CHAPTER 9: RESILIENCE AND ENVIRONMENTAL PROTECTION

This resilience and environmental protection plan includes the following information:

1. What We Heard
2. Current Practices
3. Environmental Protection
4. Greenhouse Gas Emissions Reduction
5. Resilience
6. Renewable Energy
7. Environmental Education and Outreach
8. Goals and Strategies

With a vision of being a dynamic and sustainable community that proactively addresses evolving community needs, the City of Roseville is committed to enhancing its existing natural resources and strengthening its resilience – the community's ability to respond, adapt, and thrive under changing environmental conditions.

Roseville has a history of environmental stewardship, with wetlands, ponds, trees, and vegetative cover playing a key role in the physical, social, and economic development of the city. Building upon past efforts and current initiatives – ranging from benchmarking energy used within the City to leveraging university partnerships, to evaluate potential areas of improvement – this chapter identifies strategic areas of focus to protect natural resources and strengthen citywide resilience.

While other chapters describe pathways to social and economic resilience, this chapter focuses on environmental resilience. Improving citywide resilience can help protect against anticipated climate-related risks, while also strengthening the local economy, improving public health, and enhancing livability for all Roseville residents.

1. What We Heard

Public Engagement

Community members provided input on resilience and environmental protection during public meetings and community engagement events. Promotion of water quality and conservation, local solar energy installations, and public transit were common themes. A group of community members also submitted a written list of recommendations, with proposed goals related to greenhouse gas emissions reductions and a rapid citywide transition to renewable energy. Policy recommendations relevant to this chapter addressed: water stewardship, tree coverage and diversity, electric fleet vehicles, energy-efficient buildings, multi-modal transportation, and waste reduction.

2. Current Practices

Roseville's commitment to environmental protection and resilience is reflected in its participation in Minnesota's GreenStep Cities program, which is a voluntary challenge, assistance, and recognition program to help cities achieve their sustainability and quality-of-life goals. This program is based upon 29 best practices, which can be implemented by completing one or more actions that are tailored to Minnesota cities, focusing on cost savings, energy use reduction, and civic innovation.

Roseville became a GreenStep City in July of 2014 by City Council Resolution, became a Step 2 City in June of 2015, has been working towards achieving Step 3, and will continue work towards becoming a Step 3, 4, and 5 City.

The City has used this program to document action related to energy efficiency in City facilities and street lighting, land use policies that promote density, multi-modal transportation support, solid waste reduction, water management, and more.

Visit www.MnGreenStep.org to learn more about this program and to see what Roseville and other cities have accomplished. Additional detail about Roseville's current and past initiatives is provided in the Goals and Policies section below.

3. Environmental Protection

Water

Protection of Roseville's water resources is addressed in the Water Resources chapters of the Comprehensive Plan (Surface Water Management, Water Supply System, and Sanitary Sewer System).

Land

Background

The land underlying Roseville is itself an important resource. The soil contains the nutrients and micro-organisms that allow trees, gardens, and other vegetation to grow. Soil serves as natural filtration of precipitation as it seeps into surface waters and underground aquifers, and it slows runoff after rainstorms as it moves towards built storm water infrastructure. The land supports the foundations of the structures that make up the built elements of the community. The vast majority of Roseville's land has been put to use as residential neighborhoods, commercial and industrial districts, and parks and open spaces.

One of the current issues facing potential developers of property, is liability due to contaminated soils. Minnesota was one of the first states to address, through statutes, the liability issues associated with buying, selling, or developing property contaminated by hazardous substances. The Minnesota Land Recycling Act of 1992 provides statutory authority to quickly approve cleanup of contaminated properties and provide land owners and lenders assurances that minimize potential liability. The Minnesota Pollution Control Agency's (MPCA) Voluntary Investigation and Cleanup (VIC) program can streamline the time and expense of cleanup that may be required through a normal Super Fund process. The VIC program was established to provide standards for site investigation, MPCA review of the adequacy and completeness of investigation, and approval of cleanup plans to address identified contamination. Depending on the type and degree of contamination, the MPCA will provide various levels of assurance to voluntary parties completing response actions, property owners, financial institutions, and future property owners.

The Minnesota Petroleum Release Compensation Fund program has been utilized at several gas stations in the community to clean up contamination from leaking underground fuel storage tanks. This program provides 90 percent reimbursement of eligible cleanup costs, which include investigation, development of remediation plans, and cleanup of contaminated soils and ground water. It does not cover the costs of tank removal or replacement, or cleanup of non-petroleum tank leaks and spills.

Current and Past Initiatives

Tax increment financing (TIF) is a financial tool available in Roseville to assist with cleanup of contaminated soils. The City has used TIF for soil cleanup in the Twin Lakes area, as well as the Gateway Business Center. The City has also created a hazardous soil sub-district in the Twin Lakes area. Within this sub-district, the City can capture the frozen base taxes, which normally go to all the taxing districts, to fund a cleanup plan approved by the MPCA.

Trees

Background

Trees are a significant asset to the Roseville community. They provide color and interest to the urban landscape, filter air, manage stormwater, protect soil, conserve energy, reduce noise, provide wildlife habitat, and positively impact property values. Faced with increased threats from insects, diseases, and higher temperatures, establishing and maintaining tree diversity is critical to the resilience of the urban canopy.

Current and Past Initiatives

The City of Roseville has been a designated Tree City USA community for over 20 years. The Tree City USA program provides direction, technical assistance, public attention, and national recognition for urban and community forestry programs in thousands of towns and cities across the United States.

