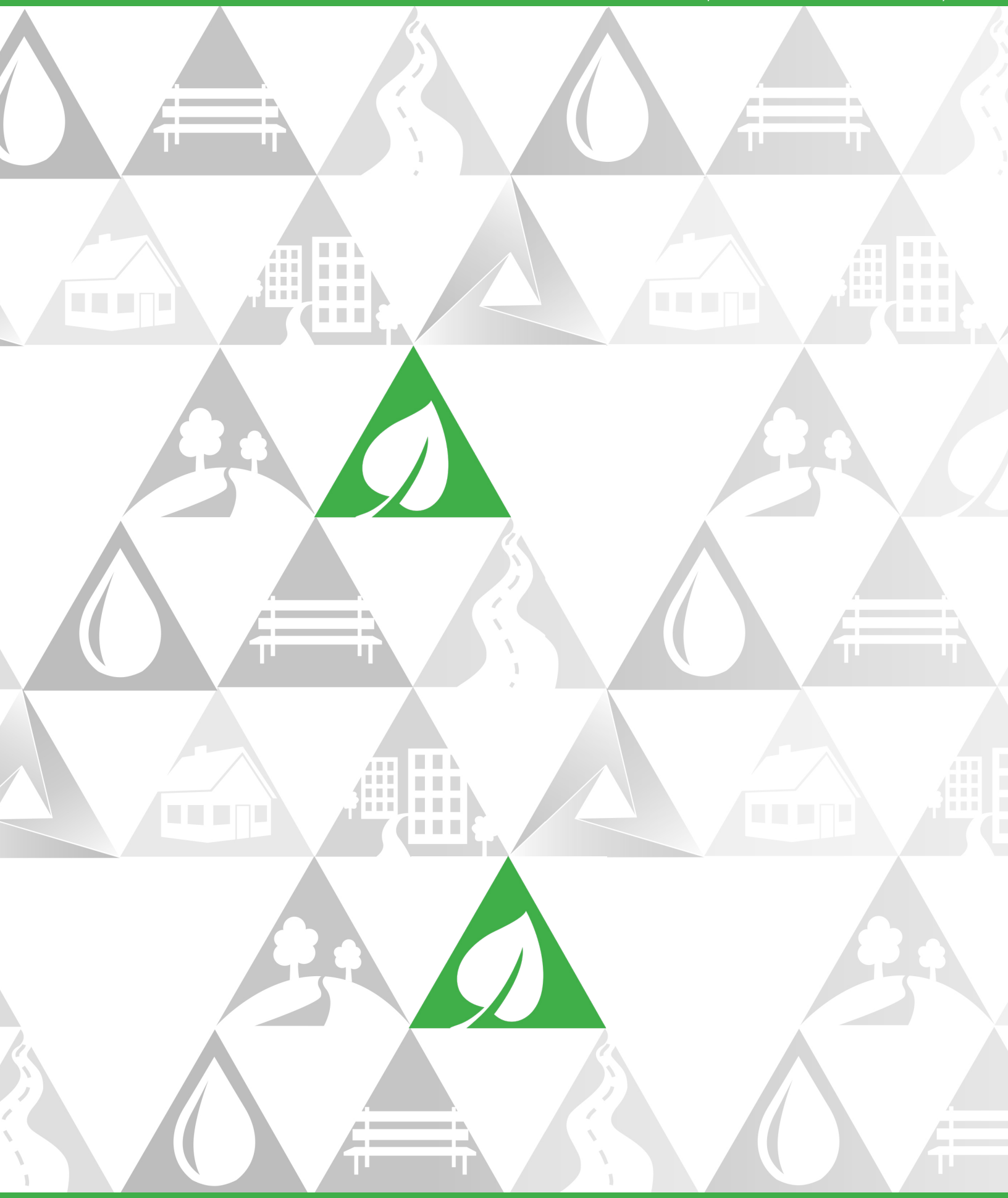


Chapter 7
Resilience And Sustainability

- Introduction
- Key Points
- Background
- Existing Conditions
- Policy Plan
- Implementation Plan

Contents

Key Points

- Golden Valley has many resources to protect and sustain for future generations
- The community has the capacity to respond, adapt, and thrive under changing and unexpected conditions
- The age and condition of the City's underground infrastructure is a major vulnerability that will be addressed in coming years
- There is significant opportunity to reduce energy consumption and waste production

PHOTO BY CITY OF GOLDEN VALLEY

Section 1: Introduction

Climate trends suggest that in the next 50 years Minnesota will experience increased precipitation, hotter summers, warmer and wetter winters, and more severe weather events. Such changes can damage infrastructure, disrupt services, drain resources, and impair a City's capacity to respond to residents' needs. This chapter includes a plan to ensure the City will survive and thrive under these chronic stresses and extreme events.

As an aging community, Golden Valley's infrastructure and human and natural resources are increasingly more vulnerable to the effects of climate variations, energy uncertainty, and the rising cost of service delivery. The City is committed to environmental stewardship and the economic and social well-being of the community, and therefore desires to become more resilient and sustainable.

Resilience is the capacity to respond, adapt, and thrive under changing conditions such as weather- and climate-related events. Consideration of vulnerabilities, and strategies to address those vulnerabilities, will strengthen Golden Valley's ability to prepare and respond to the various impacts. This includes planning for climate variations and environmental threats, improved health and well-being of residents, and economic strength and diversity.

Sustainability aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability focuses on three key factors—environmental, economic, and social. Incorporating sustainability into planning will ensure that future residents of Golden Valley will have the resources they need to survive and prosper.

Proper planning will also ensure that competing goals and priorities within this chapter and other Comprehensive Plan chapters are balanced and synergy is created to provide a high level of site design that improves community resilience and achieves the City's desired sustainability outcomes.

For example, introducing only one of the following—trees, solar energy facilities, or stormwater quality ponds—to an otherwise vacant development site would benefit the City's overall resilience and sustainability in some way. All three features cannot easily occupy the same physical space within a site. However, a site can be designed to include all three features, or an increased emphasis can be placed on one or two of the three, depending on the opportunities and constraints of the site and surrounding area. Either way, several community goals and objectives can be met.

It is expected that during the course of this plan, the City will continue to develop, review, and evaluate its policies and minimum requirements when it comes to achieving thoughtful and balanced site design.

PHOTO BY CITY OF GOLDEN VALLEY

Section 2: Background

The City of Golden Valley has demonstrated a strong commitment to the environment and has been involved in a number of environmental programs, projects, and initiatives since the formation of its Environmental Commission June 26, 2000. From natural resource management to flood mitigation to solar energy generation, the City continues to explore ways to improve the environment and the quality of life of its residents.

As a continuation of its environmental efforts, and with a new focus on reducing energy use and cost, the City began participating in the Minnesota GreenStep Cities program in 2016. The City finished its inventory of current programs and practices, completed some new actions, and was recognized as a Step 3 city in June 2018. The GreenStep Cities website summarizes all of Golden Valley's actions to date.

In 2016, in order to better plan for and mitigate the effects of climate and weather-related variations, the City applied for and received a planning grant to complete its first Resilience and Sustainability Plan. This plan provides the framework for this chapter.

