



# Transportation in Minnesota: Partnerships, Target Setting, & Progress Towards Climate Goals

Tim Sexton

AASHTO 2018 Joint Summer Conference

July 19, 2018

# 4 statements about Minnesota

*Climate change will impact Minnesota more than any state outside Alaska*

*Transportation is the #1 source of GHG in Minnesota*

*We have ambitious goals for reducing GHG emissions from transportation*

*The exact path to achieving these goals is still unclear, but we know that partnerships will be critical*

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A map of the state of Minnesota is shown, colored in four shades of orange and yellow to represent different temperature increase ranges. The northern and central parts of the state are predominantly dark orange, indicating a 2-3 degree increase, with some small patches of the darkest orange indicating a +3 degree increase. The southern part of the state is mostly light yellow, indicating a 0-1 degree increase, with some areas of medium yellow indicating a 1-2 degree increase.


## Northern Minnesota warming faster

Change in average temperature  
from 1901-1960 to 1991-2012

 +3° Increase

 2-3° Increase

 1-2° Increase

 0-1° Increase

Source: National Climate Assessment

## Timeline of Minnesota's historic mega-rain events 1866-2014



### 1866-1965

Four mega-rains  
in 100 years

#### Aug. 6, 1866

Killed 16 people in Fillmore County.

#### July 17-19, 1867

Known as the state's greatest flash flood, in central Minnesota.

#### July 20-22, 1909

Extensive across northern Minnesota, killed 2 children in Duluth.

#### September 9-10, 1947

More than 8 inches in five hours at Hibbing.

### 1966-1999

Three mega-rains  
in 33 years

#### July 21-22, 1972

Nearly 11 inches in 24 hours at Ft. Ripley, state record at the time.

#### June 28-29 and July 1-2, 1975

Intense rain in northwestern Minnesota in two events.

#### July 23-24, 1987

9 inches at Minneapolis-St. Paul International Airport, a record.

### 2000-2014

Five mega-rains  
in 14 years

#### June 9-10, 2002

More than 12 inches in 48 hours in northern Minnesota.

#### Sept. 14-15, 2004

More than 10 inches in 36 hours in Faribault and Freeborn counties.

#### Aug. 18-20, 2007

15 inches near Hokah, state record for 24 hours.

#### Sept. 22-23, 2010

More than 10 inches at Amboy.

#### June 19-20, 2012

7 inches in two days in Duluth, St. Louis River at record level.

2 in 2016

≥2 in 2018

Climate Impact	Likelihood this will change in MN over next 20 years	Potential Negative Implications for the Transportation System
Heavy precipitation / flooding	Very High	<ul style="list-style-type: none"> <li>• Damage to highway and rail infrastructure, airport runways</li> <li>• Flooded roads will slow operations and performance</li> <li>• Slope failures and erosion</li> </ul>
Warmer winters	Very High	<ul style="list-style-type: none"> <li>• More ice</li> <li>• Reduced pavement conditions and life cycles</li> <li>• Downed power lines with ice storms</li> </ul>
New species ranges	High	<ul style="list-style-type: none"> <li>• Changes in roadside vegetation mixes</li> <li>• Soil erosion</li> <li>• Increase in invasive species populations</li> <li>• Increased exposure of construction and maintenance crews to vector-borne diseases</li> </ul>
High heat	Medium	<ul style="list-style-type: none"> <li>• Pavement and rail buckling</li> <li>• Vehicles overheating</li> <li>• Electrical system malfunctions</li> <li>• Limitations on construction hours</li> </ul>
Drought	Low	<ul style="list-style-type: none"> <li>• Reduced river navigability for barges</li> <li>• Roadside vegetation stress, reduces rainwater storages and increases soil erosion</li> </ul>
Wildfires	Unknown	<ul style="list-style-type: none"> <li>• Road closures</li> <li>• Immediate and significant threat to human safety</li> <li>• Damage to roadside infrastructure</li> </ul>

# Last month...

## Highway 23 and Hwy 48 remain closed in Carlton, Pine Counties



Highway 23 in Carlton County | Photo: MnDOT

*Updated: June 20, 2018 02:48 PM*

Duluth, Minn. – The storms last weekend continue to cause problems in Carlton and Pine Counties in Minnesota. According to the Minnesota Department of Transportation, Highway 23 in Carlton County and Highway 48 in Pine County remain closed due to

## Highway 93 Closed from Henderson to Highway 169 Due to Flooding



Photo: MnDOT

Highway 93 is closed from Henderson to Highway 169 due to Rush River flooding.

*June 10, 2018 08:36 PM*

A stretch of highway southwest of the Twin Cities will remain closed until at least Monday morning.