To protect and preserve the community's established trees as land is being developed or redeveloped, Roseville created a Tree Preservation and Restoration Ordinance (1011.04). The ordinance puts an emphasis on protecting trees, and if needed, replacing trees in a thoughtful manner to restore the canopy that has been disturbed. The Community Development Department and Planning Commission administers the Tree Preservation and Restoration Ordinance.

Roseville has also developed a Tree Master Plan to begin diversifying the city's urban canopy, and is currently looking to add more diversity as emerging threats to trees move into the metro area. Since Emerald Ash Borer (EAB) was identified in Roseville in 2013, the City has managed this infestation using the Best Management Practices plan established and implemented in that same year. The Plan requires most of the infested trees on public property be removed. Since the initial EAB infestation, Roseville has planted 180 trees on City boulevards. The Tree Master Plan calls for planting a different tree species approximately every 500 feet and has been used to guide this reforestation. The City Tree Board and City Forester administer the implementation of the Tree Master Plan.

Roseville's Parks and Recreation Department has been aggressive in its efforts to remove invasive/nonnative plant species from City parks, and to restore and manage the native prairie/savannas, woodlands, wetlands, and shorelines. The Parks and Recreation Department has continued that commitment in its current Goals and Policies, described in Chapter 8. In particular, the Natural Resources Management policies speak specifically to the role of the park system in preserving trees and other sensitive habitats. Much of the success of these efforts is due to the physical work of many community volunteers.

In 2017, the City partnered with a team of students in the Environmental Sciences, Policy, and Management Degree program at the University of Minnesota. The Capstone project's goal was to examine the current tree canopy composition within the city, identify potential threats to the current species (diseases, insects, warmer climate, etc.), and make recommendations to help increase tree diversity. A report was created that highlights specifics about the City's current tree diversity, and is available on the City website, or at City Hall. The report includes six recommendations that will foster programs and actions that will add to the number and diversity of trees in Roseville:

- Implement emerald ash borer removal and canopy replacement plans that address treatment and removal costs.
- Increase urban canopy and species diversity to ensure resilience against disease and climate change.
- Focus on expanding the tree canopy in the designated priority areas.
- Conduct a tree survey by volunteers to collect information on the City's urban forest.
- Organize an Arbor Day tree sale to engage citizens.
- Apply for grants from several sources to fund planting opportunities.

Pollinators

Background

The US Department of Agriculture (USDA) estimates that pollinators play an essential role in the life cycle of almost 90 percent of our earth's plant species. Whether it is a hovering hummingbird, lumbering beetle, or one of over 350 Minnesota bee species visiting a flower in the backyard, these animals and many others contribute to a process called pollination. Examples of pollinators are bees, flies, beetles, butterflies, moths, birds, and bats. Bees have proven to be some of the most effective pollinators, and as a result are the focus of many pollination efforts.

Pollination occurs when the pollen from one plant reaches the stigma of another, usually when carried there by a pollinator. This process initiates the formation of

fruits, nuts, and seeds that will later be consumed and disbursed. Without pollinators, there is no seed formation, which means future generations of plants and the creatures that rely on them are at risk of decline. According to the USDA, 75 percent of the fruits, nuts, and vegetables grown in the United States are pollinated by native bees.

In recent years, there has been a dramatic decline in pollinator species, notably including the Rusty Patch Bumble Bee (*Bombus affinis*). Pesticides, pests and pathogens, loss of habitat, and lack of available nutrition are part of an unfortunately long list of factors which have led to depressed immune systems, a decrease in genetic diversity, and ultimately the decline of pollinator populations.

Endangered, Threatened, and Special Concern Species

Roseville currently has one species that is listed by the Minnesota Department of Natural Resources (DNR) as threatened. The Northern Long-Eared Bat (*Myotis septentrionalis*) is affected by the deadly bat disease, white-nose syndrome, and is threatened due the decline of approximately 99% of its population since 2006. According to the DNR's definitions, a species is considered threatened if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

State and federal laws govern protection of rare species. Management responsibility lies with the DNR at the state level and with the U.S. Fish and Wildlife Service at the federal level. Ramsey County includes protection of rare species and natural communities as one element in its management of county parks and open space. The City has no direct role in the preservation of rare species and natural communities but supports federal, state, and county efforts.

Current and Past Initiatives

The City of Roseville has adopted practices to make our city a place where pollinators can thrive. In June 2017, City Council passed Resolution No. 11422, committing the City to developing even stronger policies and practices to help protect pollinators.

Roseville provides habitat for pollinators through preservation of acres of natural vegetation, through enhancement of natural habitats, creation of new habitat during City projects, and by altering existing turf grass right-of-way areas to pollinator-friendly plantings.

The Parks and Recreation Policies were updated to encourage developing habitat for pollinators, as described in Chapter 8. Additional policies regarding natural resources management in Roseville's parks system are described in the Parks, Recreation, Trails, and Open Space chapter.

4. GREENHOUSE GAS EMISSIONS REDUCTION

Background

Since greenhouse gases (e.g. carbon dioxide) trap heat within the atmosphere, acting to reduce these emissions can help mitigate future climate risks.[1] Minnesota Statute 216H.02 establishes a goal "to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050." The latest statewide analysis shows that Minnesota is not currently on track to achieve these targets, with only a 4% reduction from 2005 levels in 2014.[2] With many human activities contributing to the emission of these gases – from driving to work to burning natural gas to heat a home – local governments like the City of Roseville can have a strong influence on the emissions caused by activities within its boundaries. Roseville can lead by example to reduce emissions from City operations through strategies like improving building and fleet efficiency and replacing fossil fuel use with renewable energy. Additionally, the City can use education, incentives, and regulation to impact emissions from residents and businesses.