PHOTO BY CITY OF GOLDEN VALLEY

Section 3: Existing Conditions

The 2013 Report of the Interagency Climate Adaptation Team suggests Minnesota can expect warmer winters, prolonged heat-waves and cold spells, diminished air quality, more extreme weather (droughts, heavy precipitation), and increased ecological changes (invasive species, vector-borne disease). Within this context, the Minnesota Department of Health (MDH) completed a statewide vulnerability assessment that provides a framework to understand the climate hazards that will likely impact Golden Valley as well as Minnesota and the Midwest. Using this assessment will help the City understand what to expect and how well prepared it is to respond to these changes. A local vulnerability assessment was also conducted in 2016, which was used to develop the Policy Plan of this chapter. Opportunities exist to reduce the City's contribution to climate and weather-related variations.

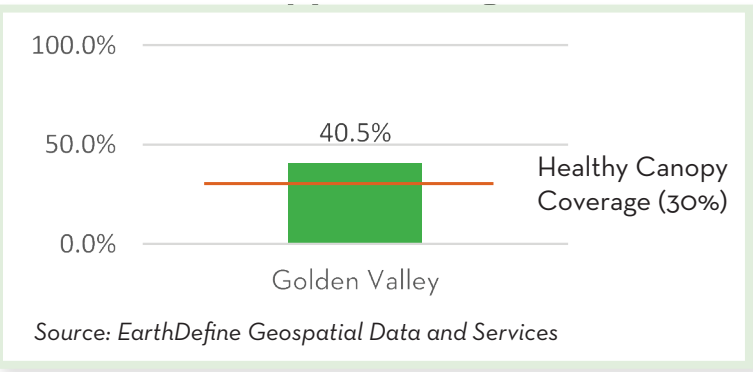
Natural Infrastructure

Natural infrastructure (trees, native landscaping, rain gardens, etc) includes ecological features that enhance and complement the functions of built infrastructure.

Trees And Native Plants

Trees offer many important benefits to communities. They improve air quality, remove carbon from the atmosphere, provide shade, support stormwater management, enhance aesthetics, are home to wildlife, and may increase property values. Native plants can also improve surface water quality, provide food and critical habitat to pollinators, improve aesthetics, and reduce maintenance costs.

Figure 7.1 Tree Canopy Coverage



Source: EarthDefine Geospatial Data and Services

Golden Valley has a healthy tree canopy coverage with a generally diverse mix of tree species (see Figure 7.1). When replacing trees, the City follows the 10-20-30 rule (percent of species, genus, and family planted) to maintain biodiversity of the urban forest. However, the City's land cover map indicates a low tree canopy in commercial areas.

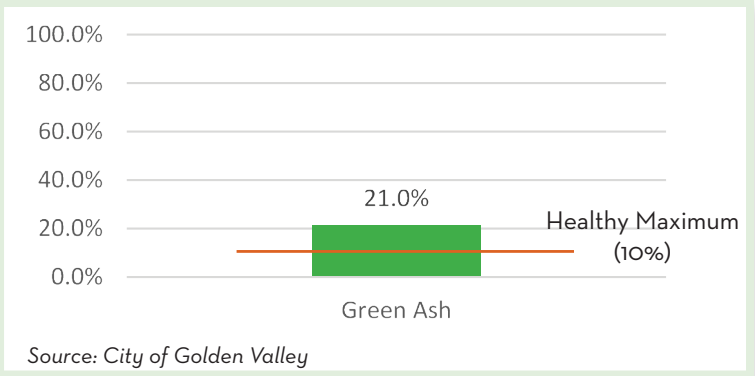
The City's average tree planting to removal ratio was 0.5:1 between 2011 and 2016, which is well below the 2:1 ratio recommended to maintain a healthy canopy. This may be due in part to storms and public projects where trees were replaced with prairie plantings and water quality facilities.

Golden Valley has a relatively high count of ash trees that are susceptible to Emerald Ash Borer (EAB). In 2016, 21.4 percent of public trees were ash trees, slightly exceeding the heathy limit for a single genus (see Figure 7.2). However, nearly all the ash trees were green ash (21 percent of all public trees), exceeding the 10 percent rule for tree species.

The greatest concern for tree health in Golden Valley is the spread of EAB and recovering from strong wind events that have taken down many trees in recent years, including a tornado in 2011. The City developed an EAB Management Plan in 2010, which is updated regularly to adjust for new management technologies and strategies. Trees are removed as needed and replaced as funding is available. Annually, the City plants between 50-75 trees for parks as part of the EAB replacement program.

When it comes to invasive species, buckthorn is by far the most common in Golden Valley, covering 543 acres. It is listed as a restricted noxious weed in Minnesota, as it out-competes native plants, degrades wildlife habitat, contributes to erosion, and can host other pests. Managing buckthorn is a challenge for many Minnesota communities. The City of Golden Valley developed a volunteer program so residents can help manage the nuisance.

Figure 7.2 Highest Single Tree Species



Source: City of Golden Valley

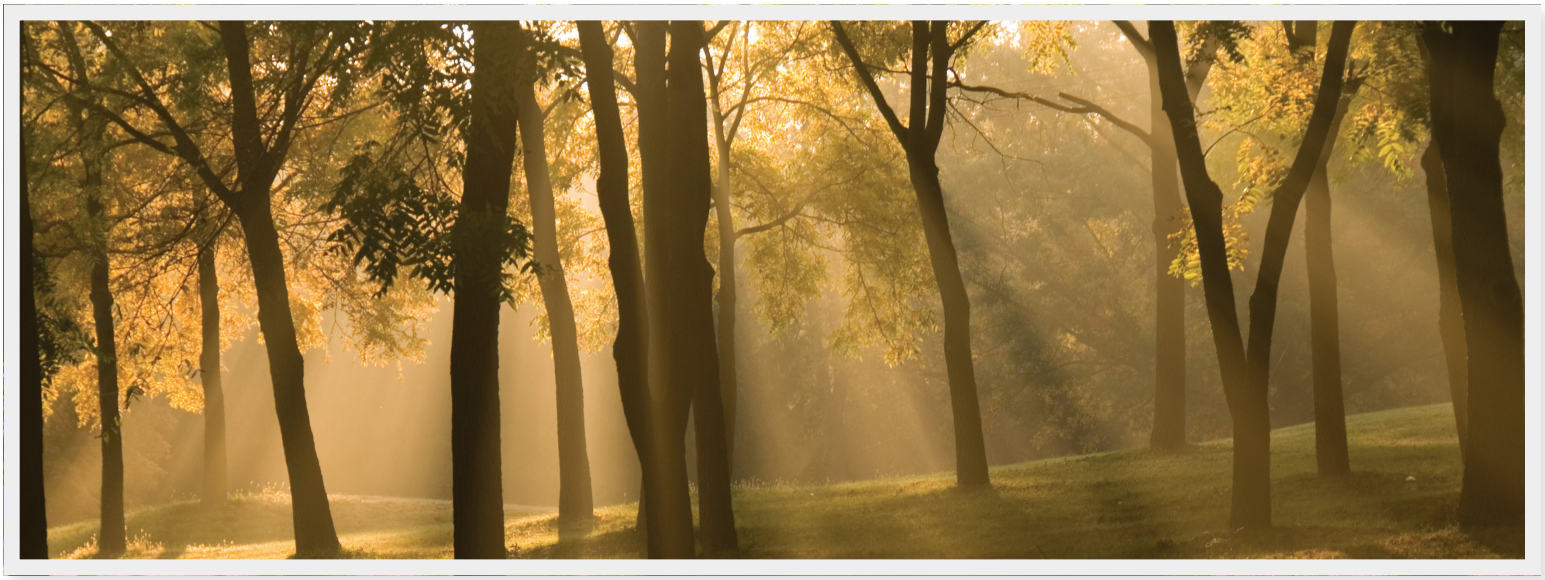


PHOTO BY JEFF LAMBERG, 2014 VIEWS OF THE VALLEY

PHOTO BY KATHY JERDE, 2017 VIEWS OF THE VALLEY

Bassett Creek

Native plantings cover relatively small areas of Golden Valley compared with manicured landscape on public property; however, the City continues to replace turf with native plantings consistent with its Natural Resources Management Plan.

