

CAP OVERVIEW & FEEDBACK

City of Northfield CAPAB Meeting

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**GREAT PLAINS
INSTITUTE**

August 7, 2019

Plan Structure

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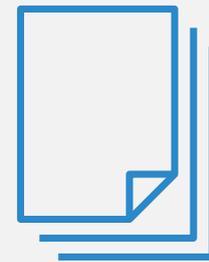
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Climate Resilience and Adaptation

Climate Hazards

Resilience Assessment

- Population
- Built Infrastructure
- Natural Infrastructure

Resilience Strategies



Local Climate Hazards

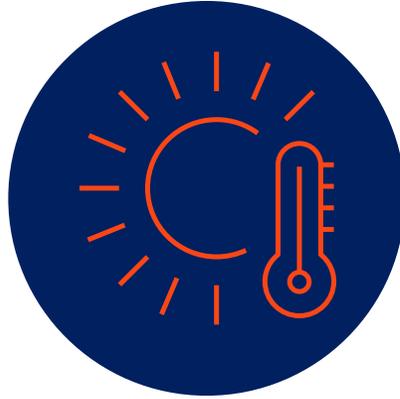
Air



Pollution, Pollen

- Respiratory illness
- Cardiovascular disease
- Allergies

Weather



Extreme weather, heat

- Heat stress, illness
- Infrastructure stress
- Power outages

Water



Flooding, drought, availability

- Waterborne disease
- Water quality
- Scarcity
- Infrastructure damage
- Drowning, injury

Ecosystem



Ecological changes

- Vector-borne disease
- Tree canopy impact
- Food scarcity

Resilience Assessment

Resilience Assessment



Population

People are impacted differently by climate hazards. The ability to recover from an event may depend on a variety of factors, including demographic characteristics (age, income, race, language, health conditions) and situational factors (mobility, housing, transportation access).



Built Infrastructure

Built infrastructure includes elements related to transportation infrastructure (roads and bridges, public transportation, and active mobility), water infrastructure (stormwater, drinking water, and wastewater), and critical infrastructure (back-up generation facilities and energy infrastructure).



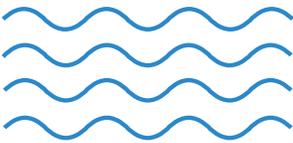
Natural Infrastructure

Natural infrastructure like trees, native plants, water, and ecosystems are simultaneously susceptible to climate hazards and help improve the resiliency of the city.

Population

HAZARD	VULNERABLE POPULATIONS	IMPACTS
 Extreme Heat	<ul style="list-style-type: none"> • Older adults – particularly those living alone • Young children and babies • People experiencing homelessness • People living in poverty – particularly those without access to air conditioning • People of color • People with preexisting health conditions • Outdoor workers 	Heat-related illnesses <ul style="list-style-type: none"> • Heat stress • Heat stroke • Dehydration • Cardiovascular health
 Air Pollution	<ul style="list-style-type: none"> • Young children • Older adults • People of color • People with preexisting cardiovascular or respiratory diseases 	<ul style="list-style-type: none"> • Severe allergies • Cardiovascular health • Asthma attacks • Respiratory illness
 Vector-Borne Disease	<ul style="list-style-type: none"> • Older adults • People with weakened immune systems • Environmental justice communities 	<ul style="list-style-type: none"> • Lyme disease • Human anaplasmosis • West Nile Virus
 Flooding & Flash Flooding	<ul style="list-style-type: none"> • Older adults – particularly those living alone • Young children and babies • People with preexisting physical or mental health conditions • People living in poverty • People with limited English proficiency • People with limited mobility options 	<ul style="list-style-type: none"> • Drowning, injury • Mold or waterborne disease • Economic loss • Property damage • Travel limitations • Food Insecurity
 Drought	<ul style="list-style-type: none"> • Older adults • Young children • People with respiratory diseases • People of color 	<ul style="list-style-type: none"> • Respiratory illness and other illness • Property damage • Economic losses • Food insecurity
 Extreme Weather	<ul style="list-style-type: none"> • Older adults • Residents with limited English proficiency • Residents with mobility limitations • Low-income residents: renters, homeowners, folks experiencing homelessness 	<ul style="list-style-type: none"> • Property damage • Injury/death • Travel limitations • Economic losses

