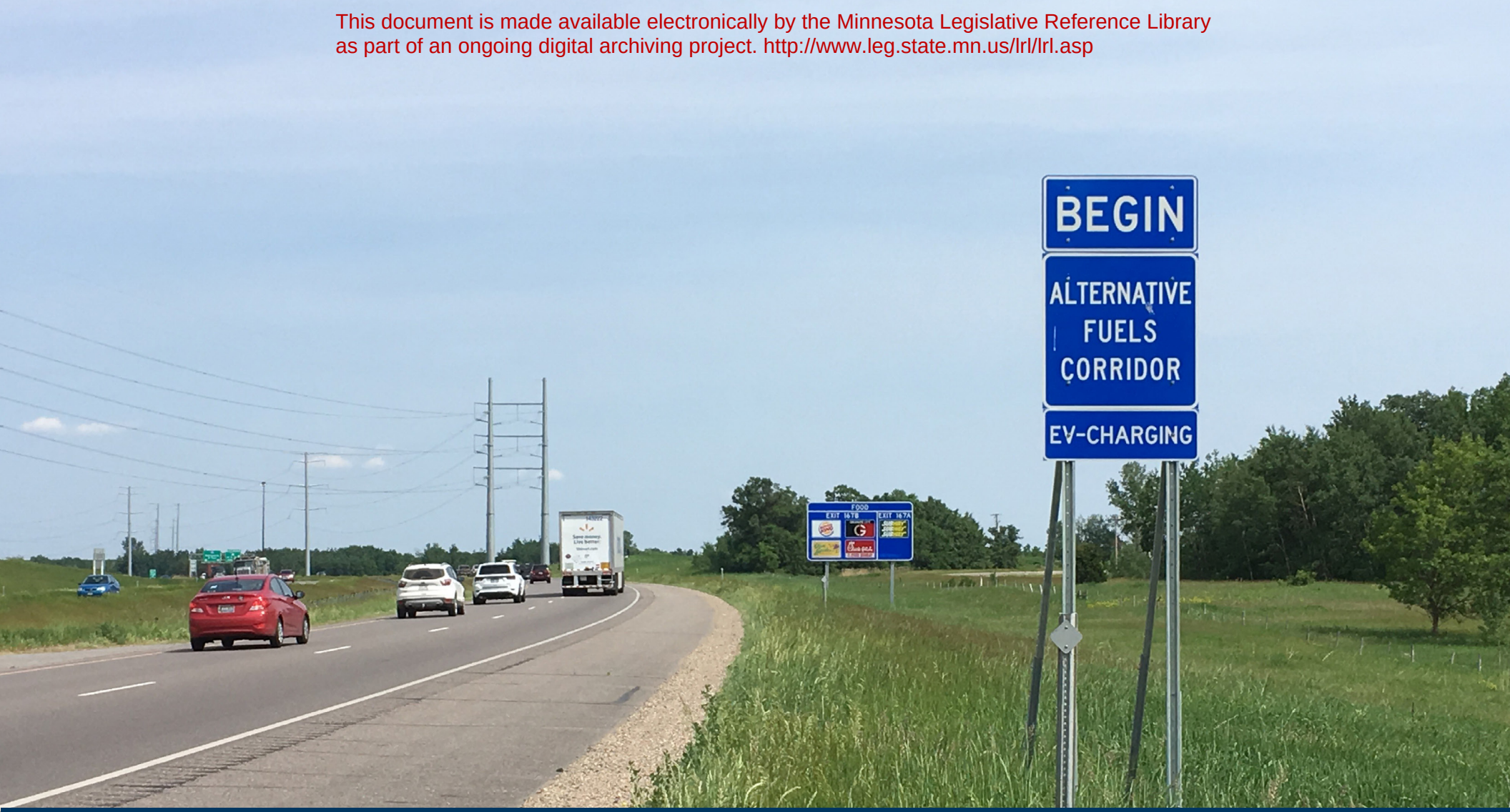

Minnesota Department of Transportation

SUSTAINABILITY REPORT 2017

DEPARTMENT OF
TRANSPORTATION

APRIL 2018

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What is this report?

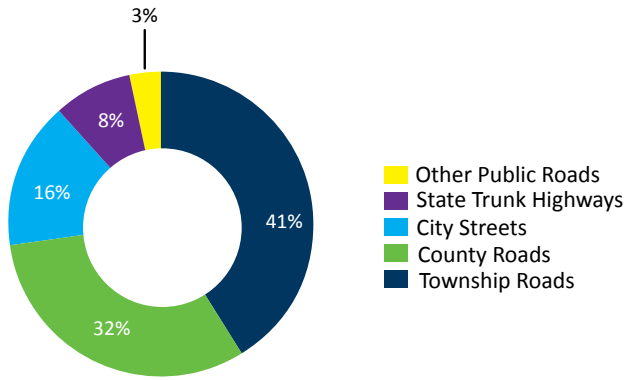
The 2017 Minnesota Department of Transportation (MnDOT) Sustainability Report outlines the agency's current sustainability efforts and performance targets. This is the first annual update to the 2016 baseline report that established agency sustainability targets and metrics. The report was created by MnDOT Sustainable Transportation Steering Committee (STSC), a management-level group that provides leadership, strategic direction, and oversight for sustainability activities.

Climate change affects you

Minnesota's multimodal transportation system maximizes the health of people, the environment, and our economy

Minnesota's quality of life and economic well-being depend on an efficient and reliable transportation system that allows people to get to work and school, visit the doctor, and take full advantage of the state's many cultural, entertainment and recreational opportunities (Figure 1). It connects businesses to suppliers and customers near and far. Our transportation system was designed to withstand historic weather and climate, but the climate is changing, and historic climate data is no longer a reliable predictor of future risk.