## Northern Minnesota

## Southern Minnesota



# Last month...

## Mudslide closes southern Minnesota highway

MPR News Staff · Jul 1, 2018

Weather



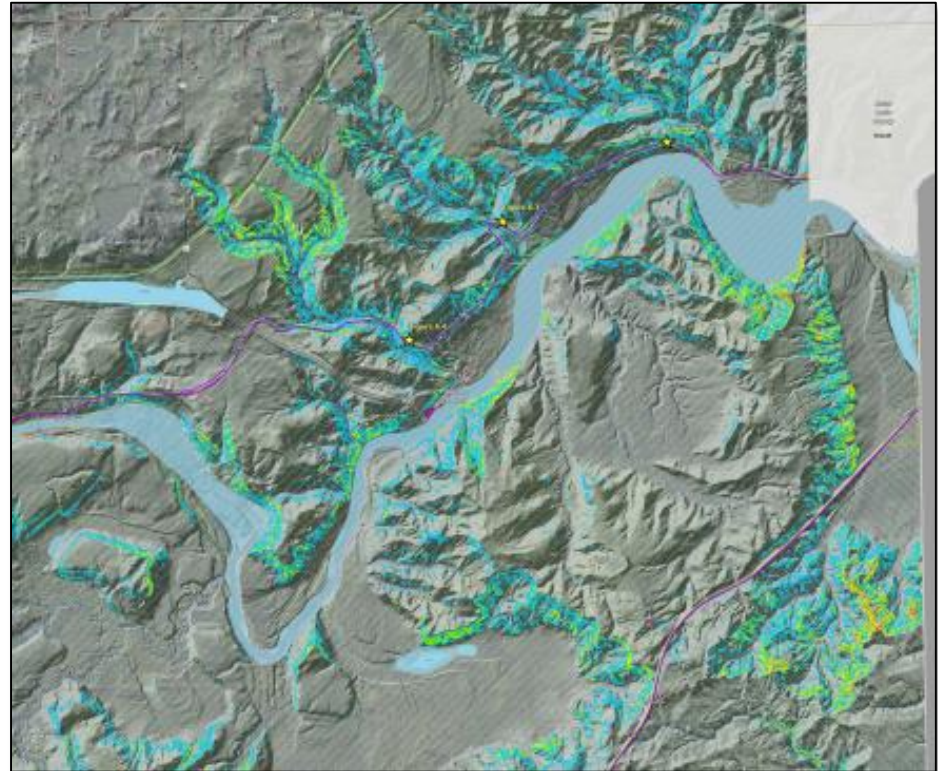
A mudslide forced the closure of State Highway 68 southeast of New Ulm, Minn., on Sunday, July 1, 2018. Courtesy of Minnesota Department of Transportation



Updated: 6:15 p.m. | Posted: 3 p.m.

A southern Minnesota highway has been closed after a mudslide Sunday left a "significant" amount of mud and fallen trees on the road.

The Minnesota Department of Transportation reported Sunday afternoon that the mudslide had closed State Highway 68 just south of Courtland, or about 5 miles southeast of New Ulm.





# Last week...

## Heavy rains drench an already soggy northern Minnesota

Tim Nelson · St. Paul · Jul 12, 2018

Weather



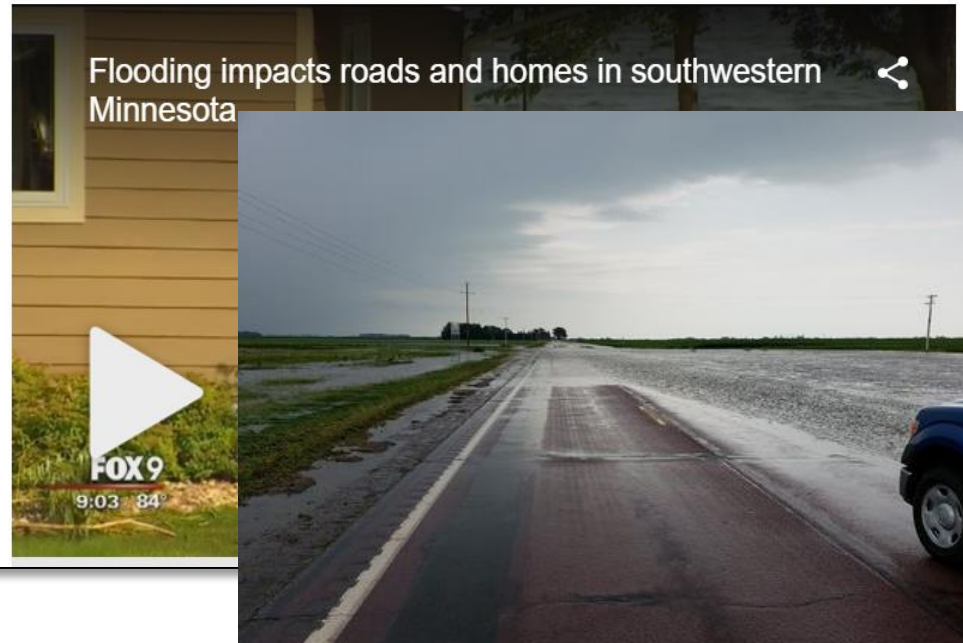
"This is why you should not drive around barricades in a flash flood zone!" tweeted the Kanabec County Sheriff's Office Thursday about this car at Howe Avenue and Walnut Street in Mora, Minn. *Kanabec County Sheriff's Office via Twitter*



Updated 12:10 p.m. | Posted 8:48 a.m.