Built Infrastructure

Infrastructure		Assessment
Water 	Stormwater (conveyance, green infrastructure)	<ul style="list-style-type: none"> • Age • Condition • Capacity • Design consideration (Atlas 14)
	Drinking water	<ul style="list-style-type: none"> • Source and supply • Well contamination • Age and condition of distribution system
	Wastewater	<ul style="list-style-type: none"> • Age • Condition • Location
Transportation 	Roads and Bridges	<ul style="list-style-type: none"> • Age • Condition
	Public transportation	<ul style="list-style-type: none"> • Service availability • Ridership • Route proximity to housing • Frequency
	Active mobility	<ul style="list-style-type: none"> • Miles of trails, protected lanes, sidewalks • Percent of commuters • City plans

Additions in next draft:

- Critical infrastructure
- Micro-grids and storage
- [Link to Rice County All Hazard Mitigation Plan](#)



City of Northfield Climate Action Plan - Draft

Natural Infrastructure

Infrastructure		Assessment
 Trees and Native Plants	Urban forest	<ul style="list-style-type: none"> • Canopy • Biodiversity • Threats • Planting practices
	Native Plants	<ul style="list-style-type: none"> • Ordinances, policies • Land cover (native vs. turf)
 Water Supply and Quality	Groundwater	<ul style="list-style-type: none"> • Stability • Contamination potential
	Surface water	<ul style="list-style-type: none"> • Water quality • Stormwater best practices
 Land Use and Food	Impervious surface	<ul style="list-style-type: none"> • Pervious: Impervious • Uses • Trail access
	Agricultural uses	<ul style="list-style-type: none"> • Existing agricultural practices
	Food Access	<ul style="list-style-type: none"> • Availability and affordability

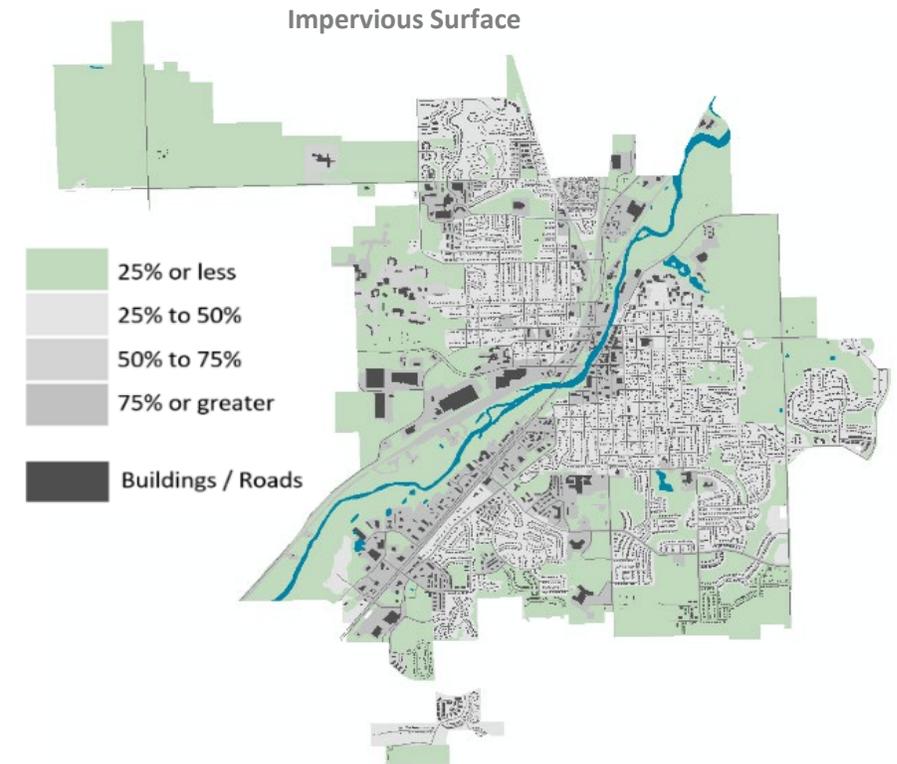


Figure 7. Impervious surfaces in Northfield, MN. Source: City of Northfield Public Works; generated by Jessi Wyatt.