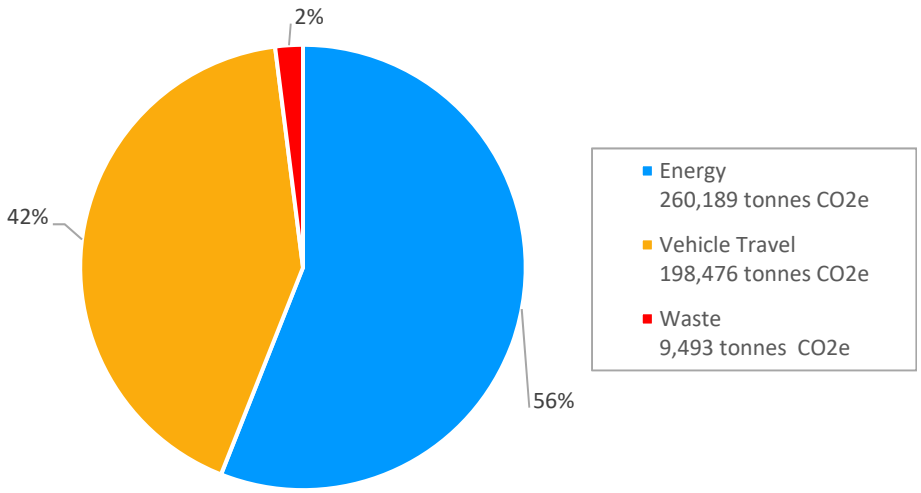
According to the Regional Indicators Initiative, in 2016 Roseville is attributed with an estimated 13.1 tonnes of carbon dioxide equivalents (CO_2e) per person for a total of 468,159 tonnes.[3] The greatest source of greenhouse gas (GHG) emissions in the community comes from building energy consumption, making up 56 percent of total emissions (**FIGURE 9-1**). Broken down by sector, the commercial and industrial sector accounts for 39 percent, while residential energy use accounts for 17 percent of all emissions. Broken down another way, electricity emissions account for 33 percent and natural gas emissions account for 23 percent of the community's total. Emissions for vehicle travel make up 42 percent, and treatment of municipal solid waste is 2 percent. Additional sources of emissions not included in this analysis come from air travel and wastewater treatment.

[1] Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive summary. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* . U.S. Global Change Research Program, Washington, DC, USA, pp. 12-34, doi: 10.7930/J0DJ5CTG.

[2] Minnesota Pollution Control Agency, "Minnesota's GHG emissions: 1990-2014 and Next Generation Energy Act goals," 2017, doi:10.1007/978-1-4419-7991-9.

[3] Metric tons (tonnes) of carbon dioxide equivalent (CO_2e) is the typical unit used for greenhouse gas inventories. Along with carbon dioxide, CO_2e includes other greenhouse gases (methane and nitrous oxide) that are weighted based on their global warming potential. A metric ton is equal to 1.102 short tons.

FIGURE 9-1 ROSEVILLE'S COMMUNITY-WIDE EMISSIONS (2016 ESTIMATE). SOURCE: REGIONAL INDICATORS INITIATIVE



Current and Past Initiatives

As signatories of the U.S. Mayors Climate Protection Agreement in 2007, Roseville's 2030 Comprehensive Plan committed to striving to meet the targets identified in the Kyoto Protocol. Since then, the City has:

- conducted an emissions inventory through the Clean Air Climate Protection software,
- developed and started implementing a campus-wide geothermal master plan,
- engaged with University of Minnesota students and Minnesota's Clean Energy Resource Teams to identify and evaluate potential emissions reduction strategies,
- joined Minnesota's GreenStep Cities program and become a Step 2 City,
- started tracking facility energy use through Minnesota's B3 Benchmarking program, an online platform that facilitates building energy data tracking and analysis,
- started exploring opportunities for solar energy installations on City facilities, and
- started tracking community-wide energy, water, travel, waste, and emissions data through the Regional Indicators Initiative.

Bringing these efforts together into a Greenhouse Gas Action Plan will help identify, quantify, and prioritize emissions reductions strategies that support other community goals.

5. RESILIENCE

Background

According to the Minnesota Pollution Control Agency, increases in the global surface temperature and changes in precipitation levels and patterns are expected to continue and intensify for decades, regardless of mitigation strategies currently being implemented. In turn, these changes in climate have impacts on the economy and health of local communities.

Weather and climate shape our economy. The National Aeronautics and Space Administration (NASA) explains that weather represents the conditions of the atmosphere over a short period of time, and climate represents how the atmosphere "behaves" over relatively long periods of time. Temperature impacts everything from the amount of energy consumed to heat and cool homes and offices to the ability for some workers to work outside. Temperature and precipitation levels not only determine how much water we have to drink, but also the performance of entire economic sectors, from agriculture to recreation and tourism. Extreme weather events, like tornadoes, hail storms, droughts, and inland flooding can be particularly damaging. In the decade from 2007 – 2016, extreme weather events have caused 51 deaths and more than $624 million in property damage in Minnesota. This compares to nine deaths and $263 million in property damage from 1980 – 1989 (NOAA National Centers for Environmental Information).