Water Quality And Supply

The City implements best management practices to reduce stormwater impacts on surface water. These practices include but are not limited to cleaning ponds, stormwater pipes, catch basins, and outlets as well as installing and cleaning sump catch basins and manholes. The City sweeps streets in spring, summer, and fall, and continues to use innovative approaches to reduce and better target the application of chloride in winter while still taking public safety into account.

Golden Valley is a member of the three-city Joint Water Commission, a consortium that purchases its drinking water from the City of Minneapolis, which draws from the Mississippi River, a historically stable source of water. The Joint Water Commission owns three wells that could be used to provide back-up drinking water in the event of an emergency.

Most stormwater in Golden Valley eventually flows into Bassett Creek, which is an impaired water and does not meet water quality standards for chloride, fish and insect bio-assessments, and fecal coliform (bacteria). Increased precipitation and freeze/thaw cycles may make it more difficult to maintain stormwater practices that help reduce pollution and maintain the health of surface water. More freeze/thaw cycles may lead to an increase in the amount of salt/deicer that is applied to the roads, which may deteriorate stormwater facilities and the quality of the water. The primary concern in Golden Valley is the health of surface water such as Bassett Creek, which may degrade as heavy precipitation events and freeze/thaw cycles increase.

The City receives an allocation of watershed funds to give to homeowners who have property along Bassett Creek or one of its tributaries to cover 50 percent of the cost of streambank stabilization. Additionally, "enhanced stormwater management" is one of the 20 public amenity options listed in the City's Planned Unit Development (PUD) requirements, encouraging development to exceed capacity for stormwater infiltration beyond the minimum requirements.

Built Infrastructure

Public Utilities And Buildings

Golden Valley has a significant amount of aging infrastructure, which has seen an increase in the amount and cost of maintenance (pipe breaks, deterioration, sink holes) over the past 20 years. Much of the system needs to be replaced or rehabilitated. The major vulnerability is the age and condition of the underground infrastructure in Golden Valley, as well as the water pipes coming into the city as part of the Joint Water Commission system. Increased precipitation and freeze/thaw cycles have the potential to stress and shock built infrastructure systems like pipes (stormwater, sanitary sewers, water), roads, and bridges. This may result in increased maintenance costs, structural damage to public infrastructure, damage to private properties, disruption of services, and inconveniences to residents.

The City has developed a map (see Appendix 7) of its flood risk and has a good understanding of which locations are most at risk for flooding. As heavy precipitation events increase, the possibility of flash-flooding also increases. Flash floods can damage property and be unsafe for pedestrians and drivers. The City continues to preserve floodplain areas and install stormwater infrastructure to reduce the potential for flood damage.

PHOTO BY CITY OF GOLDEN VALLEY

Inflow and infiltration (I/I) is a problem throughout the metro area. It occurs when clear water (rain or ground water) enters the sanitary sewer system, causing the unnecessary and costly treatment of clear water, sewer back-ups, and limiting the capacity for future development. The City has successfully implemented a program to reduce I/I.

The City of Golden Valley participates in the Buildings, Benchmarks, and Beyond (B3) program aimed at tracking and improving upon the energy usage and efficiency within public buildings. All City buildings are included in this program. As of 2017, eight City buildings were using more energy than predicted by the B3 model, suggesting opportunities for energy improvements and savings.

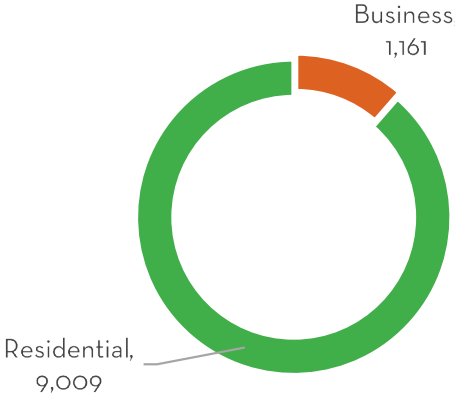
Housing Stock and Commercial Buildings

At this time, the City is not tracking the energy use and efficiency of private buildings in the community. The large stock of existing privately owned buildings represents a significant opportunity to make efficiency improvements and lower greenhouse gas emissions community-wide.

Energy Consumption

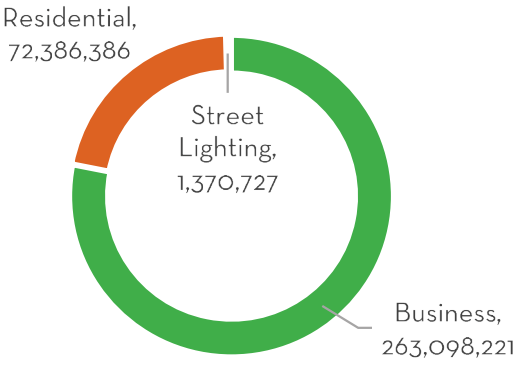
A major contributor to climate change is greenhouse gas emissions from the generation of electricity. While the electric grid in Minnesota continues to get cleaner, it remains important for local governments to understand energy consumption in their communities. Golden Valley residents and businesses get their electricity from Xcel Energy. Residents make up the largest sector, with more than 9,000 customers (see Figure 7.3); however, 78 percent of the electricity is consumed by the business sector (see Figure 7.4).

Figure 7.3: Number Of Customers By Sector



Source: Xcel Energy Community Energy Report, 2016

Figure 7.4: Electricity Use By Sector (kWh)



Source: Xcel Energy Community Energy Report, 2016

Xcel Energy offers several programs to customers to increase efficiency and clean energy actions. Xcel's Community Energy Report indicates that very few Golden Valley residents and businesses are taking advantage of these programs. Overall, current participation in clean energy and energy efficiency programs is having little impact on the energy consumption within the community.

Xcel Energy offers a production incentive for solar installations called Solar*Rewards, and 13 residents and four businesses have taken advantage of this program. A total of nine single-family residences and five businesses have been issued permits for solar energy system installations since the City began keeping electronic permit records in 2001. Since 2015, the City has installed four 40kW solar PV systems on public buildings—Public Safety, Park Maintenance, Street Maintenance, and Utilities Maintenance. There are several opportunities available to help residents and businesses improve energy efficiency and increase clean energy generation that will help reduce overall greenhouse gas emissions.

PHOTO BY CITY OF GOLDEN VALLEY

There are also several opportunities to reduce energy consumption by reducing the City's vehicle fleet fuel consumption and improving building energy efficiency through benchmarking. Additionally, there are opportunities to investigate whether renewable energy could be used for back-up power generation at the City's 13 critical infrastructure facilities (see Appendix 7).

Waste Generation

Golden Valley has an open system for solid waste collection. Licensed solid waste haulers are required to offer yard waste collection and some may also offer organics/food waste collection. The City partners with the Cities of Plymouth and Minnetonka to contract for curbside recycling services for single-family and multi-family residential properties up to four units. The City does not have data on the amount of solid waste or recyclables it generates from City operations or community-wide. Although the City continues to look for opportunities to improve its recycling efforts, it has not participated in any zero-waste events.