Climate Resilience Strategies

RS – 3 Natural Infrastructure

Description: Protect and enhance natural infrastructure to ensure resilience to climate hazards and ability to mitigate impacts from climate hazards

Recommended Actions

Education

- Host workshops to provide opportunities for interested parties to learn about actions they can take to improve resilience including: *GSC best practice 24*
 - Soil remediation best practices
 - Increasing tree canopy and caring for existing trees on private property
 - Changing landscaping practices to consider beneficial plantings and practices that provide stormwater benefits, improve soil health, and increase pollinator habitat
 - Water conservation measures to reduce consumption of potable water and treatment of wastewater
- Incorporate food education and farming programs into Northfield school districts *GSC best practice 27*

Urban Forest and Vegetation

- Update and adopt Urban Forestry Asset Management Plan *GSC best practice 16*
- Incentivize expansion of boulevard gardens on private property; expand boulevard gardens and rain gardens on city-owned lands, and incorporate pollinator gardens in all parks and encourage / incentivize them on private property *GSC best practice 11*
- Increase tree canopy through city-sponsored program to plant trees *GSC best practice 16*
 - Prioritize tree replacement and plantings in areas of low canopy coverage to reduce the impact of Emerald Ash Borer damage
 - Proactively pursue increased canopy coverage to improve long-term resilience
- Pursue pervious pavement alternatives
- With the development of City parks and green spaces, ensure accessibility for all residents through connected trails, proximity to low-income neighborhoods, and signage in English and Spanish

Soil and Agriculture

- Create Advisory Board that represents agricultural sector in Northfield, supporting best practice models for carbon reduction farming and equal access and affordability of sustainable food *GSC best practice 16*
- Enable and encourage more community gardens throughout the city *GSC best practice 16*
- Incentivize and reward soil best management practice for urban lawns, gardens, landscaping, parks, open spaces, prairies, environmentally sensitive areas, and agricultural land uses *GSC best practice 16*
- Support creation of local compost process facilities and system to deliver organic material *GSC best practice 22*
- Increase conversation with agricultural producers to support local food systems and ensure sustainable agricultural land use practices, learn with and from community to better improve and achieve community resilience *GSC best practice 27*

GHG Inventory

- Buildings: 85.31% of total emissions
- Travel: 12.17% of total emissions
- Waste (downstream only): 1.65%
- Wastewater treatment: 0.87%

Northfield 2017 Community-wide Emissions (GHG)

