spent. Establishing an Optimized Capacity establishes the cost effective solar pv installation potential based on current technology.

Identifying the installations most likely to be highly cost effective ultimately requires a site-by-site assessment, however, typical installation performance characteristics can be extrapolated to establish reasonable city-wide estimates. For the latitude and geography of Burnsville, it can be assumed that all solar suitable roof planes that are flat or south facing should ultimately be reasonably cost effective installations.

For West and Southwest facing roof planes, it is likely that all low and mid-low roof tilt installations would be cost effective, while mid-high and high roof tilt installations with West or Southwest orientation may produce self-shading for many of the solar productive hours making those installations viable on a case-by-case basis. Likewise, for East and Southeast facing roof planes, it is likely that all low roof tilt installations would be cost effective, while mid-low, mid-high, and high roof tilt installations facing East may produce self-shading, making those installations also viable on a case-by-case basis.

On the chart below, all solar suitable roof planes with roof tilt and azimuth orientation combinations likely to be consistently cost effective are highlighted in red and are considered to be the City's Optimized Generation Capacity. It should be noted that installations outside of these selections may still be cost effective but require individual feasibility assessment. The total Optimized Generation Capacity in Burnsville is estimated to be 119,138,574 KWH annually.

Optimized Generation Capacity In Burnsville

			Flat	Low Tilt	Mid-Low Tilt	Mid-High Tilt	High Tilt
Subtotal Flat							
Suitable Buildings	781	4.22%	**781**	0	0	0	0
Suitable Roof Planes	621	4.22%	**621**	0	0	0	0
Square Footage	412,819	6.80%	**412,819**	0	0	0	0
Capacity (KW dc)	7,337	6.80%	**7,337**	0	0	0	0
Generation (KWH)	12,068,846	7.18%	**12,068,846**	0	0	0	0
Subtotal South Facing							
Suitable Buildings	5,897	31.87%	0	**1,040**	**3,987**	**870**	**0**
Suitable Roof Planes	4,686	31.87%	0	**826**	**3169**	**691**	**0**
Square Footage	2,096,205	34.53%	0	**381,237**	**1,475,892**	**239,076**	**0**
Capacity (KW dc)	37,254	34.53%	0	**6,775**	**26,230**	**4,249**	**0**
Generation (KWH)	57,690,964	34.35%	0	**10,142,426**	**40,559,096**	**6,989,442**	**0**
West + Southwest							
Suitable Buildings	5,838	31.55%	0	**878**	**3,961**	997	2
Suitable Roof Planes	4,640	31.55%	0	**698**	**3148**	792	2
Square Footage	1,781,923	29.35%	0	**272,408**	**1,239,039**	270,219	258
Capacity (KW dc)	31,669	29.35%	0	**4,841**	**22,020**	4,802	5
Generation (KWH)	49,204,408	29.29%	0	**7,247,136**	**34,050,128**	7,899,910	7,235
East + Southeast							
Suitable Buildings	5,988	32.36%	0	**978**	4,012	997	1
Suitable Roof Planes	4,759	32.36%	0	**777**	3188	792	1
Square Footage	1,780,300	29.32%	0	**303,770**	1,275,711	200,696	123
Capacity (KW dc)	31,640	29.32%	0	**5,399**	22,672	3,567	2
Generation (KWH)	49,010,265	29.18%	0	**8,081,500**	35,057,916	5,867,390	3,459

Grand Total		Subtotal: Flat Roof		Subtotal: Low Tilt		Subtotal: Mid-Low Tilt		Subtotal: Mid-High Tilt		Subtotal: High Tilt	
Suitable Buildings	18,504	781	4.22%	2,896	15.65%	11,960	64.63%	2,864	15.48%	3	0.02%
Suitable Roof Planes	14,705	621	4.22%	2,301	15.65%	9,505	64.63%	2,276	15.48%	2	0.02%
Square Footage	6,071,248	412,819	6.80%	957,414	15.77%	3,990,642	65.73%	709,992	11.69%	381	0.01%
Capacity (KW dc)	107,899	7,337	6.80%	17,015	15.77%	70,922	65.73%	12,618	11.69%	7	0.01%
Generation (KWH)	167,974,483	12,068,846	7.18%	25,471,062	15.16%	109,667,139	65.29%	20,756,742	12.36%	10,694	0.01%

Burnsville Market Absorption Projections

Simply anticipating the solar adoption rate within the City of Burnsville to match the rate of adoption throughout the State based on population share, would mean an increase of 14.2 MW of installed capacity within the City by 2022, equivalent to approximately 13.2% of the total rooftop technical capacity potential or 18.4% of the optimized capacity potential within the City.

Following the projected elimination of the residential portion and a scaling back of the commercial portion of the Federal residential tax incentive, a reasonable assumption may be a partial reduction in the annual growth rate for year 2023 and a few years following. As the market continues to mature through the 2020's it may, again, be reasonable to assume another reduction in the growth rate of new installed capacity beginning in year 2031. For purposes of this study, we recommend a 2/3rd reduction of the annual rate of growth for 2023 and then again at 2030. This would result in a growth rate of 32% through 2022, an 11% growth rate for years 2023 through 2030, and a mature market growth rate of 3.5% beginning in 2031.

Burnsville Solar PV Projection Based on Potential Market Absorption

Year	Cumulative Installed (KW)	Annual Generation (KWH)	% of City Electric Consumption
2022	14,161	22,045,494	**4.23%**
2025	19,367	30,150,102	**5.78%**
2030	32,635	50,804,675	**9.74%**
2040	46,034	71,665,011	**13.74%**

Greenhouse Gas and Electricity

Greenhouse gas emissions form, primarily, from the burning of fossil fuels. The carbon footprint of electricity is the total greenhouse gas emissions throughout the life-cycle from source fuel extraction through to end user electricity. According to the Intergovernmental Panel on Climate Change (IPCC), the median greenhouse gas emission, measured in metric tonnes, for 1 Gwh of electricity by fuel type is as follows:

Electricity Source	Metric Tonnes GHG/GWh
Hydroelectric	4
Wind	12
Nuclear	16
Biomass	18
Geothermal	45
Solar PV	46
Natural gas	469
Coal	1001

The Water/Energy Nexus

Water and energy are inextricably linked in our current modern infrastructure. Water is used in all phases of energy production. Energy is required to extract, pump and deliver water for use, and to treat waste-water so it can be safely returned to the environment. The cumulative impact of electricity generation on our water sources can be significant, and varies by fuel source. According to The River Network, the average fresh water use for 1 Gwh of electricity by fuel type is as follows:

Electricity Source	Gallons/GWh
Hydroelectric	29,920,000
Wind	1,000
Nuclear	2,995,000
Biomass	2,000
Geothermal	2,000
Solar PV	2,000
Natural gas	1,512,000
Coal	7,143,000

Carbon and Water Footprint Reduction Potential

Year	Annual Generation (GWH)	GHG Emission Reduction (mTons)	GHG Emission Reduction (Cubic Feet of Atmosphere)	Water Footprint Reduction (Mgallons)
2022	22.05	8,047	159,655,918	116.94
2025	30.15	11,005	218,350,383	159.93
2030	50.80	18,544	367,933,094	269.49
2040	71.67	26,158	519,005,966	380.15

Renewable Energy

2030 Renewable Energy Goals

RE-A: 7.5% on-site solar (or REC purchase) for residential and commercial by 2030.

RE-B: 5% Increase in residential and commercial fuel switch to natural gas alternative (Bio Gas, etc).

RE-C: Achieve 100% renewable energy for all electric use for City owned facilities by 2030.

Strategies

Strategy RE1 Move electric supply of City owned facilities to renewable energy.
How We'll Measure it:
Reported annual energy use from renewable sources (on-site and off site sources with REC retention).

Strategy RE2 Implement 2019 SolSmart program recommendations.
How We'll Measure it:
Achievement of SolSmart Siliver or Gold certification level.

Strategy RE3 Increase on-site distributed renewable energy to 7.5% of Residential and Commercial electric use by 2030 (170 homes per year adopting on-site renewable or making green power purchases).
How We'll Measure it:
On-Site renewable energy installation and generation reported by Xcel Energy and Dakota Electric .

Strategy RE4 Increase commercial/industrial green power purchasing Citywide to 7.5% of Commercial electrical use.
How We'll Measure it:
Participation in renewable energy program options as reported by Xcel Energy and Dakota Electric .

Strategy RE5 Fuel Switching for Commercial Natural Gas: By 2030, 5% of residential, commercial and industrial natural gas consumption will be Renewable Natural Gas purchases.
How We'll Measure it:
Participation in renewable natural gas program option as reported by Centerpoint Energy.

Strategy RE6 Increase participation in shared renewable energy with the goal of achieving a 50% increase in the number of solar garden subscriptions within the City, by 2025 (to 306 households) and a 100% increase by 2030 over 2019 numbers (to 408 households).
How We'll Measure it:
Shared renewable energy program participation as reported by Xcel Energy and Dakota Electric.

Strategy RE7 Increase renewable energy investments by regional utilities.
How We'll Measure it:
Renewable energy source share and annual electric emission factors reported by Xcel Energy and Dakota Electric.

Renewable Energy

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits		
				Economic Benefits	GHG Reduction	Climate Adaptation
	Renewable Energy			$		
Strategy RE1	**Move electric supply of City owned facilities to renewable energy**					
RE1- 1	**Conduct a City Facility Solar Feasibility and 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 thrid party ownership (such as Power Purchase Agreements). 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.**	1	Citywide Solar Advancement Plan			
RE1- 2	Based on City Facility Solar Feasibility and Master Plan study (to be developed) convert conventional energy sources by using renewal energy sources on all City buildings and sites, where feasible with a minimum goal of at least 30% of the primary buildings included in the report (1-10 year)	2	Citywide Solar Advancement Plan	$		
RE1- 3	Install solar panels to run lighting on newly installed signs by the City (Citywide)	3		$		
RE1- 4	Provide solar EV charging stations for city fleet. Goal to achieve 10% of City fleet vehicles using EV Solar charging Stations by 2025 and 50% by 2030.	3	City Fleet Plan			
RE1- 5	Work with regional energy partnerships to develop and implement an Electrification Action Plan for all City facilities to eliminate on-site fossil fuel combustion. Include new and existing buildings, incorporate strategies to address electricity storage, and focus on highlighting any hurdles or solutions that would be applicable to the broader community.	3				
RE1- 6	Support wind power in the Buckhill area or the closed landfill when that occurs	3				
Strategy RE2	**Implement 2019 SolSmart program recommendations**					
RE2- 1	Continue participation in the SolSmart Program and complete process and steps to achieve a Silver certification	1	Citywide Solar Advancement Plan			
RE2- 2	Update Zoning Ordinance sections as per SolSmart recommendations, including sections 10-4-2, 10-7-4, and 10-7-29	2	Citywide Solar Advancement Plan			
RE2- 3	Consider creating an overlay district identifying where principal solar uses are desired. Overlay district standards can capture co-benefits through mandated design and be applied in response to proposals as a rezoning rather than a text amendment	3	Citywide Solar Advancement Plan			

Renewable Energy

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
Strategy RE3	**Increase on-site distributed renewable energy to 7.5% of Residential and Commercial electric use by 2030** (170 homes per year adopting on-site renewable or making green power purchases)					
RE3- 1	Promote businesses and residents exploring making their building sites solar resilient: http://solarresilient.org/	1		✓	✓	✓
RE3- 2	**Proactively identify the City's "Top 100" commercial solar locations and provide informational packages to each including preliminary solar feasibility assessments, return on investment, benefits, and procurement information.**	**2**	Citywide Solar Advancement Plan		✓	
RE3- 3	Engage in and promote a residential solar group purchase campaign to support decreased purchase cost for residents annually	2	Citywide Solar Advancement Plan	✓	✓	✓
RE3- 4	Engage in and promote a commercial solar group purchase campaign to support decreased purchase cost for businesses annually and invite "Top 100" sites to participate.	2	Citywide Solar Advancement Plan	✓	✓	✓
RE3- 5	Create, distribute, and promote a "Solar Ready Building Guide"	3	Citywide Solar Advancement Plan			
RE3- 6	Encourage Solar Ready building construction in flexible building standards such as Planned Unit Developments and Conditional Use Permits.	3	Sustainability Considerations for Zoning Actions		✓	✓
RE3- 7	Find innovative ways to store energy and promote information to businesses in City	3				
RE3- 8	Encourage on-site solar for all commercial properties receiving City funding and incentives.	3	Sustainability Considerations for Zoning Actions	✓	✓	✓
RE3- 9	Explore ways to incentivize renewable energy generation and energy storage projects	3			✓	✓
RE3- 10	Provide more incentives for rooftop solar	3		✓	✓	✓
RE3- 11	Make it easier for large multi-family, commercial, and industrial customers to maximize the benefit of using their space for photovoltaics (e.g., feed-in tariff, third-party lease agreements, roof space rental)	3		✓		✓
RE3- 12	Explore the development of a Renewable Energy TIF District to promote renewable energy as well as economic development.	3		✓	✓	✓
RE3- 13	Require all commercial building permit applications to include an on-site solar feasibility assessment illustrating generation potential and financial payback with available incentives and tax benefits. (property owners not required to construct array, study submission only)	3				
RE3- 14	Maximize utility programs. Coordinate with Xcel Energy and Dakota Electric for promotion of utility programs supporting renewable energy.	3			✓	✓
Strategy RE4	**Increase commercial/industrial green power purchasing Citywide to 7.5% of Commercial electrical use**					
RE4- 1	Establish and promote an award/promotional campaign recognizing the City's largest commercial green power consumers.	2				
RE4- 2	Compile, distribute, and promote information on green power purchasing options and benefits. Include customizable promotional materials such as social media posts, business window decals, and print ready content for businesses to use to announce and promote their green power purchasing.	2	Citywide Solar Advancement Plan			

Renewable Energy

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
Strategy RE5	**Fuel Switching for Commercial Natural Gas: By 2030, 5% of residential, commercial and industrial natural gas consumption will be Renewable Natural Gas purchases.**					
RE5- 1	Coordinate with Centerpoint Energy for co-promotion of the utility's pilot Renewable Natural Gas purchase program.	2			✓	
RE5- 2	Compile, distribute, and promote information on renewable natural gas purchasing options and benefits. Include customizable promotional materials such as social media posts, business window decals, and print ready content for businesses to use to announce and promote their green power purchasing.	2				
Strategy RE6	**Increase participation in shared renewable energy with the goal of achieving a 50% increase in the number of solar garden subscriptions within the City, by 2025** (to 306 households) **and a 100% increase by 2030 over 2019 numbers** (to 408 households)					
RE6- 1	Help showcase renewable energy at other local fairs, city website utility billing page, City digital signs, 35W billboard and other events as they present themselves	2				
RE6- 2	Work with solar industry to strategically locate community solar gardens. Consider issuing a request for proposals from community solar developers, combining projects with local labor to create employment opportunities for residents	2	Citywide Solar Advancement Plan	$	✓	✓
RE6- 3	Subscribe to community solar project for all City facilites for which on-site solar is determined to be infeasible. Purchase renewable Energy Credits equal to the amount of electricity subscribed through solar garden to assure City meets operational GHG reduction goals.	2	Citywide Solar Advancement Plan	$	✓	
RE6- 4	Support the development of community solar projects that benefit all residents, particularly communities of color and low-income populations	2		$	✓	✓
Strategy RE7	**Increase renewable energy investments by regional utilities**					
RE7- 1	Help strengthen statewide standards to ensure support for renewable energy	3		$		
RE7- 2	Increase renewable energy supply options by supporting community solar and other renewable energy generation projects	3		$	✓	

What You Can Do

- Buy green electricity: Take advantage of your electric utility's Green Power options to switch to renewable and cleaner energy sources to power your home or business.
- Take advantage of local programs and rebates to install solar panels on your home or business, reducing energy costs and our reliance on fossil fuels.
- Explore participation in Community solar programs that provide opportunities for residents to participate in renewable energy without needing to install solar panels on their own roofs.
- Convert your natural gas furnace, water heater, and appliances to electric.
- Contact Centerpoint Energy and switch your natural gas account to Renewable Natural Gas.

Section 09

Solid Waste and Recycling

Click to Return to TOC


20%
FINESS
Shampoo
Conditioner
Shampoo
Revitalisant

Solid Waste and Recycling

In Burnsville, solid waste contribute about 2% of citywide greenhouse gas emissions. However, studies indicate that municipal solid waste sector has great potential to avoid emissions throughout the economy thanks to prevention and waste recovery. Landfills are the third largest anthropogenic (man-made) source of methane, accounting for approximately 11% of the estimated total global methane emissions.

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

According to the Minnesota Climate Change Advisory Group, solid waste management strategies like waste reduction, recycling, and composting are anticipated to be capable of reducing statewide solid waste GHG emissions by over 50%.

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, accessibility based on housing type, and language barriers.
- Populations that are situated closer to the landfill or the wastewater treatment facility may experience nuisance issues like bad odors and potential health issues.

Burnsville Sustainability Accomplishments

Minimal Waste Events

Burnsville hosted hree new events in 2019: two **Party on the Plaza** events and the **Back to the 80s Car Show and Food Truck Rally** event at Burnsville Center. During these events:

- Vendors worked to use certified compostable containers and serviceware.
- Guests supported the action and put their leftover food, utensils and containers into organics collection receptacles.
- The organic material collected at the events went to a commercial compost center to be made into a soil amendment, which can be used to enhance the nutrients and quality of gardens.

Did You Know?

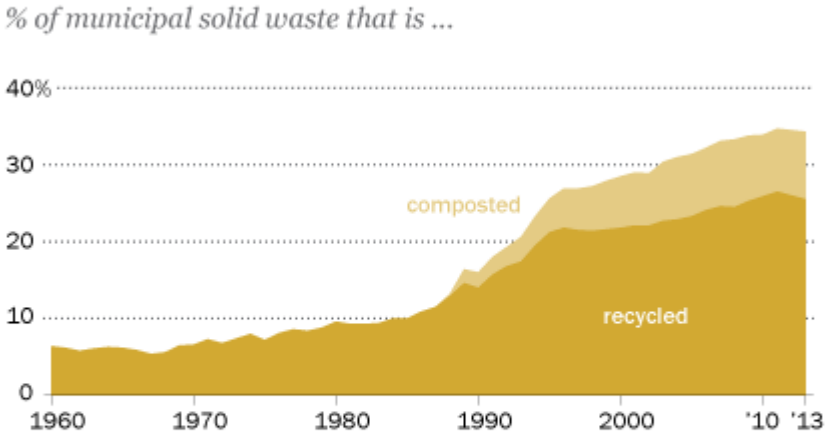
Studies show that in America, approximately **40%** of food never makes it to our dining tables—meaning the water, fertilizer, farm equipment, and transportation involved in producing this food and getting it to your refrigerator is wasted.

75% of food waste that could be composted ends up in landfills

Minnesota Waste Stream Changing

The Minnesota Pollution Control Agency (MPCA) commissioned a statewide study to determine the characteristics of statewide waste streams. The project studied garbage from six facilities throughout the state and separated it into nine primary categories. The study found that Minnesota waste has changed since the last study was conducted in 2000. Paper, plastics, and organics are still the top three components of our garbage, but the proportions have changed—plastic is up, food is up, but paper is down. This indicates great potential for increased organics recycling opportunities.