Social And Economic Vulnerabilities

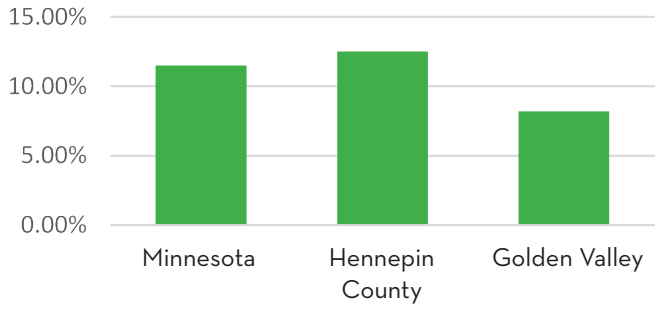
Extreme Weather And Flooding

Golden Valley and surrounding cities are likely to see more heavy precipitation events that may lead to flooding. Extreme rain and weather events may cause structural damage to personal property and may have an impact on people who need to evacuate or seek safety.

Golden Valley residents have a higher median income ($81,534) relative to Hennepin County ($65,834), an indication that many residents would be fairly well-positioned to respond to property damage as compared to residents with lower incomes. The City provides resources on its website to help residents minimize flooding impacts. The City also participates in the Federal Emergency Management Agency's (FEMA) community rating system, which requires higher floodplain management standards in exchange for lower flood insurance premiums for eligible properties. However, homes located in floodplains or susceptible to basement flooding may pose a greater risk to residents and their property.

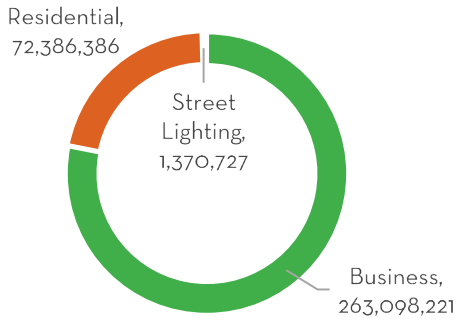
Residents who tend to be the most vulnerable during extreme weather events are those with limited mobility (including seniors and those with ambulatory difficulty), residents who do not speak English well (2.8 percent of Golden Valley residents) and may not receive adequate preparation and response instructions, and low-income residents who are likely to be disproportionately impacted by property damage and ability to recover (8.2 percent of Golden Valley residents live below poverty; see Figure 7.5).

Figure 7.5: Individuals Below Poverty



Source: American Community Survey 2011 to 2015

Figure 7.6: Residents Over Age 65



Source: Xcel Energy Community Energy Report, 2016

Golden Valley has an older population relative to Minnesota and Hennepin County—more than 20 percent of its residents are over age 65 (see Figure 7.6). Seniors who live alone may be especially vulnerable during extreme weather events, and in 2016, 33 percent of Golden Valley residents over age 65 lived alone. By 2040, Golden Valley will likely see an increase in the number of residents over age 65 as those currently between 45 and 64 (32 percent) age up.

Extreme Heat And Air Quality

Minnesota, and especially Hennepin County, will likely see an increase in the number of days that require a heat advisory. Increased extreme weather may cause power disruptions during times when air conditioning is needed. As wildfires and pollen blooms increase, more air quality alerts will be issued.

Golden Valley's healthy tree canopy in residential areas helps reduce the impact of urban heat island effect. The City is part of the North Suburban Emergency Management Group, which identifies potential refuge and cooling centers, depending on the nature of the emergency. Brookview and City Hall are two critical public facilities with air conditioning.

However, Golden Valley faces potentially significant tree loss (see natural infrastructure). Its commercial area has a relatively low tree canopy coverage and high impervious surface, particularly asphalt surface parking areas, contributing to urban heat island effect.

People who are most vulnerable to heat and air quality hazards are the elderly, children under age 5, low-income residents who live near major roadways, and those with existing respiratory illnesses like asthma or allergies (particularly those who live alone during times of power disruption that coincide with a prolonged heatwave).

Vector-Borne Diseases

Vector-borne diseases found in Minnesota include West Nile (transmitted by mosquitoes) and Lyme disease (transmitted by deer ticks). Lyme disease has been rapidly expanding throughout the Midwest as deer ticks and their hosts find it a more favorable climate. Hennepin County is currently at a low to moderate risk for Lyme disease.

Golden Valley currently has low incidence of residents who have contracted vector-borne diseases. It falls within the jurisdiction of the Metro Mosquito Control District, which has a regular program for treating mosquito breeding habitat. However, Golden Valley has many heavily wooded and natural areas that make a good

PHOTO BY KATHI MOHAMMADZADAH, 2006 VIEWS OF THE VALLEY

habitat for ticks and mosquitoes. Increased precipitation and warmer winters may also increase mosquito and tick populations. Most at-risk are children under age 5 who play outside and will need to be thoroughly checked by an adult for any sign of ticks or Lyme disease.

Economic Vulnerability

Extreme weather in other parts of the country and the world may have local impacts on the economy of Golden Valley. Changing growing seasons, drought, and heavy rains may impact agriculture, driving up the costs of purchasing food, or making certain foods unavailable. Extreme weather is already causing home insurance rates to rise nationwide, making home ownership less affordable for lower middle-class and low-income families. Global, national, and regional economic health may impact local jobs.

The community-wide vulnerability assessment (see Appendix 7) looks at how the City might fare during an economic disruption. This analysis uses unemployment numbers from 2015 and 2009 (the peak of the recession) and looks at the diversity of current employment sectors, highlighting sectors that suffered the highest percentage of job loss during the economic recession from 2007–2011.

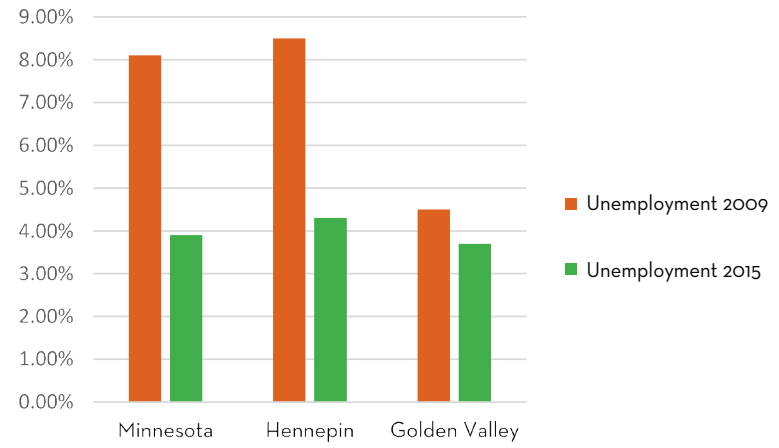
Golden Valley is well-positioned to withstand economic disruption. Both Minnesota and the Twin Cities metro region performed better than much of the country during the last economic recession. Golden Valley currently has a healthy unemployment rate and a diverse workforce. However, the Twin Cities metro region has some of the greatest income disparities between white residents and residents of color in the country. Low-income residents, residents of color, and immigrants are often hit hardest by economic disruptions. During the Great Recession, employment sectors that saw the greatest job loss include financial, construction, manufacturing, retail, and transportation (see Figure 7.7). While the City has a diverse workforce, approximately 40 percent work in the affected employment sectors.

