



# 2022

## MNDOT SUSTAINABILITY REPORT

## Sustainability and Public Health

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Special thanks to Siri Simons, Cole Norgaarden, and Anna Pierce for leading the development of this report and to all the MnDOT staff throughout the agency who supported the measures and actions reported in the report.

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# Executive Summary

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The MnDOT Office of Sustainability and Public Health (OSPH) is pleased to present the 2022 Sustainability Report.

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*MnDOT can lead the way by demonstrating how sustainable operations look. State leadership in this area could encourage other entities to advance sustainability and public health.*

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## OSPH Strategic Goals

MnDOT's Office of Sustainability and Public Health was created in December 2019. The office's strategic goals are to:

1. Reduce transportation carbon pollution.
2. Lead by example through MnDOT sustainability efforts.
3. Support transportation that improves public health for all Minnesotans.
4. Improve resilience of the transportation system in Minnesota.
5. Develop strategic external partnerships to expand innovation.

OSPH leads sustainability and public health planning at MnDOT, but relies heavily on other agencies, external partners, and the public to guide sustainable transportation efforts. The [Minnesota Statewide Multimodal Transportation Plan \(SMTTP\)](#) developed by MnDOT's Office of Transportation System Management and updated recently in 2022, is Minnesota's highest level policy plan for transportation and lays out additional goals and strategies for improving the sustainability of the transportation sector.

MnDOT also coordinates with internal and external groups to initiate new relationships, build upon existing ones and actively seek input on climate policy solutions. Examples include:

- MnDOT Climate and Resilience Workgroup
- Sustainable Transportation Advisory Council (STAC)
- Governor's Climate Change Subcabinet

Learn more about collaboration and partnerships later in this report.

## How We're Measuring Progress

The 2022 MnDOT Sustainability Report includes information related to our strategic goal to lead by example through MnDOT sustainability efforts. Each section features a set of metrics that measure progress toward targets, helping MnDOT make decisions and evaluate the effectiveness of policies, strategies, and investments.

The sections also include tables of Planned Actions that will make progress on the targets. These actions will be led and/or supported by the MnDOT Office of Sustainability and Public Health along with other agency partners in 2023 and beyond. The Planned Actions tables list actions along with their status, anticipated completion date and co-benefits. This information helps hold MnDOT accountable by offering transparency to our stakeholders and the public.

## 2022 in Review

MnDOT remains focused on leading by example consistent with statutory goals for energy and emissions reductions while recognizing the importance of continued work toward improving safety, advancing public health and supporting climate resilience.

While there is still work to be done, there have been several success stories in the past year. For example, MnDOT met its greenhouse gas (GHG) emissions reduction target for facilities for the fourth year in a row and successfully completed

statewide conversion of roadway lighting to LEDs. Each section in the following report gives a detailed look into additional accomplishments from various focus areas in 2022 with respect to:

- MnDOT facilities
- MnDOT fleet vehicles
- Highway operations
- Roadside vegetation
- Transportation construction projects

The table below summarizes goals and targets. A green circle (●) indicates a goal has been achieved, while a red square (■) indicates results not yet met.

### PROGRESS TOWARD MNDOT SUSTAINABILITY TARGETS (2022)

CATEGORY	TARGET	PROGRESS TOWARD TARGET (2022)
GHG emissions of MnDOT facilities	30% emissions reduction from 2005 levels by 2025	43% reduction ●
Energy use intensity of MnDOT facilities	30% intensity reduction from 2008 levels by 2025	24% reduction ■
Renewable energy	25% of agency energy needs met by renewable energy production or subscription by 2025	24% of energy needs ■
Water use of MnDOT facilities	15% water use reduction from 2017 levels by 2025	10% reduction ■
Municipal solid waste (MSW) recycling rate at MnDOT facilities	75% MSW recycling rate achieved by 2030	22% recycling rate ■
GHG emissions of MnDOT fleet vehicles	30% emissions reduction from 2017 levels by 2025	24% increase ■
Fossil fuel use by MnDOT fleet vehicles	30% reduction in fossil fuel use from 2017 levels by 2025	30% increase ■
Fuel efficiency of MnDOT light duty vehicle fleet	30 miles per gallon (mpg) average light duty fuel efficiency achieved by 2025	18 mpg average ■
Electric vehicles in MnDOT fleet	100% of MnDOT sedans and SUVs converted to zero emission vehicles by 2030	3% converted ■
Salt use on MnDOT roadways	200 gallons of liquid per ton of salt solids applied annually by 2027	43 gallons of liquid per ton of solids applied annually ■
LED bulb replacement for lighting on MnDOT roadways	Convert all lighting on MnDOT roadways to LEDs by 2020	99.5% complete ●
Native seeding on MnDOT projects	75% of acres on large projects planted with native seeds annually by 2025	42% planted in 2022 ■
Native planting on MnDOT projects	80% native plant material on urban projects and 90% on rural projects annually	65% of plant material in 2022 ■
GHG emissions of MnDOT construction projects	Target to be revised	Data not yet available

## What's Next

MnDOT will continue to integrate sustainability into the way we do business. For more information about MnDOT efforts to advance sustainability and public health within the transportation sector, see the [2022 Transportation System Performance Report](#).

# Introduction

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## 2022 in Context

COVID-19 remote work policies started lifting in 2022 and MnDOT employees began working and meeting at MnDOT offices more often. One result of adopting a hybrid work environment for office staff was an increased use of MnDOT facilities and fleet vehicles compared to 2020 and 2021. Supply chain issues that emerged during the pandemic continued to limit the purchasing of assets necessary for advancing sustainability goals such as electric vehicles (EVs). Additionally, extreme weather conditions prevailed across the state with near record-breaking snowfall and extreme moisture conditions occurring in many locations. This climactic pattern required above-average use of equipment for clearing and treating roadways to manage ice, slush and snow. All combined, these factors had a major impact on MnDOT's capacity to make progress toward operational sustainability targets in 2022.



Transportation continues to be the leading source of carbon pollution in both Minnesota and the United States. In 2022, MnDOT made significant headway in standing up three new programs created by the Infrastructure Investment and Jobs Act (IIJA) of 2021. Dedicated staff were hired to manage implementation of each new federal program, including:

- **National Electric Vehicle Infrastructure (NEVI) formula program:** Provides funds to states to build a convenient, affordable, reliable and equitable fast charging network for EVs across the country. Over five years, Minnesota expects to receive and invest about \$68 million from the NEVI formula program.
- **Carbon Reduction Program (CRP):** Provides funding for projects that reduce carbon dioxide emissions from on-road highway sources. Minnesota expects to receive and invest about \$20.9 million annually with an increase of up to 1.9% per year. The CRP also requires states develop a Carbon Reduction Strategy.
- **Promoting Resilient Operations for Transformative Efficient and Cost-saving Transportation (PROTECT) formula program:** Provides funding for projects that make the country's surface transportation system more resilient to the worsening impacts of climate change. Over five years, Minnesota expects to receive and invest about \$121 million from the PROTECT formula program.

Successful implementation of these programs, which includes identifying, selecting and constructing eligible projects, allows MnDOT to contribute to sector-wide decarbonization and resiliency of the transportation system in Minnesota.

MnDOT leads by example through agency sustainability efforts. This report tracks progress toward operational sustainability targets, new planned actions and areas for improvement. Some areas showed encouraging progress, while others have room for improvement.

## Guiding Statutes and Executive Direction

*The following statutes and executive directions guide MnDOT's work on sustainability and public health.*

### [MINN. STAT. 216H:](#)

#### Greenhouse Gas Emissions

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In 2007, the state passed the bi-partisan Next Generation Energy Act (NGEA), which established goals for the state to reduce greenhouse gas (GHG) emissions by 15% below 2005 levels by 2015, 30% by 2025, and 80% by 2050. However, the state did not meet the 2015 goal and is not on track to meet our future goals. Transportation became the largest emitter of carbon pollution in the state in 2016.

### [MINN. STAT. 174.01:](#)

#### Department of Transportation Creation

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MnDOT has 16 goals defined in statute (174.01) that guide agency work to create an integrated multimodal transportation system in Minnesota. A number of these goals directly relate to advancing sustainability and public health:

- (10) to ensure that the planning and implementation of all modes of transportation are consistent with the environmental and energy goals of the state;
- (11) to promote and increase the use of high-occupancy vehicles and low-emission vehicles;
- (13) to increase use of transit as a percentage of all trips statewide by giving highest priority to the transportation modes with the greatest people-moving capacity and lowest long-term economic and environmental cost;
- (14) to promote and increase bicycling and walking as a percentage of all trips as energy-efficient, nonpolluting, and healthy forms of transportation;
- (15) to reduce greenhouse gas emissions from the state's transportation sector; and
- (16) to accomplish these goals with minimal impact on the environment.

### [EXECUTIVE ORDER 19-37:](#)

#### Establishing the Climate Change Subcabinet and the Governor's Advisory Council on Climate Change to Promote Coordinated Climate Change Mitigation and Resilience Strategies in the State of Minnesota

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In 2019, Governor Walz signed Executive Order 19-37 to address the size and scope of the climate crisis, rally the resources of state government and push the state forward on climate action. The executive order describes the existential threat of climate change to all Minnesotans, including risks for health and wellbeing, natural resources, and our economy and ways of life. It also highlights that significant disparities exist in Minnesota and that existing disparities mean climate risks are not distributed equally. Some communities bear a disproportionate burden of the negative impacts.

Therefore, MnDOT must consider race, gender, geography and economic status and make sure Minnesota's climate solutions consider equity, respond to community needs and bring benefits to all Minnesotans. EO 19-37 established the Climate Change Subcabinet and the Governor's Climate Change Advisory Council to address these issues.



## EXECUTIVE ORDER 19-27:

### Directing State Government to Conserve Energy and Water and Reduce Waste to Save Money

Executive Order 19-27 requires MnDOT to report and make progress on 6 sustainability goals:

- Reduce fleet fossil fuel consumption: 30% reduction of state fleet consumption of fossil fuels by 2027 relative to a 2017 adjusted baseline.
- Reduce water consumption: 15% reduction of water use by 2025 relative to a 2017 adjusted baseline.
- Sustainable Procurement: 25% of total spend on priority contracts are sustainable purchases by 2025.
- Reduce GHG emissions: 30% reduction of GHG emissions by 2025 relative to a 2005 calculated baseline.
- Reduce energy consumption: 30% reduction in consumption of energy per square foot by 2027 relative to a 2017 adjusted baseline.
- Reduce solid waste: 75% combined recycling and composting rate of solid waste by 2030.