Figure 1. Minnesota's Transportation System Ownership (% of centerlane miles)

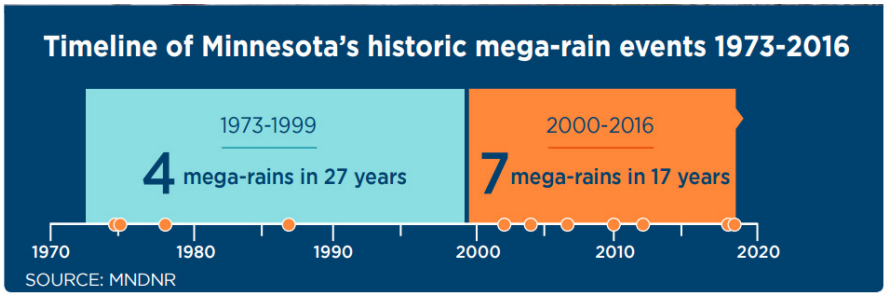


Minnesota's transportation system includes 142,914 centerlane miles of roads. While MnDOT manages 8 percent (11,814 miles), the agency plays a larger role influencing statewide transportation policy and decision-making.

Climate change amplifies risks to people, ecosystems, and infrastructure

There is a very high likelihood of heavier precipitation and more flooding in the next 20 years (Table 1). In the past 17 years, Minnesota has experienced seven mega-rain events (at least six inches of rain fall on an area larger than 1,000 square miles) since 2000, compared to four events in the 26 years between 1973 and 1999. Heavy precipitation and flooding can disrupt traffic, delay construction activities, and weaken or wash out soil and culverts that support the roads, tunnels, and bridges we depend on.

It's also very likely that climate change will cause warmer winters in our state. Annual average temperatures have increased two degrees over that past century – that's more than in any other. Warmer winter temperatures can cause more ice (vs. snow) on the road and reduce the life cycle of pavement, both of which could impact public safety and create additional costs for MnDOT.



As a State agency, we have a responsibility to act now

To thrive in the future, we need to adapt now

MnDOT has a responsibility to make transportation infrastructure resilient to changes in climate. Resilience applies to extreme weather, such as flooding or drought, but we must also prepare to adapt to smaller changes that will impact agency resources for snow and ice control, invasive species and pest management, pavement performance, and others.

MnDOT is already working to address system vulnerabilities to climate change and prepare for a changing climate:

- Climate Vulnerability Assessment Pilot Project for resilience to flash flooding (2014)
- Dedicated bond-funding to mitigate and ensure resilience for flood prone highways (2010)
- Manage bridge scour monitoring information for all 30 scour critical bridges (ongoing)
- Support up-to-date hydrology through a cooperative agreement with U.S. Geological Survey (ongoing)
- Provide funding for National Oceanic and Atmosphere Administration to develop Atlas 14, a new source for updated precipitation data (ongoing)
- Integrate key climate change vulnerability metrics from the 2014 pilot into decision-making at the agency (2020)
- Conduct a slope-vulnerability assessment (2019)

Table 1. Potential Effects of Climate Change in Minnesota

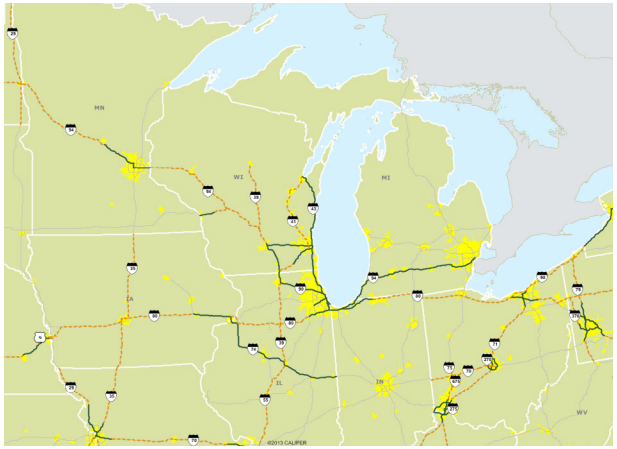
Climate Impact	Likelihood this will change in MN over next 20 years	Potential Negative Implications for the Transportation System
Heavy precipitation / flooding	Very High	• Damage to highway and rail infrastructure, airport runways • Flooded roads will slow operations and performance • Slope failures and erosion
Warmer winters	Very High	• More ice • Reduced pavement conditions and life cycles • Downed power lines with ice storms
New species ranges	High	• Changes in roadside vegetation mixes • Soil erosion • Increase in invasive species populations • Increased exposure of construction and maintenance crews to vector-borne diseases
High heat	Medium	• Pavement and rail buckling • Vehicles overheating • Electrical system malfunctions • Limitations on construction hours
Drought	Low	• Reduced river navigability for barges • Roadside vegetation stress, reduces rainwater storages and increases soil erosion
Wildfires	Unknown	• Road closures • Immediate and significant threat to human safety • Damage to roadside infrastructure

MnDOT uses data to address sustainability

Scientific advances & partnerships

At MnDOT, we continue to explore ways to reduce our impact and adapt to climate change by staying up-to-date on recent scientific developments and work with other states. MnDOT coordinates on climate change and transportation at the local, state, national, and international levels through state and national technical working groups, the American Association of State Highway and Transportation Officials, and the National Academies of Science's Transportation Research Board, and the United States Climate Alliance.

Find more information about MnDOT efforts to address climate change at: http://www.dot.state.mn.us/climate/index.html.