Golden Valley has a relatively low percentage of low-income residents (8.2 percent live below the poverty line, and 20.6 percent are eligible to receive heating assistance), and 76 percent of homes are owner-occupied. Most residents have access to a vehicle, but by choice or for personal reasons, 5.6 percent do not.

Extreme weather events may have a disproportionate impact on people who are economically vulnerable. Many climate hazards can have a direct or indirect impact on the financial stability of low-income residents. Economic disruptions are also likely to have greater consequences for low-income residents relative to middle class or wealthy residents.

Additional economic impacts that could burden residents are high heating and cooling costs due to prolonged heatwaves and cold spells. Travel may also be impacted by extreme weather, which could impede emergency routes or limit commutes and transit options. Heatwaves and prolonged cooling spells can have significant financial impacts on households with a high-energy burden. Residents without access to a vehicle may have difficulty making it to work, or evacuating in times of extreme weather events.

Figure 7.7: Unemployment Rate 2009 & 2015



Source: American Community Survey 2011 to 2015

PHOTO BY LARS SWANSON, 2010 VIEWS OF THE VALLEY

Section 4: Policy Plan

The Policy Plan includes a set of long-term goals and objectives that will be fulfilled through specific actions and policy decisions. This long-range document expresses the values of the community and establishes a vision. It provides direction and guidance for the future of the City in terms of policymaking, improvements, programs, investments, priorities, and work plans. It can be used for decision-making purposes by elected officials, commissions, boards, staff, and other interested members of the community. The Policy Plan is updated every 10 years based on new data and community feedback as required by Minnesota law.

Creating a comprehensive plan in today's uncertain and rapidly evolving world requires preparing for a new climate and weather reality, advancing technologies, and shifting social structures. Golden Valley has already taken several steps to improve its resilience and sustainability. The City has also identified the importance of building on its previous efforts to become more resilient.

GOAL 1

Promote And Develop Clean, Renewable Energy

Remove barriers and increase renewable energy use to strengthen and diversify the energy grid and mitigate climate-related impacts

Objectives

1. Increase city-wide renewable energy use, purchase, and generation
   - **1.1** Communicate opportunities and information about clean, renewable energy to the public
   - **1.2** Use solar mapping tools to identify potential solar resources and share mapping tools with residents and businesses
   - **1.3** Support programs that enable community members to participate in community renewable energy projects
   - **1.4** Create city-wide clean energy and emissions goals
2. Encourage new development, redevelopment, and retrofit projects to add renewable energy capacity or infrastructure
   - **2.1** Review and revise renewable energy standards or ordinances to remove barriers, encourage appropriate renewable energy installations, and protect solar access and development ordinances
   - **2.2** Create a transparent and consistent permit process for residences and businesses to install renewable energy systems
   - **2.3** Partner with other public entities, utility companies, and private sector entities to provide clean energy infrastructure and accomplish energy goals
   - **2.4** Require renewable energy systems or its supporting infrastructure in projects that receive City financial support
3. Continue to incorporate renewable energy or its supporting infrastructure into City projects and operations
   - **3.1** Look for programs and opportunities to fund construction of renewable energy projects on City property
   - **3.2** Evaluate new energy technologies as they become available and incorporate into City projects and operations where feasible
   - **3.3** Support programs that enable community members to participate in community renewable energy projects
   - **3.4** Create city-wide clean energy and emissions goals

PHOTO BY CITY OF GOLDEN VALLEY

GOAL 2

Improve Energy Efficiency In Buildings, Lighting, And Infrastructure

Energy efficiency improvements will decrease costs and lower energy-related emissions over time

Objectives

1. Provide education and communication to residents and business owners about opportunities to decrease energy costs and lower energy-related emissions
   - 1.1 Connect property owners with providers who offer energy audits and assistance
   - 1.2 Partner with non-profit organizations, local utilities, and the other government agencies to facilitate energy savings opportunities for low-income residents
   - 1.3 Create or participate in outreach programs to promote energy conservation
2. Integrate energy efficiency best practices information and assistance into building permit process
   - 2.1 Integrate energy efficiency standards and sustainable design features into project review and approval processes
   - 2.2 Adopt a voluntary sustainable or green building code for new development
   - 2.3 Provide incentives to residential and commercial property owners who add energy efficiency improvements
   - 2.4 Require higher efficiency standards and renewable energy generation or its infrastructure for projects that receive City financial support
3. Increase the energy efficiency of all public buildings, campuses, infrastructure, and operations
   - 3.1 Make no-cost and low-cost lighting improvements and operational changes to reduce energy costs
   - 3.2 Use an integrated systems approach when designing new City buildings and infrastructure
   - 3.3 Partner with other public entities, utility companies, and private sector entities to maximize energy efficiencies

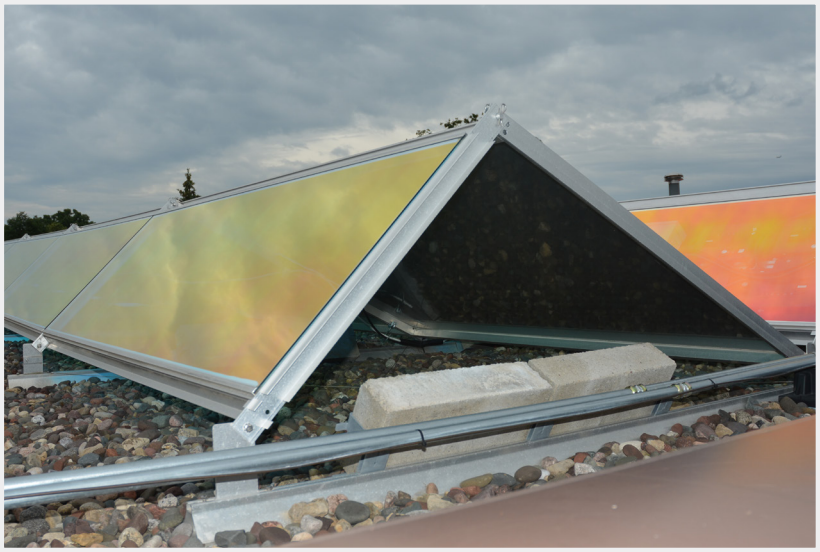


PHOTO BY CITY OF GOLDEN VALLEY

GOAL 3

Promote Waste Reduction, Recycling, And Composting

Comprehensive management of waste will lower energy costs and reduce energy-related emissions over time

Objectives

1. Improve efficiencies in solid waste removal
   - 1.1 Meet or exceed goals included in the Hennepin County Solid Waste Management Master Plan
   - 1.2 Review the frequency of waste and recycling pickups
   - 1.3 Explore the potential of implementing organized collection systems, including residential, commercial, and institutional source separated organics collection
   - 1.4 Research options for improving the management of yard waste, woody brush, and soil
   - 1.5 Take advantage of opportunities to expand the recycling program and recyclable products
2. Motivate residents, businesses, and institutions to reduce, reuse, and recycle waste
   - 2.1 Continue to partner with other public entities to reduce costs and provide improved services
   - 2.2 Create goals for solid waste reduction, recycling, composting, and organics recycling for City operations as well as residential and commercial sectors
   - 2.3 Provide education and incentives to residences and businesses to reduce waste and recycle
   - 2.4 Require that City events are zero waste
   - 2.5 Communicate with residents about events that promote waste reduction, such as Fix-it Clinics
   - 2.6 Increase accessibility to composting and organics recycling