Recycling Rates Have Declined Recently



According to the EPA, only 34.3% of the 254.1 million tons of municipal solid waste generated in 2013 was recovered through recycling or composting; the overall recovery rate has actually slipped a bit since peaking at 34.7% in 2011. These numbers indicate a potential for increased recycling and organics participation.

(Source: Pew Research Center)

Minnesota's Waste Hierarchy

Following the Minnesota Climate Change Advisory Group's initial recommendations on statewide GHG emissions reductions, the MPCA conducted a study to identify the most promising potentials for reduction of solid waste emissions. The report produced the above heirarchy of waste management to achieve the best environmental results.

Burnsville Solid Waste

Based on the State of Minnesota SCORE report for Dakota County, Burnsville's total Municipal Solid Waste (MSW) handled increased approximately 5% between 2005 and 2016. During that same time, recycling decreased 23%, while Organics increased 8 fold and the total MSW sent to landfill decreased 24%. For the year 2016, the City of Burnsville achieved a total landfill diversion rate of 58.9%, up from 43.4% in 2005.

The following are detailed breakdown estimates for the City of Burnsville.

Burnsville	FY 2005 Municipal Solid Waste Profile			
Population	59,026			
Households	23,651			
Workers	32,462			
MSW Breakdown				
Total Recycling	26,571.73		0	0
Total Organics	1,494.49		0	0
Subtotal Rec/Org	**28,066.22**			**0**
Total Onsite	0.00	N/A		0
Total WTE (Waste To Energy)	0.00		0.368	0
Total Landfill	36,636.66		0.448	16413.225
Subtotal MMSW	**36,636.66**			**16413.225**
City Total MSW Handled	**64,702.88**	**tons of waste**		**16,413.22** **mTons**

Burnsville	FY 2016 Municipal Solid Waste Profile			
Population	61,278			
Households	24,553			
Workers	33,700			
MSW Breakdown				
Total Recycling	20,380.44		0	0
Total Organics	12,127.41		0	0
Subtotal Rec/Org	**32,507.86**			**0**
Total Onsite	0.00	N/A		0
Total WTE (Waste To Energy)	7,514.62		0.368	2765.3796
Total Landfill	27,964.20		0.448	12527.964
Subtotal MMSW	**35,478.82**			**15293.343**
City Total MSW Handled	**67,986.68**	**tons of waste**		**15,293.34** **mTons**

Solid Waste and Recycling

2030 Solid Waste and Recycling Goals

SW-A: Reduce waste in City operations and work towards an 85% diversion rate .

SW-B:Increase residential recycling and waste reduction.

SW-C:Promote commercial and multi-family recycling.

Strategies

Strategy SW1 Reduce waste in city operations by measuring waste in all facilities and work towards an 85% diversion rate.
How We'll Measure it:
City facility waste generation as reported by waste haulers.

Strategy SW2 Increase residential recycling and waste reduction.
How We'll Measure it:
Residential recycling participation reported by haulers, Minnesota SCORE Reported waste and recycling volumes for Dakota County (Burnsville pro-rata share)

Strategy SW3 Promote commercial and multi – family recycling.
How We'll Measure it:
Multi-family residential recycling participation reported by haulers, Minnesota SCORE Reported waste and recycling volumes for Dakota County (Burnsville pro-rata share).

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Detailed Implementation Actions

Benefits Key

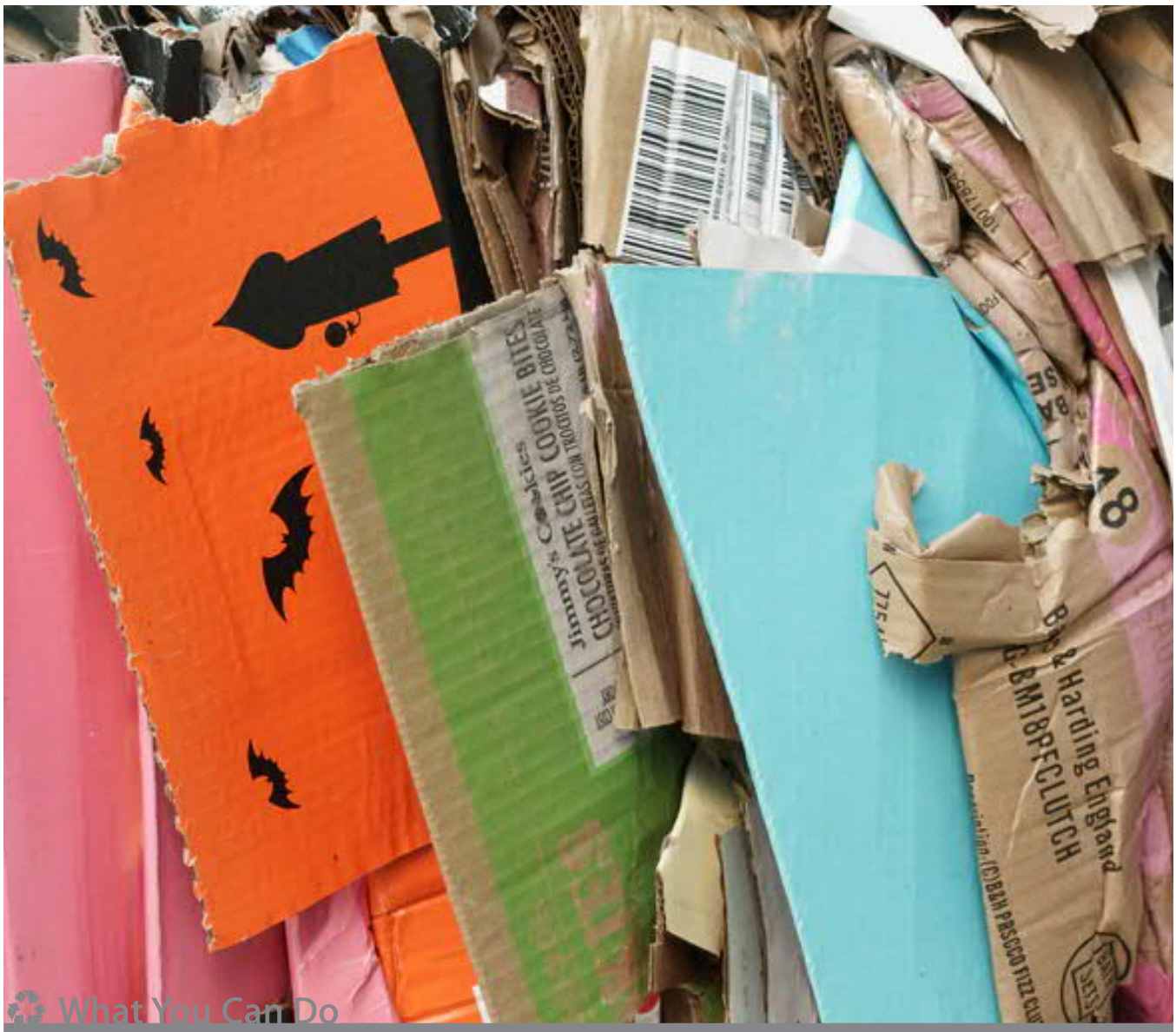
- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

See next page for Detailed Implementation Actions list.

♻ Solid Waste and Recycling

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
♻	**Solid Waste and Recycling**			$		
Strategy SW1	**Reduce waste in city operations by measuring waste in all facilities and work towards an 85% diversion rate**					
SW1- 1	Implement organics recycling at all city facilities where it is feasible.	1				
SW1- 2	Measure waste in all facilities and conduct a waste sort study	1				
SW1- 3	Implement the Environmentally Preferable Purchasing policy by educating all purchasers about the policy whenever there is a purchasing policy update (at least every two years).	2	Staff Sustainability Handbook and Training			
SW1- 4	Require that all events on city property collect/recycle a designated list of recyclables (paper, metal, glass, plastic) using best waste management practices (labeled containers, co-locate containers, educate vendors)	2	Staff Sustainability Handbook and Training			
SW1- 5	Estabish a recycled content products purchasing requirement for City Operations	2				
SW1- 6	Educate all property owners and event sponsors that they must recycle a designated list of recyclables and require event sponsors, owners and operators of events and event venues provide back-of-house organics collection and follow best management practices	2	Staff Sustainability Handbook and Training			
Strategy SW2	**Increase residential recycling and waste reduction**					
SW2- 1	Conduct a survey to discover where gaps exist in recycling knowledge for city residents (social media "I don't know" box)	1				
SW2- 2	Investigate the possibility for developing a requirement for a significant financial increase between the different sizes of garbage containers through the hauler licensing process by 2023	1		$		
SW2- 3	Explore the options of organized recycling and organics collection	2				
SW2- 4	Explore creating a volunteer composting and organics coordinator position	2				
SW2- 5	Promote county compost and yard waste drop off sites and work with the county to develop a compost drop offsite in Burnsville	2		$		
SW2- 6	Reduce waste through the development of a ReUse store and Community shelf, and an online community shelf access tool	3		$		
SW2- 6	Support community projects, such as neighborhood compost projects, tool libraries, and fix-it clinics	3		$		
Strategy SW3	**Promote commercial and multi – family recycling**					
SW3- 1	Investigate the addition of more flexibility for recycling/organics enclosures	1				
SW3- 2	Encourage recycling of building material (demolition debris and diversion) by educating through the permitting process	2				
SW3- 3	Work with the Planning Department to require adequate space/chutes in multi-family buildings for recycling and organics making sure recycling is as convenient as garbage	2				
SW3- 4	Investigate plastic reduction at commercial establishments	2				
SW3- 5	Connect multifamily properties to Dakota County multifamily recycling program and connect large facilities/generators of waste to the Dakota County business recycling program	2				



What You Can Do

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

Section 10

Transportation

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Transportation

Moving ourselves and our goods and services from place to place is very energy intensive while the vehicles we use for that mobility are very material resource intensive. Transport systems have significant impacts on the environment, accounting globally for 20% to 25% of world energy consumption and carbon dioxide emissions - in Burnsville transportation accounts for over 34% of citywide GHG emissions. Passenger cars consume 59% of transportation fuels and are responsible for 17% of total GHG emissions nationally. The manufacture of automobiles is also material intensive. According to the United Nations Environment Program, auto manufacture is the number 1 ranked manufactured product in terms of its contribution to environmental impacts globally.

Sustainable transportation is the capacity to support the mobility needs of a society in a manner that is the least damageable to the environment and does not impair the mobility needs of future generations. Many options exist for improving the sustainability of our transportation systems while improving quality of life and equity. Increasing shared transportation while decreasing use of passenger vehicles has been shown to significantly reduce the environmental impacts of transportation as well as improve equity in mobility. Alternative transportation modes like bicycles, eBikes, and scooters can also increase opportunities for exercise while reducing air pollution. Lastly, studies indicate that recent advances in electric vehicles, car-sharing technologies and the potential for self-driving vehicles underline a much more sustainable usage of car assets that could remove up to 90% of the vehicles from the streets.

Equity Considerations:

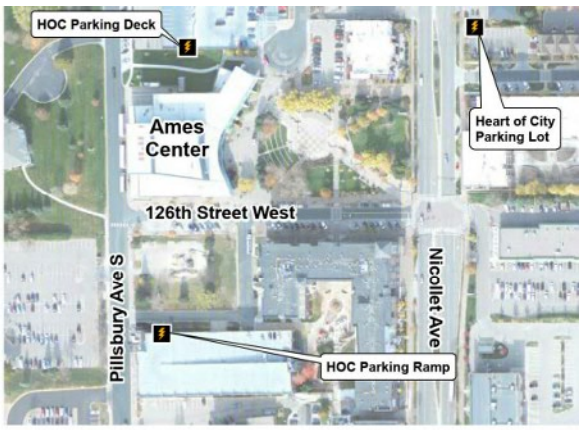
- Some neighborhoods in Burnsville have fewer transportation options than others, putting a strain on households that need to walk longer distances to access public transit and other public services.
- Increased opportunities for public transit and active transportation can help address health disparities for many at-risk populations.
- Affordable and reliable options for mobility for people with special transportation needs can significantly improve transportation equity. Populations with special transportation needs include older adults, youth, persons with disabilities, persons with reduced

Burnsville Sustainability Accomplishments

A Move to Electric

ELECTRIC VEHICLE CHARGING STATIONS

In response to the growing popularity of electric vehicles, Burnsville installed **three charging stations** around the Heart of the City. On average, an electric vehicle creates half as much carbon pollution as a gas-powered vehicle. The charging station locations are:



- Heart of the City parking ramp (two plug-ins)
- Heart of the City parking deck (two plug-ins)
- Surface lot on the corner of Nicollet Ave.and East 125th St. (one plug-in)

Did You Know?

If your commute to work is 20-miles round trip, the switch to public transportation could lower your carbon footprint by up to 17% annually.

On average, switching your daily commute to public transit will save:

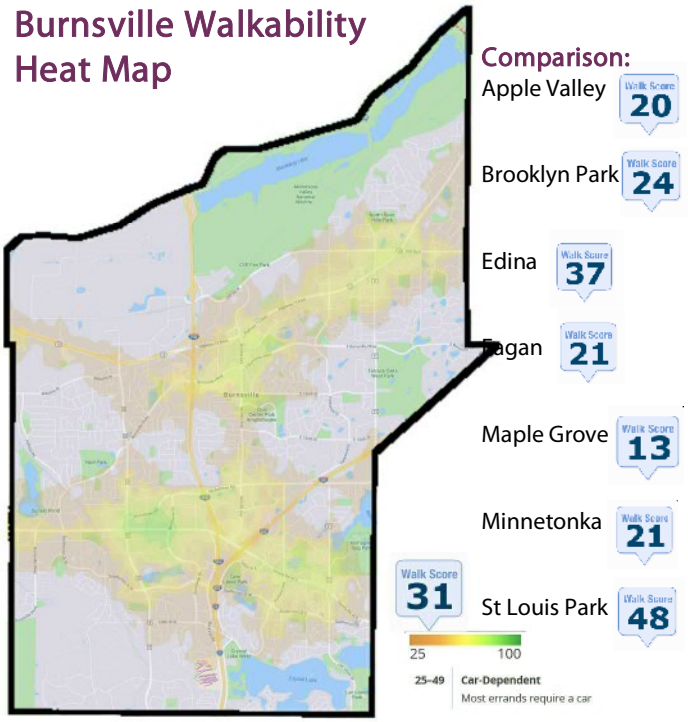
$9,797 annually

42,720 cubic feet of greenhouse gas atmosphere

Transportation

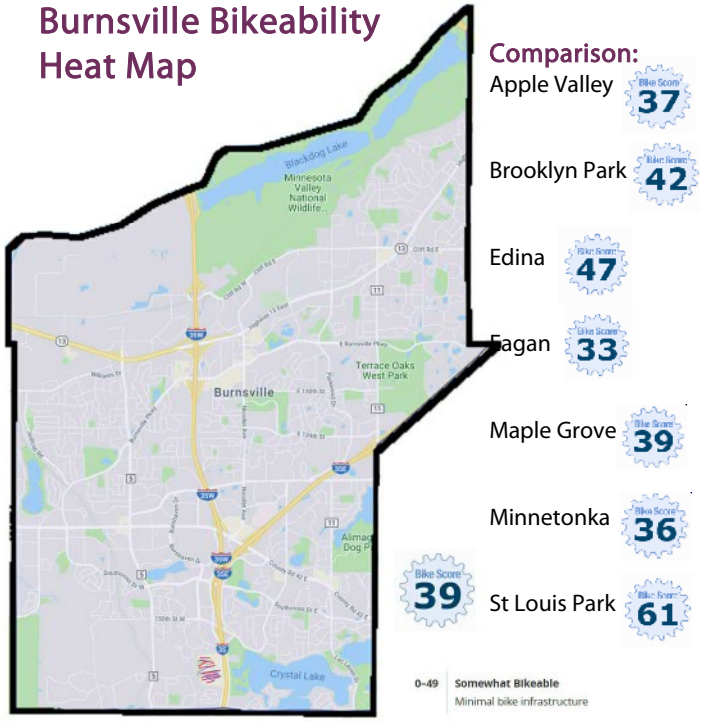
The measure of a community's walkability and bikeability are an important metric of the community's ability to advance sustainable transportation. Below are Burnsville's walk and bike heat maps:

Burnsville Walkability Heat Map



(Source: WalkScore.com)

Burnsville Bikeability Heat Map

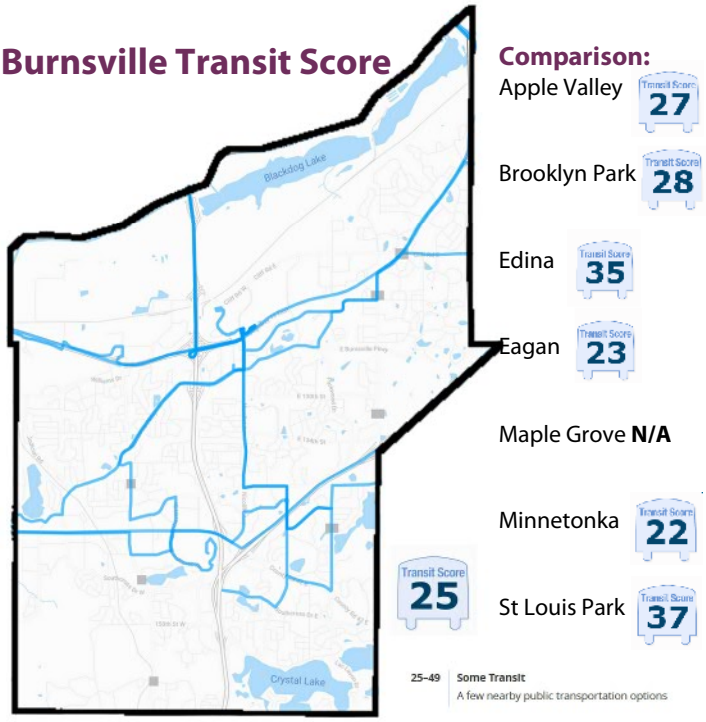


(Source: WalkScore.com)

Transportation

A review of a community's transit options, commute times, and overall transit performance can identify opportunities for improvement to the sustainability of the community's transportation system.

