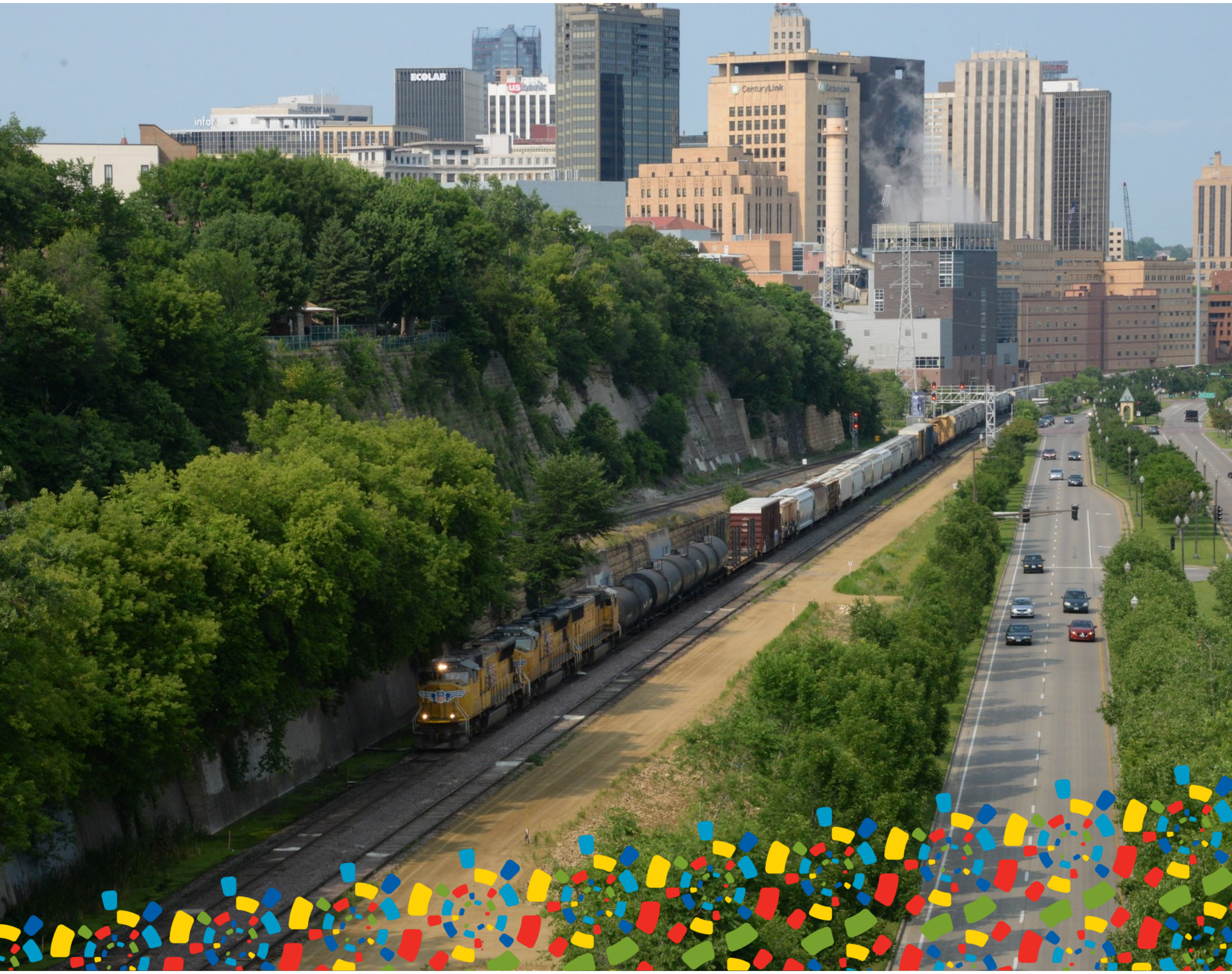
June 6, 2024 Draft for TAC Planning

EVALUATION AND PERFORMANCE



IMAGINE 2050
transportation policy plan

A prosperous, equitable, and resilient region with abundant opportunities for all to live, work, play, and thrive. The statement builds off of the regional values and goals set by the Met Council to guide our policy work.

Regional core values

Equity | Leadership | Accountability | Stewardship

Regional goals

Our region is equitable and inclusive
Racial inequities and injustices experienced by historically marginalized communities have been eliminated; and all residents and newcomers feel welcome, included, and empowered.

Our communities are healthy and safe
All our region's residents live healthy, productive, and rewarding lives with a sense of dignity and wellbeing.

Our region is dynamic and resilient
Our region meets the opportunities and challenges faced by our communities and economy including issues of choice, access, and affordability.

We lead on addressing climate change
We have mitigated greenhouse gas emissions and have adapted to ensure our communities and systems are resilient to climate impacts.

We protect and restore natural systems
We protect, integrate, and restore natural systems to protect habitat and ensure a high quality of life for the people of our region.

2050

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Introduction

The 2050 Transportation Policy Plan uses a performance-based approach to measure success in meeting the region's transportation goals and objectives. This chapter describes the performance measures the Metropolitan Council will use to monitor and evaluate this plan's effectiveness.

The Met Council and its regional partners have selected performance measures that are clear, measurable, and closely tied to the plan's goals and objectives. The measures will indicate where the region is meeting its goals and objectives and what areas require greater emphasis and resources.

The 2050 Transportation Performance Plan performance measures fall into one of two main categories:

- **Required federal performance measures** that are tracked and must be reported upon on a regular basis. As the region's Metropolitan Planning Organization, the Metropolitan Council is required to set short-term performance targets for these measures. The results of these measures are primarily concerned with the overall short-term trend and whether this trend is meeting the desired expectations.
- **Regional performance measures** that the Met Council tracks to evaluate the region's progress towards its goals and objectives.

Regional performance measures are organized by the plan's goals and objectives:

- Our region is equitable and inclusive
- Our communities are healthy and safe
- Our region is dynamic and resilient
- We lead on addressing climate change
- We protect and restore natural systems

Each section describes what measures will be used for that goal and objective. The sections provide tables or graphics summarizing existing trends. In cases where a measure can be forecasted, this chapter provides projections of the measure under the following scenarios:

- **Base scenario:** This scenario uses 2022 regional socioeconomic (in other words population and employment) estimates and the existing roadway and transportation network, as well as some projects with an estimated completion date of 2025.
- **2050 no-build scenario:** This scenario uses year 2050 regional socioeconomic forecasts and the Base Scenario transportation network. This scenario explores how the transportation system will perform under forecasted regional growth if we do not make any further investments.
- **2050 current revenue scenario:** This scenario uses regional socioeconomic forecasts for the year 2050 and investments included in the plan's current revenue scenario.

The Met Council used forecasts from the Regional Travel Demand Forecast Model (called an Activity Based Model) and the Regional Transit Ridership Model to forecast the performance outcomes of each scenario.

Some performance measures apply to multiple goals and objectives. For instance, aAccess to Destinations can be used to evaluate progress towards both an equitable and inclusive region as well as a dynamic and resilient region. In these cases, measures have been linked to the goals and objectives where they can provide the greatest insight.