In 2016, US DOT designated I-94 as an alternative fuel corridor. In 2017, Minnesota, Wisconsin, Illinois, Indiana and Michigan rebranded it as the Great Lakes Zero Emission Vehicles Corridor.

Measuring sustainability at MnDOT

The STSC and agency technical experts reviewed research, revised the metrics, and gathered data to develop five dashboards to describe sustainability metrics and related sustainability strategies. Metrics are based on a scan of transportation and corporate sustainability reports and existing MnDOT plans.

Each dashboard focuses on a functional area within the agency organizational structure. These include: facilities, fleet, highway operations, roadside management, and construction. Each metric includes a brief description, target, current results as of Calendar Year 2017 (unless noted otherwise), data trend, and analysis. Future year targets are shown on the graphs as a green line. When projections are illustrated, they are shown in gray.

Facilities

Background

MnDOT owns and operates over 1,075 buildings with over 6,600,000 square feet including:

- 137 truck stations
- 18 regional/headquarters maintenance sites
- 5 special services sites: MnROAD Research Facility, Arden Hills Training Center, Central Shop, Maplewood Materials Lab, and the Aeronautics building
- 173 salt/sand delivery sites
- 68 rest area buildings

Strategy in the Spotlight: Energy Reduction Efforts

Since 2011, MnDOT has taken many steps to reduce energy use. Building Service and District Building Maintenance staff update building automation to web-connected systems, allowing building operators and the agency's energy engineer to monitor facility operational trends and adjust statewide mechanical systems remotely. New systems use energy saving strategies such as occupancy controls (schedules, sensors), door sensors, and demand-based temperature and pressure set points.

Staff also reassess and recommission existing systems and replace outdated and over-sized equipment with energy efficient upgrades. Several districts have upgraded shop lights and pole lights to LED fixtures. New building construction includes efficient boilers, furnaces, and unit heaters, LED lighting with occupancy sensors, and thermal insulation.

MnDOT's efforts resulted in energy savings and cost savings of $400,000 annually.

Strategies

Energy Reduction

- Continue energy reduction efforts such as automation, equipment upgrades, lighting upgrades, and standardized specs for new construction that exceed energy code requirements
- Adopt temperature set point standards for all MnDOT facilities
- Provide feedback and promote behavioral shifts
- Promote renewable energy

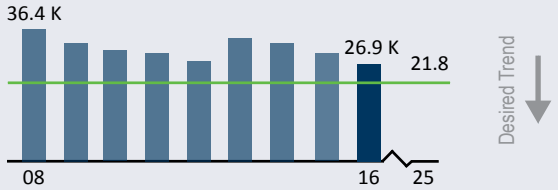
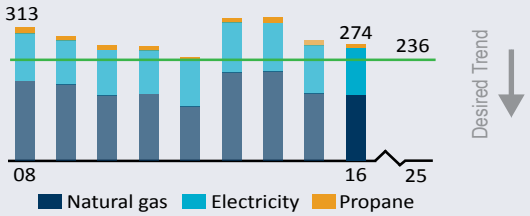
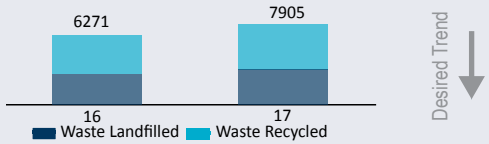
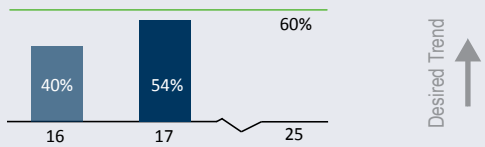
Waste Reduction

- Identify recycling captains
- Standardize waste and recycling data collection
- Initate waste audit for MnDOT facilities
- Implement District recycling competition
- Pilot compost collection
- "Make Recycling Easier" campaign

Water Use Reduction

- Install additional water meters and enter data
- Minimize landscape irrigation water use
- Seal artesian flowing wells
- Re-use stormwater and waste water
- Incorporate new water conservation into new building construction & existing building renovation

Facilities

Metric	Target	Results	Trend	Analysis
Greenhouse Gas Emissions Total carbon dioxide equivalent (CO_2e) emissions generated annually by MnDOT-owned facilities	21,880 metric tons CO_2e -30% from 2005 to 2025	26,905 metric tons CO_2e 2016		Greenhouse gas emissions from MnDOT facilities have reduced significantly since 2008, due to more clean energy on the grid in 2016 compared to 2008. **Progress Needed: -23.3%**
Total Energy Use Total annual electricity, natural gas, and propane consumption at MnDOT-owned facilities in billion British Thermal Units (BBTU)	236 BBTU -20% from 2008 to 2025[5]	274[6] BBTU 2016		MnDOT used less energy in 2016 than in 2008. Usage fluctuates partly due to weather. Automation and mechanical equipment upgrades as well as lighting upgrades at several sites contributed to the decline. 4.2 BBTU average reduction needed each year to meet target. **Progress Needed: -14%**
Renewable Energy Amount of renewable energy as percent of total energy used by MnDOT*	25% Total energy by 2025[7]	0.3%	Capacity Solar = 40 kW Wind=35 kW Geothermal=80,000 kBTU	2.5% annual increase needed to meet 2025 target. **Progress Needed: +25 percentage points**
Waste Generated Total annual waste generated by MnDOT-owned facilities	To be set in 2018 -25% from 2017 by 2025	7,905 metric tons** 2017		MnDOT generated 26% more waste in 2017 than 2016. The increase is partly due to more accurate data collection. **Progress Needed: NA**
Waste Recycled Total annual waste diverted through recycling by MnDOT-owned facilities[8]	60% until 2030 then 75% for Metro[9]	54% of total waste generated** 2017		Between 2016 and 2017, the recycling rate increased 14 percentage points. The rate likely increased because of a over 3000 tons of signage recycled in Metro District. **Progress Needed: +6 percentage points**
Water Consumption Total water consumed at MnDOT-owned sites annually	TBD	200 million gallons*** 2017	Not available	MnDOT conserves water through EPA Water Sense best practices and on-site treatment. Weather also affects water needs for winter brine and summer dust control.