Burnsville Transit Score



Comparison:

Apple Valley 27

Brooklyn Park 28

Edina 35

Eagan 23

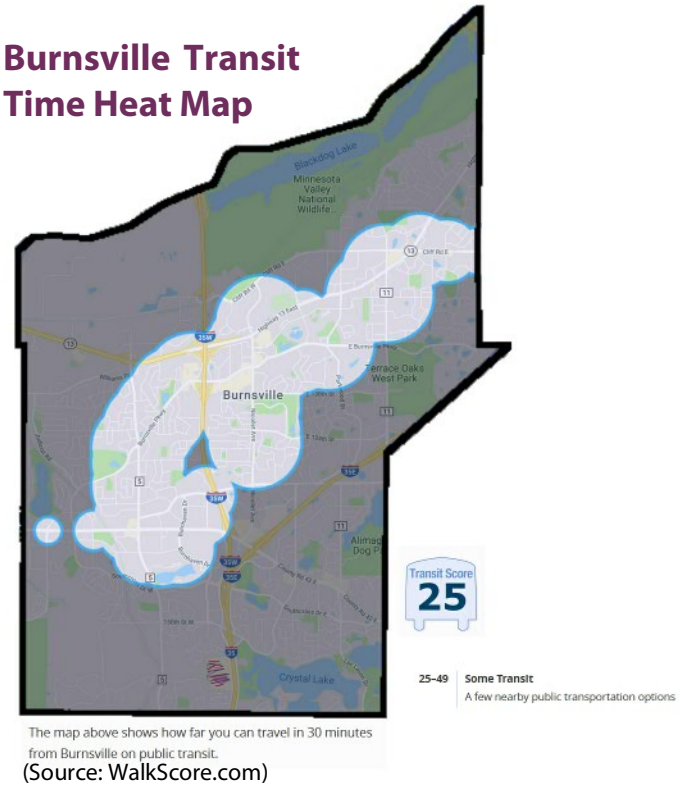
Maple Grove **N/A**

Minnetonka 22

St Louis Park 37

(Source: WalkScore.com)

Burnsville Transit Time Heat Map

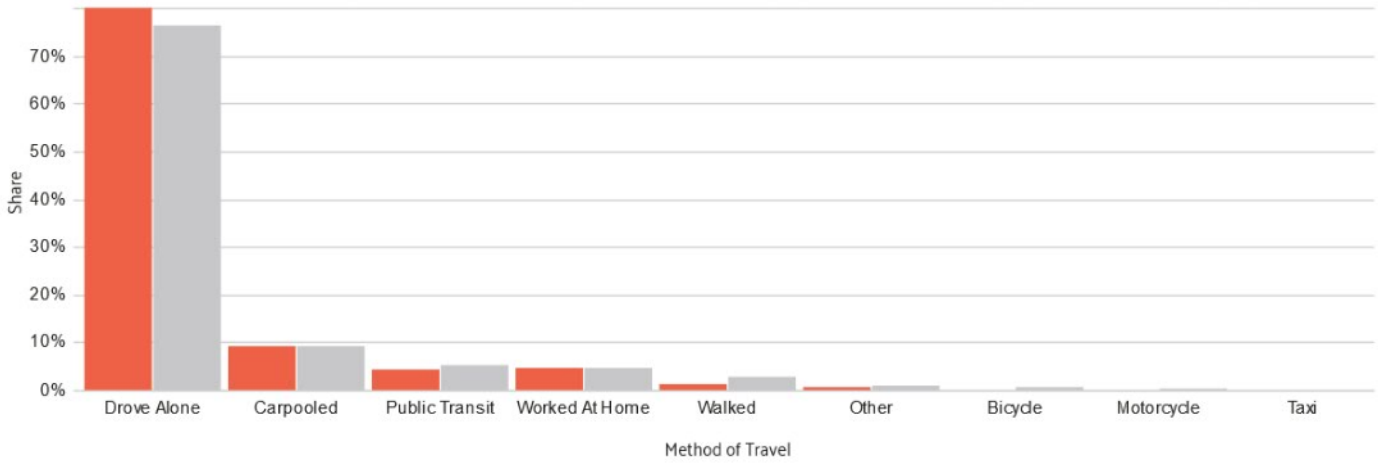


(Source: WalkScore.com)

Burnsville Commuter Characteristics

In 2017, 80% of Burnsville commuters drove alone for their regular commute. This number is down slightly from 81.4% in 2013.

(Source: Deloitte DataUSA.io, US Census)

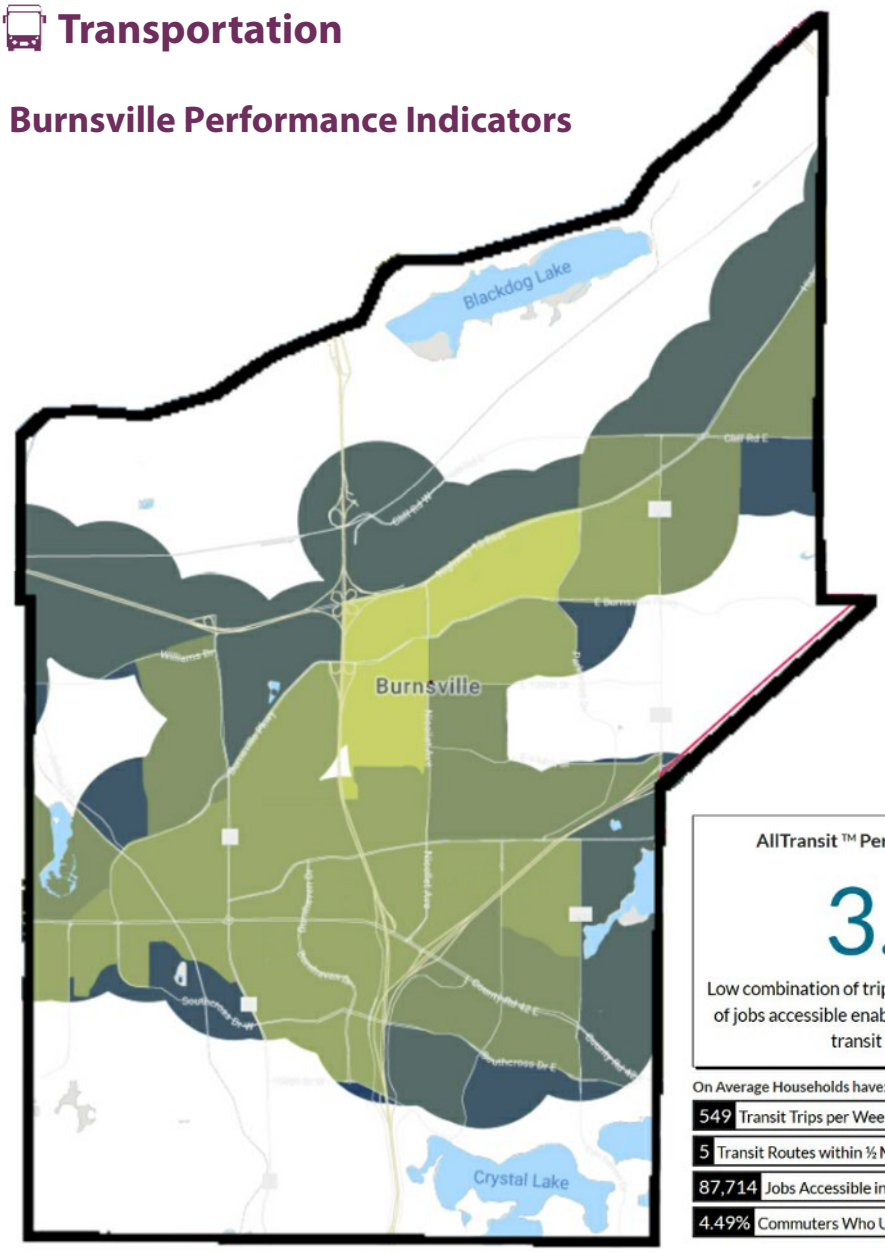


COVID-19 Impacts on Transportation Patterns

COVID-19 has a dramatic effect on transportation patterns and usage in 2020 and may have mid-term and long-term on job commute patterns. The City will take these factors into consideration moving forward as it relates to Transportation Sustainability.

Transportation

Burnsville Performance Indicators



AllTransit ™ Performance Score

3.8

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

On Average Households have:

549	Transit Trips per Week within ½ Mile
5	Transit Routes within ½ Mile
87,714	Jobs Accessible in 30-minute trip
4.49%	Commuters Who Use Transit

JOBS

Jobs Near Transit: Percent of jobs that are located within ½ mile of transit.

74.2%

26,655 jobs are near transit

ECONOMY

Transit Access to Customers: Customer households accessible to a business within a 30 minute transit commute.

22,964

Households within a 30 minute transit commute.

HEALTH

Healthy Commuters: Workers who commute by walking or biking and live within ½ mile of transit.

1.31% Walk

0.05% Bike

(Source: AllTransit)

Transit Ridership Comparison:

Apple Valley:	4.42%
Blaine:	3.9%
Brooklyn Park:	6.21%
Coon Rapids:	3.56%
Eden Prairie:	3.65%
Edina:	3.31%
Eagan:	3.63%
Lakeville:	3.58%
Maple Grove:	3.75%
Minnetonka:	4.41%
Plymouth:	3.47%
St Louis Park:	6.29%
Woodbury:	3.54%

Transportation

2030 Transportation Goals

T-A: Increase Public Transit ridership from 4.5% to 6% of commuters by 2030.

T-B: Increase Walk/Bike Transportation 0.5% by 2030 (of total commute).

T-C: Increase Electric Vehicle Adoption to 10% of Citywide Vehicle share by 2030.

T-D: Achieve a "Bicycle Friendly Community Bronze Level" by 2028.

Strategies

Strategy T1 Increase Public Transit Ridership from 4.5% to 6% by 2030.
How We'll Measure it:
Reported ridership by MTVA, AllTransit.

Strategy T2 Increase Walk/Bike Transportation 0.5% by 2030 (of total commute).
How We'll Measure it:
US Census Cycling Commuter data, VMT reported by State of Minnesota, Community commuter survey.

Strategy T3 Increase Electric Vehicle Adoption to 10% of Citywide Vehicle share by 2030 (36% of new car and 3.5% of new truck purchases by Burnsville residents are electric vehicles, such that EVs comprise 10% of total car ownership and .35% of all truck ownership citywide).
How We'll Measure it:
Number of electric vehicles registered in City of Burnsville.

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Transportation

Detailed Implementation Actions

Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Transportation			$		
Strategy T1	**Increase Public Transit Ridership from 4.5% to 6% by 2030**					
T1- 1	**Create a multi-modal transportation plan**	1	Multi-Modal and Compete Streets Plan		●	
T1- 2	Coordinate with MVTA to promote MVTA connect to expand and promote that strategy create custom shuttle routes based on demand	1	Multi-Modal and Compete Streets Plan		●	●
T1- 3	Explore shared mobility options for seniors and youth: oelectric golf carts on safe routes for day to day needs and "last mile" transit needs oestablished routes that are plowed oCart sharing	2	Multi-Modal and Compete Streets Plan	$	●	
T1- 4	Explore the development of an "Eco-District". Could be tied to requirements for a developer when purchasing existing City owned land-as a pilot project. Could develop criteria for Center Village	2		$		
T1- 5	Work with MVTA to expand options for "the last mile" and "the first mile" that cover these lo blocks to the nearest stop that are safe for youth, seniors, disabled, etc	2	Multi-Modal and Compete Streets Plan		●	
T1- 6	Work with MVTA to plan transit to serve residents in easy day to day needs (not only a route that hits everything in an hour long ride when a rider just wants to go to the grocery store)	2	Multi-Modal and Compete Streets Plan		●	●
T1- 7	Establish and use funds to increase in bus service/use	3			●	●
Strategy T2	**Increase Walk/Bike Transportation 0.5% by 2030 (of total commute)**					
T2- 1	Develop a strategy to maximize the use of the Right of Way (ROW). oIdentify areas where on-street bike lanes make sense oIdentify where street widths can be reduced—Inclusion of sidewalks, trails, larger boulevards, medians, etc.	1	Multi-Modal and Compete Streets Plan		●	
T2- 2	Create a trails gap map oIdentify gaps in the trail network. oCreate a hierarchy of implementation based on need, priorities identified, funding availability oWork with developers when possible to fill gap if associated with their development project. oIdentify funding sources to "fill the gaps"	1	Multi-Modal and Compete Streets Plan		●	
Strategy T3	**Increase Electric Vehicle Adoption to 10% of Citywide Vehicle share by 2030**					
T3- 1	Encourage Planned Unit Developments and Conditional Use Permits, and all projects receiving public financing support to install publicly accessible EV charging.	2	Sustainability Considerations for Zoning Actions		●	
T3- 2	Incentivize installation of EV charging through reductions in required parking for new commercial development.	3	EV Roadmap	$	●	
T3- 3	Create, distribute, and promote an "EV Ready Building Guide"	3	EV Roadmap		●	

Transportation

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
T3- 4	Coordinate and promote annual EV Ride and Drive event to promote EV benefit awareness and adoption	3	EV Roadmap		✓	
T3- 5	Establish and promote a "Burnsville's Greenest Fleets" awards/promotional program recognizing the City's greenest commercial fleets	3	EV Roadmap		✓	
T3- 6	Promote and/or create an EV sharing service citywide	3	EV Roadmap	✓	✓	
T3- 7	Guidance on new construction "EV ready" and could be incentivized and required if city funds go into project or the City grants a PUD or Conditional Use Permit	3	Sustainability Considerations for Zoning Actions		✓	

What You Can Do

- **Take a walk, ride a bike, or take public transit. Leaving your personal vehicle behind when commuting or running errands can make a big difference for your carbon footprint and can also be a healthy and enjoyable alternative to driving.**
- **Purchase a fuel-efficient vehicle. When purchasing your next personal vehicle, consider more efficient alternatives such as hybrid or electric vehicles.**
- **Avoid driving alone where possible. Ride transit, carpool, walk, and/or bike.**
- **Reduce your air travel; Consider alternative travel options that are less impactful.**
- **Buy carbon credits to offset your impact: Can't avoid the trip? Buy a credit to help mitigate the impact.**
- **If possible, telecommute or carpool to avoid transportation emissions**

Section 11

Water

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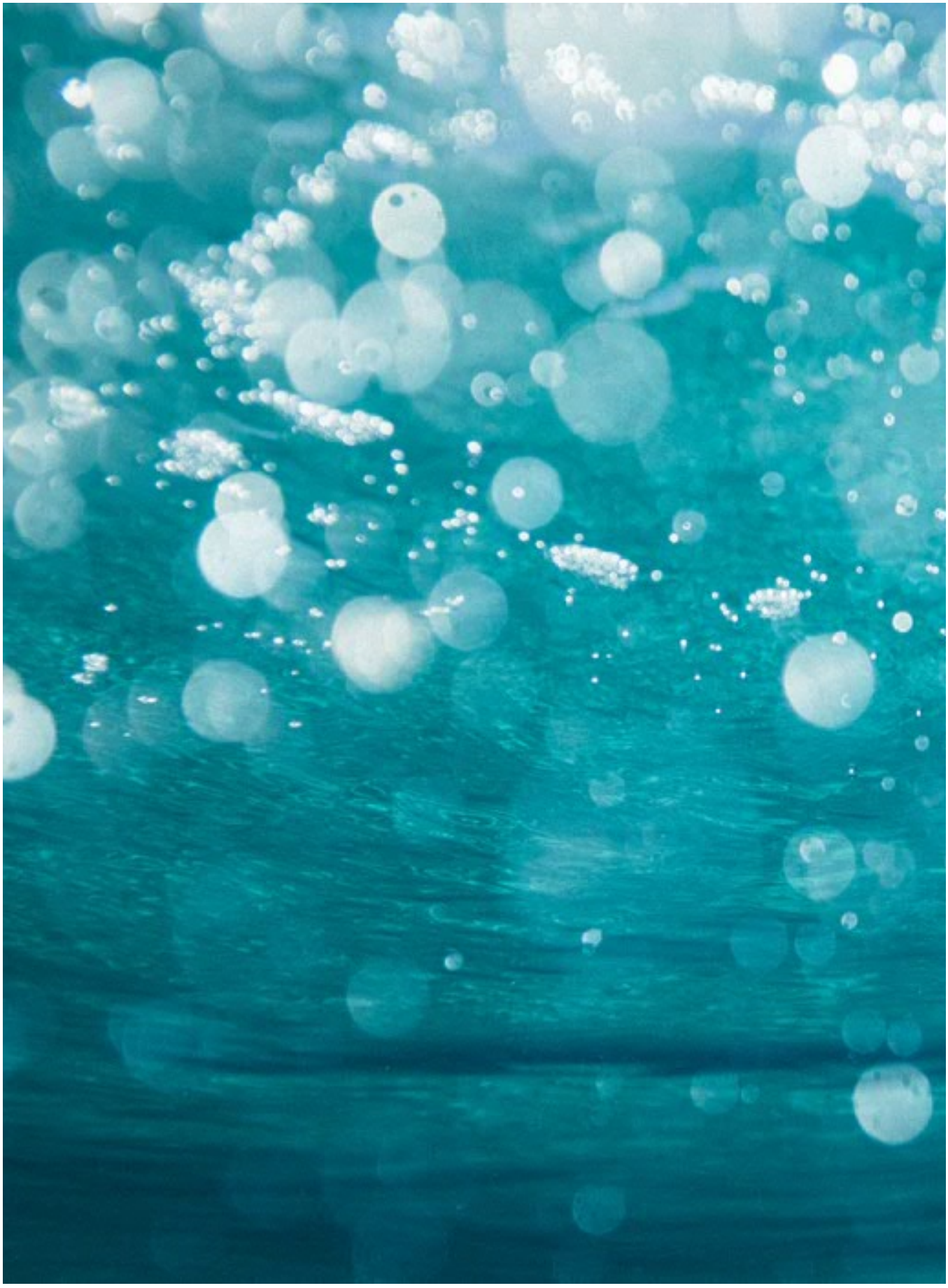


Water

Water is at the core of 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. Water is also at the heart of adaptation to climate change - climate change, particularly in the Midwest will be closely linked to changes in precipitation including increased likelihood of drought combined with increased instance of heavy rain events and flooding. 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.

Sustainable stormwater management is an alternative to the traditional piped approach. It promotes onsite collection and movement of stormwater from roofs, parking lots, streets, and other surfaces to infiltrate into the ground or collect for reuse. This can often reduce the need for costly underground structures while improving the quality of surface water bodies.

Equity Considerations:

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

Burnsville Sustainability Accomplishments

Crystal Lake is off the Impaired Waters List

In 2002, Crystal Lake showed levels of phosphorus in the water that exceeded state standards. It was then put on the Impaired Waters List by the Minnesota Pollution Control Agency (MPCA). Phosphorus can get into lakes from a variety of sources, but the most common are runoff from the surrounding area, stream bank erosion, treated wastewater from facilities and airborne sources.

Through the City of Burnsville's efforts in partnership with local watershed districts, water quality was improved enough for Crystal Lake to be removed from the Impaired Waters List in 2018.

Water Conservation

In the summer of 2019, the City of Burnsville offered rebates of up to $200 to residents who installed WaterSense-approved irrigation smart controllers.

- Smart irrigation controllers use local weather reports to determine how much it has rained in recent days and how much it's expected to rain in the near future.
- The controller uses the information to turn sprinklers on and off automatically, watering when it is most effective.
- A total of 59 homeowners took advantage of the rebate program.

Water Use

The City of Burnsville provides potable water to the city's residents using water from three aquifers (extracted from 17 wells) and from excess water pumped out of the Kraemer Quarry. Since 2005, the Prairie Du Chien-Jordan Aquifer has provided residents and businesses with a total of almost 25 billion gallons of water. This is more than half of the total water being provided to the City. The second largest source of water is the Kraemer Quarry, which has provided the City almost 10 billion gallons of water since 2011 (Figure 1). The Kraemer Quarry was not used as a source of water until 2009. Since 2011, the Kramer Quarry makes up more than 30% of the city's total potable water allocation (Table 1). Since Kraemer Quarry has been used as a water source, water allocations have increased by about 20% (Figure 2). This is in large part due to the City of Burnsville supplying water to the City of Savage during this time period, which accounts for approximately 0.65 billion gallons of water per year. It should be noted that aquifer levels around the Kramer quarry have increased over time while most other parts of the metro area have seen a decrease in aquifer water levels over the same period.