This performance-based approach is an ongoing, dynamic program. The Met Council and its partners in the region will update these measures throughout the plan's implementation as needed. Ongoing Met Council studies and reports, like the Met Council's Transportation System Performance Evaluation and future work items, will continuously refresh these performance measures. Going forward, the Met Council will also explore methods of providing evaluations in more dynamic and interactive ways.

Federal Performance Measures

Federal law (23 CFR 490.29) requires that all state departments of transportation and metropolitan planning organizations establish a performance-based planning program that monitors and tracks the transportation system's performance. This requires setting performance measure targets for the following six categories:

- Transportation safety
- Bridge and pavement condition
- System performance and reliability
- Congestion mitigation and air quality
- Transit asset management
- Transit safety

For each of the non-transit performance measures, the Minnesota Department of Transportation has an established deadline to set an overall statewide target. After that target is set, metropolitan planning organziations have 180 days to either:

- Adopt a performance measure target specific to the metropolitan planning organization planning area
- Agree to plan and program projects so that they contribute toward accomplishing the state department of transportation performance measure target.

The performance measure categories are either four-year targets with the option to revise in the middle of the performance period or set on an annual basis. Per federal requirements, the Transportation Policy Plan includes an evaluation of the region's progress in meeting the established performance measure targets. The following sections discuss the current metro area performance.

Transportation safety

The region has implemented several strategies to improve safety for users of all modes within the metro area. These strategies support the Met Council's commitment to aggressively reduce the number of fatal and serious injury crashes annually, with an aspirational goal of achieving zero fatal and serious injury crashes no later than 2050, consistent with the Strategic Highway Safety Plan.

Pursuant to federal requirements, the Met Council has adopted short-range annual highway safety performance targets that are both reasonable and achievable. The Met Council adopted 2024 targets that reflect an annual reduction from the base-year data for fatal and serious injury crashes, as shown in Table 1. For 2024, the Met Council set safety targets on a straight-line decline from the 2020 and 2021 targets.

Table 1: Metropolitan Council Adopted Transportation Safety Performance Measures, 2024

Category	Measure	Baseline (Placeholder)	2024 adopted planning organization target
Safety performance measures that advance a long-term goal of zero deaths and serious injuries	Number of fatalities in planning area (all crash types)		No more than 82
	Fatal injuries per 100 million vehicle miles travelled in planning area		No more than 0.29
	Number of all serious injuries in the planning area (all crash types)		No more than 532
	Serious injuries per 100 million vehicle miles travelled in planning area		No more than 1.89
	Pedestrian and bicyclist fatalities and serious injuries in the planning area		No more than 131

Bridge and pavement condition

In 2023, the Council adopted bridge and pavement performance measure targets that matched the statewide targets adopted by MnDOT. The targets were determined through close coordination with MnDOT staff. Overall, bridge and pavement conditions are similar in the metro area to the state as a whole. The adopted targets are shown in Table 2.

Table 2: Adopted Bridge and Pavement Performance Measure Targets

Category	Measure	Baseline (placeholder)	Adopted 2023 target	Adopted 2025 target
Bridge condition	Percent of National Highway System bridges by deck area in good condition		>30%	>35%
	Percent of National Highway System bridges by deck area in poor condition		<5%	<5%
Pavement condition	Percent of interstate pavement in good condition		>60%	>60%
	Percent of interstate pavement in poor condition		<2%	<2%
	Percent of non-interstate National Highway System pavement in good condition		>55%	>55%
	Percent of non-interstate National Highway System pavement in poor condition		<2%	<2%

System performance and reliability

The Metropolitan Council adopted performance and reliability measures for reliability measures for interstate, non-interstate, and truck travel times. System reliability is a measure of the dependability of travel times across different days. Table 3 shows the adopted targets for 2023 and 2025.

Table 3: Adopted System Reliability Performance Measure Targets

Category	Measure	Baseline (placeholder)	Adopted 2023 target	Adopted 2025 target
System reliability	Percent of reliable person-miles traveled on the interstate		>82%	>82%
	Percent of reliable person-miles traveled on the non-interstate National Highway System		>90%	>90%
	Truck travel time reliability index		<1.4	<1.4

Congestion mitigation and air quality

Congestion mitigation and air quality measures are unique in that they only apply to areas which are not in full air quality attainment. Targets must be jointly agreed to by both the Met Council and MnDOT. The region is currently in full air quality attainment; however, new two- and four-year congestion mitigation and air quality measures were required in October 2021, just under a year before the 20-year maintenance period expired in September 2022. These two- and year- year targets are shown below.

The on-road mobile source emission target applies to PM-10 emission, the pollutant for which the region was under a maintenance plan until 2022. The maintenance plan applied to a small portion of Ramsey County. PM-10 emissions in this maintenance area are largely due to stationary sources; transportation sources are not a significant contributor. Staff have determined that the only project in this area that might reduce PM-10 emissions is the METRO Gold Line Project, and these impacts would be very small. Based on this, the two- and four-year target for PM-10 reductions due to transportation projects were set to 0.0 kg/day.

The percent of regional travel by non-single occupancy vehicles has been gradually increasing over the past several years, with more residents choosing to carpool, walk, bike, or take transit to and from work. The slight increase from >28% to >29% reflects expectations that this trend of increasing use of alternatives to single-occupancy vehicles will continue in the future.

Excessive delay is a significant mobility concern within the metro area and affects the access to destinations goal of the Transportation Policy Plan, among others. The adopted target was set to with no more than 8.5 hours of peak hour excessive delay per capita in both 2023 and 2025.

Table 4: Adopted Congestion Mitigation and Air Quality Performance Measure Targets

Category	Measure	Baseline (placeholder)	Adopted 2023 target	Adopted 2025 target
Congestion Mitigation and Air Quality	On-road mobile source emissions reduction (PM-10)		0.0 kg/day	0.0 kg/day
	Percent of travel by non-single-occupancy vehicles		>28%	>29%
	Peak-hour excessive delay (annual hours of excessive delay per capita)		<8.5 hours	<8.5 hours

Transit asset management

Transit asset management, a best practice and a requirement under federal law, is a business model that prioritizes funding decisions based on the condition of transit assets. Transit providers are required to assess, track, and report on their assets to FTA, and develop annual targets for asset management to ensure a state of good repair. Transit providers also develop transit asset management plans that document implementation actions for asset management within their transit systems. Initial transit asset management targets must be coordinated with the Met Council, which is the region's metropolitan planning organization. The four FTA-required performance measures for transit asset management are:

- Rolling stock (buses and train used for serving customers): The percentage of revenue vehicles (by type) that exceed the useful life benchmark.
- Equipment (vehicles used in a support role): The percentage of non-revenue service vehicles (by type) that exceed the useful life benchmark.
- Facilities: The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model Scale.
- Infrastructure: The percentage of rail track segments (by mode) that have performance restrictions.

Track segments are measured to the nearest one-hundredth of a mile. The region's transit operators officially established targets are shown in Table 5. The Federal Transit Administration (FTA) does not require metropolitan planning organizations to adopt regional transit asset management targets on an annual basis.