* Includes MnDOT 35 kW wind turbine at D8 Slayton Truck Station and 40 kW solar array at D6 headquarters in Rochester. Geothermal energy indirectly helps MnDOT with on-site renewable energy goals by reducing the total energy we consume.
** Recycling includes all specialty recycling such as scrap metal, batteries, and auto oil.
*** Annual water consumption includes a combination of metered values and estimates typical wastewater flow rates for various facility types and sources (e.g., rest areas, office buildings, etc.). This estimate is based off reporting from 75% of sites and an inflation factor.

Fleet

Background

MnDOT fleet consists of a variety of vehicles and fuels to perform maintenance, snow plowing, delivery, and various employee duties across the state. MnDOT fleet procurement decisions are determined by the Office of Maintenance and operation of vehicles are determined within each division.

MnDOT owns more than 4,000 vehicles, including:

- 1,200 light-duty vehicles
- 2,700 heavy-duty vehicles
- 38 hybrid vehicles

Fuel use depends on what the fleet is used for. For example, heavy winter snow events require heavy-duty vehicles to use more fuel to keep roads safe.

Strategies

Fuel Reduction

- Eliminate unnecessary idling through policy
- Utilize telematics for snow route planning
- Optimize vehicle lifecycle standards
- Rightsize fleet to improve fuel efficiency
- Expand use of alternative fuels
- Direct motor pool use towards fuel efficient vehicles
- Promote electric vehicle use

Strategy in the Spotlight: Eliminate Unnecessary Idling

Each winter, MnDOT snow and ice removal operations consume over one million gallons of diesel fuel.

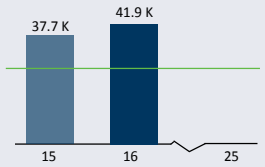
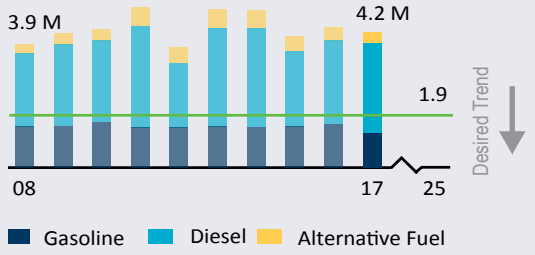
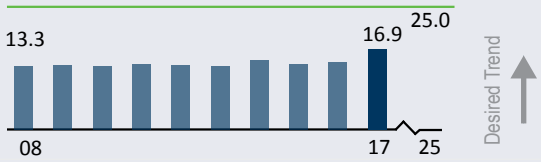
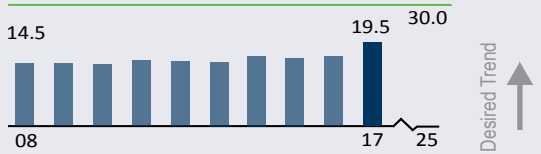
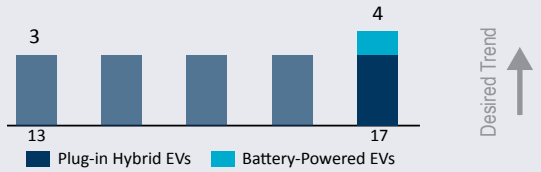
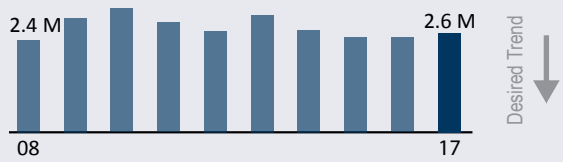
MnDOT installed telematics systems to track the time snow plows spend idling. This information can help staff make routes more efficient, minimize idling time, and ultimately save fuel and money for the agency.

So far, the systems have been installed on 675 snow plows and will be added to an additional 57 each year. The goal is to equip all plows with the technology by 2020.

While data is still being collected at MnDOT, anti-idling policies have led to energy and cost savings for other entities. For example, Washington DOT estimated 50 percent reduction in fuel use from their no idling policy - and a cost savings of $500,000 annually.

Above: Charging stations are available at MnDOT's Water's Edge facility in Roseville, MN.