Torrential rains swept across parts of northeast and east-central Minnesota early

## Heavy rains cause flooding, road closures in southwestern Minnesota



Northern Minnesota

South Central Minnesota

# 4 statements about Minnesota

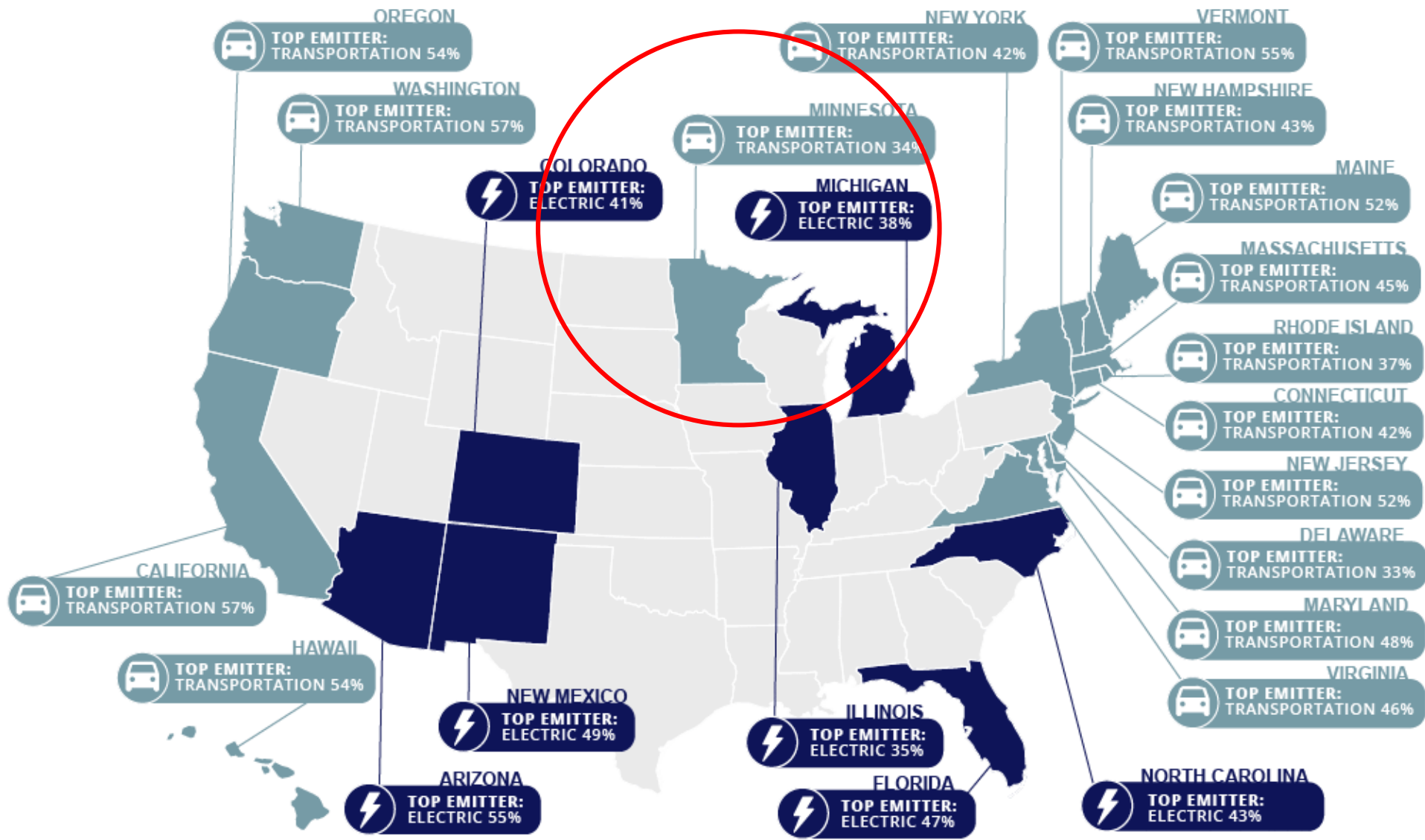