Table 5: Adopted Transit Asset Management Performance Measure Targets

Category	Measure	Baseline (placeholder)	Adopted 2023 Target
Transit asset management	Rolling stock (revenue vehicles): percent exceeding useful life, by vehicle type		Articulated bus: 18% Over-the-road bus: 0% Bus: 14% Cutaway: 39.92% Light rail vehicle: 0% Other: 0% Commuter rail locomotive: 0% Commuter rail passenger coach: 0%
	Equipment: percent exceeding useful life, by vehicle type		Automobiles: 29% Trucks/other rubber tire vehicles: 21%
	Facility: percent rated below a 3 on condition scale, by facility type		Passenger/parking facilities: 0% Administrative/maintenance facilities: 0%
	Infrastructure: percent of track with performance restrictions		Light rail: 1%

Transit safety

Table 6 summarizes the region's transit safety measures.

Table 6: Adopted Metro Transit Bus and Light Rail Safety Performance Measure Targets

Category	Measure	Baseline (placeholder)	Adopted 2023 target – bus	Adopted 2023 target – light rail
Metro Transit bus and light rail safety performance targets	Collisions		3.8 per 100k vehicle miles travelled	0.6 per 100k vehicle miles travelled
	Annual fatalities from vehicle operations		0 per 100k vehicle miles travelled	0 per 100k vehicle miles travelled
	Annual injuries from vehicle operations		62 per calendar year	100 per calendar year
	Rate of injuries		0.31 per 100k vehicle miles travelled	2.08 per 100k vehicle miles travelled
	Number of safety events		68 per calendar year	122 per calendar year
	Rate of safety events		0.34 per 100k vehicle miles travelled	2.54 per 100k vehicle miles travelled
	Total major mechanical failures		2,364	192
	System reliability: vehicle mean distance between failures		8,460 miles mean distane between failures	25,000 miles mean distane between failures

Regional Performance Measures

The Transportation Policy Plan regional performance measures track the region's progress towards achieving this plan's goals and objectives. This chapter looks at recent trends and current conditions to evaluate where the region presently stands in relation to goals and objectives. Where possible, the chapter compares existing conditions with performance goals or with forecasts of different transportation investment scenarios.

Goal: our region is equitable and inclusive

These measures evaluate how the transportation system provides access to opportunities for historically disadvantaged communities and repairs disparate impacts to Black people, Indigenous people, and people of color. These measures also explore how well the transportation system accommodates people with disabilities or limited mobility.

A key feature of these measures is that they look at the impacts of the transportation system on different groups of people, not just how the transportation system affects the region as a whole.

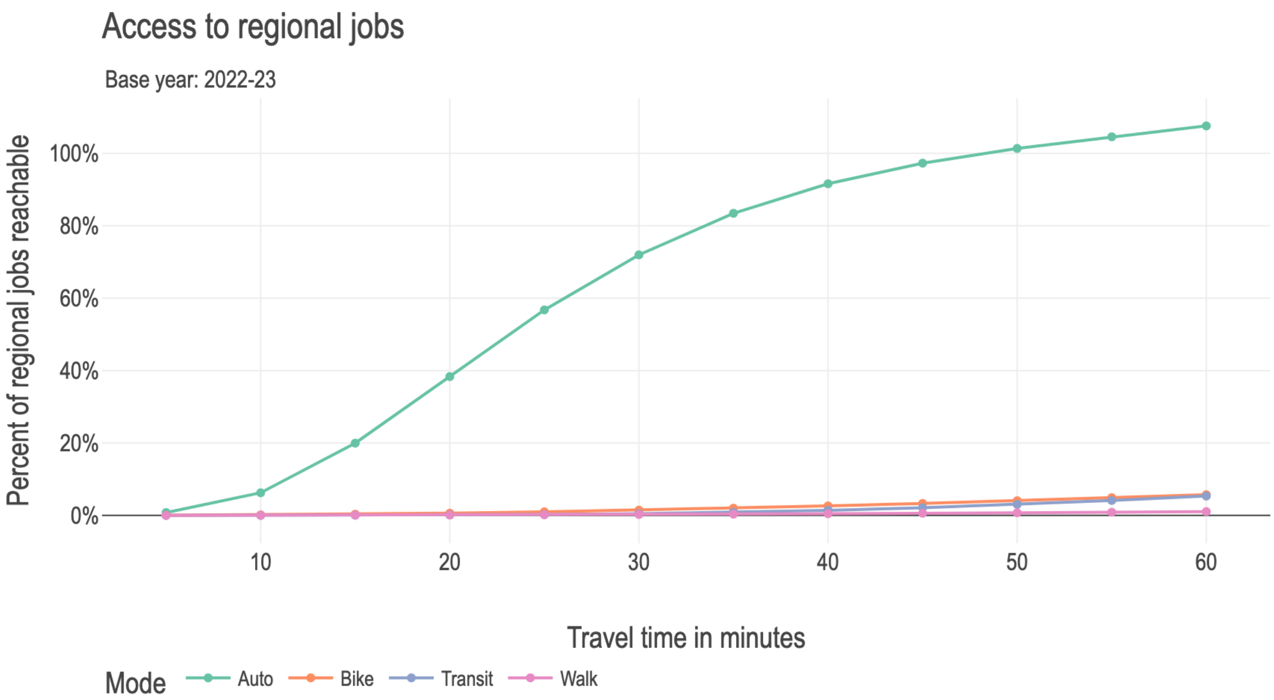
Access to destinations

Access measures look at how many of a certain thing (jobs, shopping, etc.) people can reach within a certain travel time.

Unlike measures like average speeds, access considers both land use and the transportation system. Access measures acknowledge that it doesn't just matter how fast you can travel to your destination, but also how close or far you might be from that destination.

Job access is a useful measure since it provides an indication of both employment opportunities and access to services like retail. As the chart below shows, automobiles currently offer the highest job accessibility. The average resident can reach 50% of all jobs in the region in 25-30 minutes by car on a weekday and 100% of jobs in about 50 minutes. (Note: Percentages in Figure 1 exceed 100% since commuters also begin to have access to jobs outside the region with higher travel times). Access to jobs by other modes (for example, bikes, transit) is much lower under our current land use and transportation system.