Fleet

Metric	Target	Results	Trend	Analysis
Greenhouse Gas Emissions Total annual GHG emissions related to fuel use from ground and air-based MnDOT vehicles	26,500 metric tons CO_2e	41,913 metric tons CO_2e[10] 2016		Greenhouse gas emissions from fleet increased 11% between 2015 and 2016, likely due to an increase in diesel fuel use.
Total Fuel Use Total annual fuel use by ground-based MnDOT vehicles	1.9 million gallons 50% reduction from 2005 by 2025	4.2 million gallons[11] FY 2017		Diesel use is largely driven by snow control and dependent on winter weather. 2008 is used to represent baseline levels because of data gaps in 2005 data. -9% reduction need each year on average to meet 2025 target. **Progress Needed: -55%**
Diesel Fuel Use Total annual diesel fuel use by ground-based MnDOT vehicles	1.1 million gallons 25% reduction from 2005 by 2025	2.8 million gallons[11] FY 2017		
Fleet Vehicle Fuel Efficiency Average miles per gallon achieved by all MnDOT vehicles annually	25 mpg 2025	16.9 mpg[11] 2017		Average vehicle efficiency increased 27% between 2008 and 2017. **Progress Needed: +48%**
Light Duty Vehicles Average miles per gallon achieved by light duty MnDOT vehicles annually	>30 mpg	19.5 mpg[11] 2017		Since 2005, light duty vehicle efficiency has improved. **Progress Needed: +65%**
Electric Vehicles Total number of plug-in hybrid electric and battery electric light duty MnDOT vehicles	2	4[12]		Three plug-in hybrid electric vehicles were purchased in 2013. MnDOT purchased a Chevy Bolt in 2017. EVs are .003% of the MnDOT fleet. **Progress Need: Target exceeded**
Employee-Owned Auto Mileage Total number of miles annually traveled by MnDOT employees in personal vehicles for work purposes	No target	2.6 million miles FY 2017		MnDOT has no previously set target for reducing employee-owned auto mileage. MnDOT encourages employees to use the right vehicle or mode for the right job, and consider Skype/video conferencing.

Highway Operations

Background

Minnesota's environment and water resources are vital to the people and economy of the State. MnDOT has taken a leadership role in finding ways to meet the public and economic demands for safe winter driving conditions, while striving for the most intelligent use of salt and other winter chemicals.

Over the past 15 years, MnDOT and national partners developed a winter support tool known as the Maintenance Decision Support System (MDSS). MnDOT has become a national leader in development and implementation of MDSS.

MDSS incorporates real time weather forecasting and road infrastructure analysis to produce optimized salt application recommendations. While MnDOT has moved toward MDSS recommendations over time, MDSS testing and analysis suggests that salt use still exceeds the level recommended by MDSS. There are various reasons for the higher use, including snow fighter acceptance of MDSS and the need for MDSS refinements.

Strategy in the Spotlight: Anti-icing and Pre-wetting

Anti-icing efforts take place before or during snow events. This chemical treatment strategy prevents the bond of frozen precipitation to the road surface. Anti-icing dramatically cuts the cost of maintaining a safe road surface over conventional deicing.

Prewetting is the process of spraying deicing salt with a solution of liquid chemical before spreading the salt on the roadway. Prewetting helps the salt work more effectively as a deicing agent by keeping more of the chemical on the road surface and by activating the chemical more quickly.

The result is that less salt is spread, saving money, and minimizing environment al impacts. These proven strategies result in less salt use. MnDOT continually looks for opportunities to add anti-icing; and its plow fleet is fully equipped for pre -wetting service.

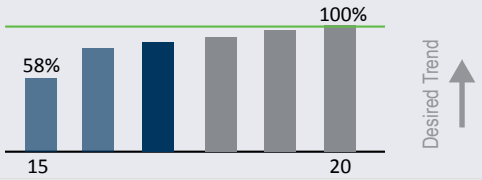
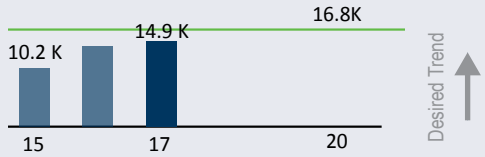
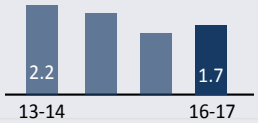
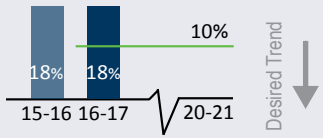
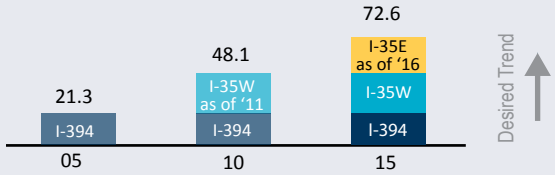
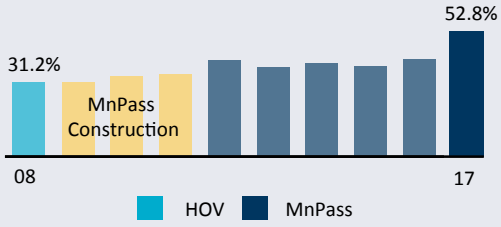
Strategies

Salt Sustainability Program

- Use technology, like anti-icing and pre-wetting, to optimize the treatment and use of salt on roads
- Use liquid chemical deicers instead of salt or sand
- Use underbody plows to reduce the amount of salt needed
- Train drivers on new snow plowing techniques
- Pursue chemical and equipment innovations not currently used at MnDOT
- Install blowing snow control measures such as living snow fences, standing corn rows, strategically placed bales, native tall grass wildflower prairie plantings, and road design elements to increase snow storage or facilitate the wind blowing the snow off the surface.

Left: University of Minnesota Professor, Steve Druschel, speaks with MnDOT snowplow driver John Hakkanen. Professor Drushel conducted an experiment with Metro District snowplow drivers to study the effects of weather and vehicle traffic on different de-icing treatments.