## Collaboration and Partnerships

The Office of Sustainability and Public Health (OSPH) leads sustainability and public health planning and coordination at MnDOT, but progress hinges on involvement from staff across the agency. MnDOT also relies on other state agencies, regional and local partners and the public to set sustainability and public health strategies for the agency to implement. In addition to the key groups listed below, OSPH collaborates with topic-specific internal workgroups and broader national coalitions to guide agency sustainable transportation efforts.

### Internal Stakeholders

#### COMPLETE STREETS POLICY WORKGROUP

The Complete Streets Policy Workgroup met from January 2021 through March 2022 to guide the MnDOT Complete Streets Policy update and Complete Streets Handbook development. Membership was representative of Complete Streets Policy responsibility areas within the agency.

#### RESILIENCE ADVISORY TEAM

In 2019, MnDOT created the internal Resilience Advisory Team (RAT) to guide the agency on resilience efforts. The multidisciplinary team is comprised of MnDOT staff from several offices throughout the agency, charged with the following tasks:

- Identify and recommend resilience priorities for the agency.
- Discuss and vet potential barriers and areas of concern.
- Refine and expand on how the agency assesses and measure climate resilience.



## External Stakeholders

### SUSTAINABLE TRANSPORTATION ADVISORY COUNCIL

The STAC makes recommendations to the MnDOT Commissioner to help the agency reduce carbon pollution from the transportation sector in Minnesota, consistent with the MnDOT statutory goals outlined in Minn. Statute 174.01, the Next Generation Energy Act and the annual MnDOT Sustainability Report.

The STAC is a type of long-form public engagement. The STAC workgroups listed below develop recommendations that prioritize climate action and equity:

- Fueling and Powering Workgroup
- Vehicle Miles Traveled (VMT) Workgroup

The goal of the STAC is to help Minnesota transition to a low carbon transportation system consistent with statutory goals for energy and emissions reductions to maximize benefits to Minnesota, while recognizing the importance of improving safety, reducing inequities and supporting economic development.



### GOVERNOR'S CLIMATE CHANGE SUBCABINET

The Governor's Climate Change Subcabinet includes executives from 15 state agencies, departments and boards. The subcabinet was established to take on several actions.

- Identify policies and strategies that will put Minnesota back on track to meet or exceed the Next Generation Act goals to reduce GHG emissions.
- Identify policies and strategies to enhance the climate resiliency of Minnesota's natural resources, working lands, and communities and to assist state agencies, businesses, and local communities to prepare for climate change impacts that cannot be avoided or mitigated.
- Engage with Minnesotans on these complex issues.
- Promote equitable policy solutions that reduce disparities in Minnesota, ensure a just transition for impacted workers and communities and encourage green economic development and job creation.

To identify effective policies and strategies, state leaders convene action teams across state agencies to address challenges and opportunities each faces from climate change. MnDOT participates in three action teams to inform state-level transportation, sustainability and public health strategies:

- **Climate Engagement Team:** Identifies opportunities to reduce emissions and build resiliency in our communities.
- **Transportation Action Team:** Identifies strategies to address climate change and decarbonize the transportation sector in Minnesota.
- **Resilience and Adaptation Action Team:** Leverages a pre-existing inter-agency team to identify the policies and strategies that build resiliency and adaptation called for in EO 19-37.

## CLIMATE AND RESILIENCE WORKGROUP

The Climate and Resilience Workgroup (CRW) provides recommendations for the new federal transportation programs to MnDOT's Transportation Programming and Investment Committee (TP&IC). It includes three subgroups:

- **Electric Vehicle (EV) Subgroup:** The National Electric Vehicle Infrastructure (NEVI) program began in 2022. The EV Subgroup was initially convened to advise MnDOT on the distribution of NEVI funds (central management or through districts), give feedback on plan development and represent stakeholder interests in developing the EV charging network. In 2023 the subgroup is asked to provide input on possible nominations on Alternative Fuel Corridor, review the NEVI plan annual update and provide feedback on the first Request for Proposal for site applications.
- **Carbon Reduction Program (CRP) Subgroup:** The purpose of the CRP Subgroup is to advise MnDOT's CRW on how to distribute and solicit for the CRP formula funds throughout Minnesota and provide oversight of the Carbon Reduction Strategy development and document.
- **Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Subgroup:** The purpose of the PROTECT subgroup is to guide the development of the Resilience Improvement Plan (RIP). This resilience plan will inform the way PROTECT formula funds will be programmed through future years. The RIP will refine MnDOT's understanding of how extreme weather creates vulnerabilities to Minnesota's surface transportation system.

## LOCAL AGENCY VEHICLE MILES TRAVELED (VMT) WORKGROUP

The purpose of the Local Agency VMT Workgroup is to convene partners from cities and counties representing the entire state (including elected officials, planners and engineers) to share and develop resources related to the Statewide Multimodal Transportation Plan (SMTP) VMT reduction target.

The group's goals are to:

- Develop shared understanding of why we're measuring outcomes with a VMT target.
- Provide input to MnDOT's emerging VMT research, education and strategy development.
- Guide development of consistent VMT modeling.
- Support development of local VMT strategies.

The Local Agency VMT Workgroup was launched in November 2022 and is jointly staffed by MnDOT OSPH and State Aid.

## NEXTGEN HIGHWAYS WORKING GROUP

Representatives from 12 MnDOT offices, the Minnesota Department of Commerce, the Public Utility Commission and the FHWA Minnesota Division office are part of a working group analyzing NextGen Highways, a proposed model for the co-location of transmission and broadband in highway rights of way.

The group's goals are to:

- Identify technical, regulatory and economic barriers for transmission lines in MnDOT-owned right of way (all highway types).
- Evaluate potential for implementation in Minnesota. While limited transmission projects have been sited on U.S. and State highways, a prohibition remains for longitudinal utilities in controlled access environments such as Interstates.
- Build relationships and shared understanding across State agencies, stakeholders and MnDOT offices around how transmission occupancy in right of way can support decarbonization of energy and transportation electrification.

The working group informed a Phase I feasibility study released in April 2022, which was a proactive planning project initiated by the Ray, NextGen Highways Coalition and Great Plains Institute and underwritten by philanthropy. Phase II analysis was launched in fall 2022 with plans to gather additional stakeholder input from public utilities and renewable energy developers as well as to investigate formal business impacts and risk assessments.

## Strategic Partnerships

MnDOT's Strategic Partnerships program was launched in 2021 to expand opportunities for collaboration with external groups on climate action, public health, quality of life, clean energy and transportation equity. Emerging state, federal and local priorities offer MnDOT opportunities to embrace innovation and leverage new opportunities to generate community benefits through transportation investments. MnDOT seeks to balance competing concerns and conflicting community needs and desires against a backdrop of complex environmental, physical and social contexts.

### ADVANCING CLEAN ENERGY AND CONNECTIVITY PROJECTS THROUGH NEXT GENERATION HIGHWAYS COLLABORATION WITH THE RAY AND NGI CONSULTING

Since 2021 MnDOT has collaborated with the Minnesota Department of Commerce and the Public Utilities Commission to evaluate the impacts of expanded transmission and broadband in MnDOT highway right of way. Increasing interest in leveraging existing highway right of way for clean energy and connectivity projects offers opportunities for MnDOT to support decarbonizing energy and electrifying transportation. In 2022 MnDOT joined a feasibility study to evaluate technical and regulatory considerations for NextGen Highways—highways that strategically co-locate transmission and communications infrastructure in highway roadsides. [The NextGen Highways Feasibility Study for MnDOT](#) was released in April 2022 with recommendations for how transmission in highway rights of way could support the additional grid capacity needed for the electrification of transportation and the additional transmission needed to incorporate renewables and improve grid reliability.

### ADVANCING MNDOT'S MISSION THROUGH CREATIVE PROJECTS IN PARTNERSHIP WITH SMART GROWTH AMERICA

Since 2019, MnDOT has partnered with Transportation for America to pilot embedding an artist within the agency to implement creative projects to meet agency goals. The 2022-2023

Sustainability and Public Health Fellow, Sarah Petersen, supported MnDOT in exploring creative ways of achieving state GHG reduction goals.

In 2022, Petersen launched "[Tell Us How You Move Around](#)". It was a public engagement project that consisted of an interactive website, surveys, workshops, games, a poster campaign and a public engagement kit. Each part of the project built on the previous portion of the project: the online website responses informed the in-person workshops, which informed the poster series. The project created opportunities for MnDOT to hear directly from people's lived experiences with transportation and collected data on transportation needs. "Tell Us How You Move Around" additionally provided a tool for people to self-reflect on their experiences and values while communicating with MnDOT. Petersen's work sought to expand participants' awareness and understanding of their transportation options, while also being able to analyze the limitations of those options.



© "What If You Could..." poster campaign created by graphic designer Noah Lawrence-Holder.

# Reporting Framework

The annual MnDOT Sustainability and Public Health Report is developed by the agency's [Office of Sustainability and Public Health](#).

Each content section begins with an overview of the focus area, a collection of recent accomplishments, and a success story from the MnDOT districts. Then, detailed information about the relevant metrics, targets and actions is provided.

## Metrics

Each focus area describes progress on a set of metrics used to measure progress toward targets. Tracking these metrics help MnDOT make decisions and evaluate the effectiveness of policies, strategies, and investments.

## Targets

Targets in the report were established by state statute, executive orders, the MnDOT family of plans, and the Sustainable Transportation Steering Committee.

## Planned Actions

Each focus area includes a table of planned actions that were identified by MnDOT subject matter experts and Office of Sustainability and Public Health staff to make progress on the targets. The Planned Actions tables list actions along with their status indicator, anticipated completion date, and co-benefits.

MnDOT subject matter experts and Office of Sustainability and Public Health staff evaluated the co-benefits of each action based on the evaluation criteria listed to the right.