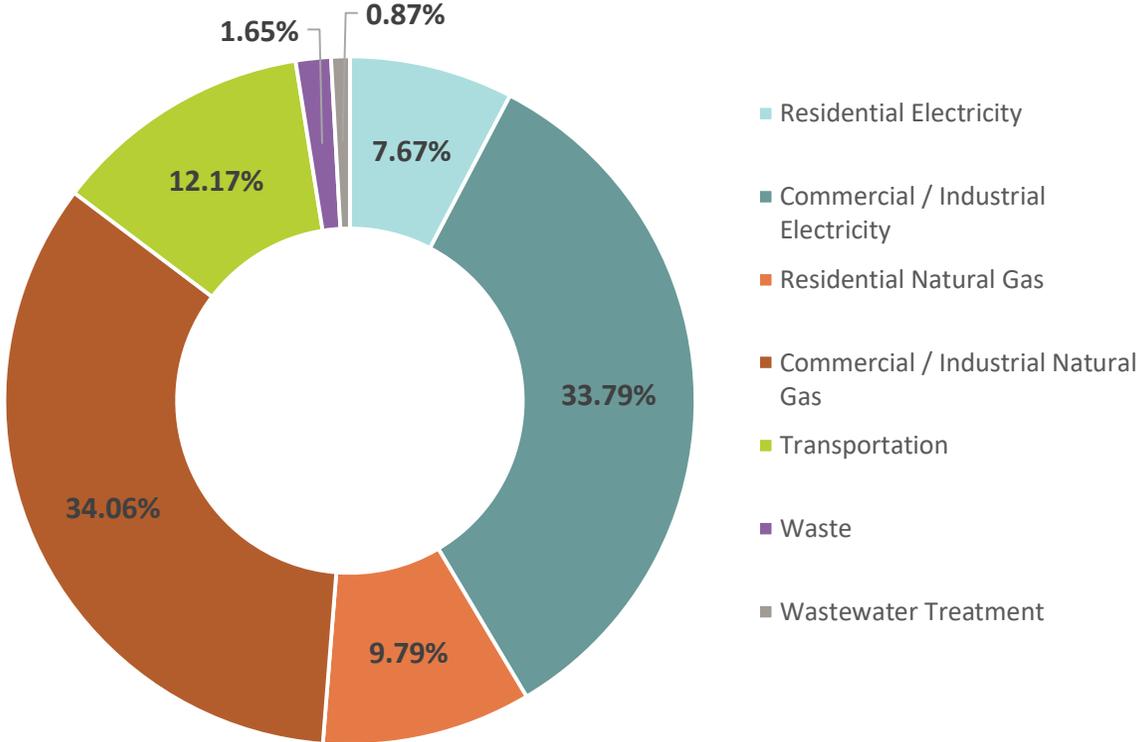
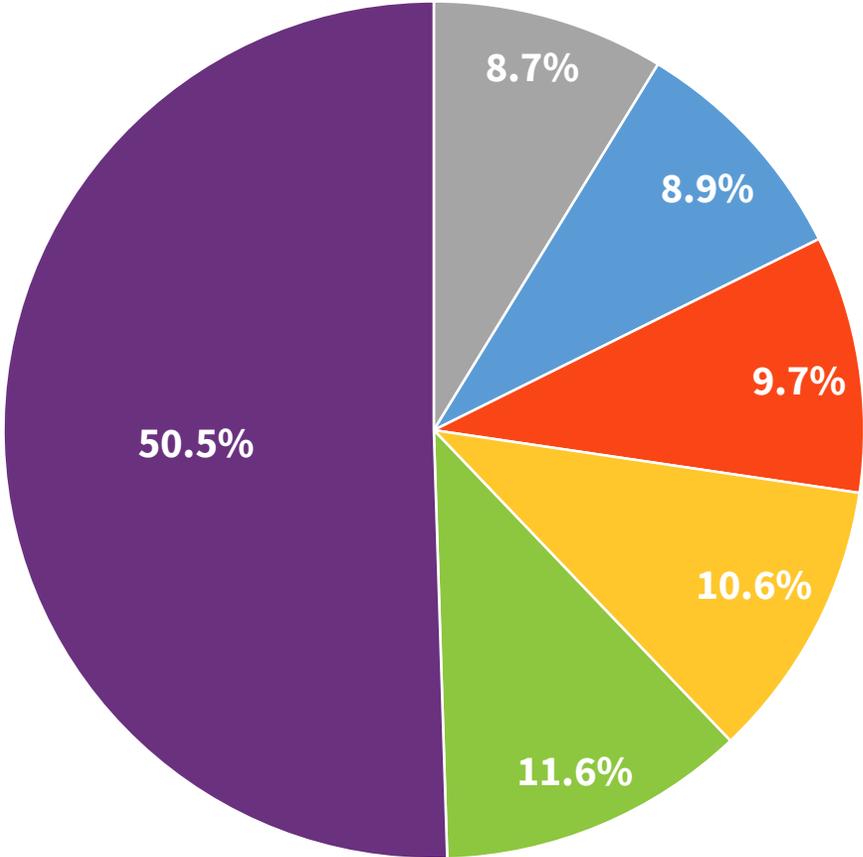
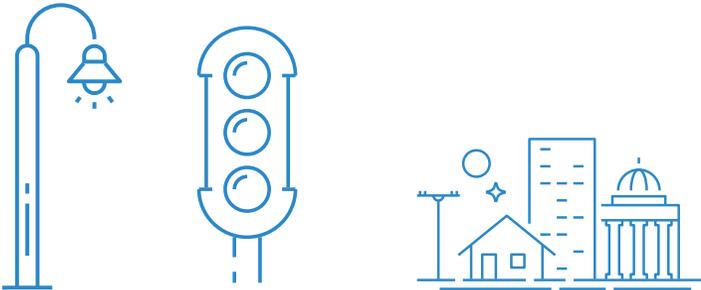