In addition, climate conditions affect the quality of life and life safety of communities – particularly those populations especially sensitive to climate impacts. Extreme weather events linked to climate change have the potential to harm community member health in numerous ways. Rising temperatures, for example, can result in a longer-than-average allergy season, erode air quality, and prolong the stay and increase the population of insects, increasing the risk of vector-borne diseases. Climate impacts also exacerbate economic challenges that can directly impact the ability of at-risk populations to cope, while creating more exposure to dangerous living/working conditions and poor nutrition.

Strengthening community resilience is rooted in an ongoing assessment of potential vulnerabilities, anticipation of potential climate impacts, development and implementation of strategies to address those vulnerabilities, and communication and outreach to the members of the community.

Current and Past Initiatives

The City completed a *Population Vulnerability Assessment and Climate Adaptation Framework* in February 2018. This report identifies habitats, infrastructure, and neighborhoods that are more vulnerable to the climate change risks described above and recommends adaptation strategies.

6. Renewable Energy

Background

In addition to providing clean sources of energy that have much lower environmental impacts than fossil fuels, local renewable energy systems can provide local economic opportunities and can help increase energy security if there are disruptions to the global energy supply.

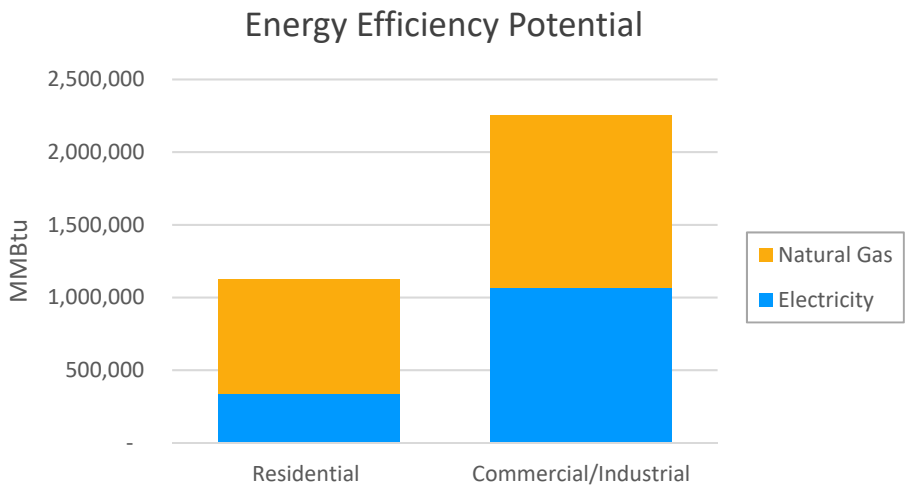
While Minnesota does not have an indigenous fossil fuel supply, the state does have many renewable energy resources available for development. The following list includes excerpts from the "Existing Energy Conditions" report developed through the Minnesota Local Government Project for Energy Planning.

Energy Efficiency Resource:

The most cost-effective clean energy resource is efficiency, which can be achieved through strategies like weatherization, efficient equipment, and efficient building operations. With Roseville residents and businesses spending $55.8 million each year on electricity and natural gas, efficiency also represents an opportunity for cost savings.

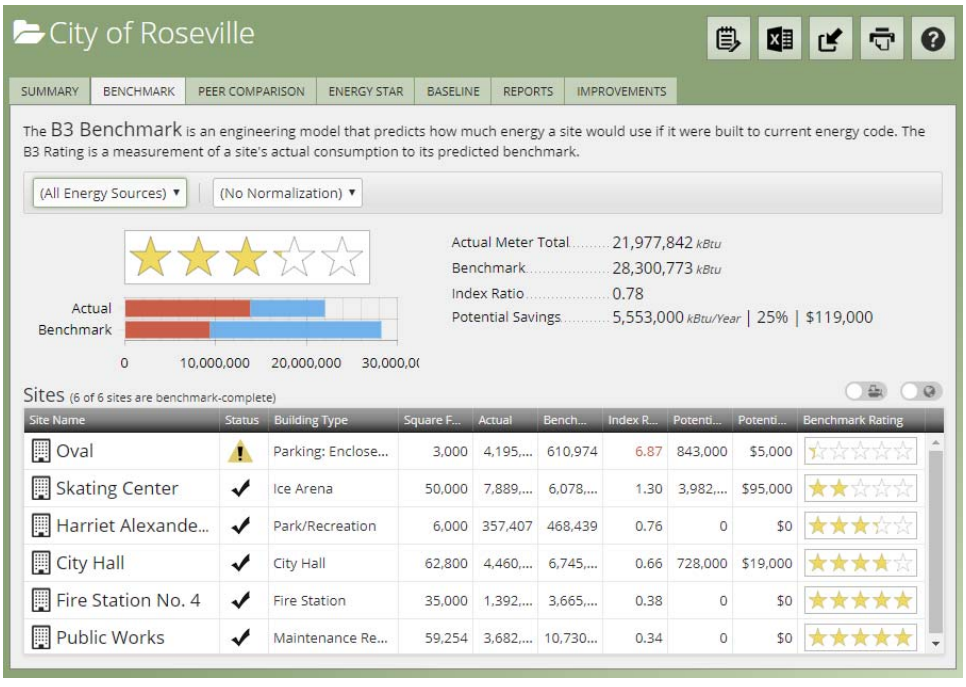
As shown in the Regional Indicators Initiative graphic summary (**Figure 9-2**), two-thirds of energy consumed within the city's buildings is being used by commercial and industrial customers, despite making up only 13 percent of the total number of premises, making this sector a strong efficiency resource. These customers also use a greater percentage of electricity than residential customers, which is currently more carbon-intensive than natural gas. However, the residential sector also provides an efficiency resource; since residential efficiency improvements are typically more standardized than commercial strategies, they may be easier to apply broadly.