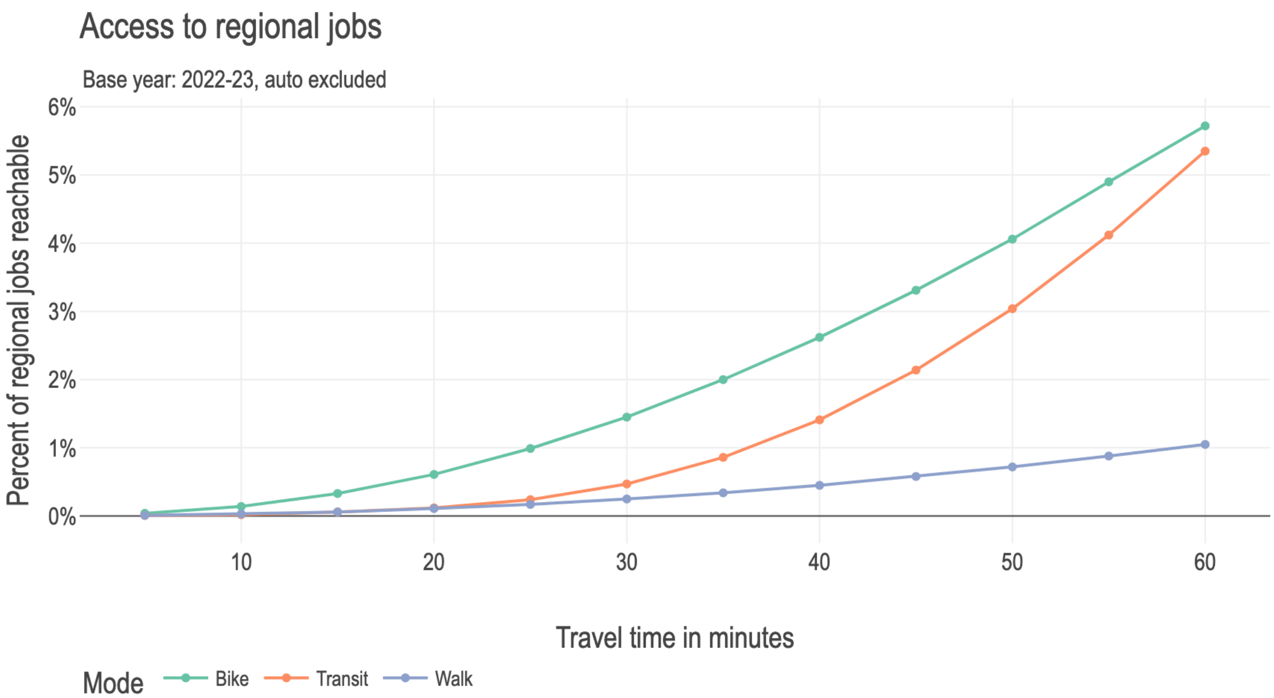
Figure 7: Access to regional jobs (2022-2023)[1]



Because of the dramatic difference between auto accessibility and other modes, it is useful to look at these other modes with a separate chart. Bikes and transit offer the next highest levels of access to jobs. With bike and transit, less than 2% of all regional jobs are accessible within 30 minutes and just over 5% of regional jobs can be reached in an hour on average.

[1] University of Minnesota Accessibility Observatory

Figure 2: Access to regional jobs, non-motorized only (2022-2023)



Another way of looking at how accessibility differs by mode how long it takes people to get to common destinations by different travel modes. Table 7 uses analysis from the University of Minnesota's Accessibility Observatory of typical travel times across for two different common destinations: food stores and K-12 schools. This analysis looks at how long it takes to reach the three nearest options for food stores and K-12 schools, based on the assumption that people might need access to more than the nearest option to meet their particular needs.

Table 7 shows that driving offers significantly faster average travel times to common destinations compared to other modes. Improving these differences requires a combination of changes to transit services as well as land use changes.

Table 7: Typical travel times to food stores and K-12 schools by different modes (2022-2023)[2]

Performance measure	Driving	Transit	Walking	Biking
Median time to reach the nearest three food stores (minutes)	2.7	20	25	12
Median time to reach the nearest three K-12 schools (minutes)	17.8	47	60	45

One way of looking at how accessibility changes with future scenarios is to forecast the change in average job accessibility. Table 8 shows average job accessibility by auto within 20 minutes and transit by 45 minutes for the three different scenarios. The numbers in this table reflect how many jobs a person (on average) can reach by traveling 30 minutes by car and 45 minutes by transit.

[2] University of Minnesota Accessibility Observatory, Met Council

The table shows that job accessibility by automobile goes down in the future between the base year and the no-build scenario. This could be due to population growth in areas where there is less employment as well as slightly higher travel times due to more people using the highway network. The current revenue scenario goes up 2% compared to the no-build, suggesting that some of the new highway investments will improve job accessibility slightly compared to the no-build; however, average job accessibility is forecasted to decrease between the base year and 2050, even under the current revenue scenario.

Future transit accessibility is forecasted to increase in the future. The average job accessibility in 45 minutes by transit goes up 12% between the base-year and the no-build. This increase is probably due to the forecasted growth of jobs and population along transit rich corridors. This transit accessibility goes up even further in the current revenue scenario due to the increased transit service provided by improvements such as arterial bus rapid transit and new transitways.

Table 8: Forecasted change in job accessibility[3]

Performance measure	Base	2050 no-build	2050 current revenue	% Change Base – no-build	% Change – No build- current revenue
Average job accessibility by car (30 minutes)	1,275,437	1,087,908	1,107,748	-15%	2%
Average job accessibility by transit (45 minutes)	37,592	41,994	48,147	12%	15%

[Placeholder: This section will be updated with more detailed breakdowns of accessibility by geography or demographics.]

Exposure to pollution

Exposure to air pollution is a risk for all communities in the region; however, studies show that low-income neighborhoods and communities of color face higher risks. According to the Minnesota Pollution Control Agency, 46% of all low-income communities and 91% of communities of color face air-pollution risks above health guidelines. The statewide average is 32%.[4]

The region's pollution measures will go beyond measuring regional pollution totals; it will also look at how pollution exposure concentrates in specific communities based on socioeconomic characteristics. To do this, this measure evaluates localized indicators of air pollution.

One source for looking at local air pollution exposure is the Environmental Protection Agency's Environmental Justice Screening and Mapping Tool. This resource provides environmental and socio-economic indicators to help identify communities at higher environmental risks.

Figures 2 maps how estimates of some transportation-related air pollutants vary across the region. Pollutant values for each U.S. Census tracts are presented as percentiles of national levels – in other words, a value of 60% means that 60% of tracts in the United State have a lower value.

The maps also highlights Environmental Justice areas. [Placeholder for demographic discussion of exposure to pollution risks]

[3] University of Minnesota Accessibility Observatory, Met Council

[4] Minnesota Pollution Control Agency, "Environmental Justice" (webpage), accessed June 2024.

Figure 3 also shows the relationship between demographics and pollution exposure. The charts compare demographic features with local pollution exposure at the tract level.

[Placeholder for a map overlaying EJ areas with EJ index levels for particulate matter 2.5, ozone, diesel, and air toxins]

[Placeholder for charts showing how EJ index increases with some demographic variables.]

The Minnesota Pollution Control Agency's Understanding Environment Justice in Minnesota story board provides an online, interactive depiction of local air pollution risk. This resource provides maps of the Air Pollution Score (an index that looks at the highest air pollution risk communities face) alongside maps of Areas of Environment Justice Concerns.

Exposure to noise

Noise exposure is a complex topic; noise modeling is very technical and exposure varies depending upon where you are in the region. Both factors make noise exposure a challenging topic to capsulate in a few paragraphs in this chapter. Even so, noise exposure is an important way that the transportation system affects different communities.