Goal 9 of the 2017 Water Resources Management Plan is to is to, in part, promote ground water recharge and conservation.

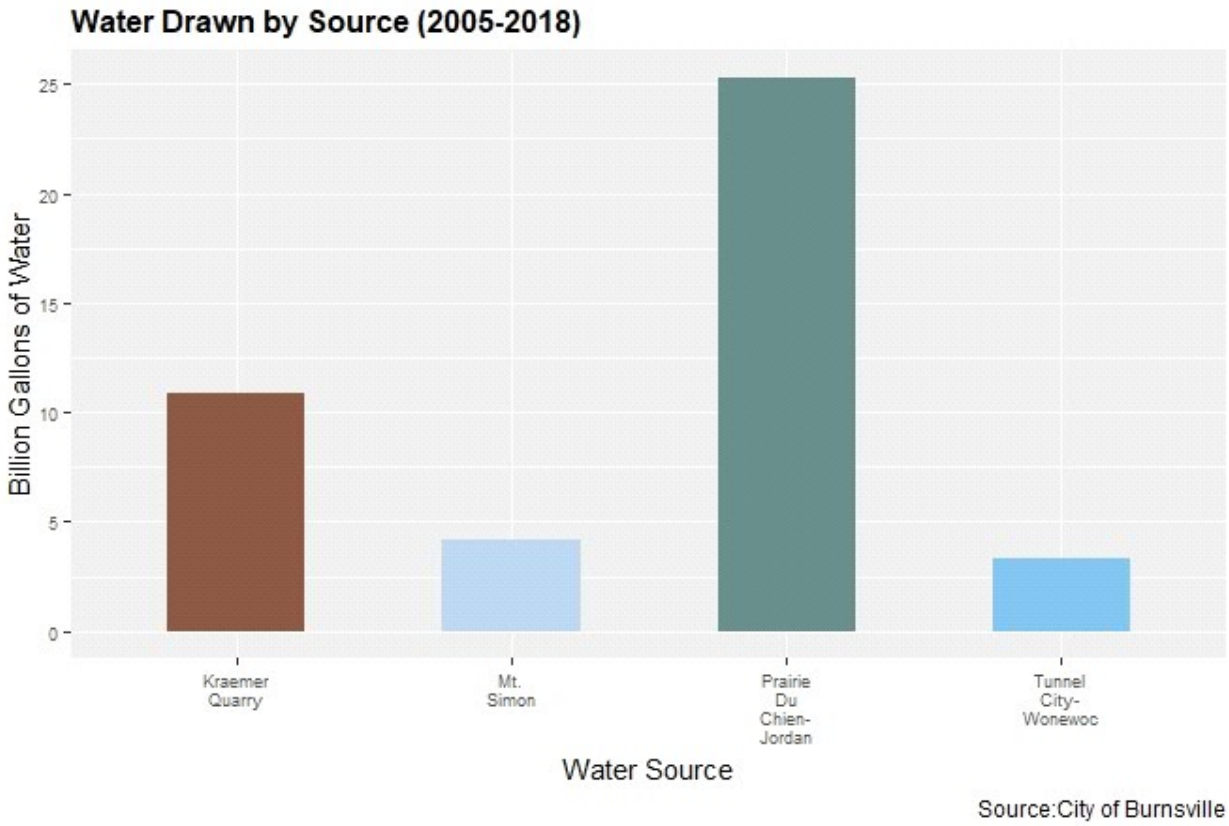


Figure 1. Total quantity of potable water drawn by source (2005-2018)

Table 1. Percent of Potable Water Drawn by Source by Year (2005-2018)

	Water Source			
Year	Mt. Simon	Prairie Du Chien-Jordan	Tunnel City-Wonewoc	Kraemer Quarry
2005	14%	78%	7%	0%
2006	12%	80%	8%	0%
2007	12%	80%	8%	0%
2008	14%	77%	9%	0%
2009	12%	66%	9%	13%
2010	5%	44%	6%	44%
2011	8%	45%	8%	39%
2012	9%	51%	7%	33%
2013	10%	49%	6%	35%
2014	8%	51%	6%	35%
2015	7%	57%	7%	29%
2016	7%	53%	6%	34%
2017	8%	47%	8%	36%
2018	6%	45%	11%	38%

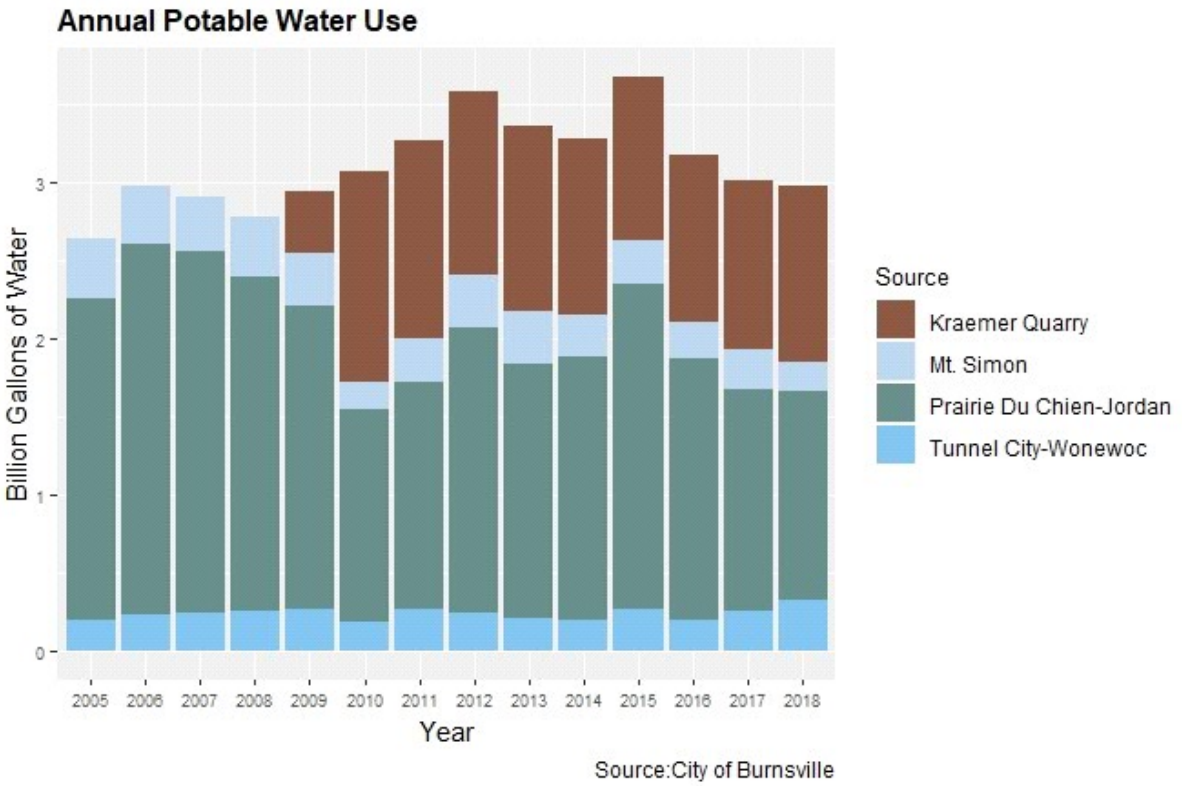


Figure 2. Annual gallons of potable water drawn by source

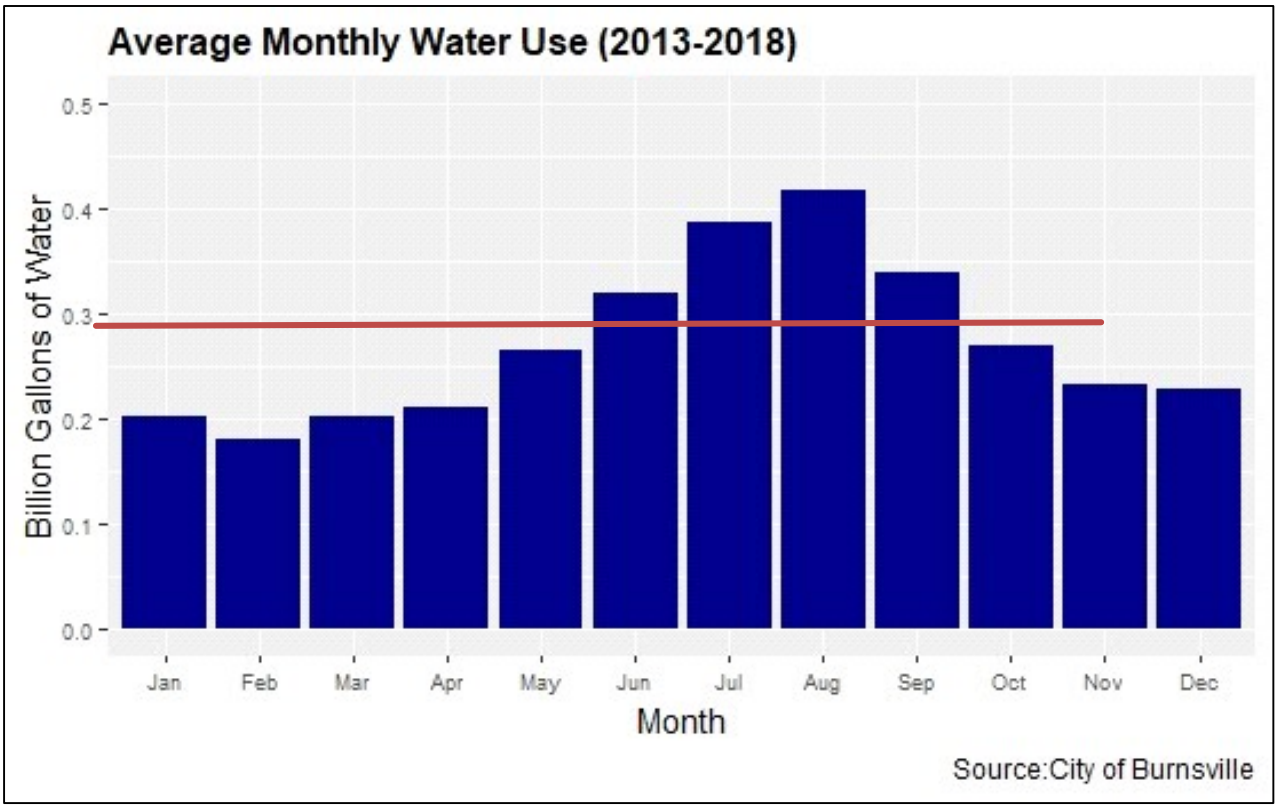


Figure 3. Average Monthly Water Use (Citywide)

Surface Water Quality

In 2009, the City of Burnsville had five lakes listed on the Impaired Waters List, including Alimagent, Crystal, Earley, Keller, and Lac Lavon, as well as one impaired reach of the Minnesota River. In 2011, Total Maximum Daily Load (TMDL) studies were completed and approved by the EPA for Crystal, Keller, and Earley Lakes. Because of the results of the data collected for Earley lake, it was delisted and taken off the 303(d) Impaired waters list in 2012. In 2015 the Vermillion River Watershed Restoration and Protection Strategy (WRAPS) project was developed, which included an assessment of Lake Alimagnet's impairment. In 2018, Crystal Lake was removed from the impaired waters list. As of Spring 2020, three Burnsville lake remain on the Impaired Waters List: **Alimagnet Lake, Keller Lake, and Lac Lavon Lake**. Alimagnet Lake and Keller Lake are impaired for nutrients, while Lac Lavon Lake is impaired for mercury.

According to the 2017 Water Resources Management Plan, urban runoff is the primary source of pollutants to water resources in the City of Burnsville. Urban runoff pollutants include sediment, nutrients, oxygen-demanding substances, toxic chemicals, chloride, bacteria, and floatable trash and litter. In addition urban runoff, the MPCA has identified numerous underground leaking storage tank sites in Burnsville that pose a threat to water resources, as well as a number of permitted feedlots and permitted wastewater discharges.

Water Quality Rules

The City of Burnsville is located within four major watershed units. These watersheds are regulated by three local watershed organizations: Black Dog Watershed Management Organization (BDWMO), Lower Minnesota River Watershed District (LMRWD), and Vermillion River Watershed Joint Powers Organization (VRWJPO). The City of Burnsville regularly amends it's Water Resources Management Plan to remain in compliance with the recommendations and requirements of the watersheds within it's boundaries. Currently the City of Burnsville water quality rules apply to all projects disturbing more than 0.5 acres of land, or creating 5,000 square feet or more of new impervious area.

Water Quality Improvement Practices

Green infrastructure, Low Impact Design (LID), and Stormwater Best Management Practices (BMPs) are tools that cities can use to help improve water quality within their city and region through the treatment of urban runoff. Stormwater BMPs include a variety of landscape-wide technologies such as rain gardens and underground water detention facilities that filter stormwater runoff before it infiltrates back into the sub-surface groundwater flow or flows overland to an existing body of water such as a lake or river. The City of Burnsville has implemented a total of 123 BMPs according to their most current records. The majority of these BMPs are in private ownership, with 19 of them being City owned. The BMPs are in five categories, including environmental manhole structures, infiltration practices, rain gardens, underground detention, and underground infiltration facilities.

- **Environmental Manhole structures** include improvements within a storm sewer pipe that trap or remove sediment or pollutants from runoff water before it enters surface water bodies.
- **Infiltration Practices** include areas designed to capture and infiltrate runoff water. The areas are generally vegetated and maintained in a natural state.
- **Rain gardens** include areas designed to capture and filter or infiltrate runoff water using deep rooted vegetation. These are generally maintained as a manicured garden.
- **Underground detention/infiltration facilities** include underground structures designed to capture water temporarily, allowing for the settling out of sediments and pollutants prior to the discharge from the system.

The breakdown of how many of each BMP is installed within City boundaries is shown in Figure 4. Infiltration BMPs and rain gardens make up the majority of the practices.

In addition to these improved stormwater projects, the City also maintains an extensive network of stormwater ponds to aide in flood control and pollution reduction. However, these are not as effective at water quality improvement as the BMPs shown in Figure 4 and are not tracked as part of the City's stormwater BMP program.

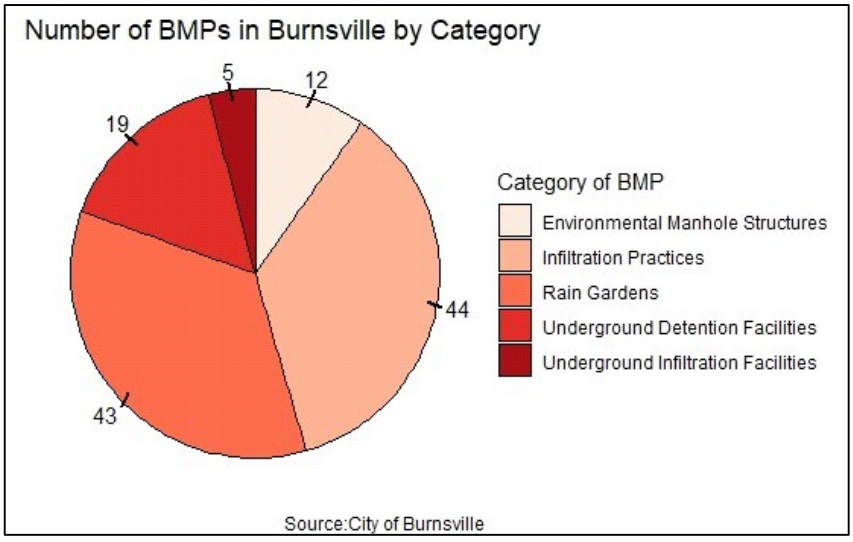


Figure 4. Number of BMPs in Burnsville by Category

Stormwater Harvest and Use

An emerging green infrastructure practice that targets both water quality and water quantity is stormwater harvest and use. This technology provides infrastructure for the capture and storage of stormwater runoff (usually from rooftops or other relatively clean surfaces) and a way to meter out the water at a later time for an intended purpose such as a golf course or housing development irrigation system. Harvest and use can be implemented in new development or in urban retrofit scenarios. Water can be stored in open ponds or in above or below ground cisterns. The harvested non-potable water can be used for irrigation or for some pre-approved indoor uses such as toilet flushing. Stormwater harvest and use is a way to protect and conserve groundwater resources while reducing the volume of stormwater that could contribute to flooding. The City of Burnsville will be implementing it's first Water Reuse system at the new Fire Station in 2020-2021.

Native Landscape Restoration

Another important effort that impacts water quality in urban and suburban environments is the restoration of native plant communities. Impervious surfaces such as buildings, pavement, and even compacted turf lawns shed pollutants to stormwater runoff which decreases water quality in lakes and streams. Replacing pavement and turf areas with native plants filters and retains runoff so that less pollution reaches surface water bodies. Native plants also take up water through evapotranspiration and their deep root systems improve the infiltration capacity of existing soils so that stormwater runoff can return to local groundwater sources. In addition, native plants offer refuge and forage for desirable birds and pollinators. The City of Burnsville has undertaken the effort to restore native plant communities in many of their parks and open spaces. They have completed over 130 acres of woodland plant restoration across 14 parks, over 44 acres of prairie restoration across 15 parks, and over 40 acres of wetland restoration at parks and ponds across the city (Table 2).

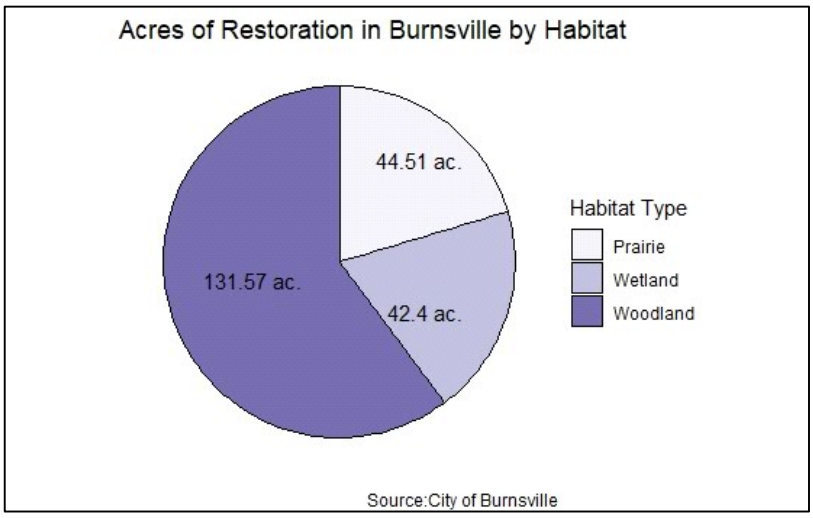


Figure 5. Acres of Habitat Restoration in Burnsville

Table 2. Total Native Plant Restoration Acres in Burnsville

Park	Acres of Woodland Restoration	Acres of Prairie Restoration	Acres of Wetland Restoration	Total Acres of Restoration
Terrace Oaks	46.8	1.5		*48.2*
Alimagnet Park	37.3	6.1		*43.3*
Kraemer Preserve	1.5	12.5	22.6	*36.6*
Kelleher Park	25.3	0.7		*26.0*
Sunset Pond		9.4	6.7	*16.1*
Cliff Fen		0.7	11.7	*12.4*
Crystal West Park	7.0	0.3		*7.3*
Civic Center Park	2.3	3.9		*6.2*
35W and BV Parkway		3.7		*3.7*
Hemlock Lane	3.7			*3.7*
Hollow's Park	2.9			*2.9*
Tennisioux Park		2.7		*2.7*
Day Park	1.4	1.0		*2.4*
West Buck Hill	0.9		1.4	*2.3*
Earley Lake	1.6			*1.6*
Lac Lavon Park		1.1		*1.1*
Pershing Circle	0.8			*0.8*
Water Treatment Plant		0.7		*0.7*
Wood Pond Park	0.3			*0.3*
Utech Pond		0.2		*0.2*
Bluebill Bay Road	0.1			*0.1*
TOTAL	*131.6*	*44.5*	*42.4*	***218.5***

Water Quantity

Flooding was listed as the Number 1 priority in the 2002 Burnsville Water Resources Management Plan. This was triggered in part by a severe storm that occurred in July of 2000 and the serious flooding that resulted. Since that time the flooding areas identified in the 2002 plan have largely been addressed or improved. Another severe storm in August of 2015 once again increased concern about flooding within the city. It remained the number 2 priority to address in the 2017 Water Resources Management Plan (following Water Quality as the Number 1 priority). The City of Burnsville has invested significant capital into analyses and improvement of flooding issues within the city for the past two decades. Many issues have been resolved or are slated for future capital improvement projects. The city should remain on this track to resolve all known issues, and should remain vigilant to the increased number of extreme weather events that are likely to result from accelerating climate change over the next decades. An updated City-wide Hydrologic and Hydraulic Model and Stormwater Resiliency Plan will be completed in the second half of 2020 and will aid in this endeavor.