## Focus Areas



### Lead by example through MnDOT sustainability efforts

- Facilities
- Fleet
- Highway Operations
- Roadside Vegetation
- Construction

## Evaluating Co-benefits

### Potential to reduce greenhouse gas emissions

- Does this action decrease greenhouse gas emissions?

### Potential to improve public health

- Does the action enhance safety and injury prevention, physical activity and active transportation, environmental health, connectivity, and access or equity?

### Potential to support climate resilience

- Does the action reduce vulnerability of infrastructure or community, increase flood resilience, or support evacuation and emergency response?



# Facilities



## METRICS

- Facilities greenhouse gas emissions
- Energy intensity
- Renewable energy
- Water consumption
- Municipal solid waste recycling rate

## Overview

MnDOT is committed to using resources efficiently at agency owned and operated facilities. The agency owns over 1,000 buildings totaling over 6.2 million square feet. Operating facilities consume energy and water and produce waste. [Executive Order 19-27](#) directs state agencies to use these resources responsibly.

## Energy

MnDOT facilities are served by over 80 different utilities, including investor-owned utilities, local public utilities, municipal utilities and electric cooperatives. MnDOT is required to establish site-specific goals to reduce energy use at agency owned facilities.

## Water

Water is used for plumbing, irrigation, and production of liquid salt brine at MnDOT facilities. Reducing water consumption offers many benefits, including lower energy use and costs, less wear and tear on equipment, less treated wastewater being discharged into the watershed and increased resiliency in the wastewater system to handle extreme climatic events.

## Waste

MnDOT office workers create municipal solid waste (e.g., paper, cans, cardboard) and specialty waste (e.g., fluorescent lightbulbs, motor oil). MnDOT facilities offer recycling and trash collection for staff and visitors and encourage recycling of specialty waste whenever possible.

## 2022 Accomplishments

- Supported more renewable energy than any previous year. Community solar garden subscriptions, off-site wind subscriptions and solar panels at MnDOT facilities produced the equivalent of 24% of MnDOT's electricity use.
- Continued to meet the greenhouse gas (GHG) emissions target for facilities, down 43% since 2008.
- A newly installed 30 kW solar array at MnDOT's Northfield Truck Station is expected to generate 37,500 kWh annually.
- Continued to implement temperature set point standard, HVAC and lighting upgrades.
- Continued retrocommissioning efforts for existing facilities.



☒ Recently installed solar panels atop the Northfield Truck Station. Photo courtesy of Brian Ivers, MnDOT

**💡 DISTRICTS IN THE SPOTLIGHT:**

## Reusing Washwater in Districts 3 & 8

MnDOT truck stations in Buffalo and Granite Falls are using less water after installing two new water reuse systems. Developed in partnership between MnDOT Building Services and the University of Minnesota, these facilities help MnDOT meet water consumption reduction targets. Each tank captures and treats salty water discharged from truck washing operations, recycling roughly 20,000 gallons of water and harvesting approximately 2,500 pounds of salt each season. This astonishing 80% washwater reuse rate not only reduces water use but also curtails the release of salt into the sewer system. Moreover, it cuts operational costs by reducing the frequency of pumping onsite holding tanks.

Currently these facilities are designed for small, rural truck stations but MnDOT staff are researching how to integrate water reuse into larger, more advanced brine making systems.

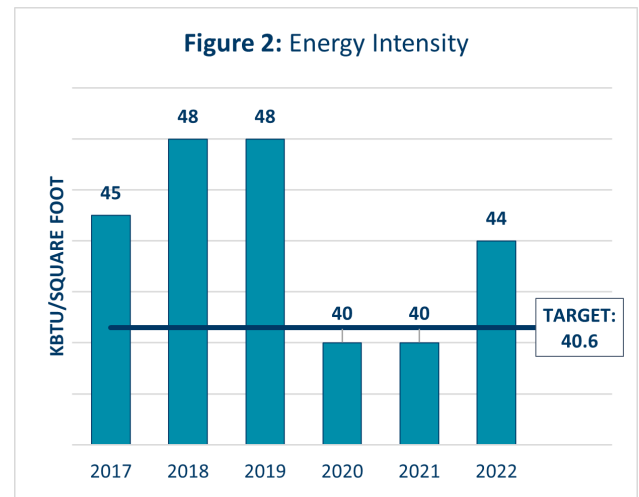
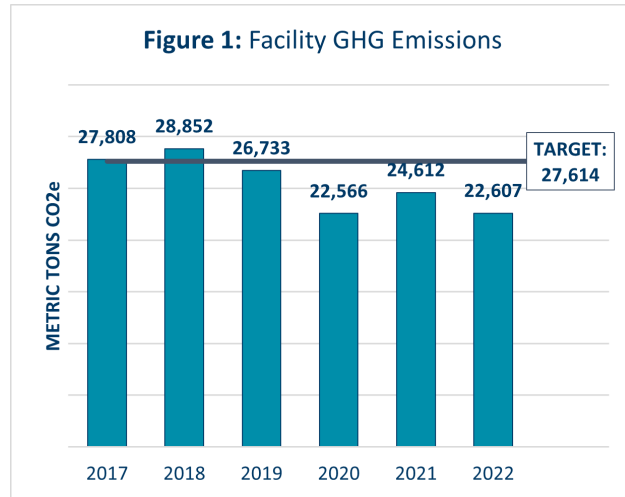


*Left: Installation of treatment tank at Buffalo Truck Station. Right: New treatment system in operation at Buffalo Truck Station. Photos courtesy of Neile Reider, MnDOT.*

### **BENEFITS OF THE WASHWATER REUSE SYSTEM INCLUDE:**

- Transforms truck wash runoff into a reusable resource.
- Reduces water use at facilities while providing a beneficial resource for brine making operations.
- Reduces salt discharge to the sewer systems.

# Measuring Progress



## Facilities Greenhouse Gas Emissions

🎯 **TARGET:** Reduce greenhouse gas emissions by 30% from 2005 levels by 2025.

✅ **RESULTS:** Between 2008 and 2022, the agency reduced GHG emissions from MnDOT owned and operated facilities by 43%.

A cleaner electricity grid, energy efficiency efforts and renewable energy projects drove MnDOT’s ability to achieve the GHG emissions reduction target for facilities for the fourth year in a row. 2022 emissions did not increase despite MnDOT staff returning to office and utilizing facilities at an increased rate compared to 2020 and 2021.

## Energy Intensity

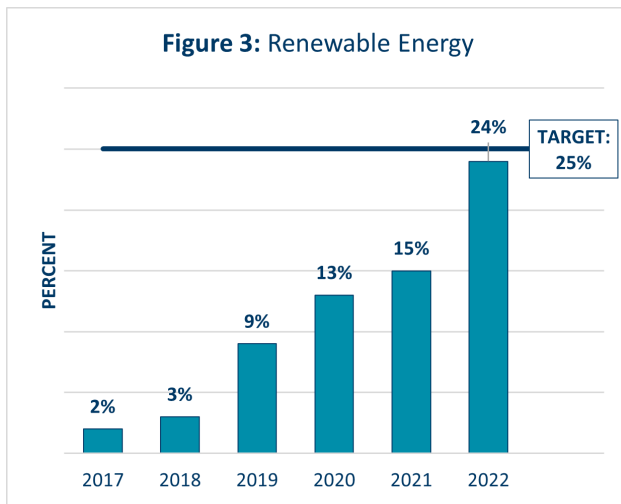
🎯 **TARGET:** Reduce energy intensity by 30% from 2008 levels by 2025.

✅ **RESULTS:** Between 2008 and 2022, the agency reduced energy intensity, or energy consumption per square foot by 24%.

Energy efficiency projects drove the improvements between 2008 and 2020. Between 2020 and 2021, facility energy intensity remained low at 40 KBTU/square foot because of energy efficiency improvements, mild weather and significantly increased teleworking necessitated by the COVID-19 pandemic. Many office staff returned to work at MnDOT facilities on a semi-regular basis in 2022, driving energy intensity back up in tandem with severe winter conditions that required above-average facility use.

In 2022, MnDOT continued to implement energy efficiency projects and support teleworking opportunities for eligible staff with a hybrid work environment that can help to maintain lower energy intensity levels.



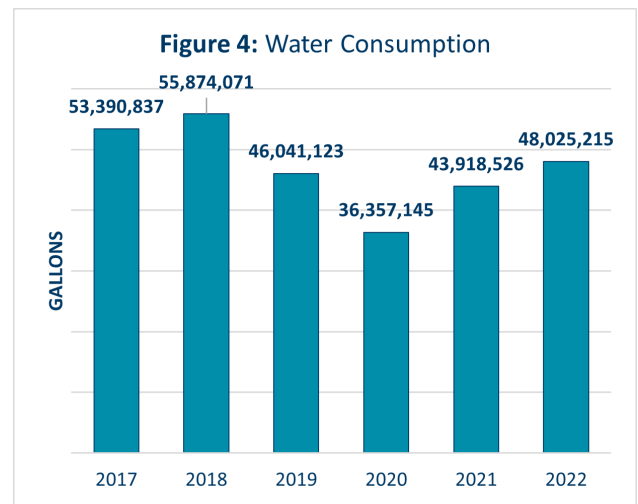


## Renewable Energy

🎯 **TARGET:** Subscribe to or use renewable energy to meet 25% of agency energy needs.

✅ **RESULTS:** In 2022, MnDOT subscribed to or produced renewable energy equivalent to 24% of agency electricity use.

On-site solar energy production, off-site wind subscriptions and community solar garden subscriptions produced the equivalent of 24% of electricity needs at agency facilities in 2022, nearly meeting the 25% target. Solar arrays located at MnDOT Central Office, District 4 in Morris, District 6 Maintenance and Operations facility in Rochester and a former MnDOT-owned gravel pit in Afton produce renewable energy used by MnDOT. Newly added solar capacity in addition to community solar garden subscriptions enabled the agency to meet more of its electricity needs with renewable sources in 2022 than in any previous year, despite higher energy use overall.



## Water Consumption

🎯 **TARGET:** Reduce water use by 15% from 2017 levels by 2025.