FIGURE 9-2 THE CURRENT ENERGY USE IN ROSEVILLE'S BUILDINGS INDICATES THE POTENTIAL EFFICIENCY RESOURCE (DATA FROM 2016). SOURCE: XCEL COMMUNITY ENERGY REPORT (ACCESSED JANUARY 22, 2018).



There is also potential for energy efficiency within City-owned facilities, which represent about 0.6 percent of the community's total energy use (**FIGURE 9-3**). Energy use in City buildings is tracked through Minnesota's online B3 Benchmarking platform. By comparing the actual, observed energy use in Roseville's buildings to code-based benchmarks, B3 Benchmarking has identified an energy savings potential of 25 percent, primarily in electricity.

FIGURE 9-3 ELECTRICITY IS SHOWN IN RED, NATURAL GAS IN BLUE. SOURCE: B3 BENCHMARKING (2017 DATA).



Xcel Energy offers incentives to residential and business customers to help increase energy efficiency. Participation rates for these programs can be found in Xcel Energy's Community Energy Reports. For Roseville, 2016 participation rates by businesses and residents are shown in the table below, with savings equivalent to 1.4 percent of community-wide electricity and 0.6 percent of natural gas.

TABLE 9-1 ROSEVILLE PARTICIPATION IN CONSERVATION IMPROVEMENT PROGRAMS IN 2016. SOURCE: XCEL COMMUNITY ENERGY REPORT (ACCESSED JANUARY 22, 2018).

Sector	Rebates Given	Electricity Savings (kWh)	Natural Gas Savings (Therms)
Business	160	5,372,024	32,328
Residents	1,082	520,801	90,186

Utility companies can manage the electric load through demand response programs. These programs incentivize consumers to allow the utility to ramp down appliances (e.g. Saver's Switch® for central air conditioning) or other larger electric equipment to relieve congestion from the electric grid during times of high use. In 2016, more than 298 Roseville businesses participated in such programs, creating 5,630 kW of available capacity; 5,782 residential customers participated, creating a load management resource of 3,147 kW.

Transportation efficiency is another significant resource, comprising over 40 percent of the City's GHG emissions and a significant portion of energy expenditures. Ramsey County is already active in working with its local governments and the Metropolitan Council to encourage transit use and expand the reach of multi-modal transportation infrastructure.

Solar Energy Resource:

The University of Minnesota developed a high-resolution statewide solar resource map that allows cities to calculate potential electricity generation from local solar energy systems. This data (see Roseville Solar Potential Map, **MAP 9-1**) was used to calculate Roseville's solar resource or "solar reserves," shown in the table below. The solar reserves represent how much solar energy is reasonably economically available for development – similar to how oil or gas reserves are measured – not considering individual site limitations due to roof structure, ownership, or local regulations that might limit solar installations. The gross potential includes the total available resource, regardless of location; rooftop capacity and generation include only the resource available on the rooftops of buildings located in the City.

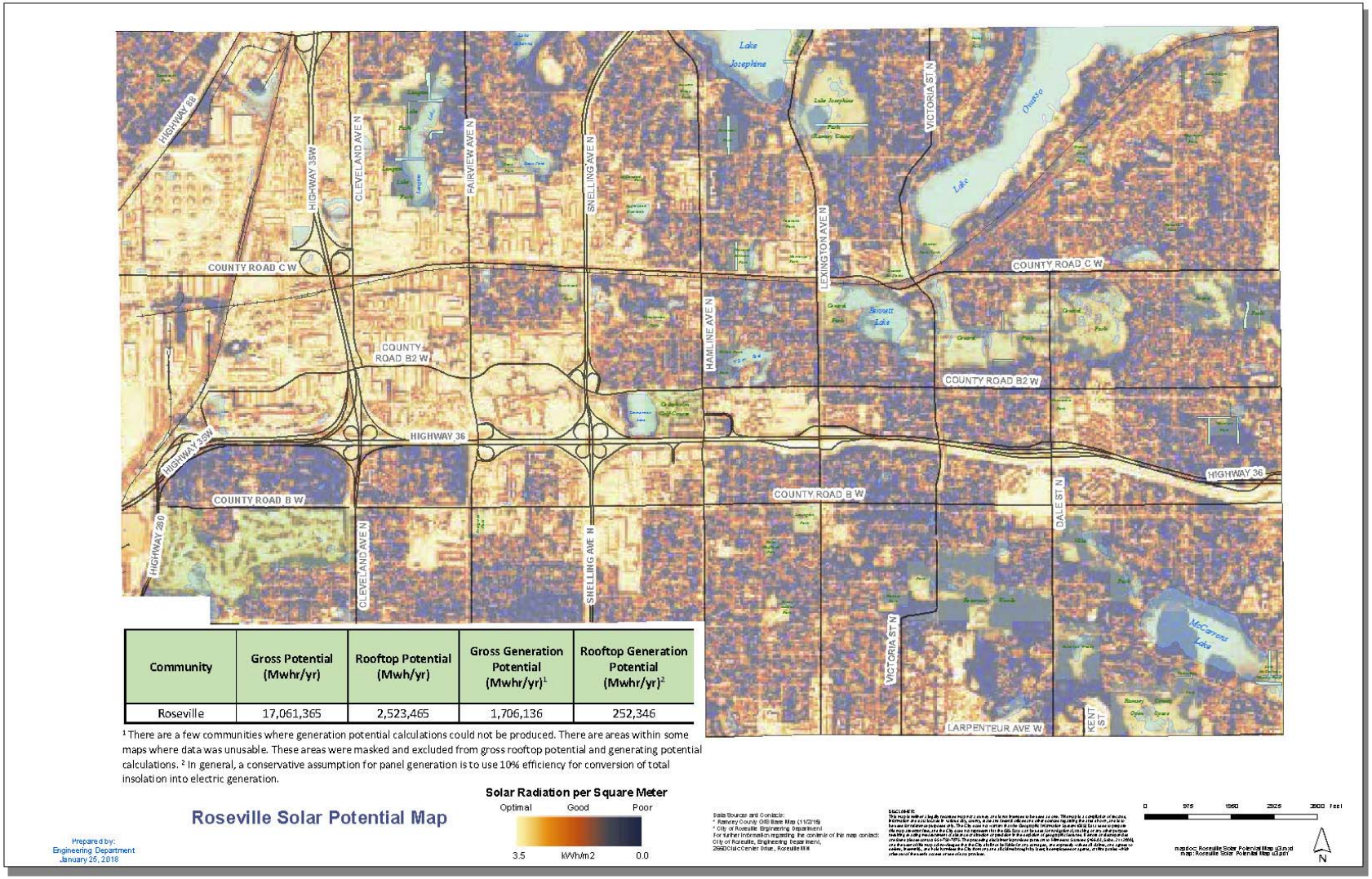
TABLE 9-2 ROSEVILLE SOLAR RESOURCE. SOURCE: METROPOLITAN COUNCIL AND GREAT PLAINS INSTITUTE.