Water Funding

In 1992, the City of Burnsville implemented a stormwater utility fee as a means for collecting funds for water management. In 2018, approximately $4,271,185 was collected in storm utility fees. City staff estimate that in 2019 $4,315,000 will be collected.

For surface waters, both water quality and water quantity improvement are budgeted out of the stormwater utility. The City's Potable water system is funded from Water and Sewer Utility funds which are partially used to make capital improvements to produce and deliver quality drinking water to the residents and businesses. Both utility funds also provide operating funding for surface water management and potable water production and delivery as well.

Water

2030 Water Goals

W-A: Protect ground water resources.

W-B: Meet Burnsville TMDL goals for Alimagnet and Keller lakes.

W-C: Encourage water reuse.

W-D: Promote low impact development (LID) and green infrastructure approaches.

Strategies

Strategy W1 Protect Ground Water Resources (quality and quantity).
How We'll Measure it:
Increase pumping of surface water from KMM to 4 million gallons per day by 2030 (and 5 million gallons per day by 2040).

Strategy W2 Meet Burnsville TMDL Goals for Alimagnet and Keller Lakes (phosphorus reduction required).
How We'll Measure it:
Decrease phosphorus levels enough to have both lakes removed from Impaired Waters List by 2040.

Strategy W3 Encourage Water Reuse.
How We'll Measure it:
Implement 3 rainwater harvest and use projects at city facilities by 2030.

Strategy W4 Promote Low Impact Development (LID) and Green Infrastructure Approaches.
How We'll Measure it:
Develop private BMP maintenance program by 2025.

What You Can Do

- **Trade your shower heads and faucets for low-flow, water-efficient options.**
- **Purchase a State of Minnesota Critical Habitat license plate, your money will go towards the protection of Minnesota's land, waters and wildlife.**
- **Collect rainwater in rain barrels to water your lawn and/or plants.**
- **Convert lawn areas to native, drought resistant landscaping that does not require watering.**
- **Install a Smart Irrigation Meter to Prevent watering grass that doesn't need it.**
- **Pick up after your pets and don't blow grass and leaves into the street.**

Major Project Group Implementation

The Detailed Implementation Actions outlined in all sectors have also been organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. See Section 12 Implementation and Monitoring for all Sustainability Plan actions organized by Major Project Groups.

Detailed Implementation Actions

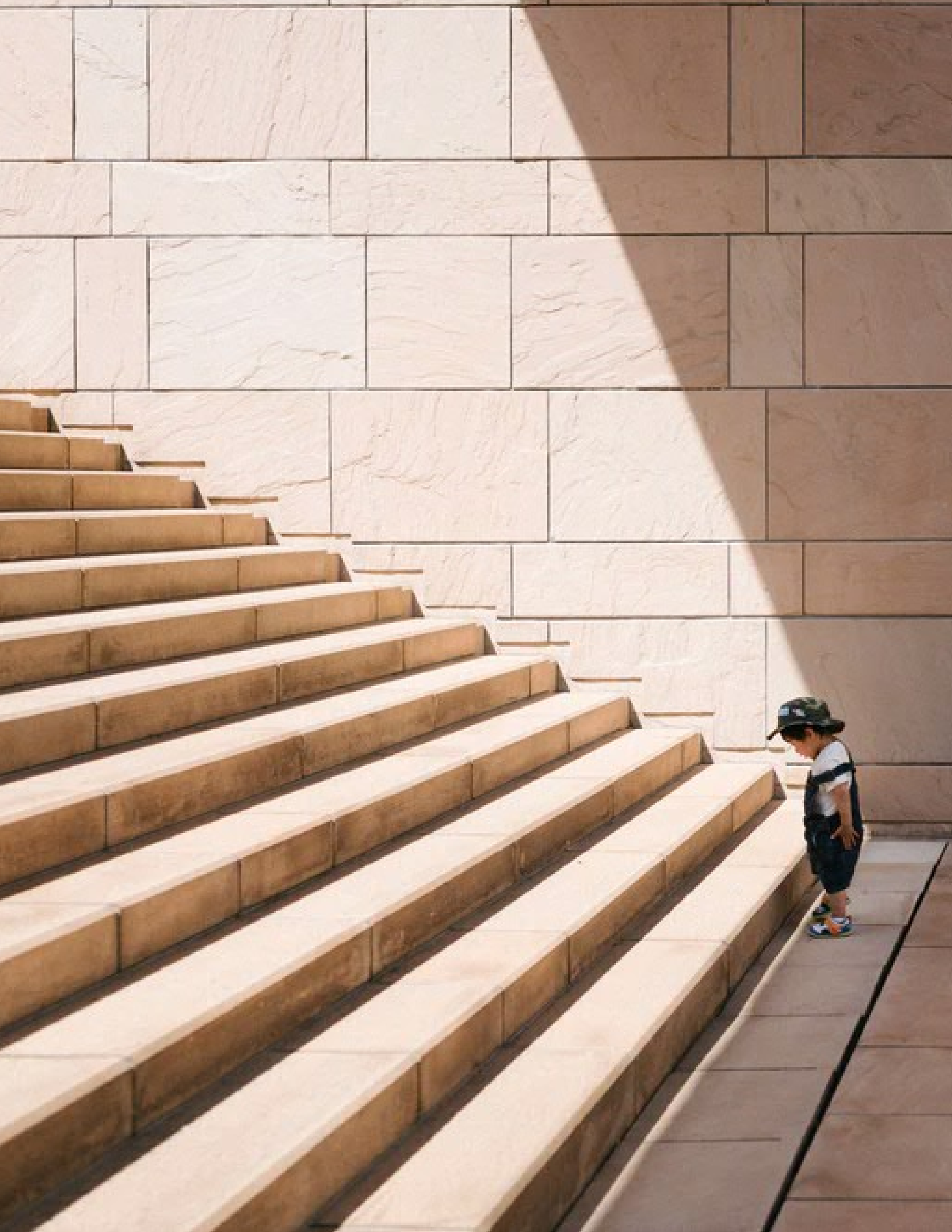
Benefits Key

- Potential Cost Savings for City or Community
- Potential Opportunity To Create Jobs (short or long-term)
- Primary Contributor to GHG Reductions
- Secondary/Potential Contributor to GHG Reductions
- Primary Contributor to Climate Adaptation/Preparedness
- Secondary Contributor to Climate Adaptation/Preparedness

See next page for Detailed Implementation Actions list.

Detailed Implementation Actions (continued)

	Strategy / Action	Priority	Major Project Group	Co-Benefits: Economic Benefits	Co-Benefits: GHG Reduction	Co-Benefits: Climate Adaptation
	Water			$		
Strategy W1	**Protect Ground Water Resources (quality and quantity)**					
W1- 1	Increase the use of Smart Irrigation systems and water conservation fixtures (new or retrofit opportunities) At City facilities (install irrigation and fixtures) Rebate programs for private use (measurable) 2030	1	Water Reuse and Conservation Plan	$		
W1- 2	Water system resiliency and emergency response plans Resiliency Plan submitted to EPA by December 30th Emergency Response Plan within 6 months after Done by 2021 Run a scenario every 3 years	1				
W1- 3	Provide Water Treatment Plant tours	1				
W1- 4	Update City's Drinking Water Supply Management Area Plan.	1				
W1- 5	Proper closure of landfills and dumps in wellhead protection area By 2025 ensure proper closure of freeway landfill and freeway dump	2				
W1- 6	Advance Meter technology: Water loss detection and repairs, distribution system, By 2025 have a program in place Water audits of top water users – plans for reduction – 50/50 audit reimbursement, goal to do at least 2 per year Customer portal opt-in incentive 50% of customers enrolled by 2030 60-70% by 2040	2		$		
W1- 7	Increase harvesting rate of surface water in KMM (decreasing ground water pumpage) By 2030 achieve 4 million gallons per day By 2040 achieve 5 million gallons per day	2		$		
Strategy W2	**Meet Burnsville TMDL Goals for Alimagnet and Keller Lakes** (phosphorus reduction required)					
W2- 1	Stormwater quality improvements in Lake Alimagnet and Keller Watersheds	1				
W2- 2	Specific projects targeting phosphorus reduction	1				
W2- 3	In-lake manipulations to reduce nutrient cycling (alum treatments, fish, and plant communities)	1				
Strategy W3	**Encourage Water Reuse**					
W3- 1	Partner with county for rain barrel program for residential use.	1	Water Reuse and Conservation Plan	$		
W3- 2	Educational campaign with signage and tours	2	Water Reuse and Conservation Plan	$		
W3- 3	Implement 3 water reuse projects by 2030.	2	Water Reuse and Conservation Plan	$		
Strategy W4	**Promote Low Impact Development (LID) and Green Infrastructure Approaches**					
W4- 1	**Create a Complete streets/ Living Streets Plan (specifically the stormwater) Tie into multi-modal transportation program**	**1**	Multi-Modal and Compete Streets Plan	$		
W4- 2	Utilize GIS/Web Map tools to promote Green Initiatives	1				
W4- 3	Develop private BMP maintenance program By 2025	1				
W4- 4	Partner with school district for stormwater education program Explore potential for stormwater demonstration projects on school property.	2				
W4- 5	Partner with other Agencies or Groups on Stream Restoration Opportunities	2				
W4- 6	*Develop, expand, and promote rain garden incentive and education programs.*	2	Water Reuse and Conservation Plan	$		
W4- 7	Provide Educational Opportunities at Annual Public Works Open House.	2	Water Reuse and Conservation Plan			



Section 12

Implementation and Monitoring

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Implementation and Monitoring

The first few years after plan adoption are critical to its success. Establishing roles, both internal and external, 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 community sustainability, GHG emission reductions and addressing climate resilience. This vision will require commitment and integration of the Sustainability Plan into City operations, functions, and services.

Implementation is for Everyone

This Sustainability Plan includes actions that require leadership and engagement from City Council, City departments and staff as well as the business community, households and individuals. While some actions will require City Council to amend policy there will be opportunities for businesses, organizations, households, and individuals to support the City Council policy changes and provide input on and feedback for those policies. Ultimately, achieving the visionary energy efficiency, renewable energy, alternative transportation, and climate resilience goals outlined in this plan will require engagement and a sense of responsibility not only by the City of Burnsville leadership and government, 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.

General Implementation Recommendations

The following are foundational recommendations to support the long-range implementation of the Sustainability Plan:

Building Internal Capacity

Continuing to build internal capacity will be important to help establish the Sustainability Plan 2020 as a priority integral to internal operations as well as fostering connections to community partners, businesses, and individuals through outreach, education, special projects, and service delivery.

We recommend careful consideration of appropriate staffing to support the implementation of this plan. The City will likely need a full time sustainability coordinator position 100% dedicated to Sustainability in Burnsville in order to have this plan fully considered and implemented. Sections of the plan like Transportation, Water and Solid Waste and Recycling have staff dedicated to those areas currently and will likely be able to make good progress in advancing the actions outlined in those sections. Other focus areas such as Local Food, Community Health and Renewable Energy do not currently have staff dedicated to them in the same way and may require a full time, dedicated staff position to successfully implement those actions and help the City achieve the benefits associated with accomplishing those goals. This role may also be very beneficial in supporting the community outreach, communication, and engagement appropriate in successfully implementing the plan.

1. Establish clear guidance and direction for the participation in and support of the Sustainability Plan implementation actions by all City of Burnsville departments.
2. 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, State, Federal, and non-profit provider partners.
    - Support City of Burnsville department managers and staff as they implement Sustainability Plan actions within their service area or area of expertise.
    - Maintain the internal City Sustainability Team and empower the team to meet regularly and provide updates on progress and success of the Sustainability Plan, identify additional support or resources needed to advance actions of the plan, and collaboratively discuss strategies for implementation challenges as they arise.
    - Ensure the maintenance of City of Burnsville Environment/Sustainability webpage supporting Sustainability Plan resources for the community.
    - Coordinate and organizing volunteer groups and events.
    - Engage city boards and commissions (e.g., the Parks and Natural Resources Commission, Planning Commission, etc.) to ensure the Sustainability Plan is integrated into their work plans.
3. Assemble or conduct a community wide GHG inventory on a regular basis (1-2 year cycle) to support monitoring of GHG emissions reduction progress.
4. Review Sustainability Plan implementation progress and impacts on a regular basis (1-2 year cycle); adjust, add, and remove detailed Sustainability Plan actions as appropriate based on implementation progress review.

Implementation and Monitoring

External Support
City staff and elected officials will not be able to implement this plan without robust support from community members and coordination with jurisdictional, institutional, and organizational partners.

1. Establish the Parks and Natural Resources Commission as the main citizen-body to support the implementation of the Sustainability Plan:
    - Form subcommittees that focus on particular areas of the Sustainability Plan
    - Coordinate with City staff in all relevant departments to receive updates on City projects and progress.

2. Establish jurisdictional partnerships that advance Sustainability Plan strategies to advance and accelerate action. This can include government entities like Dakota County, the State of Minnesota, the Black Dog Watershed Management Organization, and Dakota County Soil & Water Conservation District; utilities like Xcel Energy and Dakota Electric Association; institutions like Dakota County Technical College; community groups; and neighboring communities.

Funding
Funding the implementation of the Sustainability Plan may require reallocation/reconsideration of existing City funds, raising new City funds, or identifying outside resources and funding opportunities. Some funds will need to be dedicated toward long-term support like staffing, while other funding will be on a project-by-project basis.

1. Maintain a budget and identify funding sources for staff dedicated to the implementation of the Sustainability Plan.

2. Identify a budget necessary to support projects on an annual basis as per the detailed actions outlined in the Climate Economy and Climate Action Capacity sections of the plan and climate actions.

3. Utilize no-cost technical assistance offerings as available.

Example Policies and Ordinances

The paleBLUEdot team has assembled example policies and ordinances supporting some of the strategies and actions included in the Burnsville Sustainability Plan 2020. The examples can be found on the following webpage:

https://palebluedot.llc/burnsville-sustainability-plan-policies

Implementation and Monitoring

Implementation Plan

The following is the full detailed list of the detailed Sustainability Plan actions outlined in each of the sector chapters earlier in this plan document. This Implementation Plan assembles most actions together organized into 11 Major Project Groups which facilitate the coordinated implementation of related and supportive actions across all sectors. Individual actions not included in a Major Project Group are represented in a 12th group "Stand-Alone Actions and Projects". The Implementation Plan also provides implementation details including estimated implementation budgets, identification of potential implementation partner agencies, identification of recommended City staff role responsible for implementation and recommended City department responsible for oversight of each action.

Major Project Groups	Sectors Supported by Project Group
City Facilities Energy Audit and Energy Efficiency Master Plan	
Staff Sustainability Handbook and Training	
ENERGY STAR Program	
Ground Cover Improvement Plan	
Multi-Modal and Compete Streets Plan	
EV Roadmap	
City Fleet Plan	
Citywide Solar Advancement Plan	
Local Agriculture and Nutrition Security Study and Plan	
Sustainability Considerations for Zoning Actions	
Water Reuse and Conservation Plan	
Stand-Alone Actions and Projects	

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	City Facilities Energy Audit and Energy Efficiency Master Plan						
BE1- 1	Water Department to continue rewarding rebates for the installation of Smart Controllers on residential building to decrease the amount of irrigation water used. This reduces the energy used at the Water Treatment Plant	1	City Facilities Energy Audit and Energy Efficiency Master Plan	$5,000	City & community	Water	Utilities Superintendent
BE1- 2	**Conduct a City Facilities Energy Audit on all buildings within the next 3 years. Use results from City Facilities Energy Audit to prioritize City Facilities Capital Improvement Plans (CIPS) and maintenance improvements.**	**1**	City Facilities Energy Audit and Energy Efficiency Master Plan	Unknown (by project)	CITY	All	Department Heads
BE1- 5	**Conduct a occupancy and plug load energy efficiency study of primary city owned facilities and establish a "Plug Load and Occupancy Energy Eficiency Guide" outlining operational practices to advance the City's energy efficency goals for City facilities. Provide training to all existing city employees and provide on-going training to all new city hires.**	**2**	City Facilities Energy Audit and Energy Efficiency Master Plan	Unknown	CITY	Sustainability	Sustainability Lead
BE1- 6	Continue and expand the City's Sustainability Fund to encourage City Departments to be more energy efficient	2	City Facilities Energy Audit and Energy Efficiency Master Plan	$12,000	CITY	All	Facility Maintenance Supervisor
BE1- 8	Evaluate the use of low-carbon concrete and/or recycled asphalt shingles on City buildings	3	City Facilities Energy Audit and Energy Efficiency Master Plan	Unkown	CITY	planning and streets	Department Heads
BE2- 1	Following the completion of an energy audit overview of all City facilities, identify potential sites for Net Zero retrofit/renovation.	1	City Facilities Energy Audit and Energy Efficiency Master Plan	Unknown (by project)	CITY	All	Department Heads