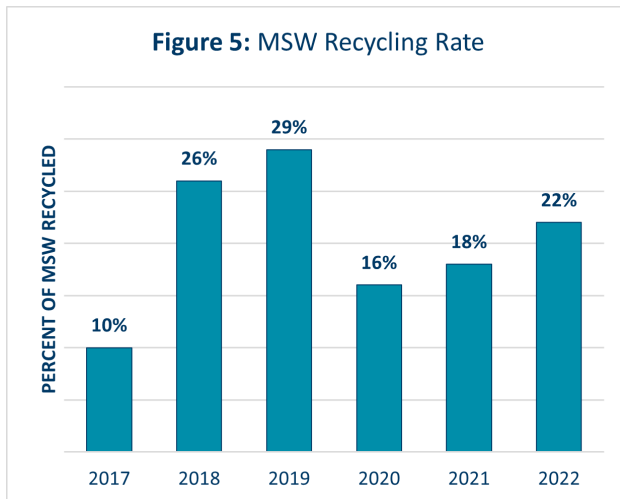
✅ **RESULTS:** Between 2017 and 2022, MnDOT used 10% less water at agency owned and operated facilities.

Since 2020, an upward trend in water use has emerged that is likely to continue. Building closures, fixture replacements and operational changes due to COVID-19 drove a significant drop in water use between 2019 and 2020. As staff returned to offices at agency facilities and MnDOT increased liquid brine production, water use increased overall. In 2022, MnDOT continued to support teleworking opportunities and implement water conservation measures (e.g., water reuse systems) that maintain efficient water use at MnDOT facilities.

Minnesota's water resources are vital to the people and economy of the state. Making roads safe for motorists remains MnDOT's first concern and all parties involved in winter maintenance must learn to continuously consider environmental impacts and reduce chloride use wherever possible. The agency is increasingly blending liquid salt brine with alternative chemicals (e.g., calcium chloride) to reduce negative impacts on water quality from salt. Liquid brine use increased from 6.5 million gallons in state fiscal year 2020 to 8.1 million gallons in state fiscal year 2022. When placed at

the recommended rate, a gallon of liquid salt brine uses approximately 30% less rock salt compared to using rock salt alone. While liquid brine production increases water use, the corresponding reduction of salt provides significant water quality benefits. This is just one way the agency balances tradeoffs between sustainability targets and other priorities.

recycling in areas where there are haulers and commercial composting facilities). There may not be recycling or composting haulers or facilities in all parts of the state, but there is an opportunity to explore expanding these practices where they are available.



## Municipal Solid Waste Recycling Rate

🎯 **TARGET:** Achieve 75% recycling and composting rate by 2030.

✅ **RESULTS:** The municipal solid waste recycling rate at MnDOT facilities increased from 18% in 2021 to 22% in 2022.
























The Municipal Solid Waste recycling rate at MnDOT facilities increased from 18% in 2021 to 22% in 2022, down from a high of 29% in 2019. In 2020 and 2021, some employees were teleworking, so the total amount of waste produced was less, but the diversion rate was lower. This may be due in part to the reduction in printing and recycling of office paper while employees were not in the office. The recycling rate is higher at MnDOT headquarters and truck stations than at rest areas.

As staff return to the MnDOT offices there is an opportunity to reengage employees about recycling benefits and best practices and to refresh or amend existing recycling processes (e.g., by adding organics

## 2023 Planned Actions Table

Many of the planned actions have the potential to reduce GHG emissions by using less energy or using renewable energy. By drawing less energy from power plants, the actions will reduce air pollutants and improve public health. The actions that reduce

water consumption have the potential to support climate resilience by drawing less on local aquifers, discharging less wastewater into the watershed and increasing the wastewater system capacity to handle extreme weather events.

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
1 Develop facility energy plans for one additional MnDOT district that identifies energy efficiency and renewable energy projects.	 IN PROGRESS	Ongoing			
2 Remove barriers to implementation for compliance with agency temperature set points.	 IN PROGRESS	Ongoing			
3 Continue energy efficiency projects (e.g., building automation, upgrades to equipment, and lighting).	 IN PROGRESS	Ongoing			
4 Evaluate opportunities to expand recycling (including organics) at facilities statewide.	 IN PROGRESS	Ongoing			
5 Implement water fixture improvements in the 2018 Facility Water Reduction Assessment.	 IN PROGRESS	Ongoing			
6 Add urinals to reduce water use in bathrooms as they are updated.	 IN PROGRESS	Ongoing			
7 Add water conservation measures in new building construction and existing building renovation.	 IN PROGRESS	Ongoing			
8 Retrocommission existing MnDOT facilities. (NEW)	 IN PROGRESS	Ongoing			

# Fleet



## METRICS

- Fleet greenhouse gas emissions
- Fleet fossil fuel use
- Light duty fuel efficiency
- Electric vehicles
- Employee-owned auto mileage

## Overview

MnDOT uses a variety of vehicles and fuels to perform maintenance, delivery, transportation, assessment and provide services for the safety of the traveling public. The agency used more than 4,600 vehicles in 2022, including nearly 1,200 light duty vehicles (including 124 sedans and 152 SUVs), over 2,100 medium- and heavy duty vehicles and over 1,200 off-road vehicles. MnDOT remains committed to reducing fossil fuel use from MnDOT fleet vehicles, as it accounts for more than a quarter of the total fossil fuel consumption across the state enterprise.

[Minn. Stat. 16C.137](#) calls for state departments, whenever legally, technically and economically feasible, subject to the specific needs of the department and responsible management of agency finances, to ensure that all new on-road vehicles, excluding emergency and law enforcement vehicles, are purchased in conformity with the vehicle preference order established in section 16C.135, subdivision 3:

- an electric vehicle;
- a hybrid electric vehicle;
- a vehicle capable of being powered by cleaner fuels; and
- a vehicle powered by gasoline or diesel fuel.

## 2022 Accomplishments

- Added four battery EVs, two plug-in hybrids, and three hybrids to the fleet in 2022.
- Partnered with Sawatch Labs to analyze utilization of MnDOT's existing EV fleet and to determine which non-EV vehicles are most suitable for electrification.
- Light duty fuel efficiency improved to 18 miles per gallon.



📷 A Chevy Bolt EV from the MnDOT Central Office fleet. Photo courtesy of Beth Croteau-Kallestad, MnDOT.



📷 Close-up of the Chevy Bolt EV dashboard. Photo courtesy of Beth Croteau-Kallestad, MnDOT.

**💡 DISTRICT IN THE SPOTLIGHT:**

## Fleet Electrification in District 2

District 2 has made great strides in increasing capacity to electrify its fleet by acquiring 18 Level 2 EV chargers and one Level 3 (150 kW) EV charger. So far, 12 of the Level 2 chargers are installed at MnDOT facilities in Bemidji, Walker, Crookston, Thief River Falls, Roseau and Baudette. The remaining chargers will be installed at Park Rapids, Hallock and additional locations in Bemidji. District staff met with local electrical utility representatives to explore options for off-peak or separate service to save money on operating the chargers.

District 2 also purchased three all-electric 2022 Chevy Bolts which have an EPA-estimated average driving range of 247 miles on a full charge. Staff are currently completing a telematics-based EV suitability assessment to identify other vehicles that would be good candidates for replacement, including recommendations for specific makes and models. Driver acceptance, range anxiety, electric grid capacity at MnDOT facilities and difficulty charging vehicles off-site are some of the challenging factors that impact EV use in District 2 and across the state.



📷 *A fleet vehicle parked in an EV charging stall at a District 2 garage. Photo courtesy of Tony Bowe, MnDOT.*

# Measuring Progress

## Fleet Greenhouse Gas Emissions

🎯 **TARGET:** Reduce greenhouse gas emissions from fuel used by MnDOT vehicles 30% from 2017 levels by 2025.

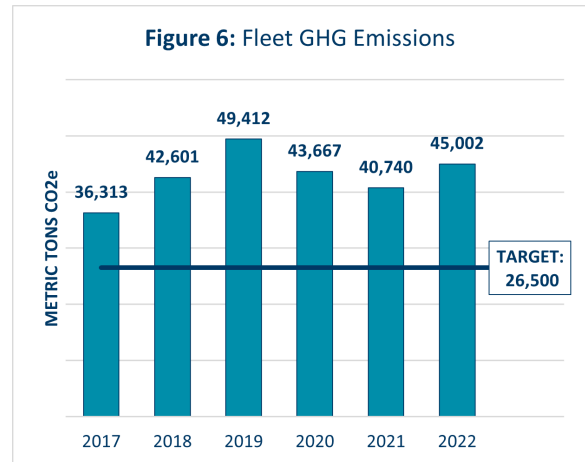
📊 **RESULTS:** Fleet GHG emissions increased by 24% from 2017 levels.

Between 2017 and 2022, fleet GHG emissions increased by 24%, reversing a decline between 2019 and 2021. Both emissions and fuel use increased due to higher fleet utilization in 2022. MnDOT staff drove light duty vehicles more frequently for traveling to in-person meetings and events, while severe winter conditions required above-average use of roadway deicing and snow clearing equipment.