Gross Generation Potential (MWh/year)	Rooftop Generation Potential (MWh/year)	Rooftop Capacity (MW)	Top Ten Rooftop Generation Potential (MWh/year)
1,706,136	252,346	194	29,272

This analysis estimates that the City of Roseville has enough solar reserves to generate 252,346 MWh/year through rooftop solar energy (**TABLE 9-2**), equal to approximately 61 percent of the electricity currently consumed within the city. The top ten rooftops alone have enough solar resource available to meet 7 percent of the electricity currently consumed within the city. This analysis does not include the impact of potential energy efficiency measures or the potential for ground-mount systems, which would increase the percentage of citywide electricity that can be met through solar.

In its 2016 Community Energy Report, Xcel Energy reports that there are six on-site commercial solar installations within Roseville, with a total capacity of 167 kW. These installations produced 54,961 kWh in 2016. For residential, Xcel reports 39 on-site solar installations with a total generating capacity of 291 kW. These residential installations produced 81,976 kWh in 2016. These yields are reported through Xcel's Solar*Rewards program. Many installations had been made through the Made in Minnesota Program as well: 18 residential installations with a total capacity of 140 kW and one commercial installation with a capacity of 39.4 kW.

MAP 9-1 ROSEVILLE SOLAR POTENTIAL



Community	Gross Potential (Mwhr/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwhr/yr)[1]	Rooftop Generation Potential (Mwhr/yr)[2]
Roseville	17,061,365	2,523,465	1,706,136	252,346

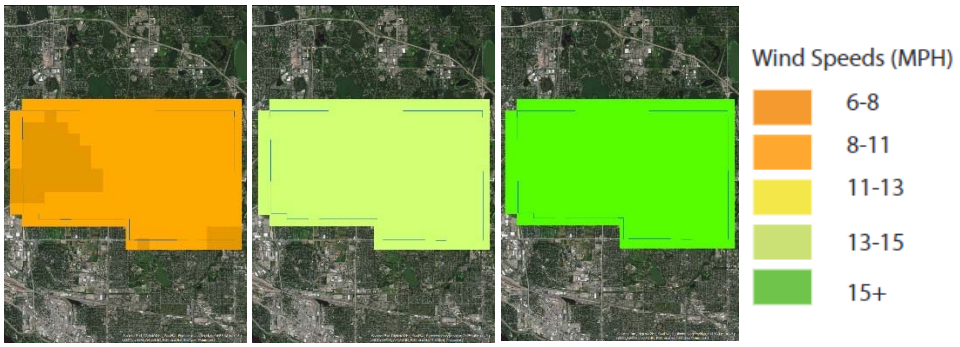
[1] There are a few communities where generation potential calculations could not be produced. There are areas within some maps where data was unusable. These areas were masked and excluded from gross rooftop potential and generating potential calculations. [2] In general, a conservative assumption for panel generation is to use 10% efficiency for conversion of total insolation into electric generation.

Wind Energy Resource:

A good wind energy site needs to meet a number of characteristics, such as: a good wind resource; soils that can support the weight of the turbine; a site large enough to accommodate safety setbacks from neighboring properties, structures, or other uses; and surrounding land uses for which the visual impact and potential nuisances will not create a conflict.

The Minnesota Department of Commerce developed wind speed maps at a 500-meter resolution to give a general sense of the wind resource at various tower heights (**FIGURE 9-4**); these maps are not appropriate for a specific site assessment.

FIGURE 9-4 WIND SPEEDS AT DIFFERENT TOWER HEIGHTS IN ROSEVILLE. SOURCE: MN DEPARTMENT OF COMMERCE.