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Staff Sustainability Handbook and Training						
BE1- 4	Create a policy, to be part of assigned duties and presented during new employee orientation, that City employees shall turn off lights and equipment when they are done using them	2	Staff Sustainability Handbook and Training	$0	CITY	City Manager/ HR	City Manager/HR
CH3- 3	Provide training and other capacity building opportunities to staff to facilitate creative, climate positive innovations in operations, project design and implementation. GREEN-INFRASTRUCTURE POLICY	2	Staff Sustainability Handbook and Training	$0	city	planning	
CH3- 5	Ensure environmental policies remain current and are being enforced. Add training bulletins or information blasts about these policies	2	Staff Sustainability Handbook and Training	$0	city	all	
CH3- 6	Develop a standardized educational program on ways to improve conservation and pollution reduction	3	Staff Sustainability Handbook and Training	$1,000	city		
FE1- 5	Education of (New) employees. Compile an "Ecodriving Guide" and distribute to all employees and include in new employee training. Example: https://www.fs.fed.us/sustainableoperations/documents/TheEcoDriversManual.pdf	3	Staff Sustainability Handbook and Training				
SW1- 3	Implement the Environmentally Preferable Purchasing policy by educating all purchasers about the policy whenever there is a purchasing policy update (at least every two years).	2	Staff Sustainability Handbook and Training	$0	DVR	Recycling , Finance	Environmental Specialist
SW1- 4	Require that all events on city property collect/recycle a designated list of recyclables (paper, metal, glass, plastic) using best waste management practices (labeled containers, co-locate containers, educate vendors)	2	Staff Sustainability Handbook and Training	$0	City	Recycling, Facilities, Rereation	Environmental Specialist/Technicians
SW1- 6	Educate all property owners and event sponsors that they must recycle a designated list of recyclables and require event sponsors, owners and operators of events and event venues provide back-of-house organics collection and follow best management practices	2	Staff Sustainability Handbook and Training	$2,000	DVR/City	Recreation, Recycling	

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	ENERGY STAR Program						
BE1- 3	Continue to track 11 City Buildings Energy Use through B3 Benchmarking	1	ENERGY STAR Program	$0	CITY	Facilities	Facility Maintenance Supervisor
BE4- 1	**Create and advertise a building energy disclosure program for all public buildings and all commercial buildings that are greater than 75,000 square feet.**	**1**	ENERGY STAR Program	Unknown	City & community	Sustainability	Sustainability Lead
BE4- 2	Promote grants offered by other agencies and utility companies through City Website and promotional material.	1	ENERGY STAR Program	$0	City & Local Utilities	Sustainability, Communications	Sustainability Lead
BE4- 3	Engage and recruit large commercial business stakeholders to support this effort; identify companies with energy/climate goals to be leaders	2	ENERGY STAR Program	$0	City & community	Sustainability, Community Development, Communications	Sustainability Lead
BE4- 4	Provide training to residents and businesses on strategies for weatherizing buildings and reducing energy consumption and costs	2	ENERGY STAR Program	Unknown	City & community	Sustainability, Community Development, Communications	Sustainability Lead
BE5- 1	Expand city-hosted Doing Business webpage, with additional resources about home energy options for residents, including available energy programs and where to purchase ENERGY STAR appliances	1	ENERGY STAR Program	$0	CITY	Sustainability, Communications	Sustainability Lead, Communications
BE5- 2	Encourage commercial and industrial properties including multifamily buildings to track energy, water and waste through the Energy Star Portfolio manager	1	ENERGY STAR Program	$0	City & community	Sustainability, Community Development, Communications	Sustainability Lead, Community Development, Communications
BE5- 3	Encourage Energy Star certification for eligible facilities and Include a link to Energy Star Portfolio Manager on city's Small Business Resources page	1	ENERGY STAR Program	$0	City	Sustainability, Communications	Sustainability Lead, Communications
BE5- 5	Incentivize local businesses to participate in ENERGY STAR Portfolio Manager and ENERGY STAR Certificaiton by offering free ENERGY START Certification review support	3	ENERGY STAR Program	Unknown	City & community	Sustainability	Sustainability Lead
BE5- 6	Recognize businesses and organizations that document progress towards reducing energy usage in Energy Star Portfolio Manager	3	ENERGY STAR Program	$0	City & community	Sustainability, Community Development, Communications	Sustainability Lead, Community Development, Communications

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Ground Cover Improvement Plan						
CH1- 1	Plant shade trees to limit the need for indoor cooling and reduce temperatures at parks, playgrounds, and other outdoor spaces.	1	Ground Cover Improvement Plan	$5,000	city	parks	
CH2- 3	Install roadside vegetation that creates effective barriers to prevent drifting of air pollutants to adjacent schools and residences	3	Ground Cover Improvement Plan	$2,000	city	parks or streets	
CH4- 1	Explore re-vegetation, tree preservation planting and maintenance, de-paving and porous pavement, green infrastructure like eco-roofs and site development performance standards.	1	Ground Cover Improvement Plan	$0	city & community	planning	
CH4- 2	Promote the expansion of tree canopy in urban heat islands or areas that need air conditioning such as schools.	1	Ground Cover Improvement Plan	$5,000	School district		
GC1- 6	Increase tree canopy by planting additional trees on City Parks and land.	1	Ground Cover Improvement Plan	$5,000/year	City	Forestry/Parks	
GC2- 1	Expand prairie restoration/conversion in pre-buckthorn areas through grant funded programs	1	Ground Cover Improvement Plan	$40,000	city & community	Natural resources	
GC2- 4	Analyze private property for unused turf and impervious areas, do outreach and incentives for native conversion (start program by 2025)	1	Ground Cover Improvement Plan	Consultant Est. $5,000	City	Sustainability	Sustainability Lead
GC2- 5	**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.**	**1**	Ground Cover Improvement Plan	Consultant Est. $20,000 ?	City	Parks & Natural Resources	Parks & Natural Resouces (Daryl)
GC2- 6	**Complete land conversion opportunity study. Analyze private property for unused turf and impervious areas, do outreach and incentives for native conversion (start program by 2025)**	**1**	Ground Cover Improvement Plan	$25,000.00	City	Natural Resources	Daryl Jacobson
GC2- 7	Continue natural vegetation conversion for passive park areas. Add 110 Acres of native plant and pollinator restoration area on City Property by 2040.	1	Ground Cover Improvement Plan	TBD	city	Natural resources/parks	
GC2- 9	Promote the use of climate adaptive plants and high carbon sequestering species in landscaping projects. Options for promoting climate-friendly plant species include 1) educating the public and professional landscapers and 2) working regionally with partners to develop and promote a planting guide. A planting guide could include information on climate-adaptive plants, applying compost, mulching, and reducing synthetic fertilizers to support soil health, store more water in the ground, and store carbon in soil, plants, and trees.	3	Ground Cover Improvement Plan	$2,000	city & community	Natural resources/parks	
GC3- 1	Add urban and street trees with a distribution focus in line with the "New Tree Planting Annual Target to Meet 2040 Tree Canopy Goal" recommendation from the 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study	1	Ground Cover Improvement Plan	?	City	Forestry and Engineering	
GC3- 2	**Conduct an Impervious Surface Conversion study. Study to provide particular focus on reduction of impervious surface coverage witin neighborhoods with the highest existing coverages (see 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study)**	**1**	Ground Cover Improvement Plan		city & community	parks, engineering and streets	
GC3- 3	Analyze the use of pervious pavers in non-salt, low winter use, summer lots	1	Ground Cover Improvement Plan	100,000/per lot	City	parks, engineering and streets	
GC3- 5	Explore requiring the planting of shade trees on the south and west facings sides of new residential and commercial development with ecological considerations. Note: dwarf tree varieties and other strategies to ensure rooftop solar resources are preserved should be included.	2	Ground Cover Improvement Plan	$0	city & community	planning	
GC3- 6	Explore adding more rain gardens to parking areas that cannot be otherwise converted.	2	Ground Cover Improvement Plan	$2,500	city	planning	
F1- 7	Allow additional permaculture neighborhood gardens on city park turf areas to reduce intensive maintenance (Natural Environment Plan)	1	Ground Cover Improvement Plan	Minimal	City	Recreation/ Natural Resources	tbd
F2- 2	Promote Community Gardens to replace turf grass areas (Natural Resources Management Plan)	1	Ground Cover Improvement Plan	Minimal	City	Recreation	tbd

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Multi-Modal and Compete Streets Plan						
CH1- 2	Increase the amount of bike racks around the city to advocate for more bicycle use.	1	Multi-Modal and Compete Streets Plan	$5,000	city		
CH2- 1	Add bike racks around neighborhood businesses and community gathering places to reduce vehicle exhaust from driving and idling.	1	Multi-Modal and Compete Streets Plan	$2,500	city & community		
CH2- 4	Reduce generation of waste heat from mobile sources by promoting and incentivizing public transit, biking and walking	3	Multi-Modal and Compete Streets Plan	$2,500	city & community		
L1- 1	Consider establishing bike parking standards for public and private land uses. (Short Term 1 – 3 Years)	1	Multi-Modal and Compete Streets Plan	$0	City	Planning	City Planner
L1- 5	Work with rail line owners to convert rails to trails particularly underutilized lines and lines that divide neighborhoods and passages below or over busy streets	3	Multi-Modal and Compete Streets Plan	$0	City	Sustainability, Planning	Sustainability Lead
T1- 1	**Create a multi-modal transportation plan**	1	Multi-Modal and Compete Streets Plan	$200,000	City	Engineering, Public Works, Planning, Parks	City Engineer, City Planner, Parks, Public works staff
T1- 2	Coordinate with MVTA to promote MVTA connect to expand and promote that strategy create custom shuttle routes based on demand	1	Multi-Modal and Compete Streets Plan		City, MVTA	Public Works	
T1- 3	Explore shared mobility options for seniors and youth: oelectric golf carts on safe routes for day to day needs and "last mile" transit needs oestablished routes that are plowed oCart sharing	2	Multi-Modal and Compete Streets Plan		City, Community Education, DARTS, School Districts 191, 194, 196	Public works, streets, Parks & Rec	
T1- 5	Work with MVTA to expand options for "the last mile" and "the first mile" that cover these lo blocks to the nearest stop that are safe for youth, seniors, disabled, etc	2	Multi-Modal and Compete Streets Plan		City, MVTA	Public works, Parks & Rec	
T1- 6	Work with MVTA to plan transit to serve residents in easy day to day needs (not only a route that hits everything in an hour long ride when a rider just wants to go to the grocery store)	2	Multi-Modal and Compete Streets Plan		City, MVTA	Public Works	
T2- 1	Develop a strategy to maximize the use of the Right of Way (ROW). oIdentify areas where on-street bike lanes make sense oIdentify where street widths can be reduced—Inclusion of sidewalks, trails, larger boulevards, medians, etc.	1	Multi-Modal and Compete Streets Plan		City	Engineering, Public Works, Planning, Parks	City Engineer, City Planner, Parks, Public works staff
T2- 2	Create a trails gap map oIdentify gaps in the trail network. oCreate a hierarchy of implementation based on need, priorities identified, funding availability oWork with developers when possible to fill gap if associated with their development project. oIdentify funding sources to "fill the gaps"	1	Multi-Modal and Compete Streets Plan		City	Engineering, Public Works, Planning, Parks	City Engineer, City Planner, Parks, Public works staff
W4- 1	**Create a Complete streets/ Living Streets Plan (specifically the stormwater) Tie into multi-modal transportation program**	1	Multi-Modal and Compete Streets Plan	$25,000.00	City	Engineering	City Engineer

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	EV Roadmap						
CH2- 2	Add free EV charging stations at public parking facilities to promote EV in community.	2	EV Roadmap	$15,000	city	electric/buildings and grounds	
FE3- 1	**Create a citywide EV Roadmap. Plan should create citywide and city facility electric vehicle (EV) charging station study and masterplan to map existing infrastructure, determine the current and future demand for EV charging stations, Establish public EV parking regulation, and to identify options for increasing number of electric charging stations in public parking areas (e.g., schools, parks, libraries, City-owned parking garages, near City Hall) and in commercial and high-density residential areas. Plan should include implementation strategies to meet citywide EV charging demand and promote adoption of EVs withing the community.**	1	EV Roadmap	Consultant $40,000 ?	City, Private Property Owners, County, School District	Sustainablity, Planning, Engineering, Economic Development	Sustainablity Coordinator, City Planner, City Engineer, Economic Development Coordinator
FE3- 2	City to help private or other government agencies convert Fleets to electric by promoting and sharing Xcel and Dakota Electric Transition Planning tools, or create and promote a City of Burnsville transition tool	1	EV Roadmap	$2,000	City	Communications, Sustainability, Economic Development	Sustainablity Coordinator, Economic Development Coordinator, Communications
FE3- 3	Create an anti-idling ordinance to reduce idling emissions of vehicles community-wide. (http://www.ci.minneapolis.mn.us/environment/air/airquality_antiidling_home ; https://www.pca.state.mn.us/featured/warming-your-engine-no-need)	1	EV Roadmap	?	City	Public Works (?)	Public Works Director
FE3- 4	Assemble info on advantages and cost savings of EV fleets as well as information on resources and share with public and targeted businesses	2	EV Roadmap				
FE3- 10	Organize and promote an electric vehicle (EV) Group Purchase campaign for City fleets, business fleets within Burnsville, and interested Burnsville residents annually to partner with local dealerships to offer limited-time discounted pricing on EVs to help reduce the costs of EV purchase through volume purchasing power.	3	EV Roadmap	City Staff time	City	Fleet	Fleet Manager
FE3- 11	Incentive and reduce costs for charging stations for businesses and residents ▪Create and lead an EV group purchase campaign ▪Explore pricing structure for charging with utilities	3	EV Roadmap				
T3- 2	Incentivize installation of EV charging through reductions in required parking for new commercial development.	3	EV Roadmap	City Staff time	City, Xcel, Dakota Electric	Community Development	Economic Development Coordinator, City Planner
T3- 3	Create, distribute, and promote an "EV Ready Building Guide"	3	EV Roadmap	City Staff time	City	Building, Economic Development, Communications	Building Official, Electrical Inspector, Economic Development Coordinator, City Planner, Communications
T3- 4	Coordinate and promote annual EV Ride and Drive event to promote EV benefit awareness and adoption	3	EV Roadmap	City Staff time	City	Fleet	Fleet Manager
T3- 5	Establish and promote a "Burnsville's Greenest Fleets" awards/promotional program recognizing the City's greenest commercial fleets	3	EV Roadmap		City	Public Works (Fleet)	Fleet Manager?
T3- 6	Promote and/or create an EV sharing service citywide	3	EV Roadmap		City, Dakota Electric, Xcel, Chamber of Commerce, private businesses	Community Development, Communications	Economic Development Coordinator

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	City Fleet Plan						
FE1- 1	Establish a Fuel Economy Target for citywide internal combustion engine (ICE) fleet. Target should exceed US Energy Information Agency projecitons (https://www.eia.gov/todayinenergy/detail.php?id=31332).	1	City Fleet Plan	N/A	City	Fleet	Fleet Superintendent
FE1- 2	**Conduct a Fleet and Equipment Use and Operations Assessment to analyze city fleet and equipment use and to provide a guide for the right vehicle/equipment for City functions, with a focus on advancing EV and high fuel efficiency features (like auto-off). Assessment to identify most economical ways of operating which minimize emissions and fuel consumption (i.e. mowing patterns and schedules, street plowing efficiency study, policy patrol efficiency study, etc) Study to include recommendations on: •Emissions/Fuel Reductions •Alternative Fuel Types •Vehicle Type •Pooling System •Assess city diesel fleet and identify opportunities for conversion to Clean/Bio Diesel and opportunities to leverage the EPA Midwest Clean Diesel Program Funding. Particular focus should be made to convert all pre-2006 diesel engines**	1	City Fleet Plan	Consultant Est. $40,000 or more?	City	Fleet, Parks, Streets	Assistant Public Works Director
FE1- 3	Update City Operations anti-idling policy and increase enforcement	1	City Fleet Plan				
FE1- 4	Meet or Exceed State Wide Air Reduction Goals for City Operations.	2	City Fleet Plan				
FE1- 6	Explore the use of Carbon Credit/Offset purchases for fleet emissions reductions, particularly in transitionary years prior to significant electrification of City's fleet.	3	City Fleet Plan				
FE2- 1	Develop and implement an Electric Vehicle "EV Ready" strategy plan for City operations to establish an implementation plan for conversion of City Fleet and equipment to EV and to establish a charging station implementation plan for City facilities. Plan should also include exploration of solar powered EV charging for city fleets.	1	City Fleet Plan	?	City	Fleet, Engineering	Fleet Superintendent, City Engineer
FE2- 2	Strategically increase Electric Vehicles within the City's fleet. Update City vehicle purchasing policy/budget process to default to alternative fuel with traditional internal combustion engine (ICE) as optional requiring proof of need. Policy to take emissions/fuel reductions into account when purchasing vehicles/equipment. Focus on small vehicles as well as large vehicles for alternative fuels. EV replacement to be prioritized for high mileage vehicles. Action to be coordinated with the Fleet Size and Purchasing Guideline and Goalsetting Study effort	1	City Fleet Plan	?	City	Fleet	Fleet Superintendent
FE2- 3	Establish an Electric Equipment purchasing policy for a range of equipment types including: Generators, Weed Whips, Chain Saws, Etc Action to be coordinated with the Fleet Size and Purchasing Guideline and Goalsetting Study effort	1	City Fleet Plan		City	Parks/Public Works	Public Works Director
FE2- 4	Expand Sustainability Fund – Cover Additional Capital Costs to Purchase Greener Equipment	2	City Fleet Plan				
RE1- 4	Provide solar EV charging stations for city fleet. Goal to achieve 10% of City fleet vehicles using EV Solar charging Stations by 2025 and 50% by 2030.	3	City Fleet Plan	Unknown	City	Fleet	Fleet Mgr

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Citywide Solar Advancement Plan						
RE1- 1	**Conduct a City Facility Solar Feasibility and 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 thrid party ownership (such as Power Purchase Agreements). 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.**	**1**	Citywide Solar Advancement Plan	50,000-60,000	City	Sustainability	Sustainability coordinator
RE1- 2	Based on City Facility Solar Feasibility and Master Plan study (to be developed) convert conventional energy sources by using renewal energy sources on all City buildings and sites, where feasible with a minimum goal of at least 30% of the primary buildings included in the report (1-10 year)	2	Citywide Solar Advancement Plan	Unknown by project	City	All	Department Head
RE2- 1	Continue participation in the SolSmart Program and complete process and steps to achieve a Silver certification	1	Citywide Solar Advancement Plan	$0-$1,000	City	Sustainabilty and Comm. Development	Sustainabilty Coord
RE2- 2	Update Zoning Ordinance sections as per SolSmart recommendations, including sections 10-4-2, 10-7-4, and 10-7-29	2	Citywide Solar Advancement Plan	$0-$1,000	City	Planning	Staff Planners
RE2- 3	Consider creating an overlay district identifying where principal solar uses are desired. Overlay district standards can capture co-benefits through mandated design and be applied in response to proposals as a rezoning rather than a text amendment	3	Citywide Solar Advancement Plan		City	Planning	?
RE3- 2	**Proactively identify the City's "Top 100" commercial solar locations and provide informational packages to each including preliminary solar feasibility assessments, return on investment, benefits, and procurement information.**	**2**	Citywide Solar Advancement Plan	$10,000-$25,000	City	Communications and Planning	Staff Planners and Communicastions Staff
RE3- 3	Engage in and promote a residential solar group purchase campaign to support decreased purchase cost for residents annually	2	Citywide Solar Advancement Plan	Unknown	City and Solmart	Sustainabilty	Sustainabilty Coord
RE3- 4	Engage in and promote a commercial solar group purchase campaign to support decreased purchase cost for businesses annually and invite "Top 100" sites to participate.	2	Citywide Solar Advancement Plan	$0-$1,000	City	Communications and Planning	Staff Planners and Communicastions Staff
RE3- 5	Create, distribute, and promote a "Solar Ready Building Guide"	3	Citywide Solar Advancement Plan	$15,000	City	Communications	Communicaitons Staff
RE4- 2	Compile, distribute, and promote information on green power purchasing options and benefits. Include customizable promotional materials such as social media posts, business window decals, and print ready content for businesses to use to announce and promote their green power purchasing.	2	Citywide Solar Advancement Plan	$10,000- $25000	City	Sustainabilty and Communications	Sustainabilty Coord and Communications Staff
RE6- 2	Work with solar industry to strategically locate community solar gardens. Consider issuing a request for proposals from community solar developers, combining projects with local labor to create employment opportunities for residents	2	Citywide Solar Advancement Plan	$2,000	City	Sustainabilty	Sustainabilty Coord
RE6- 3	Subscribe to community solar project for all City facilites for which on-site solar is determined to be infeasible. Purchase renewable Energy Credits equal to the amount of electricity subscribed through solar garden to assure City meets operational GHG reduction goals.	2	Citywide Solar Advancement Plan	Revenue Generated	City	Parks, Recreation & Facilities	Department Head