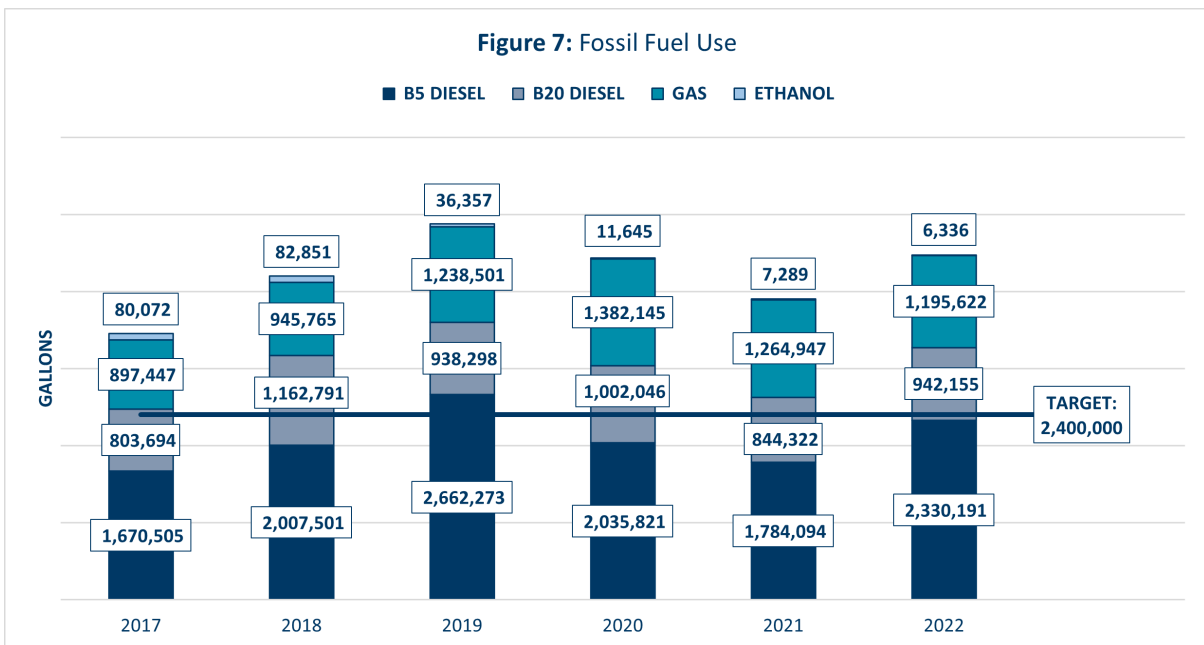
## Fleet Fossil Fuel Use

🎯 **TARGET:** Reduce fossil fuel use from MnDOT vehicles by 30% from 2017 levels by 2025.

📊 **RESULTS:** Between 2017 and 2022, fossil fuel use by MnDOT vehicles increased by 30%.



Between 2017 and 2022, fossil fuel use increased by 30%, reversing a decline seen between 2019 and 2021. However, light duty vehicles used less gasoline in 2022 than the three previous years. Both emissions and fuel use increased due to higher fleet utilization in 2022. Light duty vehicles were used more frequently for traveling to in-person meetings and events while severe winters required above-average use of roadway clearing equipment.



# Light Duty Fuel Efficiency

🎯 **TARGET:** Achieve an average light duty fuel efficiency of 30 mpg or more by 2025.

📊 **RESULTS:** In 2022, the average light duty fuel efficiency of vehicles in the MnDOT fleet was 18 mpg.

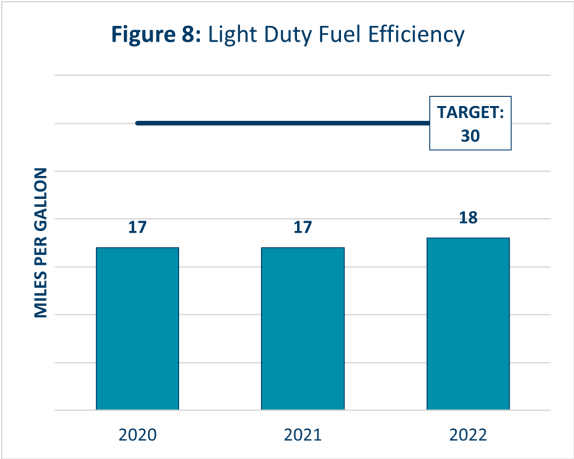
*Light-duty fuel efficiency is a measurement based on the fuel efficiency of MnDOT sedans, SUVs, vans, and pick-up trucks that weigh less than 8,500 lbs.*

**WEIGH LESS THAN** <8,500 lbs



Light duty fuel efficiency improved to 18 miles per gallon (mpg) in 2022. Light duty fuel efficiency measures the fuel efficiency of MnDOT sedans, SUVs, vans, and pick-up trucks that weigh less than 8,500 lbs. Heavy duty vehicles traveled 3 million more miles in 2022 than 2021, while light and medium duty vehicles traveled slightly more than in 2021.

The vehicle life cycle for sedans in the MnDOT light duty fleet is eight years and fuel efficiency improves as light duty vehicles are incrementally replaced with more efficient and electric models. Additionally, MnDOT is utilizing telematics to reduce vehicle idling and support other immediate improvements to fuel efficiency.





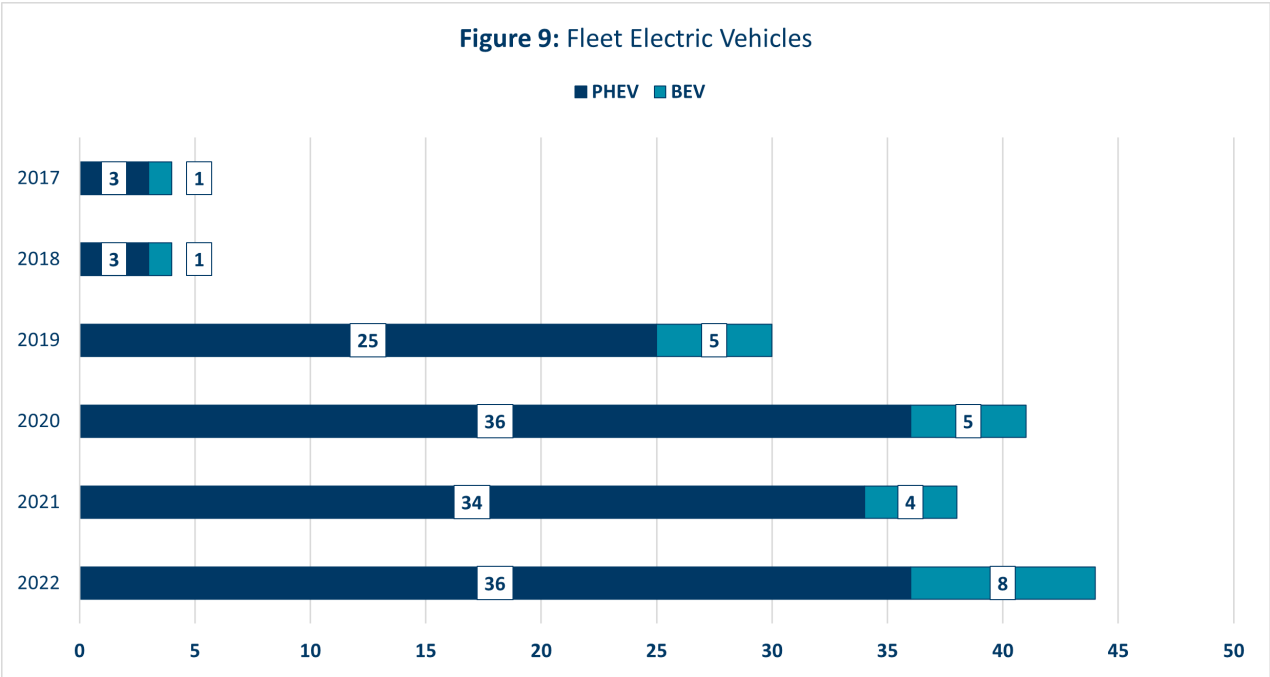
# Electric Vehicles

**TARGET:** Transition 100% of MnDOT sedans and SUVs to zero emission vehicles by 2030.

**RESULTS:** In 2022, 3% of MnDOT sedans and SUVs in the MnDOT light duty fleet were zero emission vehicles, which includes battery EVs.

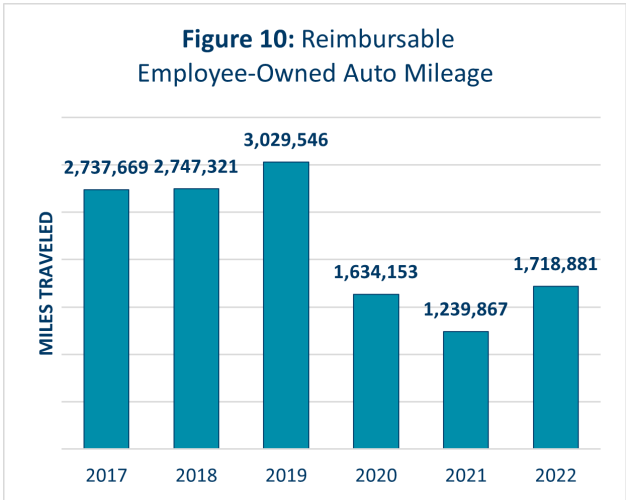
MnDOT added two plug-in hybrid EVs (PHEVs) and four battery EVs (BEVs) to the fleet in 2022. Additionally, the agency added three hybrid vehicles

to the fleet, bringing the total number of hybrids to 48. Together, ZEVs (BEVs), PHEVs and hybrids make up a third of the sedans and SUVs in the light duty fleet. However, several factors present significant challenges to meeting the EV transition target by 2030, including operational constraints, limited availability of charging infrastructure, procurement delays caused by supply chain disruptions and timing of the existing fleet replacement schedule. For example, two Ford Lightning pickups were ordered for the District 6 fleet but only one was delivered; the other was canceled by the manufacturer.



# Employee-owned Auto Mileage

In 2022, reimbursable employee-owned auto mileage was 43% lower than in 2019. MnDOT has no target for reducing employee-owned auto mileage and does not currently track employee fuel use consistently. MnDOT encourages employees to use the right mode for the right job, including carpooling and offering virtual meetings. Employee-owned auto mileage had dropped significantly between 2019 and 2021, primarily due to COVID-19, but rose slightly again in 2022 as in-person meetings and events became common again.



## 2023 Planned Actions Table

The following actions are planned for 2023 to reduce the fossil fuel use and greenhouse gas emissions from the MnDOT fleet. Fleet vehicles

powered by fossil fuel generate air pollution, which is a health risk, and reducing emissions from the MnDOT fleet benefits public health.