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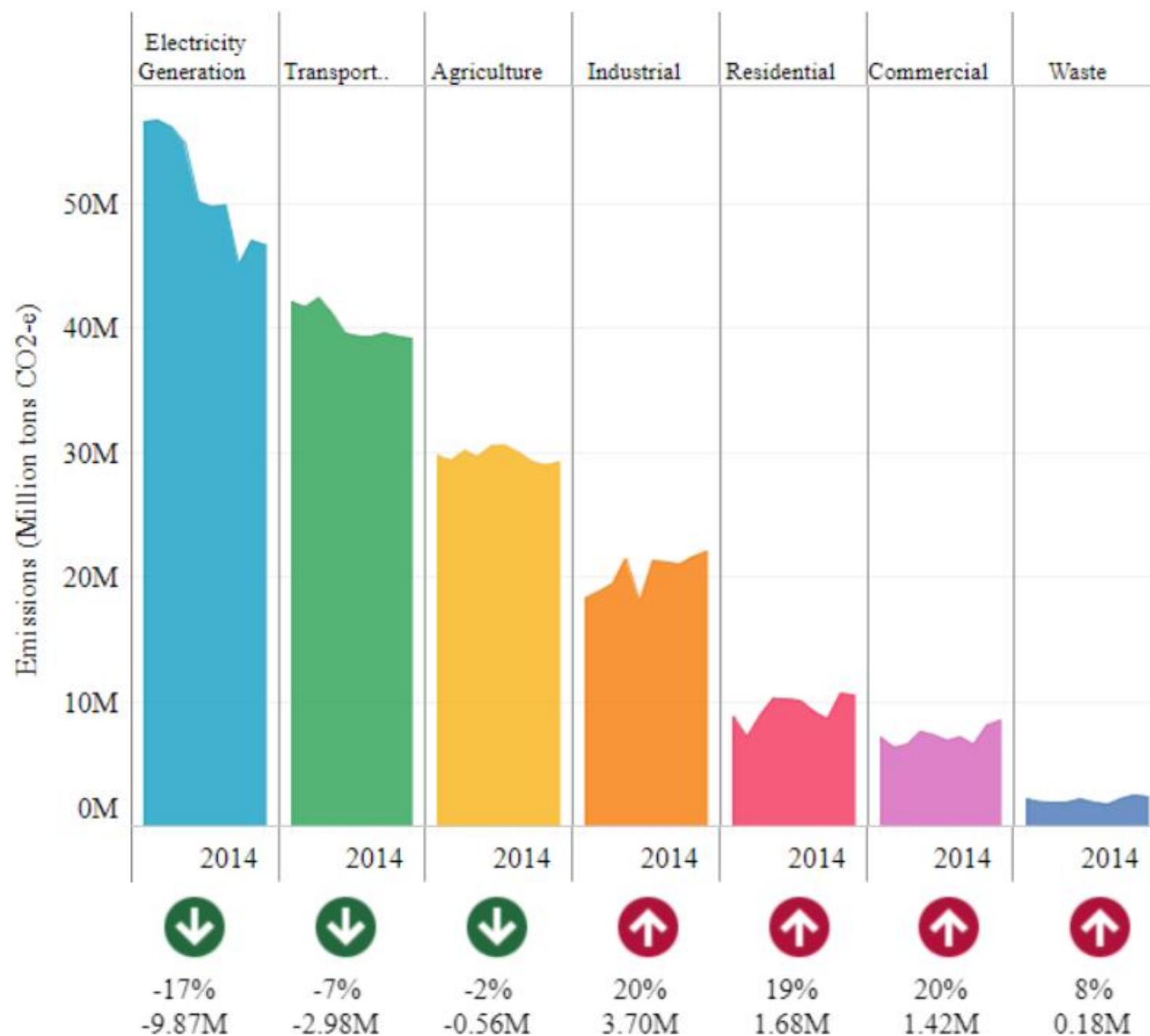
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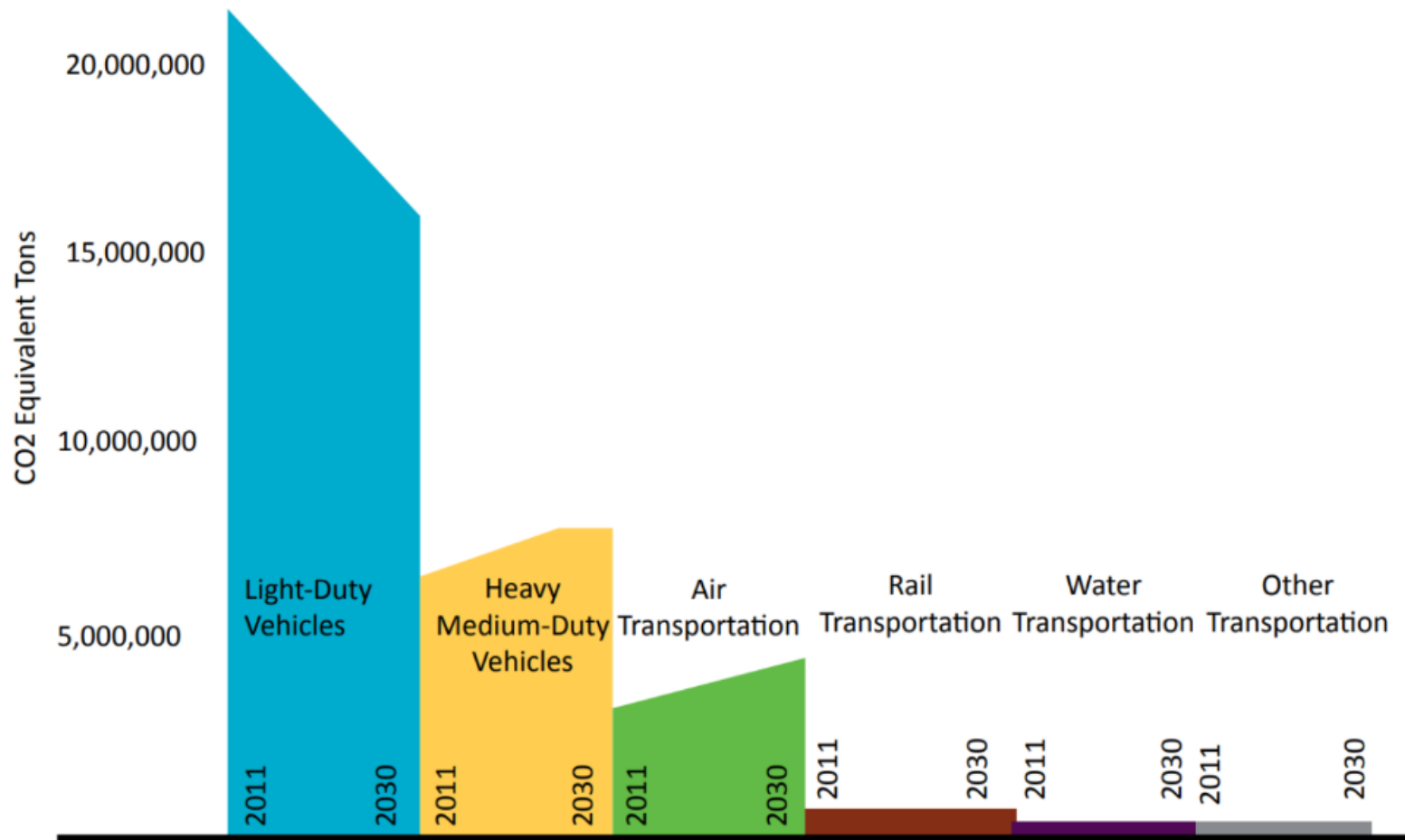
# Transportation is the new #1