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Local Agriculture and Nutrition Security Study and Plan						
CH1- 3	Review and enhance the City's public health procedures, information and messaging to encourage local gardening, composting, leaving leaves, and reducing chemical fertilizers and pesticides.	2	Local Agriculture and Nutrition Security Study and Plan	$0			
CH1- 10	Create more neighborhood gardens for citizens to have access to locally sourced food. Plant hardy, perennial fruit bearing trees and shrubs to have low maintenance food source.	3	Local Agriculture and Nutrition Security Study and Plan	$10,000	city	parks	
F1- 1	Consider allowing small scale farming on capped landfills (Minnesota River Quadrant)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal - unless prep needed?	City/County/MPCA	Public works	City engineer
F1- 2	Continue to allow small scale farming and community gardening in floodplains (Minnesota River Quadrant)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Public works/Planning	Planners
F1- 3	Use permaculture (examining and following nature's patterns) in landscaping. Explore opportunities for pilot projects using City land or Right of Way areas (Future Land Use Guide Plan)	1	Local Agriculture and Nutrition Security Study and Plan	$10,000	City	Parks	tbd
F1- 4	Consider special use permits for food collection or vegetation harvest in wetland systems (Wetlands Protection and Management Plan)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Natural Resources	tbd
F1- 5	Continue implementation of ordinances and/or zoning district standards that permit Urban Agriculture and local food producers. (Future Land Use Guide Plan)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Planning	tbd
F1- 6	Promote Farmer's markets (Neighborhoods and Housing Plan)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City and Burnsville center	Planning/recreation	tbd
F1- 8	Work with county and Met Council to develop an entrepreneurship program for commercial urban farming	1	Local Agriculture and Nutrition Security Study and Plan	Minimal- grant funded program?	City and Met Council	Planning	tbd
F1- 9	Encourage aquaponics and other sustainable practices (Cliff Road Business Park)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City and Watershed District	Natural Resources	tbd
F1- 10	Encourage local/cottage food industries. (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Planning	tbd
F1- 11	Establish incentives to neighborhood food production (bees, chickens, goats, etc.) (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Planning	Planners
F1- 12	Support Aquaculture as a potential land use (Minnesota River Quadrant)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Natural Resources	tbd
F1- 13	Support programs that support and incentivize urban agriculture (UA) and local food production and businesses. (Future Land Use Guide Plan)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Natural Resources/Planning	tbd
F1- 14	Facilitate Community Engagement on local food systems (Community Enrichment Plan)	2	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Recreation	tbd
F1- 15	Support growing, harvesting, selling and delivery of locally-grown produce. (Community Enrichment Plan)	3	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Planning	tbd
F1- 16	Establish a policy to serve local food at all City events	3	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	planning	tbd
F2- 3	Coordinate with City GIS Mapping servcies to identify potential sites for community garden sites or community farm sites (similar to Dubuque Rescue Mission Community Farm (http://dbqrescue.org/)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Engineering	tbd
F2- 4	Continue to allow for community gardens. Compile, distribute, and promote information on how to start a community garden. (Neighborhoods and Housing Plan)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Recreation	tbd
F2 5	Establish community gardens at unused city owned space and consider identification of additional publicly-owned sites that may be suitable for community gardens and urban farms, work with advocacy groups to make these sites available. (Community Enrichment Plan)	2	Local Agriculture and Nutrition Security Study and Plan	Access to water	City	Recreation	tbd
F2- 6	Encourage / create community gardens and encourage private developers to do so	2	Local Agriculture and Nutrition Security Study and Plan	$1,000	City	Plannin/Economic Development	tbd
F3- 1	Work with Dakota County to identify areas with limited access to traditional food markets. (Community Enrichment Plan)	1	Local Agriculture and Nutrition Security Study and Plan	$0	City/County	Planning	tbd
F3- 2	Identify, map and prioritize food insecure areas and populations.	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City	Planning	tbd
F3- 3	Attract and promote grocery store and food market investment in food desert sections of the City. Explore successful strategies used in other communities to attract grocery stores into food desert locations and implement best practices. Collaborate with neighboring communities to maximize coverage. (Major priority)	1	Local Agriculture and Nutrition Security Study and Plan	Minimal	City/Grocery Stores	Communications/Recreation	tbd
F3- 4	Continue to allow farmers markets (Heart of The City)	1	Local Agriculture and Nutrition Security Study and Plan	$0	City	Planning	tbd
F4- 1	Explore development of a mobile food pantry with a focus on local, organic, and whole foods to increase access to high quality nutrition in underserved areas of City	3	Local Agriculture and Nutrition Security Study and Plan	Tbd	City/Food Justice Org	Sustainability	Environmental Specialist
F4- 2	Explore options and partners for promoting and increasing food donation	3	Local Agriculture and Nutrition Security Study and Plan	Tbd	City/Food Justice Org	Sustainability	Environmental Specialist

Implementation and Monitoring

Implementation Plan

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Sustainability Considerations for Zoning Actions						
BES- 4	Encourage all Planned Unit Developments and Conditional Use Permits, and all projects receiving public financing support to meet LEED or ENERGY STAR Certification requirements.	3	Sustainability Considerations for Zoning Actions	$0	City	Planning, Sustainability	Planners
L1- 2	Through Development Review process work with applicants to incentivize bike usage by increasing the availability of bike racks and lockers, bike share programs, shower facilities etc. (Short Term 1 – 3 years)	1	Sustainability Considerations for Zoning Actions	Tax break incentives?	City, Private Property Owners	Planning, Engineering, Building	City Planner, City Engineer, Building Inspections
RE3- 6	Encourage Solar Ready building construction in flexible building standards such as Planned Unit Developments and Conditional Use Permits.	3	Sustainability Considerations for Zoning Actions	$0-$1,000	City	Planning	Staff Planners
RE3- 8	Encourage on-site solar for all commercial properties receiving City funding and incentives.	3	Sustainability Considerations for Zoning Actions				
T3- 1	Encourage Planned Unit Developments and Conditional Use Permits, and all projects receiving public financing support to install publicly accessible EV charging.	2	Sustainability Considerations for Zoning Actions	City Staff time	City	Community Development	City Planner
T3- 7	Guidance on new construction "EV ready" and could be incentivized and required if city funds go into project or the City grants a PUD or Conditional Use Permit	3	Sustainability Considerations for Zoning Actions	City Staff time	City, Xcel, Dakota Electric	Community Development	Economic Development Coordinator, City Planner

	Strategy / Action	Priority	Major Project Group	Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Water Reuse and Conservation Plan						
W1- 1	Increase the use of Smart Irrigation systems and water conservation fixtures (new or retrofit opportunities) At City facilities (install irrigation and fixtures) Rebate programs for private use (measurable) 2030	1	Water Reuse and Conservation Plan	$20,000 annually	City	Utilities	Linda Mullen
W3- 1	Partner with county for rain barrel program for residential use.	1	Water Reuse and Conservation Plan	$0.00	City	Natural Resources	Specialist (Caleb)
W3- 2	Educational campaign with signage and tours	2	Water Reuse and Conservation Plan	0.00	City / Dakota County	Natural Resources/ Utilites	Caleb / Linda
W3- 3	Implement 3 water reuse projects by 2030.	2	Water Reuse and Conservation Plan	TBD	City	Natural Resources/ Utilites	Caleb / Linda
W4- 6	Develop, expand, and promote rain garden incentive and education programs.	2	Water Reuse and Conservation Plan	$10,000 (annualy)	City	Natural Resources	Caleb Ashling
W4- 7	Provide Educational Opportunities at Annual Public Works Open House.	2	Water Reuse and Conservation Plan	$1,000.00	City	Public Works	Ryan Peterson

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	Strategy / Action	Priority	Major Project Group	Implementation			
				Estimated Budget Need	Implementing Agent (City or Community Partner)	City Department Responsible	Staff Responsible
	Stand-Alone Actions and Projects						
	Buildings And Energy Efficiency						
Strategy BE1	**Improve total City owned building energy efficiency by 10% Electricity and 7% Natural Gas by 2030**						
BE1- 7	Establish a policy that the City will look at the most energy efficient products When replacing equipment.	2		Unknown (by project)	CITY	All	Department Heads
Strategy BE2	**Achieve a minimum of 1 Net Zero ready or Net Zero City Owned facility by 2030** (Net Zero is defined as a building which generates as much energy on-site as it consumes in a year)						
BE2- 2	Establish a policy requring all future new construction City owned facilities to meet high performance energy efficiency levels and to be constructed to meet "Moving Towards Net Zero Ready" guidelines.	3		Unknown (by project)	CITY	All	Department Heads
Strategy BE3	**Improve total Community wide residential building energy efficiency by 10% Electricity and 5% Natural Gas by 2030**						
BE3- 1	Encourage homeowners to sign up for the City of Burnsville Customer portal on the City Website. The new water meter customer portal will allow people to track their usage, set goals, set notifications when they reach a certain amount of gallons, and they will be notified if they have higher than normal usage.	1		$0	City & community	Water Department	Utilities Superintendent
BE3- 2	The City will partner with local utilities to promote energy efficiency programs and rebates	2		$0	City & Local Utilities	Sustainability, Communications	Sustainability Lead/Communications Staff
BE3- 3	Partner with Dakota County CDA to promote programs for seniors, residents and 1st time home buyers.	3		$0	City & CDA	Sustainability, Communications	Sustainability Lead/Communications Staff
BE3- 4	Partner with local community organizations serving under-resourced households to promote energy audits for low-income residents	3		$0	City & community organizations	Sustainability, Communications	Sustainability Lead/Communications Staff
BE3- 5	Explore a cool roofs policy for new residential development with air conditioning that applies the voluntary standards established by CalGreen.	3		$0	city & community	planning	
BE3- 6	Establish a cost subsidy for Home Energy Squad visits, particularly for vulnerable, at-risk, and low income residents.	3		Unknown	CITY	Sustainability	Sustainability Lead
Strategy BE4	**Improve total Community wide commercial building energy efficiency by 10% Electricity and 7% Natural Gas by 2030**						
Strategy BE5	**Increase ENERGY STAR certified buildings within the community to 20 by 2030.**						
BE5- 7	Create, distribute, and promote a guide for building construction and renovation projects outlining voluntary GHG and sustainability impact offset measures building owners and builders can implement. Guide to provide recommended options and proportions based on project size – ie. Plant x trees per acre, established ratios of tree canopy coverage per parking spot, x EV charging stations per parking spots, etc.	3		$2,000 - $5,000	City	Sustainability, Communications	Sustainability Lead, Communications
	Community Health						
Strategy CH1	**Develop a standardized educational program on ways to improve health of citizens, workers and students while promoting a healthier lifestyle**						
CH1- 4	Train K-12 teachers on climate change science and curriculum.	3		$0	School district		
CH1- 5	Increase outreach to diverse populations about climate change and health, natural hazards, and emergency preparedness via broadcast, print, bus ads, social media, and other forms of communication in multiple languages and accessible to individuals with disabilities to ensure that emergency preparedness planning reaches all City residents	3		$1,000			
CH1- 6	Work with unions, businesses and other stakeholders to protect workers in extreme weather	3		$100	Community partners		
CH1- 7	Engage leading employers in a dialogue on climate action, for example, by organizing and facilitating roundtables.	3		$200	city & community		
CH1- 8	Post information about the City pesticide policy at City properties, include the policy in the City's annual mailing to landscapers, and encourage voluntary steps to reduce pesticides.	3		$250			
CH1- 9	Increase community participation in health and wellness, exercise and nutrition programs.	3		$500	city		
CH1- 11	Conduct education and outreach on the health impacts of vector-borne disease and strategies for avoidance	3		$1,000	city		
Strategy CH2	**Meet or exceed the goal of reducing greenhouse gas emissions from city operations by 40%, while encouraging the public to reduce emissions and pollutants**						
Strategy CH3	**Educate employees on current environmental policies and develop new policies in areas that are lacking and enforce those policies.**						

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CH3- 1	Develop, promote and implement a local green business recognition program	1		$500	city		
CH3- 2	Promote online citizen services (such as permitting and bill payment) to reduce paper use and car trips	1		$0	city	billing	
CH3- 4	Adopt policies with incentives to building owners to increase the resilience of existing and new buildings with resilience strategies such as elevated HVAC and electrical off basement floor, installation of backflow preventers, tree maintenance, permeable pavements, energy conservation and on-site renewable energy generation, and safe rooms	2		$0	city & community	planning	
Strategy CH4	**Explore more options to reduce heat island/roof effects and educate public/business about potential effects and areas for improvement**						
CH4- 3	After weather-related emergency events, assess response to identify effectiveness, deficiencies and resources needed to build future resilience.	2		$0	city	police and fire	
CH4- 4	Explore community/county-based programs that will provide check-ins on vulnerable populations during extreme weather events.	3		$0	city and community	police and fire	
Strategy CH5	**Expand climate adaptation capacity and preparedness within the community**						
CH5- 1	Conduct a City Climate Migration Study and Plan to identify the likely impacts of climate migration on the City and establish actions to minimize negative impacts and guide positive outcomes. References https://www.nature.com/articles/nclimate3271.epdf: https://www.citylab.com/environment/2020/02/climate-change-migration-map-sea-level-rise-coastal-cities/605440/	2		$2,000	city		
CH5- 2	Explore, with partners like the MPCA, MDH, and Dakota County Health creating a volunteer home health and climate adaptation assessment program. Program could provide home assessments for vulnerable populations to identify what specific actions can be done to improve the health and safety of a home including reduction of heat island impacts, flood resistance, etc.	3		$0	city & community	police and fire	
	Fleet and Equipment						
Strategy FE1	**Emissions and Fuel Reductions – City Operations**						
Strategy FE2	**Move Towards Electrification of City's Fleet** (Target: Electrify 50% of the City's Vehicle and Equipment fleet by 2030 measured by fuel consumption).						
Strategy FE3	**Influence Private Sector**						
FE3- 5	Create a recognition program " Burnsville Green Fleets!" promoting businesses and organizations that advance electrification of their fleets.	2					
FE3- 6	Develop an incentive program to convert fuel-burning lawn equipment such as gas-powered lawn mowers and blowers to electric. Coordinate with Dakota Electric and Excel Energy rebate programs to promote electric yard equipment.	2		$10,000	city & community; Xcel Energy, Dakota Electric		
FE3- 7	Develop, promote, and provide educational opportunities to advance more sustainable fleets and equipment. Explore grant opportunities to support educational content as well as to support advancement of more sustainable fleets and equipment.	2					
FE3- 8	Encourage/Incentivize utilization of Electric/Lesser Polluting Vehicles	2					
FE3- 9	Produce a Case Study report and promotional material outlining the City's actions and strategies for fleet efficiency, size reduction, and electrification. Distribute and promote the case study with businesses and institutions throughout city.	3					
FE3- 12	Develop incentive program for local businesses and multifamily to add EV charging stations. Tie incentive program into recommendations of the Citywide EV charging station study and masterplan	3		$2,500	city & community		
	Ground Cover						
Strategy GC1	**Increase Tree Cover and Diversity** (Citywide Tree Canopy coverage goal of 33% by 2030 and 37% by 2040)						
GC1- 1	Promote the proactive replacement of declining ash trees with a diverse mix of species to build urban forest resiliency and maintain canopy cover	1		Forestry fund Budget	City	Forestry	
GC1- 2	Update Woodland Redevelopment Worksheet. In support of worksheet update: •Explore altering zoning codes to promote diversity of native tree cover, to establish minimum tree coverage for developments, and to require planting islands in parking lots, with a mix of canopy trees, shrubs, and groundcovers appropriate to the lot and its surroundings. Use data in 2019 City of Bursnsville Tree Survey and Carbon Sequestration Study to identify targeted tree coverage minimums. •Ecplore requiring new developments to meet site plan review illustrating their capacity to meet tree canopy coverage goal (city wide average 44.4%) as well as on-site solar utilization in a manner that minimizes conflict between solar and trees	1		$0	City	Planning	
GC1- 3	The City will explore a program to give away trees on an annual basis for residents to plant on their property. Potenial program concept: grow seedlings and give to homeowners once per year, or sell at a discount (do run a tree sale program already) 200+ per year	1		$12,000	City	Forestry	
GC1- 4	Update Natural Resources Master Plan	1		$15,000	City	Natural Resources	
GC1- 5	Update the citywide urban tree canopy assessment every five years and maintain a current street tree inventory to develop targets and goals for tree canopy cover and identify strategies to achieve them	1		$5,000	City	Forestry	
GC1- 7	Continue to use the Forestry Fund to conduct programs for control of invasive species and diseases	2		No additonal Cost	City	Forestry	
GC1- 8	Require soil profile rebuilding at all building project sites or compacted soil conditions to reduce erosion and runoff contaminated with fertilizers, increase soil carbon stores, support long-term soil building, and improve new tree survival and growth rates.	2		$0	City	Planning/Engineering	