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
1 Install 43 EV chargers at MnDOT facilities for agency fleet vehicles and visitors on official state business.	COMPLETE	Fall 2022			
2 Continue to track and communicate flags to District staff to eliminate unnecessary idling.	IN PROGRESS	Ongoing			
3 Apply for grant funding to upgrade bulk fuel dispensers for compatibility with up to B100.	ON HOLD	TBD			
4 Pilot one Ford Lightning pickup truck in MnDOT fleet.	IN PROGRESS	TBD			
5 Partner with Xcel Energy and Sawatch Labs to electrify MnDOT vehicles and address charging needs.	IN PROGRESS	Phase 1: Summer 2022  Phase 2: In progress			
6 Develop recommendations to optimize snowplow routes and fuel use.	IN PROGRESS	TBD			
7 Track electric and hybrid vehicle utilization and resulting savings accrual/emissions reduction. (NEW)	NOT STARTED	Ongoing			

# Highway Operations



## METRICS

- Gallons of liquid per ton of salt used
- Salt use
- Snow fences
- LED bulb replacement and greenhouse gas emissions savings

## Overview

MnDOT strives to meet the public and economic demands for safe winter driving conditions. MnDOT's salt sustainability efforts include using liquid chemical deicers (in addition to salt or sand), plows to reduce the amount of salt needed, and research to identify alternative deicers. MnDOT also uses mobile observations to optimize salt use and blowing snow control measures such as living snow fences, structural snow fences, standing corn rows, strategically placed bales, native tallgrass wildflower prairie plantings, and road design elements to further reduce the need for snow management.

## 2022 Accomplishments

- Achieved LED target by converting lighting on MnDOT roadways to low carbon LEDs
- Increased use of liquid salt brine to further reduce amount of salt used in snow removal.
- Invested in liquid salt brine production, storage, mixing and application technology across the state.
- Participated in pooled fund study of snow removal decision support technology.



© A MnDOT snowplow operator checking equipment.

## 💡 DISTRICTS IN THE SPOTLIGHT:

### Statewide Liquid Brine Use

MnDOT first started using liquid salt brine to clear roadways in the 1990s, but in recent years the agency invested in scaling up liquid salt brine application as a primary deicing method across the state. \$2,000,000 dollars were invested over the past four years in liquid salt brine production, storage, mixing and application, with an additional \$4,000,000 secured to support further implementation over the next four years. MnDOT continues to participate in the Clear Roads research program, which brings together transportation professionals and researchers from around the country to drive innovation in the field of winter maintenance.

There are several benefits that make liquid salt brine a more effective deicer when compared to rock salt (solid chloride), including:

- Less likely to be blown from the roadway in windy conditions.
- Reduced impact on environment due to 30% reduction in use of solid chloride.
- 30% faster snowmelt rate.
- Improved performance at lower temperatures, including extreme cold.
- Improved operational efficiency that reduces snowplow mileage.

By measuring the ratio of gallons of liquid chloride used for each ton of rock salt, MnDOT Operations can track efficiency while controlling for winter conditions that vary significantly from year to year. Within the last 10 years, that ratio improved from 14 to 54 gallons per ton on average. To ensure that this promising trend continues, MnDOT is developing training materials and technology to support staff in continuing to adopt liquid salt brine as an environmentally conscious and operationally efficient deicing strategy for Minnesota.

## Measuring Progress

### Reduction in Total Salt Applied to Roadways

Ratio of liquid to solid de-icing chemicals applied to roadways for snow and ice control

🎯 **TARGET:** 200 gallons of liquid per ton of solids (salts) applied annually by 2027.

✅ **RESULTS:** During the winter of 2021-22, an average of 43 gallons per ton of solids applied. During the winter of 2022-23, an average of 54 gallons per ton of solids applied.

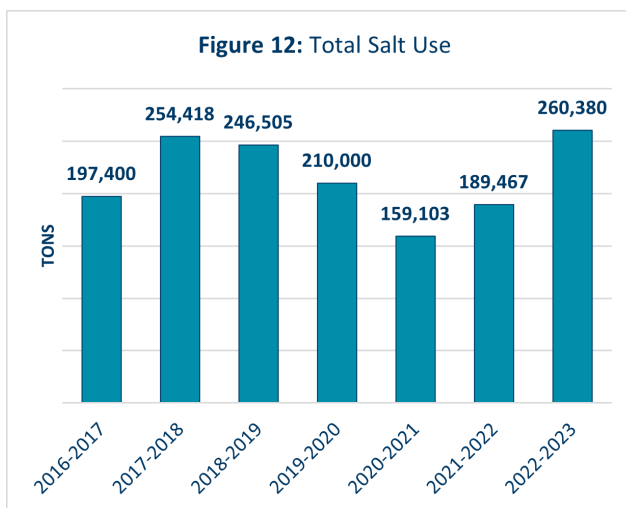
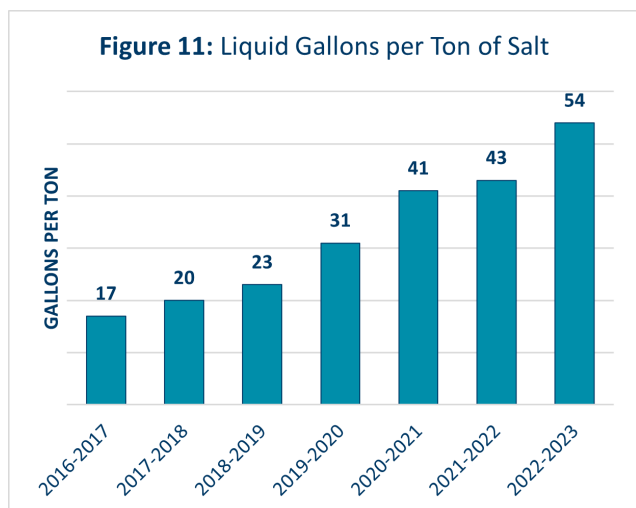
During Minnesota winters, salt plays a key role in providing safety and mobility for the traveling public. Salt does, however, have an adverse effect on nearby environments and groundwater sources. By increasing the ratio of liquids to solids, MnDOT will reduce the total amount of salt applied to roadways.

When placed at recommended rates, one gallon of liquid salt brine uses approximately 30% less rock salt compared to using rock salt alone. To reach department goals, MnDOT will need to increase water use and invest in blending, storage, and application systems.

Since the winter of 2016-17, MnDOT has seen a steady increase in the rate of liquids to solids. This rate should continue to increase as investments are made and refined practices are implemented. Winters vary significantly in severity, so we do not expect to see a steady linear decline in salt use. Severe winters will require more salt, even if our salt use is more effective.

### Salt Use

Salt use increased during the 2021-2022 season to 189,467 tons because of severe winter conditions that required more frequent and higher volume application of salt in solid and liquid form. This pattern repeated with greater severity during the 2022-2023 season, resulting in 260,380 tons of salt applied.



## Snow Fences

Long-term snow fence activity (i.e., living and structural snow fencing) increased by 23.3 miles statewide from the previous year. MnDOT's standing corn row program did not change significantly. MnDOT Districts are increasing the use of MnDOT's Blowing Snow Control Shared Service for plan development and construction inspection assistance.

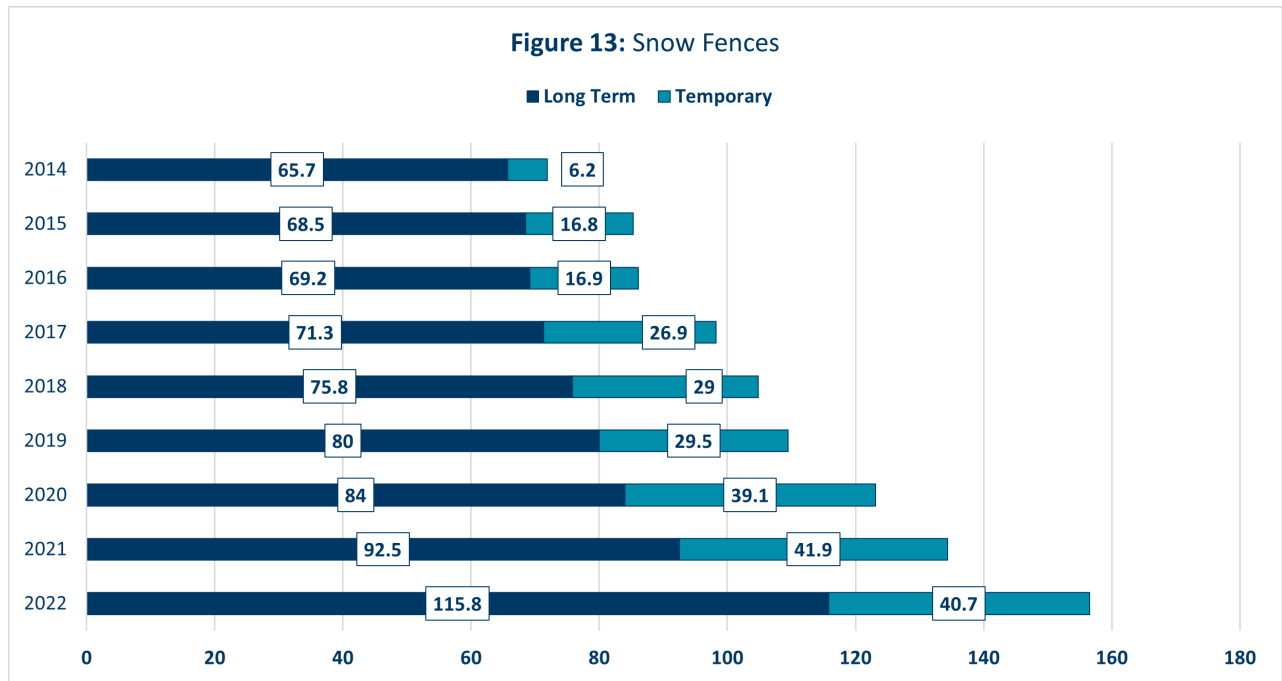
## LED Bulb Replacement

🎯 **TARGET:** Convert all lighting on MnDOT roadways to LEDs by 2020.

🎯 **RESULTS:** In 2022, nearly all lighting on MnDOT roadways was LED.

It is now standard MnDOT practice to install LEDs when installing or replacing roadway lighting.





































While the data does not include lighting at all rest areas and tunnels, MnDOT is working to convert lighting in these areas as well. The estimated greenhouse gas reduction for each light converted from high pressure sodium to LED is 1,433 lbs CO<sub>2</sub>e or 65%.