30 meter tower 80 meter tower 100 meter tower

According to the Minnesota Department of Commerce, the minimum average annual wind speed required for a good wind resource is 12 miles per hour. At 30-meter heights (about 100 feet), Roseville has an average wind speed of less than 11 mph. At 80 meters (about 260 feet), wind speeds are more favorable – between 13 and 15 mph throughout the city. At 100 meters (about 330 feet), wind speeds are over 15 mph throughout the city. As a suburban community with some urban and rural characteristics, Roseville may or may not be suitable for the taller towers needed for productive wind energy systems.

Alternatively, residents and businesses can participate in Xcel Energy's Windsource® or Renewable*Connect programs. These programs provide the clean energy benefit of having local wind (and solar) energy, although the economic benefits of clean energy development are realized elsewhere. According to Xcel Energy, seven businesses are subscribed to a total of 642,209 kWh, and 702 residences are subscribed to a total of 1,884,077 kWh in Roseville as of 2016. This amounts to 0.6 percent of the community's total electricity use.

Biomass Resources:

Fuel derived from biomass can be used in several processes as a source of renewable energy, including electricity, waste heat, and renewable gas. Minnesota has several facilities that use biomass to generate electricity and/or heat. Biomass resources include municipal solid waste, landfill gas, wood waste, agricultural byproducts, food processing residue, and other organic waste. Much of the biomass resource can come from the metropolitan area, particularly for solid waste and landfill gas, as well as yard waste.

Information about the type of biomass resources at the community level is difficult to acquire; there is little standardized assessment of potential biomass resources, and the types of resources vary widely across communities. At present, Ramsey County operates public compost sites for the disposal of leaves, grass clippings, brush, and other compost materials, and the City collects and composts leaves. Additionally, residents can bring their food waste and non-recyclable paper to Ramsey County Yard Waste sites and other dedicated Organics Recycling facilities.

The draft Solid Waste Management Master Plan from Ramsey County focuses on reducing risk to environment and public health, increasing waste to energy, reducing waste through recycling and composting, and reducing greenhouse gas emissions. Among the emerging technologies being considered is the utilization of organic waste as a feedstock for anaerobic digestion. There will likely be opportunities for the City to collaborate with Ramsey County to increase composting and maximize the benefits of organic material.

Current and Past Initiatives

City of Roseville staff and Public Works, Environment & Transportation Commission (PWETC) is currently studying the utilization of solar energy to help reduce demand for non-renewable energy sources. City staff has met with different solar representatives from installers, financers, non-profit organizations, and the State to look at available options. Each option presents different payback periods, upfront costs, long-term maintenance, grant funding, etc. These considerations will help determine the best course of action to help reduce City energy costs over the next 20+ years.

Other ongoing ways that the City encourages residents and businesses to conserve energy or take advantage of renewable sources available on-site include:

- partnering with the Minnesota Center for Energy and Environment (CEE) to offer a variety of home improvement loan options,
- referring residents to Ramsey County's Home Improvement and Suburban Weatherization loan programs,

- teaming up with Xcel Energy up to give 200 Roseville residents a free $60 energy audit each year, and
- connecting residents to the CEE Lending Center for zero-percent financing on a 10-year forgivable loan for up to $6,500 for energy conservation improvements.

In 2018 the City committed to two avenues for solar energy, Community Solar Garden subscriptions and rooftop solar arrays on City owned buildings. In 2019 the City will install solar arrays on the rooftops of City Hall, the Fire Station, and the Maintenance Facility. There will be a total of approximately 200 kW of solar energy production on the City Campus by the fall of 2019.

The City has also committed to up to 2 Megawatts of Community Solar Garden subscriptions over the next two years. Community Solar Gardens are centrally-located solar photovoltaic (PV) systems that provide electricity to participating subscribers. Through these programs, an entity can install larger solar arrays on rooftops or ground-mounted systems. The City expects the first shares to be implemented in the summer of 2019. These two initiatives have the potential to provide up to half of the overall energy consumption from the Civic Campus with renewable energy. Future projects will be considered for the Roseville Skating Center including the indoor ice arena and the Oval.

Another program that the City is working to participate in is SolSmart through the Metropolitan Council. SolSmart is a local government designation program designed to recognize communities that have taken steps to improve solar market conditions. Communities pursuing SolSmart designation, regardless of their level of solar energy experience, can receive no-cost technical assistance (similar to consulting services) from a team of national solar experts.

SolSmart designation at the Bronze, Silver, or Gold level will provide high-profile, national recognition for communities that have made it faster, easier, and more affordable for residents and businesses to invest in solar energy. Achieving designation will signal that a community is “open for solar business,” attracting new solar businesses and gaining the economic development benefits attached to solar market development.

7. Environmental Education and Outreach

Background

One of the most cost-effective and efficient ways to protect the environment is through education. By working with residents, businesses, and schools to identify

ways to promote environmental awareness, the City can help create durable public will for resilience and environmental stewardship.

Current and Past Initiatives

The City sponsors many programs and events on a local and regional level that focus on preserving and enhancing the environment. In 2017, the City partnered with a team of students in the Environmental Sciences, Policy, and Management Degree program at the University of Minnesota to identify ways that the City could improve upon current education and outreach strategies. A goal of the project was to help develop a strategy that would create social influence by providing a consistent and dependable message for the residents. While this Capstone project focused on education and outreach related to stormwater management and water quality, the three recommendations listed below can also be applied to other environmental protection issues.