PHOTO BY CITY OF GOLDEN VALLEY

Mighty Tidy Day provides residents an opportunity to properly dispose of bulky items

GOAL 4

Protect And Enhance The Natural Environment

Protect the natural environment and enhance it to mitigate weather and climate-related impacts

Objectives

1. Preserve open spaces and natural areas and seek to expand these areas as opportunities arise
   - 1.1 Support the goals and policies of the City's Natural Resources Management Plan and reference this plan when reviewing development proposals
   - 1.2 Use an adaptive management approach to protection, preservation, and enhancement of natural areas
   - 1.3 Encourage, through education or incentives, development that saves or increases green spaces and protects areas with high ecological diversity
   - 1.4 Identify areas with steep slope vulnerabilities, and consider policies regarding protection
   - 1.5 Periodically survey conditions in natural areas and gather data on the effectiveness of management techniques
   - 1.6 Maintain and develop natural corridors to foster ecosystem continuity, and provide connections to parks and open spaces
   - 1.7 Partner with public and private entities to enhance the natural environment and build resilience
2. Increase the amount of native vegetation cover, including pollinator habitat
   - 2.1 Reduce the use of chemicals that have potential negative impacts on natural resources and human health, such as fertilizers, herbicides, and pesticides
   - 2.2 Establish land management standards and practices that lower inputs and maximize resilience
   - 2.3 Provide information and assistance to residents on natural landscaping techniques, including rain garden installation and creation of pollinator habitats
3. Preserve and enhance wetlands, streams, lakes, and floodplain areas
   - 3.1 Support the goals and policies of the City's Water Resources Plan and the management plans of the Bassett Creek Watershed Management Commission and the Minnehaha Creek Watershed District
   - 3.2 Update the City's shoreland management ordinance consistent with state requirements
   - 3.3 Maintain and improve natural infrastructure assets, such as streambanks, wetlands, ponds, and rain gardens
   - 3.4 Encourage the preservation or establishment of native and natural vegetation near shorelands
   - 3.5 Continue to review development proposals for conformance with ordinances regarding water quality, wetland protection and mitigation, and floodplain and shoreland protection
4. Establish a diverse urban forest and, at a minimum, maintain the present level of tree canopy coverage citywide
   - 4.1 Continue to take a proactive approach in efforts to identify and treat diseased and insect-infested trees in a timely manner through implementation of the City's shade tree disease program
   - 4.2 Increase tree canopy in areas with low coverage, areas with high heat vulnerability, and areas exposed to more vehicle exhaust
   - 4.3 Increase the ratio of tree planting to tree removal
   - 4.4 Work with private property owners and developers to encourage reforestation and enforce the current tree and landscape ordinance

continued on page 23

PHOTO BY CITY OF GOLDEN VALLEY

continued from page 22

5. Control existing and emerging invasive plant species, pests, and diseases
   - 5.1 Continue to monitor and prepare for invasive species and pathogens that could significantly damage the City's vegetation and water resources
   - 5.2 Plan and budget for targeted invasive species removal and, where appropriate, native species replacement
   - 5.3 Provide education on invasive species removal, and work with property owners to limit the spread of invasive species
6. Encourage the construction of green infrastructure to enhance water quality and reduce stormwater runoff rates, volumes, and nutrient loads
   - 6.1 Encourage businesses and residences to retain stormwater runoff onsite and to reuse it whenever feasible
   - 6.2 Conduct education and outreach on the effects of nutrient loads and contaminants in stormwater on local water quality
   - 6.3 Integrate multi-benefit green infrastructure into City capital improvement projects
   - 6.4 Review and update lawn maintenance ordinance to encourage native, low water-use plantings
7. Provide education and outreach on maintaining and protecting natural resources
   - 7.1 Expand environmental education programs with schools and in the community
   - 7.2 Involve community members in hands-on land restoration and stewardship projects
   - 7.3 Provide information to community members about water use and conservation
   - 7.4 Support community efforts to improve the natural environment

PHOTO BY CHUCK SMITH, 2017 VIEWS OF THE VALLEY

GOAL 5

Plan For Resilient And Sustainable Infrastructure

Ensure the stability and reliability of constructed systems through long-term planning and consideration of weather and climate trends

Objectives

1. Protect and maintain constructed systems that provide critical services
   - **1.1** Support the goals and policies in the Water Resources and Transportation Chapters of the Comprehensive Plan
   - **1.2** Assess public buildings and sites for vulnerabilities to extreme weather and make improvements to reduce or prevent damage and sustain function
   - **1.3** Improve the reliability of back-up energy for critical infrastructure
   - **1.4** Continue to reduce the inflow and infiltration of clear water into sanitary sewer system
   - **1.5** Review operations and maintenance procedures and practices in response to climate impacts
   - **1.6** Continue to explore and incorporate new and emerging technologies to construct, rehabilitate, maintain, and manage public assets and infrastructure in an efficient, cost effective manner
2. Ensure new buildings and infrastructure are built to be resilient
   - **2.1** Integrate multi-benefit green infrastructure into public capital projects
   - **2.2** Consider emerging climate patterns when designing storm-water infrastructure
   - **2.3** Design infrastructure to minimize environmental and public health impacts
   - **2.4** Develop strategies to fund infrastructure renewal
   - **2.5** Include life cycle costs when planning projects and selecting construction materials
   - **2.6** Reduce impervious surface area where possible, and use lighter colored pavements and building materials to mitigate urban heat island effect
3. Minimize the excavation of public streets and disruption to public services
   - **3.1** Work with public and private partners to plan and schedule infrastructure projects to reduce disruptions and decrease costs
   - **3.2** Encourage efficient use of rights-of-way, including joint trench construction and construction of duct banks and conduits for future expansion of facilities within public right-of-way, where feasible
   - **3.3** Continue to use trenchless technologies to rehabilitate underground infrastructure
4. Support well-planned improvements to the private utility and communications networks that provide efficiency, security, and needed redundancy
   - **4.1** Work with the electric utility to identify opportunities to enhance the electric grid to be more resilient to power outages
   - **4.2** Support improvements to the natural gas network, electric grid, and smart grid technologies
   - **4.3** Engage natural gas and electric utility in discussions to include City's energy and resilience goals in franchise agreements
   - **4.4** Support microgrids that provide efficiency, security, and back-up power
5. Lower city-wide transportation-related emissions
   - **5.1** Improve fuel efficiency of City vehicle fleet
   - **5.2** Encourage alternative fuel stations, electric vehicle charging stations, and supporting infrastructure at commercial sites, office sites, and parking ramps
   - **5.3** Install alternative fuel stations, electric vehicle charging stations, and supporting infrastructure for low emissions vehicles at City campuses and public parking areas
   - **5.4** Plan, design, and maintain infrastructure to accommodate emerging vehicle technology, most notably, connected and automated vehicles

GOAL 6

Increase Community Resilience And Preparedness

Enable communities to withstand and adapt to weather- and climate-related impacts