Highway Operations

Metric	Target	Results	Trends	Analysis
LED Bulb Replacement % Total count of LED lighting installed on MnDOT roadways	100% 2020	87%[13] 24,750 lights		MnDOT estimates 28,586 MWh/year energy savings once all conversions are complete. **Progress Needed: 13% remaining**
GHG Emissions Reductions Total GHG emissions reduced by converting to LEDs	16,811 metric tons CO_2e 2020	14,924 metric tons CO_2e[14]		Converting from high-pressure sodium (HPS) to LED saves an estimated 65% on electricity costs/use per luminaire.
Salt Use Total salt applied to MnDOT roadways annually	No Target	197 tons[15] Winter 16-17		Salt use rose by 25% in 2016-2017 compared to the previous year. There are several factors that influenced the amount of salt used, including wind speed, gusts and direction, and precipitation type, duration, and amount. MnDOT is working on MDSS improvements and enhancements.
Normalized Salt Use Tons/Winter Severity Index	No Target	1.7 Winter 16-17		
Adjusted % Above MDSS Recommendation Total salt use by MnDOT compared to adjusted modeled optimal	<10% Winter 20-21	18%[16*] Winter 16-17		The percentage above the adjusted modeled optimal salt use remained the same between winter 15-16 and 16-17. **Progress Needed: -8 percentage points**
MnPASS Total miles of HOV/MnPASS Express Lanes	22.5 new miles Fall 2022	72.6[17] direct miles		The MnPASS Express Lane system consists of three corridors: I-394, I-35W and I-35E. Funding is secured for MnPASS extensions on I-35W in 2017 (46th-26th Street in Mpls.) and 2019 (Roseville to Blaine) and I-94 in 2021 (Mpls. to St. Paul).
Person Throughput at I-35W & Black Dog Road Person throughput on northbound (NB) HOV/ MnPASS Express Lane as share of the total person throughput during the AM peak.	N/A	52.8%[17]		Compared to NB I-35W general purpose lanes, the NB I-35W MnPASS lane carried 12% more people at Black Dog Road and 80% more people at Lake Street during the AM peak. Throughput increased because previous data was only reported for 3-hour rush hours (6am-9am, 3pm-6pm), while the new data includes a 4th hour (6am-10am, 3pm-7pm).

*FY17 (Winter 16-17) was the first year of the Office of Maintenance's formal salt sustainability effort, which began the 5 year initiative to meeting the no more than 10% over the adjusted MDSS recommendations. Year 2 is nearly complete.
*Salt utilized to make salt brine is included in salt use reporting.
*Data reported in RCA is entered by snow plow operators.

Roadside Management

Background

Roadside vegetation serves many functions that are critical to operating a transportation system. These critical functions include safety, drainage, erosion control, stormwater treatment, and invasive species control. Because of underlying ecological principles, these objectives are often accomplished more effectively with diverse, locally adapted native species. When native vegetation is used roadsides can also provide several additional benefits such as improved aesthetics, wildlife habitat, carbon sequestration, and protection of biodiversity.

Permanent seeding on MnDOT construction projects averaged around 1,400 acres per year over the previous five construction seasons. Projects let during 2016 showed a combined total of 2,877 acres of permanent seeding, with a materials cost of $1.7 million. Native seed comes with a higher cost than non-native seed. The most commonly used native seed mix costs about twice as much per acre as the most commonly used non-native mix. However, the total premium paid for native seed amounts to less than one hundredth of one percent of total construction spending at MnDOT.

Strategy in the Spotlight: Snow Fences

Living snow fences are trees, shrubs, native grasses and wildflowers located along roads or around communities and farmsteads. The living barriers trap snow as it blows across fields, piling it up before it reaches a road. It also includes leaving a few rows of corn along the road side, hay bales and other ways to use vegetation and temporary fencing to control blowing snow.

MnDOT's 127 miles of snow fencing provide the following benefits:

- Improve driver visibility and reduce vehicle accidents
- Reduce use of public money by reducing plow time and heavy vehicle usage
- Control soil erosion and reduce spring flooding by keeping soil sediment out of the ditches to maintain proper drainage
- Lessen environmental impacts with less salt use, fewer truck trips and less fuel consumption

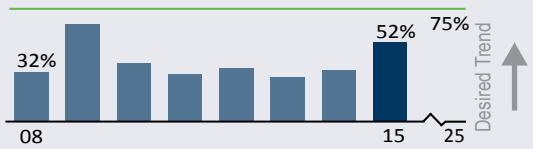
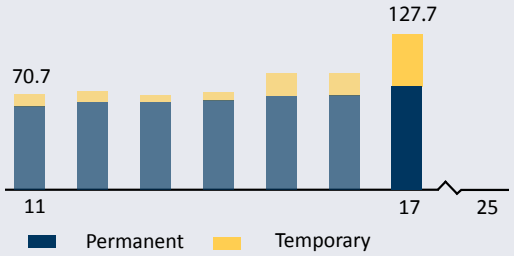
Strategies

Increase Native Plantings

- Clarify guidance for design and construction
- Improve vegetation establishment by addressing obstacles during construction
- Improve establishment speed of native mixes
- Monitor long-term vegetation outcomes

Above: MnDOT staff identifies noxious weeds along a road side.

Roadside Management

Metric	Target	Results	Trend	Analysis
Native Planting Total percentage of acres planted with native seeds as part of larger MnDOT projects	75% 2025	52%[18] 2015		The 18% increase from 2014 to 2015 was likely due to an agency effort to emphasize using native vegetation. 2016 data is not yet available. **Progress Needed: +23%**
Restoration Seeding Annual new acres of native grasses and forbs replace non-native grasses on stand-alone restoration projects	TBD	TBD	TBD	MnDOT will explore tracking in future years.
Snow Fences Total miles of structural snow fences, living plants, and corn rows installed to manage blowing and drifting snow	TBD	127.7 miles[19] Winter 17-18		Between 2016 and 2017, total snow fence miles increased 47% due to 3 road construction projects that incorporated structural snow fences, 2.5 miles of native plantings along I-90 that will reduce blowing snow, and additional temporary fencing in District 3.