- Partner with watershed districts and Blue Thumb (www.bluethumb.org) to provide educational materials on stormwater management for residents.
- Strengthen engagement of community members through residential certification programs.
- Utilize a multi-faceted toolkit to reach multiple audiences through various outreach methods.

8. GOALS AND STRATEGIES

Resilience relies on a combination of social, environmental, and economic vitality. As such, nearly all the citywide goals established in Chapter 2 support a resilient city, with topics ranging from safety and city services, to diversity and community-building. While most of these goals are addressed in other sections of the Comprehensive Plan, the two related directly to environmental protection are emphasized in this chapter:

- **Preserve and enhance soil, water, and urban forest resources.**
- **Conserve energy and reduce pollution.**

The following goals and strategies outline a path forward that supports Roseville's vision as an environmentally healthy community, related to the themes presented earlier in this chapter. Goals and strategies focused on equity are highlighted with the equity symbol. Ⓔ

Goal – Environmental Protection: Protect, preserve, and enhance Roseville's water, land, trees, and pollinators for current and future generations.

Strategies:

Land:

- Continue to use TIF to assist with environmental cleanup on sites identified as economic development priority or opportunity areas.

Trees:

- Finalize and implement a management plan for ash trees on park land and streets.
- Conduct a citywide survey, and inventory to the extent feasible, of the tree canopy. This would include all trees in both public and private areas
- Modify procurement policies, as necessary, to ensure diversity of tree species on City property.
- Promote tree diversity on public and private lands, including establishment of diversity requirements, as part of any development of commercial or multi-unit residential property.
- Expand tree canopy in priority areas.
- Create policies and procedures on proper tree planting for all City installations and promote this to residents.

Pollinators:

- The City shall review its practices for the use of insecticides and use best practices to limit systemic insecticide uses on City property, including insecticides from the neonicotinoid family where possible, and will encourage commercial applications to be free of systemic insecticides, including neonicotinoids where possible.
- The City shall undertake its best efforts to plant native plants and plants favorable to bees and other pollinators in the City's public spaces.
- The City shall undertake its best efforts to communicate to all Roseville property owners, residents, businesses, institutions and neighborhoods the importance of creating and maintaining pollinator-friendly habitat, and will encourage residents and business to use the pollinator-friendly practices including:
  - Reducing the use of pesticides, including systemic insecticides, on their property;
  - Avoiding planting flowering plants that are treated with systemic insecticides; and
  - Planting more pollinator forage on their property and adopting organic or chemical-free lawn and landscaping practices.
- The City shall provide information and avenues to identify pollinator-friendly plants and other opportunities.

Goal – Greenhouse Gas Emissions: Support Minnesota's Next Generation Energy Act goal of an 80 percent reduction in community-wide greenhouse gas (GHG) emissions, from 2005 levels by 2050, through leading by example in addition to education, incentives, and regulation to encourage action by residents and businesses.

Strategies:

- With appropriate community engagement, develop a Greenhouse Gas Action Plan to establish City-specific energy and greenhouse gas reduction goals, and select strategies to reduce emissions from building energy, travel, solid waste, and water use. The Greenhouse Gas Action Plan should include goals and strategies for both community-wide emissions and City operations, and should:
  - Identify historic community-wide greenhouse gas emissions for 2005 as a baseline year.
  - Identify current community-wide greenhouse gas emissions and, separately, emissions associated with City operations.
  - Establish mid- and long-term emissions reduction goals that support Minnesota's goal of an 80% reduction from 2005 levels by 2050 (M.S. 216H.02).
  - Propose reduction strategies and identify associated:
    - savings potential,
    - economic and business development potential,
    - implementation methods through existing or new policies and programs, and
    - implementation costs, financing mechanisms, and funding sources.
  - Develop an implementation plan with a schedule, responsible party, and measure of success for every strategy.
  - Indicate the method that will be used to track progress.
- Continue to participate in Minnesota's GreenStep Cities program, working towards becoming a Step 3, 4, and 5 City by implementing additional best practices, reporting on performance metrics, and demonstrating improvement across multiple metrics.

Goal – Resilience: Take action to equitably reduce climate-related risks to City residents.

Strategies:

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- Using the *Population Vulnerability Assessment and Climate Adaptation Framework,* develop a Resilience Plan that establishes community resilience goals and strategies.

Goal – Renewable Energy: Support increased adoption of renewable energy by protecting access to direct sunlight and supporting the development of local renewable energy installations.

Strategies:

- Incorporate energy efficiency and renewable energy strategies into the City's Greenhouse Gas Action Plan (described in a related goal, above).
- Protect access to direct sunlight for solar energy systems through revisions to the City's planning, zoning, and development regulations while minimizing potential adverse impacts to other natural resources.
- Strive to source 100 percent of the electricity used for City operations from renewable sources such as solar, wind, biomass, geothermal, and wind by 2040, with a minimum of 25 percent in on-site generation at City properties.
- Strive to produce enough solar electricity within City boundaries to meet 10 percent of citywide electricity use by 2030, which aligns with Minnesota's solar energy goal (M.S. 216B.1962).
- Facilitate and promote local solar installations by becoming a SolSmart Bronze Level community by the year 2020, and working towards the Silver and Gold level by 2040.
- Examine opportunities to allow and encourage solar installations within public and private parking lots.

Goal – Environmental Education and Outreach: Increase community awareness of resilience and environmental protection issues.

Strategies:

- Partner with other government entities to sponsor and/or host resilience education and environmental stewardship programs.
- Promote local resilience efforts and environmental stewardship through City-led communications, such as the City newsletter, City website, and the local cable-access channel.