At a very simple level, exposure to highway traffic noise is heavily dependent on three things:

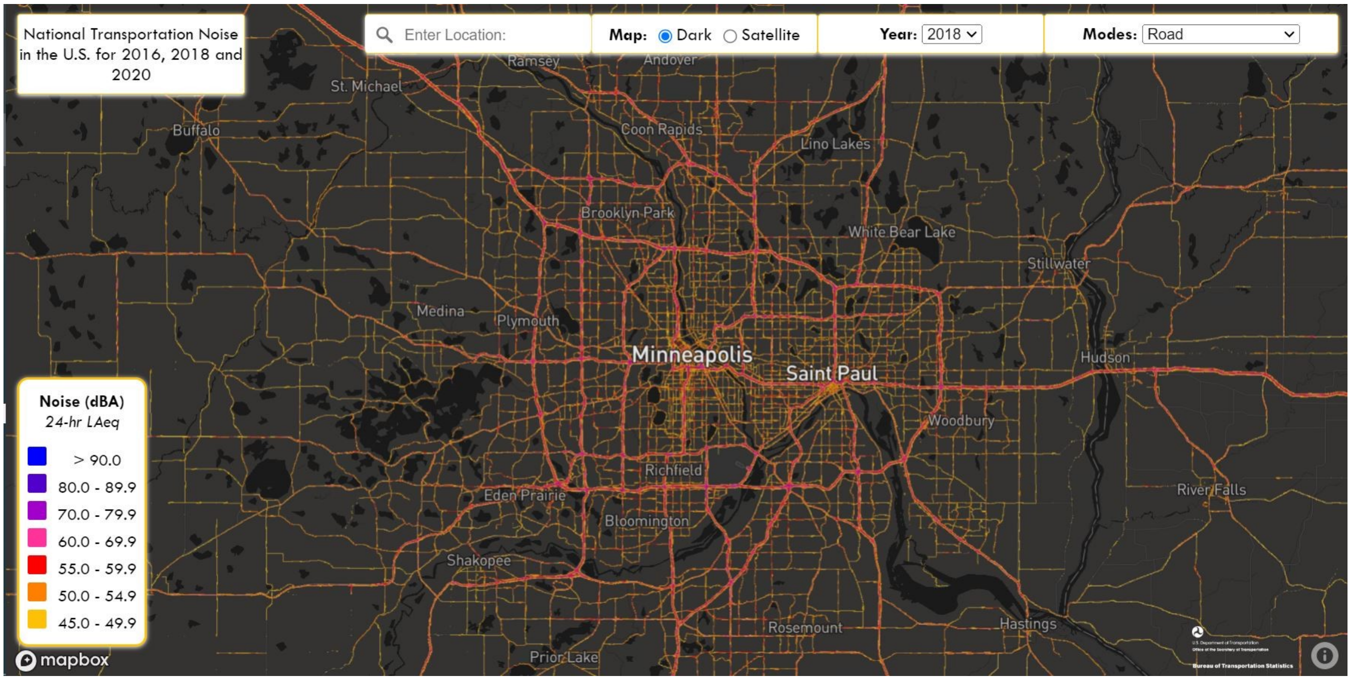
- Traffic volumes
- Traffic speeds
- How much of that traffic comes from trucks[5]

A rise in any of these things increases noise exposure for populations living near transportation facilities. Furthermore, this noise exposure decreases the further people are from these things. Consequently, populations living close to highways and other major roads have the greatest potential for noise exposure. Noise exposure can also affect wildlife[6]. Mitigation efforts such as noise barriers can minimize how much actual noise people experience near roads.

The Metropolitan Council will explore ways to work with other agencies to evaluate how transportation projects disparately affect communities. One potential resource for this work will be the upcoming Freeway Harms Study, which can explore this topic more in depth. A good place to look at noise exposure is the Bureau of Transportation Statistics' National Transportation Noise Map.

[5] Federal Highway Administration, "Noise Analysis and Abatement Guidance: Three-Part Approach to Highway Traffic Noise Abatement", August 2017.
[6] National Park Service, "Effects of Noise on Wildlife" (webpage), February 2018.

Figure 4: Screenshot of National Transportation Noise Map[7]



Exposure to extreme heat

As stated in the Met Council's Keeping our Cool project, "Extreme has unequal impacts across the region. Individual with low incomes are more likely to live in areas with less tree cover and more impervious surfaces compare to wealthier individuals."[8]

The project explored land surface temperatures to look at extreme heat risk throughout the region. Residents with low-incomes are more likely to live in hotter neighborhoods (see Figure 5). The transportation infrastructure plays a role in this heat exposure through impacts like increasing impervious spaces or altering tree canopies. The transportation system also plays a role in people's accessibility to places that provide relief from extreme heat.

[7] Bureau of Transportation Statistics, National Transportation Noise Map
[8] Metropolitan Council, "Keeping our Cool," August 2023.

Figure 5: Land temperature and median household income

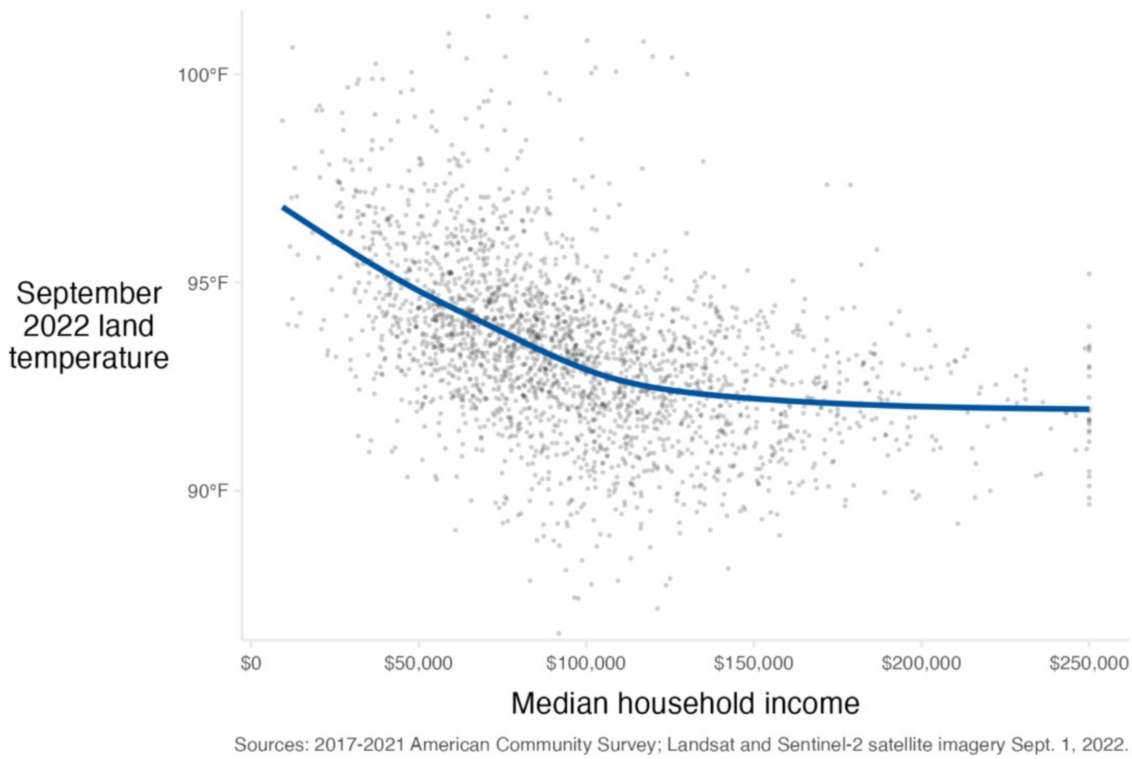


Figure 6 maps the relationship between higher surface temperatures and environmental justice areas.