Construction

Background

MnDOT's transportation system includes the following assets:

- 11,814 miles of state trunk highways
- 620 miles of sidewalk along state highways
- 1,133 miles of national and state designated bicycle routes

Construction is essential for maintaining the assets MnDOT currently has, and occasionally, constructing new ones. By using sustainable construction techniques and constructing facilities to move people from A to B however they chose, MnDOT can lower greenhouse gas emissions in this area.

Strategies

Sustainable Construction Strategies

- Increase in hot mix percentages
- Cold central plant recycling
- Cold in place recycling
- Full Depth Reclamation

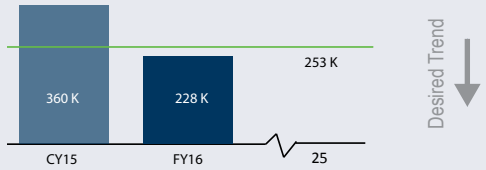
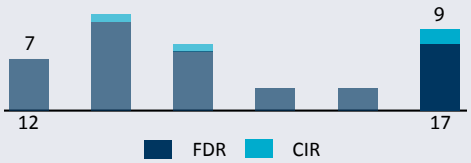
Strategy in the Spotlight: Recycled Asphalt Pavement

MnDOT has long been a leader in the use of recycled asphalt pavement or RAP. Much of the nation's current use of RAP in hot mix paving asphalt is based on the methods first used in a 1978 project that reconstructed the streets in what is now the 3M campus in Maplewood. MnDOT continues to test varying percentages of RAP in hot mix, cold central plant recycling, and cold in-place recycling and full depth reclamation.

The resurfacing portion of the Hwy 110 project east of I-35E and I-494 in Mendota Heights and Inver Grove Heights will use 100 percent recycled asphalt as the base layer of pavement. Tim Clyne, Metro pavement and materials engineer, said using 100 percent saves on rock and asphalt costs, trucking costs and time. Since the material is reused with the cold in-place recycling process, the result is a more variable product than the material produced at the plant. Hot mix will be used as the top surface.

"It's not a new technology, but this is the first time Metro has used the 100 percent RAP in at least 30 years," he said. "It provides a long-term pavement solution for an extended pavement life."

Construction

Metric	Target	Results	Trend	Analysis
Greenhouse Gas Emissions Total annual GHG emissions from the fuel and materials use to construct MnDOT projects*	252,573 metric tons CO_2e 30% reduction by 2025	228,245 metric tons CO_2e FY 2016		Emissions decreased between CY15 and FY16. This 51% reduction is driven primarily by miles of seal coating. There were 1,189 miles of seal coat in CY15 compared to 600 miles in FY16. Further, FY16 included 21% fewer projects and smaller projects in general. **Progress Needed:** While MnDOT met the target for FY16 continuous effort is needed to meet it in future years.
"Sustainable" Pavements Total annual number of jobs using warm mix asphalt (WMA), cold-in-place recycling (CR), or full depth reclamation (FDR)**	TBD	9		WMA, CR, and FDR have the potential to reduce GHG emissions compared to conventional pavement preservation techniques. MnDOT will explore tracking lane miles in the future.
Recycled Materials Total annual quantity of recycled materials used in MnDOT projects (e.g., recycled asphalt pavement and concrete fly ash)	TBD	TBD	Not currently tracked	MnDOT estimates about 20% average use of recycled materials program-wide but does not currently track actual use. MnDOT will explore tracking in the future.

* Emissions from construction include inputs from the state-run construction program and vary by year based on program size

** Includes stabilized (SFDR) and non-stabilized full depth reclamation (FDR)

Planning and Design

Background

MnDOT plans for all the ways people and goods move throughout Minnesota—individually for each mode and together as a multimodal system. The Statewide Multimodal Transportation Plan identifies overarching guidance and priorities for the entire transportation system. The other statewide transportation plans offer mode-specific strategies, guidance and investment priorities for each part of the system. These plans include aviation, bicycle, freight, highway, pedestrian, ports and waterways, rail and transit.

MnDOT's family of plans direct staff to plan, design, build, operate and maintain transportation infrastructure and facilities to improve the safety of all users and the communities they travel through. This strategy is put into practice by engineers who design roadway infrastructure. While many MnDOT projects meet or will meet user needs, there is still an opportunity to encourage more Minnesota residents to walk, bike, and use transit.

Strategy in the Spotlight: Complete Streets Design

Jordan is a medium-sized town just outside the Twin Cities Metro area. Hwy 21 through downtown was identified as a preservation project. Going into the planning and design, the project team decided that the width of the street was going to remain the same. Despite the narrow scope of work, numerous multi-modal improvements were realized for the community.

Residents were primarily concerned about a speeding problem. To address this, MnDOT worked with the community to identify what they wanted to achieve through the project. Residents wanted to draw people downtown, while still allowing traffic to move. The project managers took a Complete Streets approach by adding a 5 ft. bike lane, reducing lane widths, and adding ADA-compliant curb ramps that extended the sidewalk and facilitated safe crossing distances for pedestrians.

Strategies

Complete Streets Implementation

- Improve data collection and management to assist complete streets planning and design
- Revise and update MnDOT's Road Design Manual
- Provide technical support to the Minnesota GreenStep Cities program
- Develop district bicycle plans
- Develop Statewide Pedestrian System Plan
- Coordinate with local and regional planning partners to identify complete streets considerations identified in MnDOT's 10-Year Capital Highway Investment Plan before scoping begins
- Track complete streets implementation
- Track performance measures related to complete streets outcomes
- Establish, develop, and maintain a MnDOT bikeway program on existing rights-of-way
- Work with the State Non-motorized Transportation Committee on safety, education and development programs
- Update access management guidance
- Provide complete streets training for MnDOT staff, local units of government, and other stakeholders
- Provide training on Americans with Disabilities Act requirements for design

Planning and Design

System Use

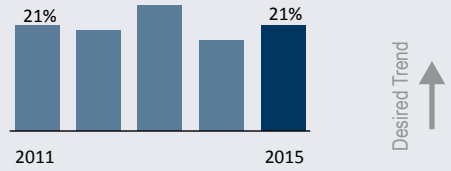
Frequency of Bicycling

Percentage of survey respondents who biked at least once a week during the bicycling season (Apr - Oct)

Target: Tracking indicator

Results: 21% (2015)

Trend:



Analysis: After a drop in 2014, the percentage of Minnesotans who bicycle at least once a week grew by three percentage points in 2015. MnDOT's 2017 public opinon survey found 28% of respondents bike on a monthly basis.