Figure 8. Community-wide greenhouse gas emissions for Northfield, Minnesota by sector. Each wedge represents a different sector and energy use category. Source: Xcel Energy, Minnesota Department of Transportation. Generated by Regional Indicators Initiative.

City Operations



- Streetlights and Signals
- Potable water
- Vehicles
- Park Facilities
- Buildings
- Wastewater Treatment

Greenhouse Gas Emissions, 2017

City Operations

Changes in Energy Consumption & GHG Emissions

Energy and Process Sources of Greenhouse Gas Emission, 2015-2017 (tonnes)

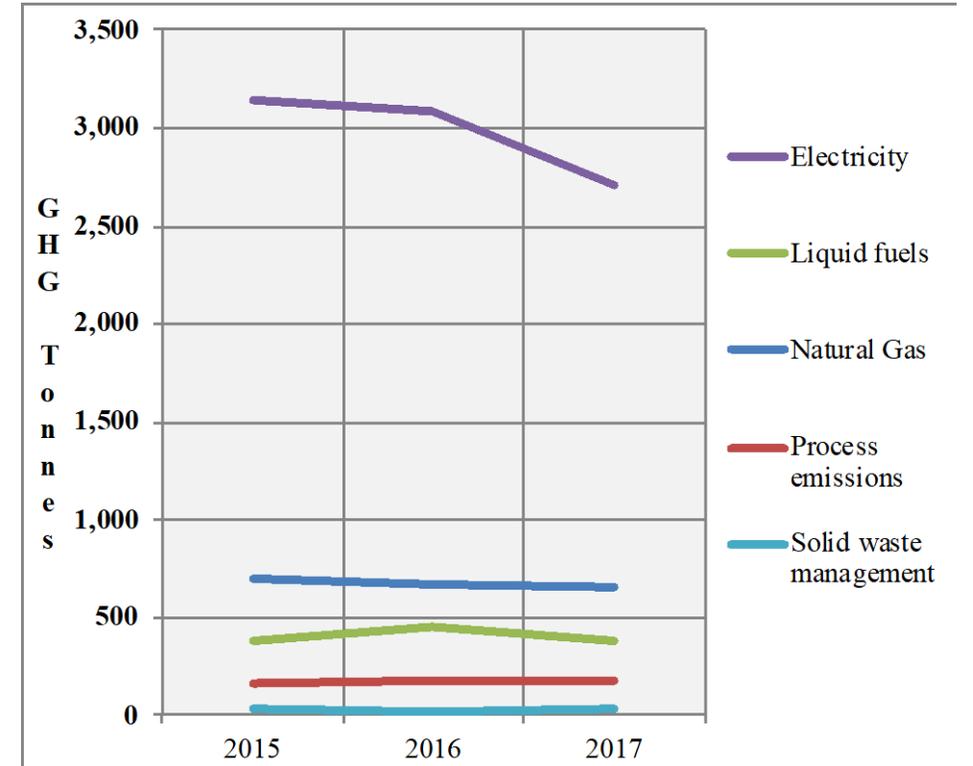
Source	2015	2016	2017	Change from 2015	Percent of Total, 2015	Percent of Total, 2016	Percent of Total, 2017	Change From 2015	Percent of Change
Electricity	3,184	3,010	2,744	-14%	71%	69%	69%	(440)	90%
Natural Gas	704	673	655	-7%	16%	16%	16%	(49)	10%
Liquid fuels	383	446	381	-1%	9%	10%	10%	(2)	1%
Process emissions	171	171	171	0.4%	4%	4%	4%	1	0%
Solid waste management	37	35	38	4.6%	1%	1%	1%	2	0%
Total	4,478	4,335	3,990	-11%	100%	100%	100%	(489)	100%