Objectives

1. Prepare to maintain public health and safety during extreme weather- and climate-related events
   - 1.1 Coordinate with regional partners to ensure basic needs of all residents are met during an emergency
   - 1.2 Continue to routinely review and participate in updating the County Hazard Mitigation Plan
   - 1.3 Identify staff responsible for City preparedness, emergency response, and recovery efforts for each type of event
   - 1.4 Designate appropriate facilities that will be made available to the public as community safe shelters and arrange for adequate provisions and backup power
2. Ensure all residents are prepared to respond to emergency situations
   - 2.1 Continue to participate in FEMA's National Flood Insurance Program Community Rating System to maintain a higher level of floodplain management in exchange for lower flood insurance premiums for eligible properties
   - 2.2 Educate residents regarding actions they can take to reduce their risk to extreme weather- and climate-related events
   - 2.3 Coordinate with emergency dispatch and first responders to address the specific concerns of residents who may be more vulnerable in each type of event
   - 2.4 Make emergency communications available in multiple languages and platforms
   - 2.5 Prepare to communicate when power and communications networks are down
3. Promote social connectedness
   - 3.1 Strengthen relationships with community organizations to support the most vulnerable residents
   - 3.2 Facilitate relationship-building between members of the community across age, ethnic, income, and other demographic differences
   - 3.3 Support and promote opportunities for public engagement in sustainability efforts
   - 3.4 Promote and report on the City's sustainability projects and initiatives
   - 3.5 Promote economic resilience to acute and chronic stressors
   - 3.6 Explore opportunities to strengthen and diversify the local economy
   - 3.7 Foster small business and green business development
   - 3.8 Develop a post-disaster impact assessment in partnership with the local business community
   - 3.9 Promote low-income weatherization and heating assistance programs through City communication mediums
4. Prepare for and respond to climate-related public health impacts
   - 4.1 Conduct education and outreach on the health impacts of air pollution, longer allergy seasons, extreme heat, and vector-borne disease
   - 4.2 Review ordinances with respect to wood burning, and update as needed to protect and maintain air quality
   - 4.3 Make air conditioned public facilities available during poor air quality days and high heat days
   - 4.4 Promote local food production, sales, and consumption by reviewing City Codes to remove barriers for urban farming
   - 4.5 Continue to work with regional partners to connect and expand options for multi-modal transportation

PHOTO BY CITY OF GOLDEN VALLEY

Section 5: Implementation Plan

The Implementation Plan includes a set of specific actions to accomplish the goals and objectives set forth in the Policy Plan. It differs from the Policy Plan in that it provides the opportunity to easily measure progress and note tangible outcomes from each task. Each task provides an approximate cost estimate for the work and notes a time frame in which the specific action should take place. Tasks are prioritized based on financial feasibility, staff capacity, importance or urgency for action, and other factors. The Implementation Plan is updated every five years (mid-cycle of the 10-year Policy Plan) based on progress and new opportunities.

GOAL 1

Promote And Develop Clean, Renewable Energy

Increasing renewable energy generation capacity in the City would reduce greenhouse gas emissions and increase the City's resilience to energy supply and price shocks.

Implementation Actions:

- **Include information on renewable energy opportunities in City communications.** Post information about green power purchasing programs or incentives for property owners to install renewable energy systems on City website and social media outlets. Include information in multiple languages (GreenStep Cities Best Practice 26.2).
- **Perform a wind and solar ordinance review and update on a regular basis.** Review language in wind and solar ordinance and update to remove barriers, protect solar access and development, and align better with changing technologies. Encourage or require owners of solar energy systems to obtain solar access easements (GreenStep Cities Best Practices 26.1, 26.7).
- **Work with private sector partners.** Identify opportunities and engage in community projects that increase renewable energy and allow community members to participate (GreenStep Cities Best Practice 26.4).
- **Advance to Step 5 or the highest level in the GreenStep Cities program by** completing energy and climate-related best practice actions.
- **Participate in existing energy or climate technical assistance program.** Energy or action planning programs available to assist cities in 2017 include:
  - Partners in Energy (PiE), an energy action and technical assistance program offered by Xcel Energy, with applications open every six months (GreenStep Cities Best Practices 2.1, 25.2)
  - The Local Government Planning for Energy Project (LoGoPEP), which provides communities with planning tools and actual results to measure progress toward their goals
  - The Clean Energy Resource Teams (CERTs), a statewide partnership to connect Minnesota communities with the resources they need to identify and implement community-based clean energy projects
- **Complete a City operations greenhouse gas inventory** to assess energy used in City operations. This includes electricity and natural gas used in buildings and facilities, streetlights, water delivery services, wastewater systems, municipal solid waste, and transportation fuels used by City fleet vehicles (GreenStep Cities Best Practice 6.5).
- **Complete a city-wide climate action plan** to inventory community-wide greenhouse gas emissions, set goals to reduce emissions, and identify strategies to achieve those goals (GreenStep Cities Best Practice 6.5).

PHOTO BY CITY OF GOLDEN VALLEY

GOAL 2

Improve Energy Efficiency In Buildings, Lighting, And Infrastructure

Ensuring that new buildings are built to be sustainable "locks in" reduced operating costs and lower energy-related emissions for building occupants and owners for years to come.

Implementation Actions:

- **Incorporate efficiency upgrades into the Capital Improvement Program (CIP) and City budgets.** Invest in larger efficiency projects through performance contracting (such as the Guaranteed Energy Savings Program from the Minnesota Department of Commerce) or other funding or through smaller retro-commissioning/retrofit projects (GreenStep Cities Best Practices 1.2, 1.3).
- **Create a green building guide.** Create a guide to constructing efficient, sustainable buildings that includes references to local resources (such as certified green builders), and make available on City website. Direct all building permit applicants to this resource to encourage the construction of more sustainable, energy-efficient buildings (GreenStep Cities Best Practice 2.2).
- **Incentivize enhanced energy and water efficiency on private properties.** Offer incentives such as lowered building permit fees, tax breaks, and expedited review to private residential and commercial property owners who make efficiency improvement and/or incorporate efficiency above and beyond current requirements into new projects (GreenStep Cities Best Practices 2.6, 3.4).
- **Adopt language to govern sustainable private renovation and development projects.** Regulate energy efficiency of new City-owned buildings and projects that receive City financial support, and consider regulating energy efficiency of private buildings that receive City regulatory approval (ie, PUDs) (GreenStep Cities Best Practice 2.7). Require energy use disclosure for commercial/multifamily buildings over a certain size (GreenStep Cities Best Practice 2.3).

GOAL 3

Promote Waste Reduction, Recycling, And Composting

Benefits of reducing solid waste include reduced county and state fees, reduced greenhouse gas emissions, and economic benefits from job creation and tax revenue, to name a few.

Implementation Actions:

- **Host zero-waste City events.** Use City events as an opportunity to showcase strategies for reducing waste. Distribute educational materials about holding zero-waste events to residents and community organizations (GreenStep Cities Best Practice 15.7).
- **Adopt waste reduction goals for internal City operations.** Measure waste generated by City operations, develop goals, implement actions to reduce waste, and report success in terms of waste diverted and money saved. (GreenStep Cities Best Practice 22.2, Step 4 metric 13.6).
- **Complete a community-wide zero-waste study** to help the City understand the challenges, barriers, and costs associated with achieving a zero-waste future.
- **Adopt a waste reduction plan.** Engage community members, including residents and businesses, use report recommendations, and identify best practices to develop and adopt a waste reduction plan.

PHOTO BY CITY OF GOLDEN VALLEY

GOAL 4

Protect And Enhance The Natural Environment

Protecting and enhancing these assets has enormous benefits, including improving air and water quality, slowing and reducing stormwater runoff, providing habitat, reducing urban heat island effect, and providing aesthetic value.