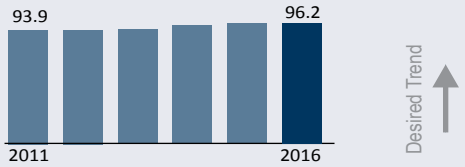
Transit Ridership in the Twin Cities

Boardings reported by public transit providers serving metro-area counties

Target: 145-150 million by 2030

Results: 96.2 million (2016)

Trend:



Analysis: Metro-area transit ridership remains on track to meet the Met Council's goal of doubling 2003 ridership levels by 2030, but year-over-year growth is slowing. Ridership growth is expected to continue as development occurs along key transitways and transit service improves.

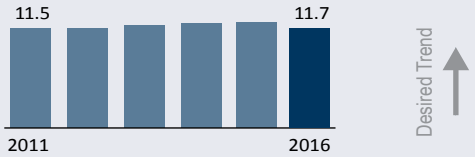
Transit Ridership in Greater Minnesota

Annual boardings reported by public transit providers serving Greater Minnesota counties

Target: 15 million by 2015

Results: 11.7 million (2016)

Trend:



Analysis: Greater Minnesota transit service providers recorded 11.7 million rides in 2016, well short of the 15 million rides needed to meet a legislatively established goal with current funding. Continued growth is expected, but not at a pace sufficient to reach 90% of transit need by 2025 (17M).

Appendix A

The following are statutes and Executive Orders related to efforts in the 2016 MnDOT Sustainability Report.

State Laws

- MN Statute 174.01 – Transportation Goals
  - (10) ensure planning and implementation of all modes of transportation are consistent with the environmental and energy goals of the state
  - (15) reduce GHG emissions from state transportation sector
- MN Statute 174.02 Subd 1a (3): Department mission that, within department resources, commissioner shall endeavor to minimize degradation of air, water, and the climate, including reducing GHG emissions.
- MN Statute 174.03 Subd 1a (3): [in the SMTP] identify performance targets for measuring progress and achievement of transportation system goals, objectives or policies
- MN Statute 216H.02 (Next Generation Energy Act): Set goal to reduce statewide GHG emissions across all sectors, including transportation, at least 15% below 2005 levels by 2015, 30% below 2005 levels by 2025, and 80% below 2005 levels by 2050.

Executive Orders

- EO 17-12 (Directing State Agencies to Conserve Energy and Water, Reduce Waste to Save Money): directs state agencies to adopt sustainability goals related to fleet, water, procurement, greenhouse gas emissions, energy and solid waste.
- EO 11-13 (Strengthening State Agency Environmental, Energy and Transportation Sustainability): directs state agencies to prevent pollution through waste reduction and recycling and conserve energy and reduce GHG emissions from state buildings and vehicles.
- EO 16-07 (Directing Steps to Reverse Pollinator Decline and Restore Pollinator Health in Minnesota): directs state agencies to coordinate efforts to promote pollinator health.

International Agreements

- Under 2 MOU: Minnesota commits to 80% - 90% GHG reduction targets from 1990 levels by 2050, including a transportation goal to further adopt ZEVs. 167 jurisdictions in 3 counties on six continents have signed on.

References

[1] The National Climate Assessment summarizes the impacts of climate change on the United States, now and in the future.

[2] Greenhouse Gas Emissions Reduction Biennial report to the Minnesota Legislature January 2017

[3] MPCA

[4] The Under2MOU has the goal of limiting warming to below 2○ C, which the UN Intergovernmental Panel on Climate Change (IPCC) scientists says is need to avoid dangerous consequences.

[5] MN Executive Order 17-12 Requires state agencies to reduce energy consumption 30 percent per square foot by 2027 relative to a 2017 adjusted baseline.

[6] MnDOT B3 Annual Benchmarking Report, 2017

[7] MN Executive Order 11-13 Strengthening State Agency Environmental, Energy and Transportation Sustainability

[8] RETRAC Recycling Report, January 2018

[9] MN Statute, Sec. 115A.15, Subd.9. “Recycling goal” requires State agencies to recycle at least 60 percent by weight of the solid waste generated by state offices in the metropolitan area, and other operations located outside of the metropolitan area.

[10] MN Executive Order 11-13 Strengthening State Agency Environmental, Energy and Transportation Sustainability

[11] MnDOT M5 Fleet Management Software

[12] MnDOT Crystal Reports

[13] MnDOT Maintenance Operations and Administration Efficiencies, September 2017

[14] Emissions savings based on MnDOT desktop analysis confirmed by the Climate Registry

[15] MnDOT Winter Maintenance Report, 2017

[16] MnDOT Resource Consumption Application, Business Intelligence Report, 2017

[17] MnDOT Regional Transportation Management Center

[18] MnDOT Annual Average Bid Prices Report, 2008-2015

[19] 2017 MnDOT Statewide Fact Sheet

DEPARTMENT OF TRANSPORTATION