*Process emissions refer to fugitive emissions of nitrogen oxides during the treatment of wastewater

Assessment Summary

1. Overall emissions decreased by 11% from 2015 to 2017
2. The decrease in emissions at the WWTP accounted for 1/3 of the total emissions reductions
3. Xcel Energy's emissions factor was responsible for more than half the reduced GHGs
4. Electricity makes up 70% of total city operations emissions

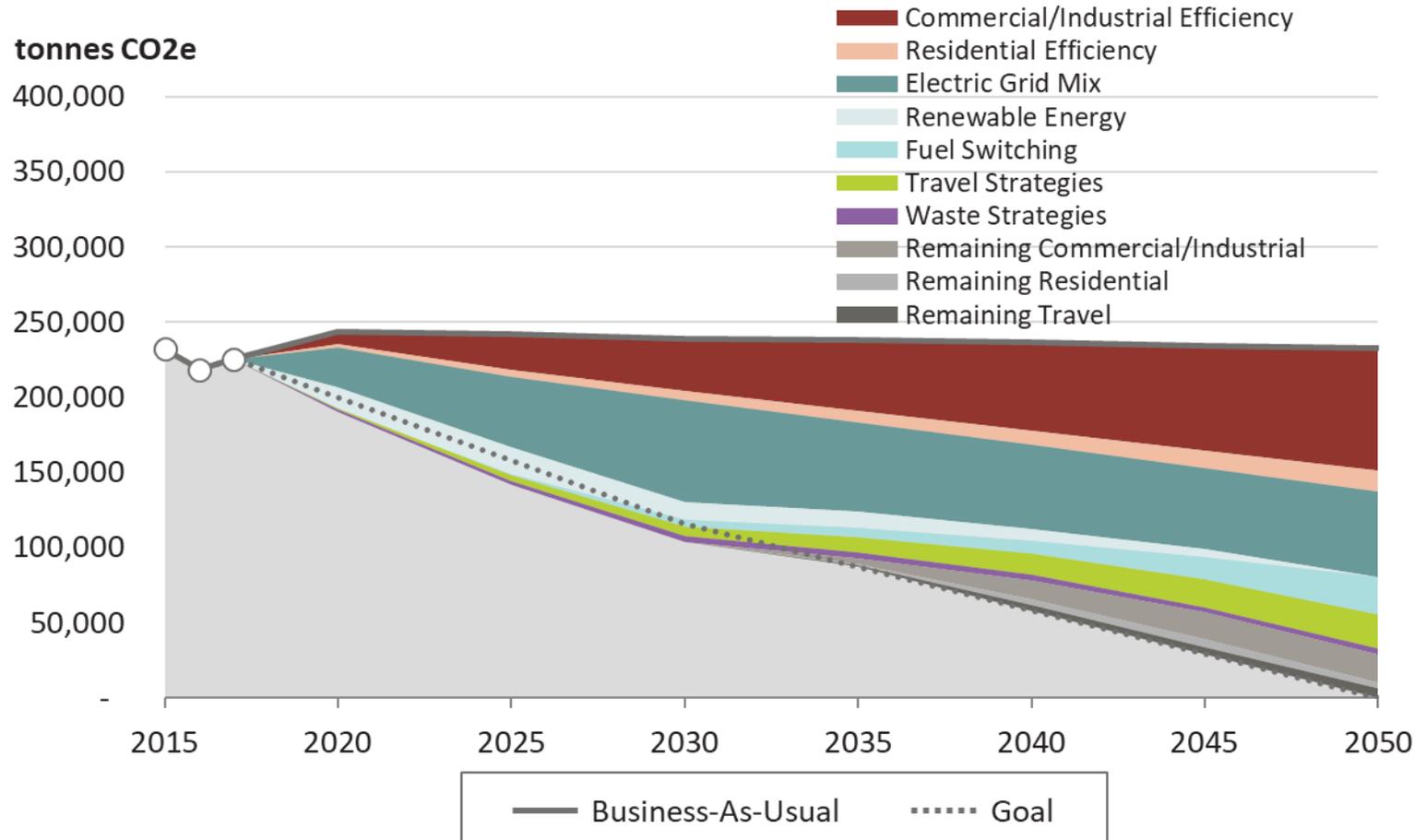
Energy and Process Sources of Greenhouse Gas Emissions, 2015-2017