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GC1- 9	Perform outreach into the community to increase the knowledge of the mitigating effects of trees on climate change and promote the additional planting of trees on private property	3		$2,500	City	Natural Resources	
Strategy GC2	**Increase the use of Native Species and Pollinator Restorations Areas**						
GC2- 2	Continue to leverage budget by obtaining grants from sources like SWCD and MN DNR.	1		$100,000.00	City / SWCD	Natural Resources	Daryl/ Caleb
GC2- 3	Require the use of local finished compost in topsoil for city projects and coordinate with The Open Door, The Mulch Store in Burnsville, the Burnsville City Compost Site, and the Mdewakanton Sioux community to explore opportunities to expand compost programs to increase use of compost in residential and community garden sites. Explore piloting/specifying use of food derived compost in certain earth work projects to support food waste composting markets.	1		$30,000	City compost site, The Mulch Store, Mdewakanton Soiux community, Open Door (gives free compost)	Recycling Planning	Environmental Specialist
GC2- 8	Continue Education and incentive programs for native and pollinator friendly plantings on residential lots; Hold annual workshops	1		$5,000.00	City	Natural Resources	Daryl/ Caleb
Strategy GC3	**Reduce Heat Island Effect**						
GC3- 4	Explore more permeable surface options and potential implementation in all new city parking areas.	2		$0	city	planning and streets	
GC3- 7	Create pilot project to test a solar reflective cool pavement product which is designed to lower surface temperatures and decrease ambient temperatures to combat the urban heat island effect, while also preserving the integrity of the pavement and extend its lifecycle	3		?	City	Engineering and streets	
GC3- 8	Partner with utilities to develop an education and rebate program to encourage green/cool roofs	3			City & Utilities	utilities/inspection?	
GC3- 9	Create pilot project to demonstrate Greenroof technology and benefits	3			City & community	Engineering/planning	
GC3- 10	Evaluate on-going pilot programs for cool paving materials (examples include Chula Vista, Chicago) to determine whether the City should establish a cool paving policy.	3		$0	city	planning and streets	
	Land Use						
Strategy L1	**Expand and Promote Walkability in Burnsville**						
L1- 3	Make a brochure that can be used by landlords to give info to their residents to assure developers and apartment owners help residents know about park locations, bike/walk/transit info, sustainability goals and resources, trash and recycling opportunities, renewable energy options, incentives, etc. Brochure can be distributed as a part of the Rental Licensing program in addition to other avenues. Brochure should link to the most up-to-date information maintained on the www.burnsvillemn.org website.	2		$0	City	Sustainability, Communications	Sustainability Lead
L1- 4	Collaborate with Transit providers to evaluate and enhance coverage and availability of public transit systems, take into account a GIS spatial analysis identifying dead-zones in which bus routes are greater than a half-mile away and promote expanded service into these areas, prioritizing areas with greater populations and greater poverty	2		$0	City, County, Metro Transit, MVTA, Metro Mobility, Darts	Planning, Engineering, IT/GIS	City Planner, City Engineer, GIS Coordinator
Strategy L2	**Expand Access to Public Parks and Open Space**						
L2- 1	Support the implmentation of the Minnesota River Quadrant Plan and the Center Village Plan	1			City, Private Property owners	Planning, Engineering, Parks & Rec	City Planner, City Engineer, Parks & Rec
L2- 2	Maintain Burnsville's quality park service to community by continuing to explore opportunities to improve equality and overall service	1		$0	City	Parks & Rec	
L2- 3	Acquire additional park land in Heart of the City (near Pleasant Ave South and Gateway Blvd.) (Long Term 10+ years)	3		Unknown	City	Parks & Rec	
Strategy L3	**Expand Sustainable Building and Infrastructure**						
L3- 1	Minnesota River Quadrant: Support the "dig and move" option for the Freeway Landfill and Dump to maximize open space and allow for sustainable redevelopment in the MRQ. (Short Term 1 – 3 years)	1		$0 funded by other sources	City, Kramer Quarry (?), Landfill owner (?), MPCA (?), Federal Government (?)	Planning, Engineering, Park & Natural Resources	City Planner, City Engineer, Parks & Natural Resources
L3- 2	Support Dredge Management and maximize use of the Minnesota River for freight transportation. (Short Term 1 – 3 years)	1		$0	City, Kramer Quarry (?), MPCA (?), Federal Government (?), EPA (?), MN DNR (?)	Planning, Engineering, Park & Natural Resources	City Planner, City Engineer
L3- 3	Minnesota River Quadrant: Work with private sector to develop a plan for a potential district energy or loop system in the MRQ to provide heat, power, cooling, water distribution, irrigation and other sustainable energy development and generation. (Medium Term 5 – 10 Years)	2			City, Kramer Quarry (?), Landfill owner (?), MPCA (?), EPA, Xcel Energy	Public Works, Utilities/Water	Public Works, Utilites/Water
L3- 4	Minnesota River Quadrant: Update land use and public infrastructure plans based on Freeway Landfill (Superfund site) and Dump remediation plans once approved by state and/or federal agencies. (Long Term 10+ Years)	3		$0	City, Kramer Quarry (?), Landfill owner (?), MPCA (?), Federal Government (?)	Planning, Public Works, Engineering, Parks & Natural Resouces	City Planner, City Engineer, Parks & Natural Resources
L3- 5	Explore bonding to acquire land ahead of redevelopment and steer towards projects that meet city goals	3					
L3- 6	Minnesota River Quadrant: Enact Closed Landfill Overlay zoning district over closed landfills as directed by MPCA. (Long Term 10+ Years)	3					
	Local Food						
Strategy F1	**Increase production of local food**						
Strategy F2	**Increase Access to Community Gardening**						

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F2- 1	Update code to provide incentives or require developers to preserve topsoil and provide space for backyard or community gardens	1		Minimal	City/Developers	Code Enforcement/ Natural Resources	tbd
F2- 7	Encourage multi-family properties developers to establish land for community gardens	3		$0	City/Developers	tbd	tbd
Strategy F3	**Explore Ways to Reduce Food Deserts Within Community. (Future Land Use Guide Plan)**						
Strategy F4	**Reduce food waste and hunger**						
	Renewable Energy						
Strategy RE1	**Move electric supply of City owned facilities to renewable energy**						
RE1- 3	Install solar panels to run lighting on newly installed signs by the City (Citywide)	3		Unknown by project	City	Parks and Recreation	Assist PW Dir
RE1- 5	Work with regional energy partnerships to develop and implement an Electrification Action Plan for all City facilities to eliminate on-site fossil fuel combustion. Include new and existing buildings, incorporate strategies to address electricity storage, and focus on highlighting any hurdles or solutions that would be applicable to the broader community.	3					
RE1- 6	Support wind power in the Buckhill area or the closed landfill when that occurs	3			City		
Strategy RE2	**Implement 2019 SolSmart program recommendations**						
Strategy RE3	**Increase on-site distributed renewable energy to 7.5% of Residential and Commercial electric use by 2030** (170 homes per year adopting on-site renewable or making green power purchases)						
RE3- 1	Promote businesses and residents exploring making their building sites solar resilient: http://solarresilient.org/	1		$0-$1,000	city & community	Sustainabilty	Sustainabilty Coord
RE3- 7	Find innovative ways to store energy and promote information to businesses in City	3					
RE3- 9	Explore ways to incentivize renewable energy generation and energy storage projects	3			City		
RE3- 10	Provide more incentives for rooftop solar	3			City		
RE3- 11	Make it easier for large multi-family, commercial, and industrial customers to maximize the benefit of using their space for photovoltaics (e.g., feed-in tariff, third-party lease agreements, roof space rental)	3			City		
RE3- 12	Explore the development of a Renewable Energy TIF District to promote renewable energy as well as economic development.	3			City		
RE3- 13	Require all commercial building permit applications to include an on-site solar feasibility assessment illustrating generation potential and financial payback with available incentives and tax benefits. (property owners not required to construct array, study submission only)	3			City		
RE3- 14	Maximize utility programs. Coordinate with Xcel Energy and Dakota Electric for promotion of utility programs supporting renewable energy.	3			City and Utilities		
Strategy RE4	**Increase commercial/industrial green power purchasing Citywide to 7.5% of Commercial electrical use**						
RE4- 1	Establish and promote an award/promotional campaign recognizing the City's largest commercial green power consumers.	2		$0-$1,000	City	Sustainability	Sustainabilty Coord
Strategy RE5	**Fuel Switching for Commercial Natural Gas: By 2030, 5% of residential, commercial and industrial natural gas consumption will be Renewable Natural Gas purchases.**						
RE5- 1	Coordinate with Centerpoint Energy for co-promotion of the utility's pilot Renewable Natural Gas purchase program.	2		$0-$100	City and CPE	Sustainabilty	Sustainabilty Coord
RE5- 2	Compile, distribute, and promote information on renewable natural gas purchasing options and benefits. Include customizable promotional materials such as social media posts, business window decals, and print ready content for businesses to use to announce and promote their green power purchasing.	2		$0-$1,000	City and CPE	Sustainabilty and Communications	Sustainabilty Coord and Communications Staff
Strategy RE6	**Increase participation in shared renewable energy with the goal of achieving a 50% increase in the number of solar garden subscriptions within the City, by 2025** (to 306 households) **and a 100% increase by 2030 over 2019 numbers** (to 408 households)						
RE6- 1	Help showcase renewable energy at other local fairs, city website utility billing page, City digital signs, 35W billboard and other events as they present themselves	2		$0-$5,000	City	Sustainabilty and Communications	Sustainabilty Coord and Communications Staff
RE6- 4	Support the development of community solar projects that benefit all residents, particularly communities of color and low-income populations	2		Unknown	City	Sustainabilty	Sustainabilty Coord
Strategy RE7	**Increase renewable energy investments by regional utilities**						

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RE7- 1	Help strengthen statewide standards to ensure support for renewable energy	3		$0-$1,000	City	Sustainabilty	Sustainabilty Coord
RE7- 2	Increase renewable energy supply options by supporting community solar and other renewable energy generation projects	3		$0-$1,000	City	Sustainabilty	Sustainabilty Coord
	Solid Waste and Recycling						
Strategy SW1	**Reduce waste in city operations by measuring waste in all facilities and work towards an 85% diversion rate**						
SW1- 1	Implement organics recycling at all city facilities where it is feasible.	1		$4,000	DVR/County	Recycling, Facilities	Environmental Specialist/Technicians
SW1- 2	Measure waste in all facilities and conduct a waste sort study	1		$5,000	DVR	Recycling, Facilties	Environmental Specialist/Technicians
SW1- 5	Estabish a recycled content products purchasing requirement for City Operations	2		Combine with SW1-3	City	Planning, Finance, Recycling	
Strategy SW2	**Increase residential recycling and waste reduction**						
SW2- 1	Conduct a survey to discover where gaps exist in recycling knowledge for city residents (social media "I don't know" box)	1		$0	DVR	Recycling	Environmental Specialist/Technician
SW2- 2	Investigate the possibility for developing a requirement for a significant financial increase between the different sizes of garbage containers through the hauler licensing process by 2023	1		$0	DVR/County	Recycling	Environmental Specialist
SW2- 3	Explore the options of organized recycling and organics collection	2		$0	City	Recycling, Planning	
SW2- 4	Explore creating a volunteer composting and organics coordinator position	2		$0	City	Recyling	
SW2- 5	Promote county compost and yard waste drop off sites and work with the county to develop a compost drop offsite in Burnsville	2		$0	DVR/County	Recycling, Communication	Environmental Specialist/Technician
SW2- 6	Reduce waste through the development of a ReUse store and Community shelf, and an online community shelf access tool	3		$5,000 or grant funding	DVR/County, Non-Profits	Recycling	Envionmental Specialist/Technician
SW2- 6	Support community projects, such as neighborhood compost projects, tool libraries, and fix-it clinics	3		$0	DVR, County, Non-Profits	Recycling, Community Services	Environmental Specialist/Technician
Strategy SW3	**Promote commercial and multi – family recycling**						
SW3- 1	Investigate the addition of more flexibility for recycling/organics enclosures	1		$0	City	Code Enforcement, Recycling, Planning	
SW3- 2	Encourage recycling of building material (demolition debris and diversion) by educating through the permitting process	2		$0	City	Building Inspections	
SW3- 3	Work with the Planning Department to require adequate space/chutes in multi-family buildings for recycling and organics making sure recycling is as convenient as garbage	2		$0	City	Planning, Building Inspections	
SW3- 4	Investigate plastic reduction at commercial establishments	2		$0	City	Recycling, Economic Development	
SW3- 5	Connect multifamily properties to Dakota County multifamily recycling program and connect large facilities/generators of waste to the Dakota County business recycling program	2		$0	DVR/County	Recycling	Environmental Specialist/Technician
	Transportation						
Strategy T1	**Increase Public Transit Ridership from 4.5% to 6% by 2030**						
T1- 4	Explore the development of an "Eco-District". Could be tied to requirements for a developer when purchasing existing City owned land-as a pilot project. Could develop criteria for Center Village	2			City, Private property owners, developers	Planning	City Planner
T1- 7	Establish and use funds to increase in bus service/use	3			City, MVTA, Metro Transit	?	?
Strategy T2	**Increase Walk/Bike Transportation 0.5% by 2030 (of total commute)**						
Strategy T3	**Increase Electric Vehicle Adoption to 10% of Citywide Vehicle share by 2030**						
	Water						
Strategy W1	**Protect Ground Water Resources (quality and quantity)**						
W1- 2	Water system resiliency and emergency response plans Resiliency Plan submitted to EPA by December 30th Emergency Response Plan within 6 months after Done by 2021 Run a scenario every 3 years	1		$40,000 (already budgeted)	City	Utilities	Linda Mullen
W1- 3	Provide Water Treatment Plant tours	1		$0.00	City	Utilities	Linda Mullen
W1- 4	Update City's Drinking Water Supply Management Area Plan.	1		$0.00	City	Utilities	Linda Mullen
W1- 5	Proper closure of landfills and dumps in wellhead protection area By 2025 ensure proper closure of freeway landfill and freeway dump	2		$125m	MPCA	Senior Leadership Team	Ryan Peterson
W1- 6	Advance Meter technology: Water loss detection and repairs, distribution system, By 2025 have a program in place Water audits of top water users – plans for reduction – 50/50 audit reimbursement, goal to do at least 2 per year Customer portal opt-in incentive 50% of customers enrolled by 2030 60-70% by 2040	2		$20,000 annually	City	Utilities	Linda Mullen

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W1- 7	Increase harvesting rate of surface water in KMM (decreasing ground water pumpage) By 2030 achieve 4 million gallons per day By 2040 achieve 5 million gallons per day	2		$2.8m	City/ KMM	Public Works	Ryan Peterson
Strategy W2	**Meet Burnsville TMDL Goals for Alimagnet and Keller Lakes** (phosphorus reduction required)						
W2- 1	Stormwater quality improvements in Lake Alimagnet and Keller Watersheds	1		$500,000.00	City	Natural Resources / Engineering	Specialist (Caleb) or Manager (Daryl)
W2- 2	Specific projects targeting phosphorus reduction	1		$250,000.00	City	Natural Resources / Engineering	Specialist (Caleb) or Manager (Daryl)
W2- 3	In-lake manipulations to reduce nutrient cycling (alum treatments, fish, and plant communities)	1		$50,000.00	City	Natural Resources	Specialist (Caleb) or Manager (Daryl)
Strategy W3	**Encourage Water Reuse**						
Strategy W4	**Promote Low Impact Development (LID) and Green Infrastructure Approaches**						
W4- 2	Utilize GIS/Web Map tools to promote Green Initiatives	1		$0.00	City	Public Works / GIS	Ryan Peterson
W4- 3	Develop private BMP maintenance program By 2025	1		$20,000.00	City	Natural Resources / Public Works	Ryan Peterson
W4- 4	Partner with school district for stormwater education program Explore potential for stormwater demonstration projects on school property.	2		$10,000 (annually)	City / School District	Natural Resources	Caleb Ashling
W4- 5	Partner with other Agencies or Groups on Stream Restoration Opportunities	2		$10,000.00	City / Trout Unlimited	Natural Resources	Daryl Jacobson

Section A1

GHG Forecast Assumptions

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GHG Forecast Assumptions

The following assumptions are included in the GHG forecasting models represented in this report:

Demographics:

- **Population:** Total Population projections through 2040 are projected based on maintaining the 13 year average growth between 2005 and 2018.

- **Jobs:** Total commercial and industrial jobs are calculated based on a 0.56% annual job growth rate - equal to the lowest 7 year trend since 2005.

Climate Data

- **Cooling Degree Days (CCD):** Projected climate changes for the region will include increased summer temperatures. The increase in temperatures will result in an increase, or variability, in air conditioning demand. The forecast calculates annual changes in air conditioning demand based on projections provided by the "Climate Explorer" tool developed by US NOAA in support of the National Climate Assessment work. https://crt-climate-explorer.nemac.org/

- **Heating Degree Days (HDD):** Projected climate changes for the region will include increased winter temperatures. The increase in temperatures will result in a decrease, or variability, in building heating demand. The forecast calculates annual changes in heating demand based on projections provided by the "Climate Explorer" tool developed by US NOAA in support of the National Climate Assessment work. https://crt-climate-explorer.nemac.org/

Electricity:

- **Residential:** Demand is based on a per household basis and modified based on the projected Cooling Degree Days for each year, assuming 15% of electricity is used for cooling (RCP 8.5 model). 50% of projected increased electrical vehicle usage is attributed to residential EV charging.

- **Commercial and Industrial**: Demand is based on a per job basis and modified based on projected cooling degree days for each year, assuming that 15% of commercial and 7.5% of industrial electricity is used for cooling. (RCP 8.5 model). 50% of projected increased electrical vehicle usage is attributed to commercial EV charging

- **All electricity emission factors** are calculated using estimated emissions factors for 2030, 2040, and 2050 based on current, known, supplier commitments. For electrical suppliers with unknown or unestablished emission commitments, and for electricity purchased from the MISO grid, electricity emission factors are calculated based on EPA forecasts (https://fas.org/sgp/crs/misc/R45453.pdf).

GHG Forecast Assumptions

Natural Gas:

- Residential: Demand is based on a per household basis and modified based on the projected Heating Degree Days for each year, assuming 75% of natural gas is used for heating (RCP 8.5 model).
- Commercial and Industrial: Demand is based on a per job basis and modified based on projected heating degree days for each year, assuming that 40% of commercial and 20% of industrial natural gas is used for heating (RCP 8.5 model).
- Natural Gas emissions factors are projected to be unchanged.

Transportation:

- Vehicle Miles Traveled is based on US Department of Transportation VMT per capita projections through 2050 (1.1% annual growth rate through 2037 and 0.8% annual growth rate from 2038 through 2050)
- https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm
  Vehicle fuel use is calculated based on US Energy Information Agency projected rolling stock average fuel efficiency projections, modified to 75% projected MPG to account for heavy duty vehicle MPG share (based on US Department of Transportation data on current light duty to average all vehicle MPG ratios) https://www.eia.gov/todayinenergy/detail.php?id=31332
- Total vehicle stock is based on per household projections maintaining existing average number of vehicles per household through 2030 (2.556) and then reducing the average vehicle per household 10% through 2050 (2.3).
- Electric Vehicle Adoption: Transportation emissions assume a reduction in fossil fuel based VMT emissions based on estimated adoption rates. Adoption rates are based on national US projections by the Edison Foundation.

Solid Waste:

- Total Solid Waste handled is based on total number of households and maintaining existing volume per household and emissions factors per ton handled.

Wastewater:

- Total Wastewater handled is based on total number of households and maintaining existing volume per household and emissions factors per household. https://www.eia.gov/tools/faqs/faq.php?id=1174&t=1

Note:

GHG emissions forecasts are not predictions of what will happen, but rather modeled projections of what may happen given certain assumptions and methodologies. GHG forecasts in this report should be interpreted with a clear understanding of the assumptions that inform them and the limitations inherent in any modeling effort.

Section A2

Glossary of Terms

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A

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)

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.

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)

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)

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
For the purposes of the Plan, Carbon Neutrality refers to the point at which the organization / organization's net greenhouse gas emissions reach 0. This will likely be achieved through a combination of reducing emission sources and offsetting and sequestering any remaining emissions.

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 in order to reduce risks to valued assets.

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 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.

Cogeneration
Cogeneration 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)

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 utilisation of the energy used. Public utilities may utilise 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 Solar
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.

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)

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

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)

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

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
Emissions that are not emitted through an intentional release through stack or vent. This can include leaks from industrial plant and pipelines. (IPCC)

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)

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.

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
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)

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.

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)

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)

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.

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)

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, 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.

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 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-zero Emissions (NZE)
Building A building or property that generates or offsets all energy consumed. If the 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)

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)

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)

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.

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
A cyclical system in which products are designed for reuse, which creates no waste. A zero waste system eliminates the volume and toxicity of waste and materials and conserves current resources through reuse.

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