[Placeholder for map of exposure to extreme heat with layer of EJ]

Goal: Our communities are healthy and safe

This goal's measures include indicators of how well we mitigate and avoid the harmful impacts of our transportation system, such as pollution and noise, to all the region's residents. They measure how our transportation system promotes public health by providing opportunities for active transportation and connections to resources that support people's well-being.

Fatalities and serious injuries rate

The Transportation Policy Plan's objective is that people do not die or face life-changing injuries on our transportation system.

The Transportation Policy Plan uses two ways of measuring fatalities and injuries: total injuries and deaths and crash rates. Crash rates look at the numbers of people being killed or seriously injured divided by per million miles traveled. Both are ways of measuring the region's progress towards zero deaths and serious injuries.

Figures 7 and 8 show recent trends. Between 2019 and 2022, crashes in the Twin Cities rose from 0.44 people killed per 100 million miles traveled (or 130 total people) to a rate of 0.65 (or 179 total people). Although this rate declined slightly from 2021 to 2022, the rates are still alarmingly higher than pre-2020 rates. Fatalities across the state of Minnesota have followed a similar pattern.

Figure 7: Fatal crash rate on all Minnesota roads and Twin Cities metropolitan planning area roads

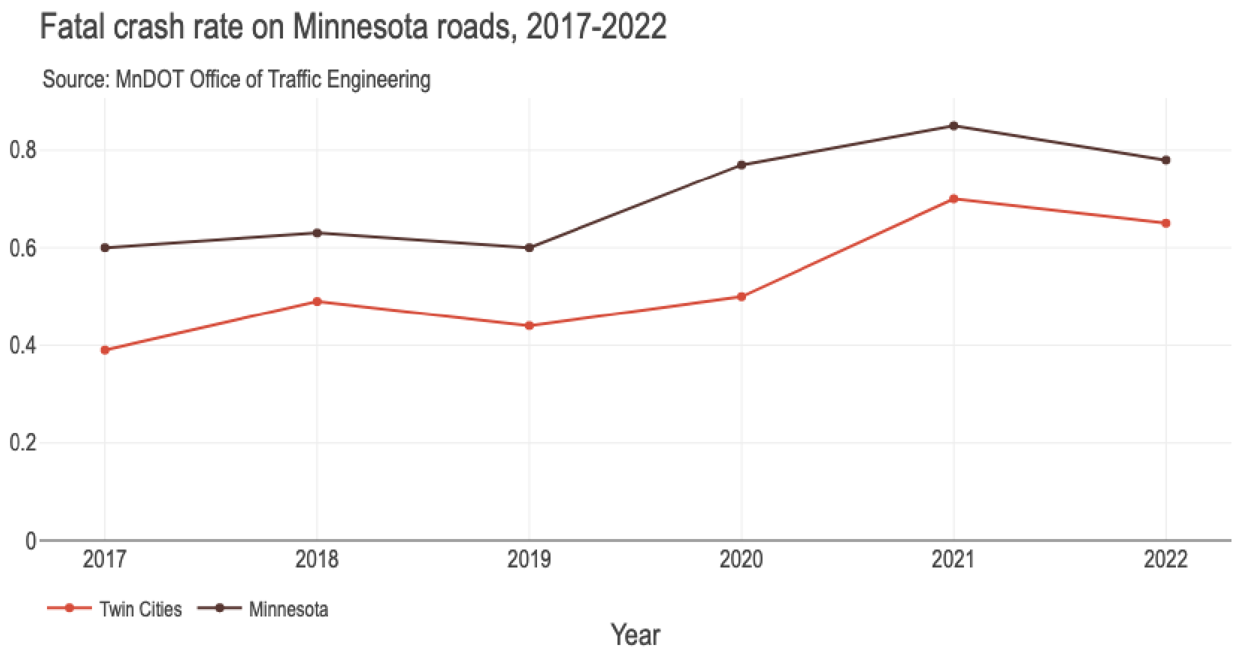
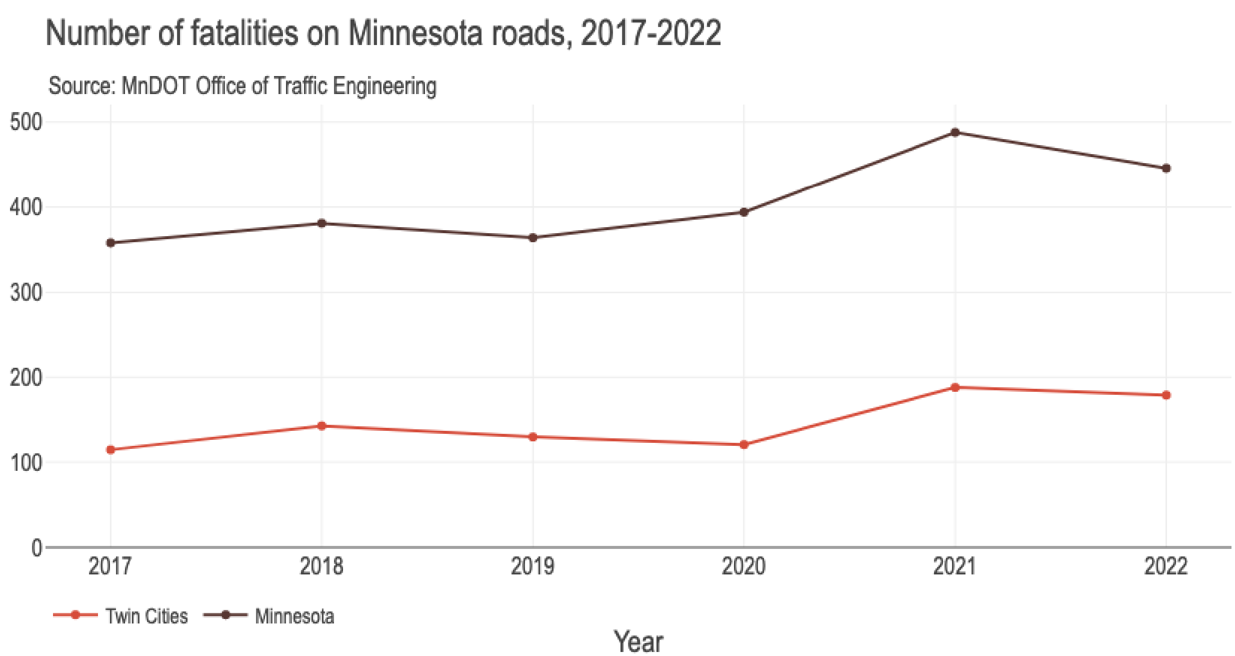


Figure 8: Number of crash fatalities on all Minnesota roads and Twin Cities metropolitan planning area roads



Serious injuries have also increased over the last three years (see Figures 9 and 10). Between 2019 and 2022, serious crash rates in the Twin Cities increased from 2.37 (or 699 total injuries) to a rate of 3.46 (or a 949 total) in 2022. As with fatalities, the regional injuries followed a similar pattern as rates across the state. Starting in 2021, the regional injury rate began to surpass the state injury rate.