# Minnesota's greenhouse gas emissions from economic sectors 2005-2014



# Minnesota's Forecasted GHG Emissions; 2011 - 2030





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# State and National Targets

## State Targets

- Next Generation Energy Act reduce GHG emissions from 2005 baseline
  - 15% by 2015
  - 30% by 2025
  - 80% by 2050

## Subnational Targets

- Paris/US Climate Alliance
- “We’re Still In”
- Under 2 MOU

### UNITED STATES CLIMATE ALLIANCE

The [United States Climate Alliance](#) is a bipartisan coalition of 17 governors committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. The Alliance is led by state governments, and is focused on state-to-state cooperation to accelerate the deployment of climate solutions needed to help each achieve their climate goals.

The Alliance represents 40% of the U.S. population and a \$9 trillion economy – an economy larger than all countries but the United States and China. The climate and clean energy policies in Alliance states have attracted billions of dollars of new investment and helped create more than 1.6 million clean energy jobs, nearly half the U.S. total. Independent analysis highlighted in the Alliance's [2017 Annual Report](#) shows that Alliance States are not only outpacing non-Alliance states in reducing their emissions, they are also growing their economies at a faster pace. Between 2005 and 2015, Alliance States reduced their emissions by 15% compared to 10% for the rest of the country. In that same time period, per capita economic output in Alliance States expanded twice as fast as in the rest of the country. The Alliance is demonstrating that climate leadership and economic growth go hand-in-hand.



#### Our Principles

States are continuing to lead on climate change: Alliance states recognize that climate change presents a serious threat to the environment and our residents, communities, and economy.

State-level climate action is benefitting our economies and strengthening our communities: Alliance members are growing our clean energy economies and creating new jobs, while reducing air pollution, improving public health, and building more resilient communities.

States are showing the nation and the world that ambitious climate action is achievable: Despite the U.S. federal government's decision to withdraw from the Paris Agreement, Alliance members are committed to supporting the international agreement, and are pursuing aggressive climate action to make progress toward its goals.

#### Our Commitments

Alliance States commit to:

- Implement policies that advance the goals of the Paris Agreement, aiming to reduce greenhouse gas emission by at least 26-28 percent below 2005 levels by 2025
- Track and report progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement, and
- Accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.

# Transportation Sector Goals

Metric	2025 Target	Results
<b>Sector Level</b> Total annual GHG emissions generated by Minnesota's transportation system	29,500,000 tons CO <sub>2</sub> e	40,300,000 tons CO <sub>2</sub> e
<b>State Highway Construction</b> Total annual GHG emissions from the fuel and materials use to construct MnDOT projects	2,500,000 metric tons CO <sub>2</sub> e	3,600,000 metric tons CO <sub>2</sub> e
<b>MnDOT GHG emissions - Operations</b>		
<b>Facilities</b> Total annual GHG emissions generated by MnDOT-owned facilities	21,800 metric tons CO <sub>2</sub> e	30,113 metric tons CO <sub>2</sub> e
<b>Fleet</b> Total annual GHG emissions generated by MnDOT-owned fleet	26,500 metric tons CO <sub>2</sub> e	37,766 metric tons CO <sub>2</sub> e