## 2023 Planned Actions Table

The following actions have the potential to lower greenhouse gas emissions by reducing the distance MnDOT fleet vehicles drive to apply salt and

chemicals to roadways. Using less salt also has the potential to improve public health by supporting water quality.

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
1 Use anti-icing, pre-wetting and slurries to optimize removal of snow and ice on roads.	 IN PROGRESS	Ongoing			
2 Continue to enhance the use of maintenance decision support technology to assist operators in the removal of snow and ice.	 IN PROGRESS	Ongoing			
3 Use equipment like ice breakers, underbody plows, tow plows and slurry systems to enhance the removal of ice and snow.	 IN PROGRESS	Ongoing			
4 Train drivers on new and existing snow removal techniques.	 IN PROGRESS	Ongoing			
5 Research alternative chemicals and equipment innovations to reduce total salt use.	 IN PROGRESS	Ongoing			
6 Continue active salt sustainability/ solutions program which brings information to and educates operators on chemical usage and snow/ice strategies.	 IN PROGRESS	Ongoing			
7 Install blowing snow control measures, such as living, structural, and temporary snow fences, and improved road and ditch design.	 IN PROGRESS	Ongoing			
8 Design salt storage facilities to minimize impact to local watersheds.	 IN PROGRESS	Ongoing			
9 Increase number of facilities for efficient production, storage and distribution of brine and liquid de-icers. (NEW)	 IN PROGRESS	Ongoing			
10 Modify snow clearing fleet for efficient storage and application of liquid de-icers. (NEW)	 IN PROGRESS	Ongoing			



# Roadside Vegetation



## METRICS

- Native seeding
- Native planting

## Overview

Roadside vegetation serves many functions that are critical to operating a transportation system. Native vegetation can provide additional benefits such as wildlife habitat and biodiversity preservation.

There is institutional and public support for native vegetation on roadsides. This is reflected in [Minn. Stat. 160.232](#) which states, “road authorities are encouraged to utilize low maintenance, native vegetation...,” in [MN Executive Order 19-28](#) which states “[MnDOT] shall manage state-owned transportation properties and rights of way to create, protect, and enhance pollinator habitat,” and the Presidential Memorandum of July 20, 2014, which directs the federal DOT to work with state DOTs to promote pollinator-friendly practices. There is also regulatory pressure to use native vegetation under the Endangered Species Act.

Planting recommendations are provided by the MnDOT Office of Environmental Stewardship, either through general guidance or project-specific recommendations. MnDOT construction staff are responsible for implementing those designs, but occasionally make adjustments in the field that may not meet intended habitat design outcomes. Long-term viability of roadside vegetation ultimately lies with maintenance staff in each district.

## 2022 Accomplishments

- Improvements on Trunk Highway 3 included a new roundabout in Farmington with 99% drought-tolerant native plants among other features, including stormwater infiltration ponds, trail facilities, pedestrian improvements, and pollinator habitat.
- Increased percentage of native plantings on transportation construction projects.<sup>1</sup>
- Continued to field test seed mixes that increase and improve establishment of native species.
- Implemented one specialized roadside vegetation management plan for the Highway 56 reconstruction project in LeRoy.
- Created an alternate process for specifying and paying for vegetation establishment on projects, with three pilots forthcoming in 2023.



*© Roadside pollinator habitat. Photo courtesy of Ashley Zidon, MnDOT.*

<sup>1</sup>On projects evaluated.

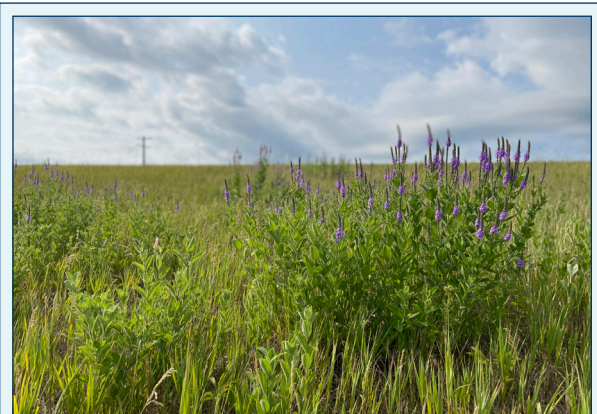
**💡 DISTRICT IN THE SPOTLIGHT:**

## Pollinator Habitat in District 3

MnDOT District 3 will be home to the largest privately funded pollinator habitat by a private partner along an interstate in Minnesota. This project was made possible through MnDOT's Highway Sponsorship Program, which works through public private partnerships to enhance highway roadsides for improved aesthetics and environmental sustainability. The Avon Hills Lions Club based in and around Avon, Minnesota, is the sponsor for nearly four acres of new habitat along Interstate 94 east of the City of Avon. The partner sought to enhance the visual aesthetics of the interstate corridor and proposed a vibrant pollinator seed mix to achieve their goals.

### PROJECT FEATURES:

- 1.61 acres of new habitat westbound and 2.14 acres eastbound, totaling 3.75 acres.
- Approved project has partner monitoring and observation responsibilities.
- Includes a wide range of project partners such as Stearns County Soil and Water Conservation District, Pheasants Forever and St. John's University.
- Took nearly three years to plan.

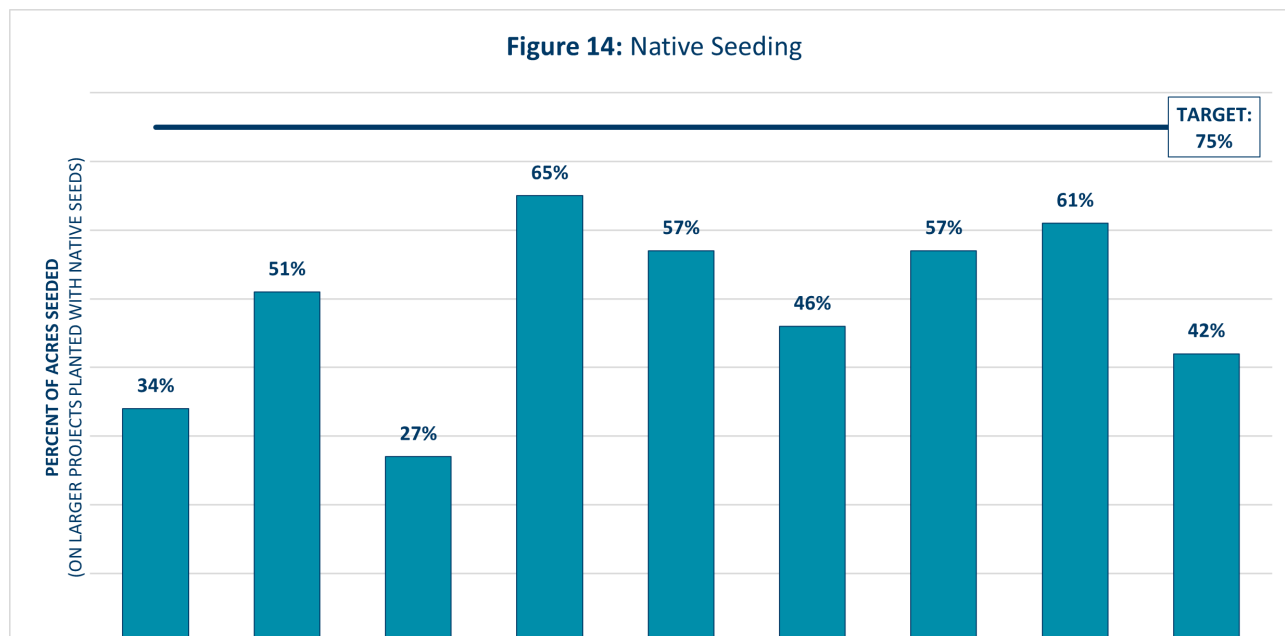


📷 *An example of pollinator habitat to be planted along I-94 near Avon. Photo courtesy of Ashley Zidon, MnDOT.*

The project required intensive MnDOT review, comment, and coordination with the Minnesota Division of FHWA. There were many lessons learned and takeaways from this project. These lessons will strengthen MnDOT's ability to work with non-governmental partners on aesthetic and environmentally sustainable projects along our roadsides.

This pollinator habitat is a first for Minnesota FHWA and MnDOT. This project will create much needed pollinator habitat along the interstate corridor while also working to foster healthy soil, an important tactic to sequester carbon. The project is currently in the funding stage and the partner is raising philanthropic dollars and business support. The project is expected to be installed in spring of 2024.

# Measuring Progress



## Native Seeding

🎯 **TARGET:** 75% of acres are planted annually with native seeds as part of large MnDOT projects by 2025.

📊 **RESULTS:** In 2022, 42% of acres on large MnDOT projects were planted with native seeds.

Native seeding decreased from 61% of acres in 2021 to 42% of acres in 2022, the lowest amount since 2016. MnDOT regularly provides manuals and recommendations to help project managers select the right native seed mix for their project. The percentage of acres planted with native seeds has historically fluctuated year to year. This target isn't 100% because non-invasive, non-native species and cultivars are also used where they are needed to withstand site-specific functions.

## Native Planting

🎯 **TARGET:** 80% of plants on urban projects each year and 90% of plants on rural projects each year are native plant material.




























📊 **RESULTS:** In 2022, 65% of plants on eight urban projects evaluated were native plant material.

Native planting increased from 50% of plants in 2021 to 65% of plants in 2022. All eight projects evaluated were urban projects. In 2021, the Sustainable Transportation Steering Committee set a new target that 80% of plants on urban projects and 90% of plants on rural projects are native species. This target isn't 100% because non-invasive, non-native species and cultivars are also used where they are needed to withstand site-specific functions.







## 2023 Planned Actions Table

The planned actions to support sustainable roadside vegetation have the potential to improve public health by supporting environmental quality. Reducing air and water pollution can improve

public health and quality of life. Actions that reduce the vulnerability of infrastructure by supporting stormwater management have the potential to support climate resilience.