Figure 9: Serious injury crash rate on all Minnesota roads and Twin Cities metropolitan planning area roads

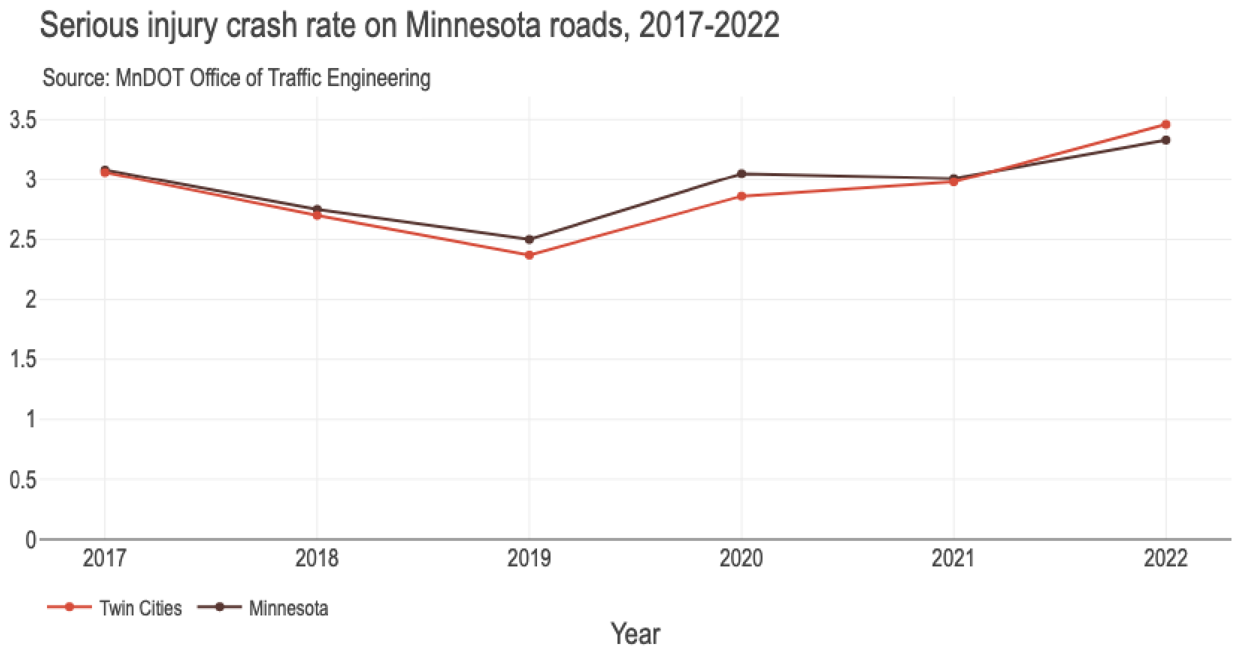


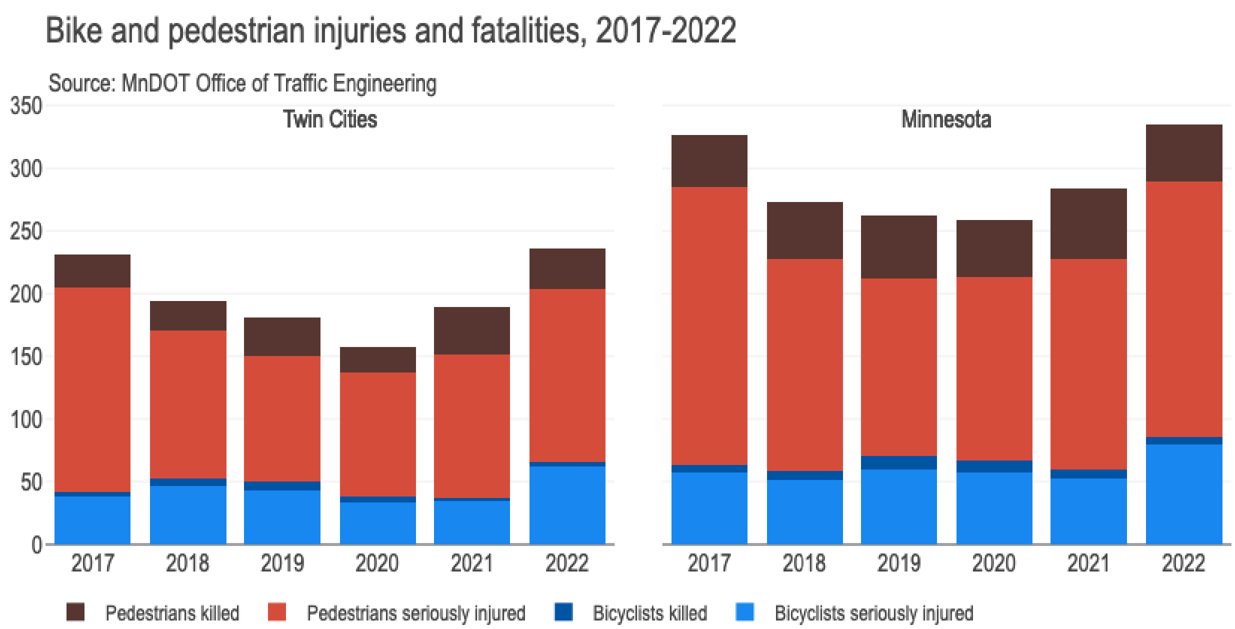
Figure 10: Number of serious injuries on all Minnesota roads and Twin Cities metropolitan planning area roads

Figures 11 shows bicycle and pedestrian injuries over the last several years. In 2022, the latest year of available data, the bicyclist injuries rose to 62, a 43% increase over the previous year. There were 3 fatalities in 2022, one higher than in 2021. In 2022, there were 139 pedestrian deaths and 32 serious injuries, which were slight decreases over 2021. Table 9 below compares our existing performance measures to federal goals

Table 9: Federal safety performance measure goals

Performance measure	2022 existing fatalities and/or injuries	2024 regional targets
Number of traffic fatalities in metropolitan planning area	179	No more than 82
Fatal injuries per 100 million vehicle miles travelled in metropolitan planning area	0.65	No more than 0.29
Number of all serious injuries in the metropolitan planning area	949	No more than 532
Serious injuries per 100 million vehicle miles travelled in metropolitan planning area	3.46	No more than 1.89
Pedestrian and bicyclist fatalities and serious injuries in the metropolitan planning area	236	No more than 131