*2016 MnDOT Sustainability Report*

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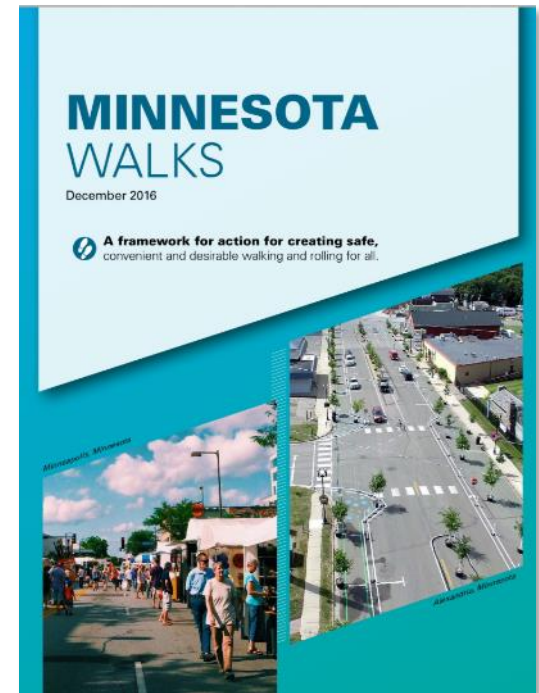
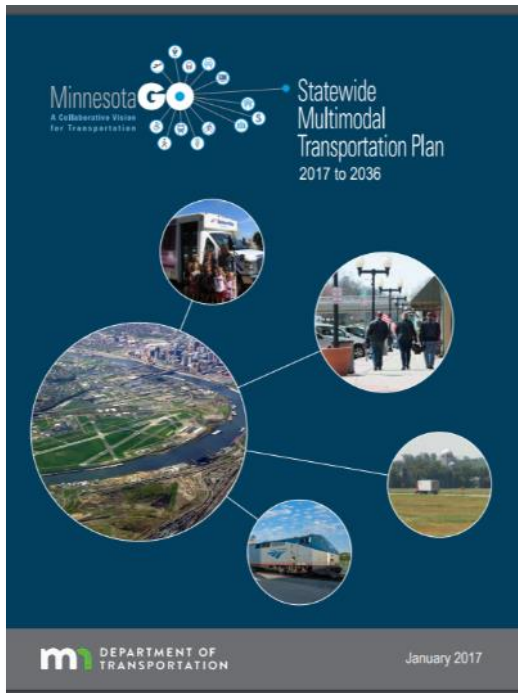
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# Transportation Options





# Transportation Options

Metric	Target	Results	Trend
<b>System Use</b>			
 <b>Frequency of Bicycling</b> Percentage of survey respondents who biked at least once a week during the bicycling season (Apr - Oct)	Tracking indicator	21% 2015	 2011 2015 Desired Trend ↑
 <b>Transit Ridership in the Twin Cities</b> Boardings reported by public transit providers serving metro-area counties	145-150 million by 2030	96.2 million 2016	 2011 2016 Desired Trend ↑
 <b>Transit Ridership in Greater Minnesota</b> Annual boardings reported by public transit providers serving Greater Minnesota counties	15 million by 2015	11.7 million 2016	 2011 2016 Desired Trend ↑

# Adding Person Throughput

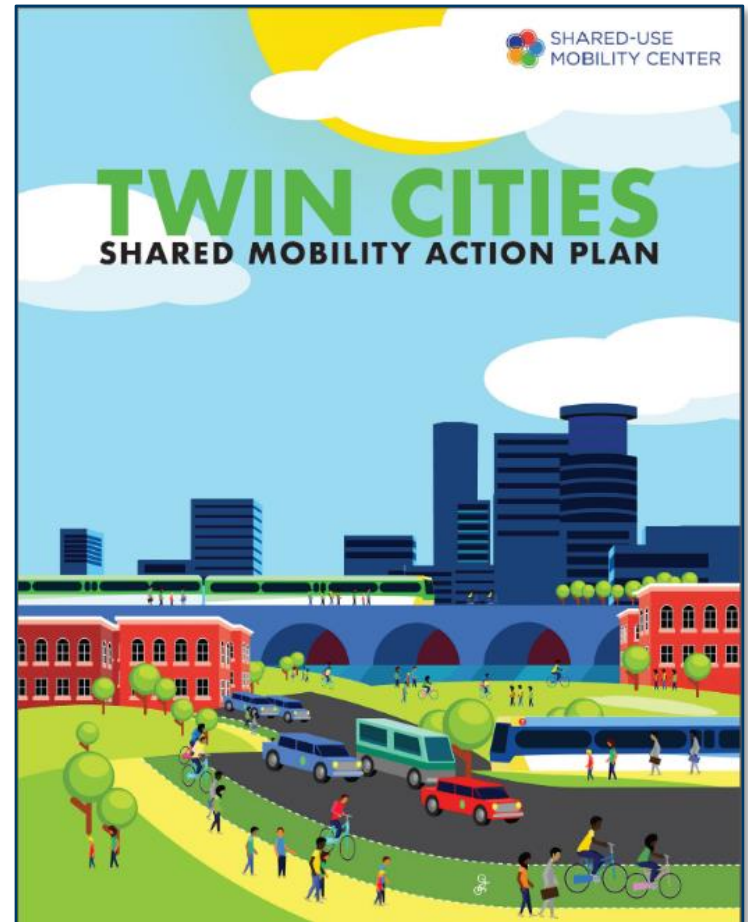


One Tool = High Occupancy  
Tolling (HOT) lanes

- 73 miles (2017)
- 95 mile (goal by Fall 2022)