Emissions Reduction Targets and Plan Impact

NORTHFIELD GREENHOUSE GAS EMISSIONS

PLANNED EMISSIONS REDUCTIONS BY SECTOR



OVERALL

Reduction from 2015 baseline:

	2030	2050
Goal	50%	100%
Plan	55%	87%
Energy	59%	89%
Vehicle Travel	21%	78%
Waste	100%	100%

Advanced strategies and/or offsets required for remaining natural gas and vehicle travel

Strategies, Priorities, and Actions for Climate Mitigation

Strategies: Umbrella

1. Education and Engagement
2. Policy and Planning
3. Innovation and Demonstration
4. Supporting the Plan

Priority Examples:

- Advanced Energy
- Transportation and Land Use

Action Example:

Identify a future development project that can demonstrate a net zero energy building design



Priorities, Strategies, and Action for Climate Mitigation

Innovation and Demonstration

The City of Northfield shall pursue these and other innovative projects that can also serve as demonstrations for Northfield residents and businesses as well as other communities locally, state-wide, and nationally wherever applicable. These projects will require a new approach that will test unfamiliar concepts and prepare to scale up those that demonstrate viability.

Impact on Emissions: These projects have the potential to achieve significant reductions in emissions.

Desired Outcome: The desired outcome of these strategies is to identify where the city can focus its efforts on deep GHG reductions through the successes and lessons learned.

IN – 1 Advanced Building Energy
Description: While many of these technologies are currently available, they are not necessarily widely used for a variety of reasons.
Recommended Actions
<ul style="list-style-type: none">• Identify a future development project that can demonstrate a net zero energy building design <i>GSC best practice 2</i>• Identify firms qualified to design, develop, or construct net zero energy buildings and encourage them to lead by example through local projects <i>GSC best practice 2</i>• Work with the Minnesota Department of Commerce to match heat waste with heat loads to see if there are opportunities for combined heat and power and district heating technologies to be utilized <i>GSC best practice 2</i>• Partner with local businesses, institutions, and Xcel Energy to develop a pilot micro-grid with renewable power and battery storage <i>GSC best practice 26</i>• Partner with Dakota and Rice Counties to understand opportunities and barriers for an anaerobic digester for food and agricultural waste <i>GSC best practice 22</i>

IN – 2 Transportation and Land Use
Description: Innovative transportation and land use projects that may take additional research and buy in before they are implemented.
Recommended Actions
<ul style="list-style-type: none">• Partner with businesses to catalyze public EV charging• Update and strengthen the comprehensive plan and Land Development Code to increase residential density within city limits through infill best practices, such as accessory dwelling units and elimination of minimum parking requirements <i>GSC best practice 6</i>• Research and promote land management practices to encourage carbon sequestration through trees and soil <i>GSC best practice 16</i>

Implementation Discussion

In the first year, the following will need to be implemented to get the plan started:

1. Staff person/s designated to leading implementation
2. Funding mechanism to pay for staff time, city operation improvements, and community projects
3. Tracking mechanism to track projects and emissions, annually (ClearPath, Regional Indicators, internal document)
4. Establish and/or enable a citizen body to support plan implementation
5. Develop an annual work plan, prioritize projects

Implementation Discussion