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
1 Update design and construction standards by rewriting seeding manual.	 IN PROGRESS	Ongoing			
2 Revise seed mixes to improve establishment speed of native mixes and increase native components of non-native mixes.	 IN PROGRESS	Ongoing			
3 Create four fact sheets on seed mix expectations and establishment needs.	 IN PROGRESS	2023			
4 Formulate roadside vegetation vision and goals.	 IN PROGRESS	Ongoing			
5 Develop designs emphasizing native plants and seeding (e.g., landscape construction and partnership, bioengineering, negotiated maintenance, living snow fence, visual quality).	 IN PROGRESS	Ongoing			
6 Update Facility Design Guide to reflect sustainability objectives for roadside vegetation.	 IN PROGRESS	2023			
7 Implement specialized roadside vegetation management plans for three locations.	 IN PROGRESS	Ongoing (one of three implemented)			
8 Explore methods of tracking planting, seeding, and establishment of vegetation; such as GIS transportation asset mapping of construction plans and the collector app.	 IN PROGRESS	Ongoing			
9 Investigate MnDOT's process of evaluating topsoil on construction projects from materials recommendations through the design phase to construction.	 IN PROGRESS	2023			

## 2023 Planned Actions Table, continued

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
<b>10</b> Develop new provision that would create an alternate process for specifying and paying for vegetation establishment on projects, to be tested on three construction projects in 2023.	 IN PROGRESS	2025			
<b>11</b> Develop methods and materials to encourage Minnesota growers to increase supply of native plants. (NEW)	 NOT STARTED	2024			



# Construction



## METRICS

- Greenhouse gas emissions from MnDOT construction projects in Metric Tons Carbon Dioxide Equivalent (MtCO<sub>2</sub>e)
- Sustainable pavements

## Overview

MnDOT's construction activities focus on keeping the state's transportation system in safe and usable condition. Preserving existing roads typically has lower costs than new construction, replacement or reconstruction because it requires less material acquisition, transportation, and processing.

There are situations where replacement or reconstruction can have the lowest environmental impact when the focus is on long-term performance. Assets that are built well and require limited preservation can provide the lowest overall emissions during their service life due to greater longevity.



📷 *Micromilling equipment used in resurfacing TH 28 near Swanville. Photo courtesy of Joel Ullring, MnDOT.*

There are several cost-competitive pavement construction techniques with the potential to reduce lifecycle greenhouse gas emissions and extend pavement life. MnDOT continues to become more familiar with these practices and increase our use of these techniques.

## 2022 Accomplishments

- Continued to participate in FHWA Sustainable Pavement Peer Exchange and received funding for forthcoming sustainable materials workshop for project managers.
- Secured FHWA Climate Challenge grant funding for research on Environmental Product Declarations (EPDs) for asphalt.
- Adopted Type 1L (Portland Limestone) cement as new industry standard, which reduces greenhouse gas emissions from cement production by as much as 10 to 12%.



📷 *Micromilled roadway surface of TH 28 near Swanville. Photo courtesy of Joel Ullring, MnDOT.*

**💡 DISTRICT IN THE SPOTLIGHT:**

## Innovative Pavement Treatment in District 3

In the spring of 2021, MnDOT Pavement Engineer Curt Turgeon created the Innovative Treatment Program to spend an additional \$1.5 million annually on preventive pavement maintenance treatments for fiscal years 2022-25. In the first project solicitation, District 3 proposed a micromill RAP and slurry seal project (instead of a conventional mill-and-overlay) for Trunk Highway 28 near Swanville based on a similar project that North Dakota DOT had successfully completed in 2019.

### PROJECT FEATURES:

- Project Roadway: Trunk Highway 28
- Location: From Swanville north to intersection with Trunk Highway 27 (5 miles)
- Background: Segment had been previously micro-surfaced and was scheduled for mill-and-overlay.
- Process: Micromilling was selected using the relative milling process and reclaimed asphalt pavements (RAP) were stockpiled, crushed and reused as aggregate for a two-lift slurry seal on the roadway.

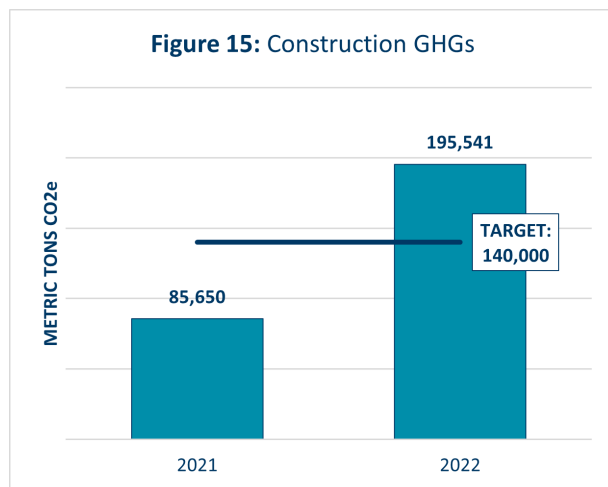


📷 TH 28 before (left) and after (right) the micromill RAP and slurry seal resurfacing project. Photos courtesy of Joel Ulring, MnDOT.

This pavement project resulted in projected savings of material and labor costs due to reduced maintenance needs and enhanced pavement longevity.



## Measuring Progress

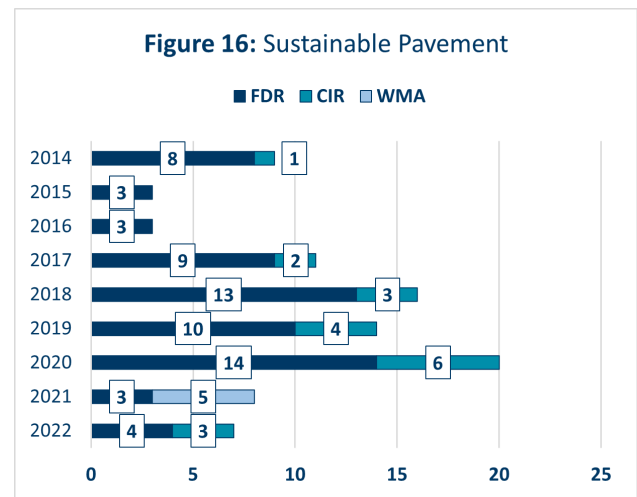


### Greenhouse Gas Emissions from MnDOT Construction Projects

© **TARGET:** Target is currently being reassessed because data on GHG emissions from MnDOT construction projects prior to 2021 have been invalidated due to changes in calculation methodology.

Estimated emissions in 2021 were 85,650 MtCO<sub>2</sub>e and estimated 2022 emissions were 195,541 MtCO<sub>2</sub>e. Analysis of construction emission totals estimated using the Minnesota Infrastructure Carbon Estimator (MICE) became a requirement as of January 2020 and applies to projects costing \$1 million or more. Projects let prior to 2020 do not require a GHG analysis, so their emissions are not yet accounted for in annual totals. To improve GHG estimates, 2021 and 2022 data is based on construction start date rather than date of project letting. By 2025, nearly all projects under construction will be subject to the requirement, resulting in increasingly accurate GHG data.

MnDOT's Office of Environmental Stewardship hired a GHG Specialist in February 2022 to centralize and improve GHG data collection. Documented GHGs reflect project level emissions, vehicle operation emissions (when applicable) and carbon intensity when mitigation measures are included. The emissions of certain projects are not calculable using the MICE tool, such as guardrails, noise barriers, traffic signals, and others.



### Sustainable Pavements





















Full-depth reclamation and cold in-place recycling can lower construction GHG emissions by reducing the amount of paving material that needs to be extracted and produced, as well as transported on site. Stabilized full-depth reclamation produces a stronger roadway base and requires less new asphalt. Additionally, warm-mix asphalt reduces energy use because it is produced at a temperature 30F degrees or lower than typical hot-mix asphalt. All three techniques extend pavement life, further reducing lifecycle GHG emissions.

MnDOT used sustainable pavement practices on seven projects in 2022, which decreased from eight in 2021. Project volume and project suitability were the primary factors that drove how often these practices were employed. With increased experience using these techniques, districts can implement them more often.

## 2023 Planned Actions Table

The following actions are planned for 2022 to increase understanding of sustainable pavement opportunities. Applying learnings from the case studies, environmental product declaration (EPD)

information and peer exchanges will reduce GHG emissions from MnDOT construction projects, improve public health and support climate resilience.

ACTION	STATUS	COMPLETE BY	POTENTIAL TO...		
			Reduce GHG emissions	Improve public health	Support climate resilience
1 Promote sustainable pavement case studies to MnDOT staff.	 IN PROGRESS	Ongoing			
2 Continue to participate in FHWA Sustainable Pavement Peer Exchange.	 IN PROGRESS	Ongoing			
3 Conduct research project to increase understanding and use of Environmental Product Declarations across the industry.	 IN PROGRESS	2024			
4 Track results of sustainable material test cell projects at MnROAD.	 IN PROGRESS	Ongoing			
5 Work with concrete suppliers that reuse water.	 IN PROGRESS	Ongoing			
6 Explore workshop or training on sustainable materials for project managers.	 IN PROGRESS	Trainings completed in 2022 and planned for 2023			

# The Road Ahead

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*MnDOT is committed to leading by example through internal sustainability efforts.*

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There are many opportunities ahead to accelerate our state's progress. Since 2016 MnDOT has worked collaboratively to identify meaningful actions, quantify results and openly communicate progress and challenges. This report is the latest snapshot of the important steps we're taking on our journey to meet MnDOT agency sustainability goals—including progress toward EO 19-27 goals and other sustainability targets set by MnDOT leadership. It's clear we've made important progress, but we also have substantial work ahead of us.

Examples of work planned in 2023 include the following:

- Reduce GHG emissions by retro commissioning existing MnDOT facilities.
- Track electric and hybrid vehicle utilization and resulting savings accrual/emissions reduction.
- Modify snow clearing fleet for efficient storage and application of liquid deicers.
- Develop methods and materials to encourage Minnesota growers to increase supply of native plants.
- Continue to participate in FHWA Sustainable Pavement Peer Exchange.

We'll continue to communicate about efforts by updating this report annually to help us track progress, create accountability and provide transparency. The MnDOT Sustainability and Public Health website is also a place for more frequent updates on our work.

Continuing to make progress toward agency sustainability goals will require us to take more urgent, bolder actions. We look forward to continued collaboration amongst MnDOT staff and with partners in coming years to meet the challenge.