# Shared Mobility

- Goal: Remove 20,000 private cars from Twin Cities roadways in next five years and 50,000 in ten years
  - Attract 30,000 new daily transit riders
  - Sustain 600 total car share vehicles
  - Add 800 bike share bikes
  - Add 1,000 daily vanpool users
  - Add 2,000 micro-transit and ride-splitting users



# Connected and Automated



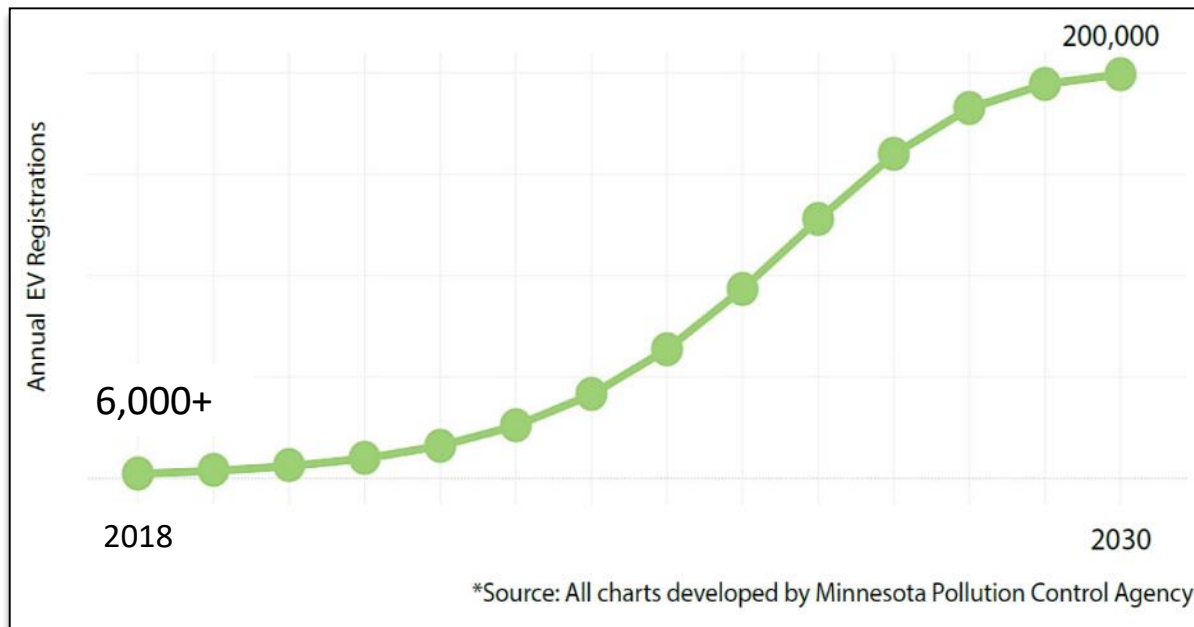


# Electric





# Electric

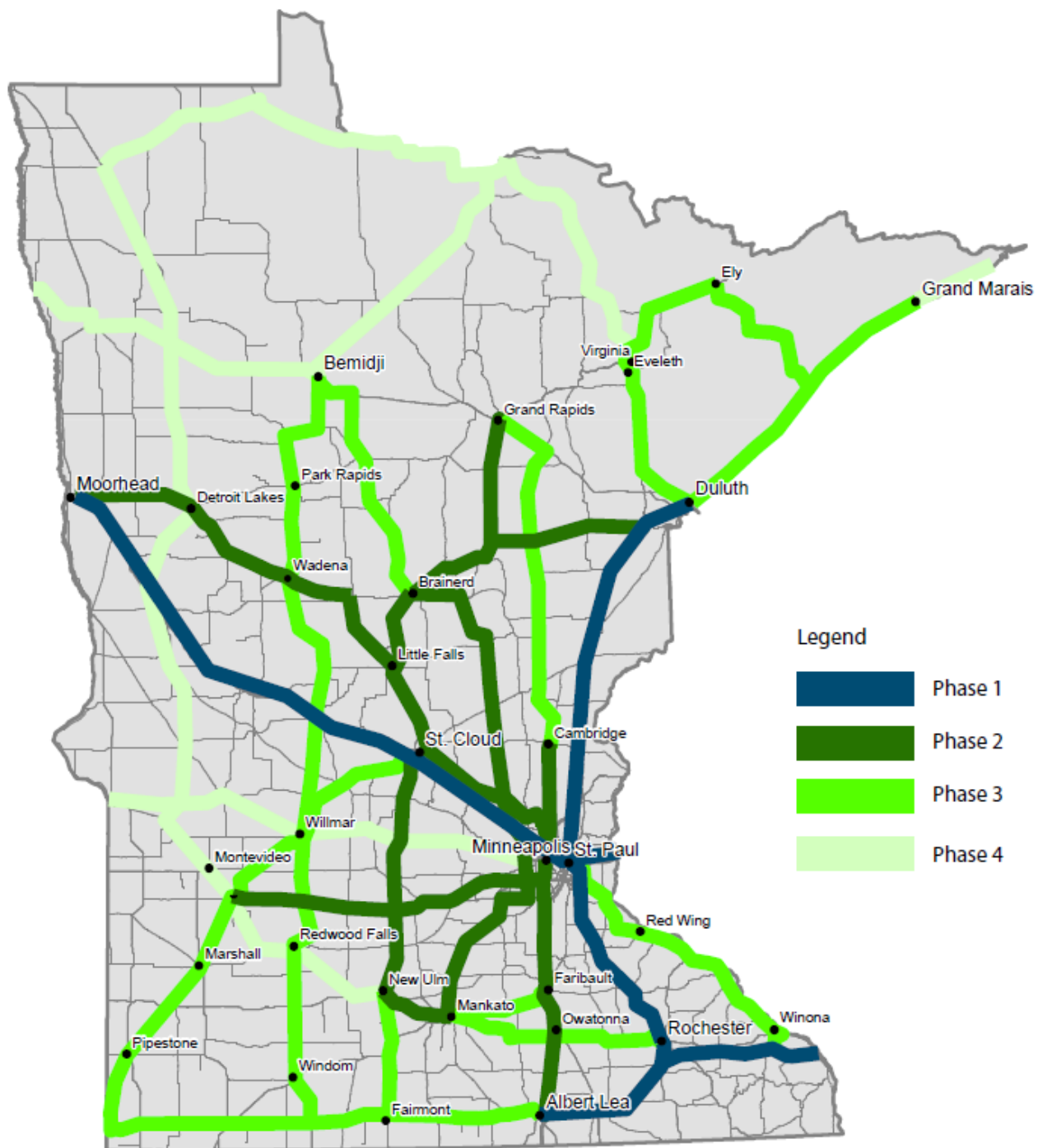


## Minnesota Electric Vehicle Roadmap



Minnesota Department of Transportation  
Minnesota Pollution Control Agency  
Great Plains Institute

2018



# Partnering

- Research, standards, funding, litigation, others...



The Great Lakes Zero Emission Corridor



**Thank You!**

Your proposal #628442 has been successfully submitted. Please print this page for your records.

Your submission is appreciated and this is notification that your documents have been received. We expect to receive up to a thousand or more submissions in just a few months, and these will be reviewed and considered for our Cycle 2 ZEV Investment Plans. We will contact you if we have clarifying questions regarding your submission. Thank you for your patience through this process.



### Minnesota sues EPA over rollback of vehicle emission rules

Cody Nelson · St. Paul · May 1, 2018

Environment

Case 4:17-cv-05439 Document 1 Filed 09/20/17 Page 1 of 23

1 XAVIER BECERRA  
2 Attorney General of California  
3 SUSAN S. FIERING  
4 Supervising Deputy Attorney General  
5 JAMIE JEFFERSON (SBN 197142)  
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16 Attorneys,  
17 and through  
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THE PEOPLE OF CALIFORNIA THROUGH XAVIER BECERRA, ATTORNEY GENERAL OF CALIFORNIA, AND JAMIE JEFFERSON, SUPERVISING DEPUTY ATTORNEY GENERAL, PLAINTIFFS, VS. THE UNITED STATES OF AMERICA, DEFENDANT.

U.S. DEPT. OF TRANSPORTATION  
HENDRIK H. R. DEPUTY ADMINISTRATOR  
HIGHWAY



Committee of the TRB (ADD40)

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About ADD40

### Summary of the Report of the Interagency Climate Adaptation Team

May 2017