Implementation Actions:

- **Complete a neighborhood-specific engagement process.** Involve residents and businesses located in areas identified as a concern for stormwater management, urban heat island effect, or invasive species in a process that allows them to influence how the City plans for and manages these areas in the face of climate variation.
- **Review and update City Code.** Review language in codes and policies related to tree and vegetation management to reflect the goals, objectives, and policies of this plan.
- **Create and implement a Buckthorn Management Program.** Using information gained from the inventory of vegetation and green space, identify high priority areas and long-term management plans to remove buckthorn from the city. Consider state and local regulations as part of the program.
- **Increase native species planted along streets and in publicly owned parking lots.** Plant native species in impervious surface areas to enhance stormwater management and provide habitat to pollinators and other wildlife.
- **Budget to maintain present level of urban canopy coverage citywide.** Set aside funds for increased tree planting after unexpected disturbances (disease, storm damage, etc) that result in tree loss.
- **Update Natural Resource Management Plan to support resilience.** Incorporate the goals, objectives, and policies of this plan regarding the resilience of natural resources into the Natural Resource Management Plan.
- **Create and fund an annual city-wide restoration event.** Engage community members in restoration of the city's natural areas (replanting shoreland buffers, restoring prairie, buckthorn and garlic mustard removal, etc) by hosting and promoting an annual event open to all community members (GreenStep Cities Best Practice 18.8).
- **Complete a detailed analysis of vegetation and green space.** Complete an inventory and assessment of the current canopy coverage, future impact of emerald ash borer, native planting areas, open spaces, and opportunities to replace impervious surfaces and areas of high heat vulnerability with site-appropriate vegetative coverage.
- **Fund and implement updated Natural Resource Management Plan.** Implement the plan, monitor progress, explore new funding mechanisms, and report on success. Ensure the implementation plan is adaptive, flexible, and adequately funded to prepare for unexpected weather events or invasive pests.

PHOTO BY STAN WALDHAUSER, 2017 VIEWS OF THE VALLEY

Plan For Resilient And Sustainable Infrastructure

Resilient infrastructure includes public buildings and constructed facilities that are built to sustain their functions during extreme weather events or other disruptions.

Implementation Actions:

- **Incorporate resilient infrastructure into the Capital Improvement Plan (CIP).** Funding for major infrastructure enhancement projects need to be strategic and opportunistic rather than come from routine street improvement projects. This may include supplements from other CIP sources, redevelopment opportunities, or grants and partnerships. Incorporating resilience into the CIP allows the City to identify improvement in the near-term and prepare it for future events (GreenStep Cities Best Practice 29.2).
- **Research ways to lower emissions related to City fleet.** Research the purchase of low emissions vehicles for City operations and make appropriate recommendations to the City Council.
- **Install alternative fuel/charging stations on a City campus.** Make low-carbon fuel or electricity available on City property for community members with low emissions/electric vehicles.
- **Create appropriate green infrastructure design standards.** Use the City's regulatory authority to implement green infrastructure design standards for new construction and substantial renovations. Expand Minimal Impact Design Standard ordinance to include green infrastructure projects (GreenStep Cities Best Practice 17.5).
- **Incentivize enhanced stormwater management on private properties.** Create a stormwater credit program that provides incentives to implement effective stormwater management practices that improve stormwater quality and/or reduces run-off quantity (GreenStep Cities Best Practice 17.4).

Increase Community Resilience And Preparedness

Prepare residents and businesses for abrupt changes in weather as well as prolonged environmental stresses by engaging community members and building social cohesion that strengthens the City's ability to withstand unexpected disruptions.

Implementation Actions:

- **Include information on community resilience in City communications.** Post resilience preparation materials on City website and social media outlets. Include tips and best practices in City newsletter and other communication outlets. Create and distribute an annual publication focused specifically on sustainability and resilience best practices. Make information available in multiple languages (GreenStep Cities Best Practice 29.1).
- **Complete a ready and resilient guide.** Several other cities in the metro area have created ready and resilient guides. The development of these guides involved research into the impact climate variation will have on the region and in-depth community engagement. These guides are designed to educate residents about what they can expect from a changing climate and how to best prepare for it (GreenStep Cities Best Practice 29.4).
- **Host community workshops on resilience.** Host periodic workshops for residents to provide instruction on resilient best practices that can be implemented at home. Include stormwater best management practices, emergency checklists, City communication protocols, and resilience resources (GreenStep Cities Best Practice 24.4).
- **Develop a volunteer community preparedness program.** Work with community leaders from every neighborhood to help residents prepare for extreme weather and create plans for safe evacuation in the event of an emergency. Once established, this group can conduct localized outreach and education to the public, encourage volunteerism, and coordinate within their neighborhoods to respond in the event of a disaster.

Summary Of Implementation Actions

Action	Estimated Cost	Time Frame
Promote And Develop Clean, Renewable Energy		
Include information on renewable energy opportunities in City communications	$	Ongoing
Perform a solar ordinance review/update on a regular basis	$	Ongoing
Work with private sector partners to identify opportunities	$	Ongoing
Advance to Step 5 or the highest level in the GreenStep Cities program	$$	0–5 years
Participate in existing energy or climate technical assistance program	$$	5–10 years
Complete a City operations greenhouse gas inventory	$$	5–10 years
Complete a City-wide climate action plan	$$	10–20 years
Improve Energy Efficiency In Buildings, Lighting, And Infrastructure		
Incorporate efficiency upgrades into the capital improvement program (CIP) and City budgets	$$$	Ongoing
Create a green building guide	$	5–10 years
Incentivize enhanced energy and water efficiency on private properties	$$	5–10 years
Adopt language to govern sustainable private development and renovation projects	$$	10–20 years
Promote Waste Reduction, Recycling, And Composting		
Host zero-waste City events	$	0–5 years
Adopt waste reduction goals for internal City operations	$$	0–5 years
Complete a community-wide zero-waste study	$$	5–10 years
Adopt a waste reduction plan	$$	5–10 years
Protect And Enhance The Natural Environment		
Complete neighborhood-specific engagement process	$	0–5 years
Review and update City Code	$	0–5 years
Create and implement a Buckthorn Management Program, including consideration of state and local regulations	$	0–5 years
Increase native species planted along streets and publicly owned parking lots	$$	Ongoing
Budget to maintain present level of urban canopy coverage and tree loss citywide	$$	0–5 years
Update Natural Resource Management Plan to support resilience	$	5–10 years
Create and fund annual city-wide restoration event	$$	5–10 years
Analyze and improve existing vegetation and green space	$$	5–10 years
Fund and implement updated Natural Resource Management Plan	$$$	10–20 years
Plan For Resilient And Sustainable Infrastructure		
Research strategies to lower emissions related to City fleet	$	0–5 years
Incorporate resilient infrastructure into the Capital Improvement Plan (CIP)	$$$	Ongoing
Incentivize enhanced stormwater management on private properties	$	5–10 years
Install alternative fuel/charging stations on a City campus	$$	5–10 years
Create appropriate green infrastructure design standards	$$	5–10 years
Increase Community Resilience And Preparedness		
Include information on community resilience in City communications	$	Ongoing
Complete a ready and resilient guide	$	0–5 years
Host community workshops on resilience	$$	0–5 years
Create annual sustainability and resilience focused publication	$	5–10 years
Develop a volunteer community preparedness program	$	10–20 years