**Adapting to Climate Change in Minnesota**

**Our climate is changing**

Climate change is already occurring in Minnesota and its impacts are affecting our state's environment, economy, and communities.

Over the last several decades, the state has experienced substantial warming during winter and at night, with increased precipitation throughout the year, often from larger and more frequent heavy rainfall events.

In the years and decades ahead, winter warming and increased extreme rainfall will continue to be Minnesota's two leading symptoms of climate change.

**How we're adapting**

Minnesota is taking many steps to increase climate adaptation in our state, including a wide range of planning, assessment, and implementation efforts.

This report summarizes ongoing adaptation activities in eleven Minnesota state agencies, including the Departments of Agriculture, Commerce, Health, Military Affairs, Natural Resources, Homeland Security and Emergency Management, and Transportation, as well as the Environmental Quality Board, Pollution Control Agency, Board of Water and Soil Resources, and Metropolitan Council.

**Planning for the future**

State agencies have developed five statewide climate adaptation indicators to help track Minnesota's progress in climate adaptation.

The Interagency Climate Adaptation Team has also identified six priority recommendations for needed action in climate adaptation by state government. These focus on resilience to extreme precipitation, health of vulnerable populations, preserving ecosystems, strengthening agricultural water management, managing climate impacts in population centers, and better using climate data.

Proceedings of a Symposium



**DECARBONIZING TRANSPORT FOR A SUSTAINABLE FUTURE**

Mitigating Impacts of the Changing Climate

Summary of the Fifth EU-U.S. Transportation Research Symposium

The National Academies of SCIENCES • ENGINEERING • MEDICINE

# Thank you!

**Tim Sexton**

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*Minnesota Commissioner of Transportation, Charlie Zelle,  
charging his Chevy Volt PHEV*





9/6/2018

[mndot.gov](http://mndot.gov)

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# Conceptual Adaptation Screening Framework