Figure 11: Bike and pedestrian injuries and fatalities

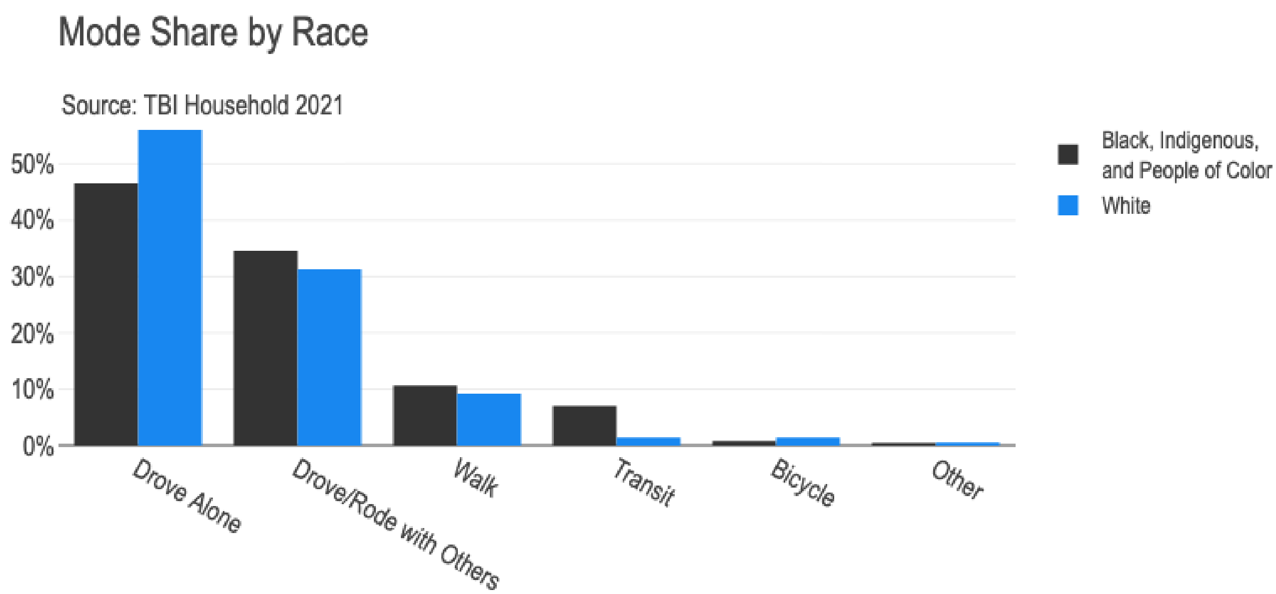


Travel by mode

The health and safety goal promotes the comfortable use of all modes and increased opportunities for active transportation. Differences in the modes of trave people use can be one measure of how our transportation system meets this goal. As shown in the table below, most trips made by household in the region are made by car. About 15% of trips use other modes. But these regional numbers do not tell the whole story. Mode share varies widely across the region based on geography and demographic factors.

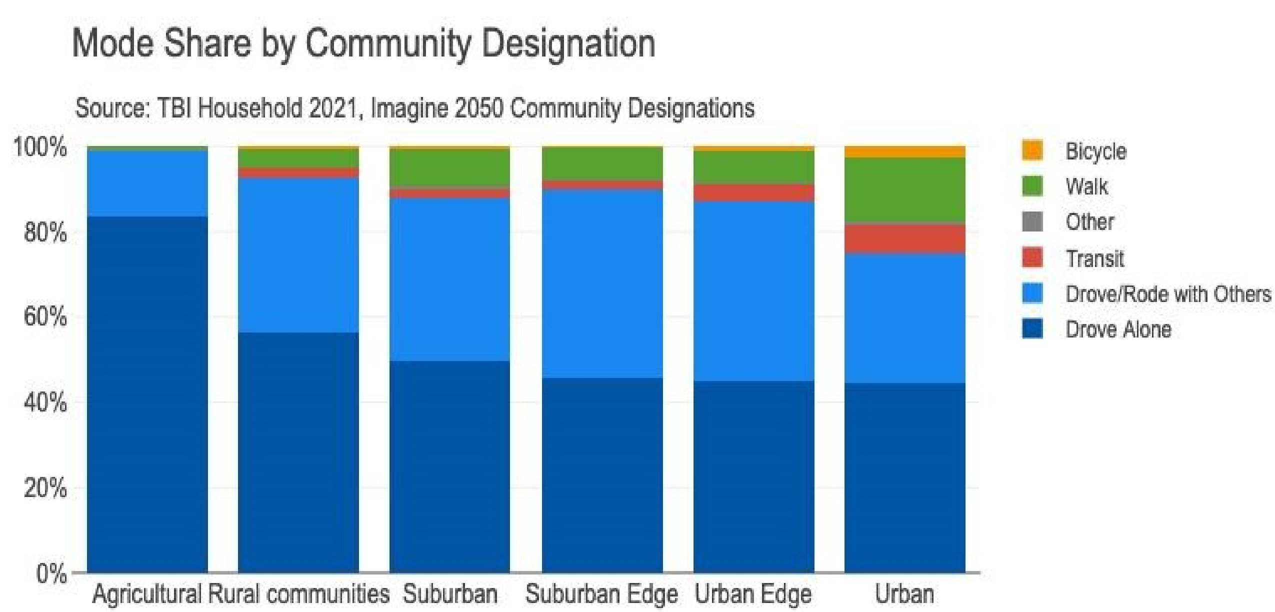
For instance, the Travel Behavior Inventory (2021) shows that Black people, Indigenous people, and people of color are more likely make trips using some alternative to driving alone compared to white people. The use of transit to make trips is especially higher among Black people, Indigenous people, and people of color (see Figure 12).

Figure 12: Mode share by race



Mode share also differs depending upon where you live. Factors like land use patterns and the availability of alternate modes affect how people travel. Figure 13 below shows mode share by proposed Imagine 2050 Community Designations. Urban areas show significantly higher usage of walking, biking, and transit compared to suburban areas. Higher density and more transit options likely influence these differences in mode share. Higher density can include higher number of housing and jobs or services in closer proximity, which can make modes like walking, biking, and transit more convenient and appealing.

Figure 13: Mode share by Imagine 2050 Community Designation



[The chart above will be updated to correct the order of Suburban Edge and Suburban]

One measure of the transportation plan's investments will be to evaluate how these mode shares might change based on transportation system improvements, changing demographics and future land use patterns. Future transportation investments – for instance, making suburban street networks less circuitous, more frequent transit service, or improvements to bike infrastructure – will also influence what mode people use. The table below summarizes how the Regional Travel Demand Model and the Regional Transit Ridership Model forecast mode share will change under three transportation investment scenarios.

Table 10: Regional model share[9]

Performance measure	Drove alone	Ride with others	Transit	Walk	Bicycle	Other
Mode share of all regional trips (base - 2021)	47.0%	38.4%	2.4%	9.3%	1.2%	1.8%
Mode share of all regional trips (2050 no build)	46.5%	37.9%	2.7%	10.2%	1.3%	1.4%
Mode share of all regional trips (2050 current revenue)	46.4%	37.9%	2.8%	10.2%	1.3%	1.4%

The first row in the table is based on observed data (in other words, not forecasts) from the 2021 Met Council Travel Behavior Inventory Household Survey. The second and third rows are forecasts of how this mode share will change in 2050 under the 2050 no-build and current revenue scenarios.

The forecasts show slight increases in people using transit, walking, and biking in the future. The main difference between the base - 2021 and the no-build is future population – both assume a similar transportation system. Some of these forecasted changes are likely occurring due to demographic changes, such as an aging population. For instance, the Other category includes school bus trips, which is forecasted to go down as the average age of the population increases in 2050. A share of these lower school bus trips could be shifted to other modes like transit, walking, or biking. Other factors, such as more people living along transit lines, or increased congestion, might also account from the small shift to transit.

The table also shows further slight increases to transit under the current revenue scenario. These shifts are likely due to the increased transit services in the form of increasing arterial bus rapid transit and new transitway corridors.

Air pollutants emission levels

The Clean Air Act (1970) established standards for six pollutants known to cause harm to human health and the environment. These six pollutants, known as criteria pollutants, are:

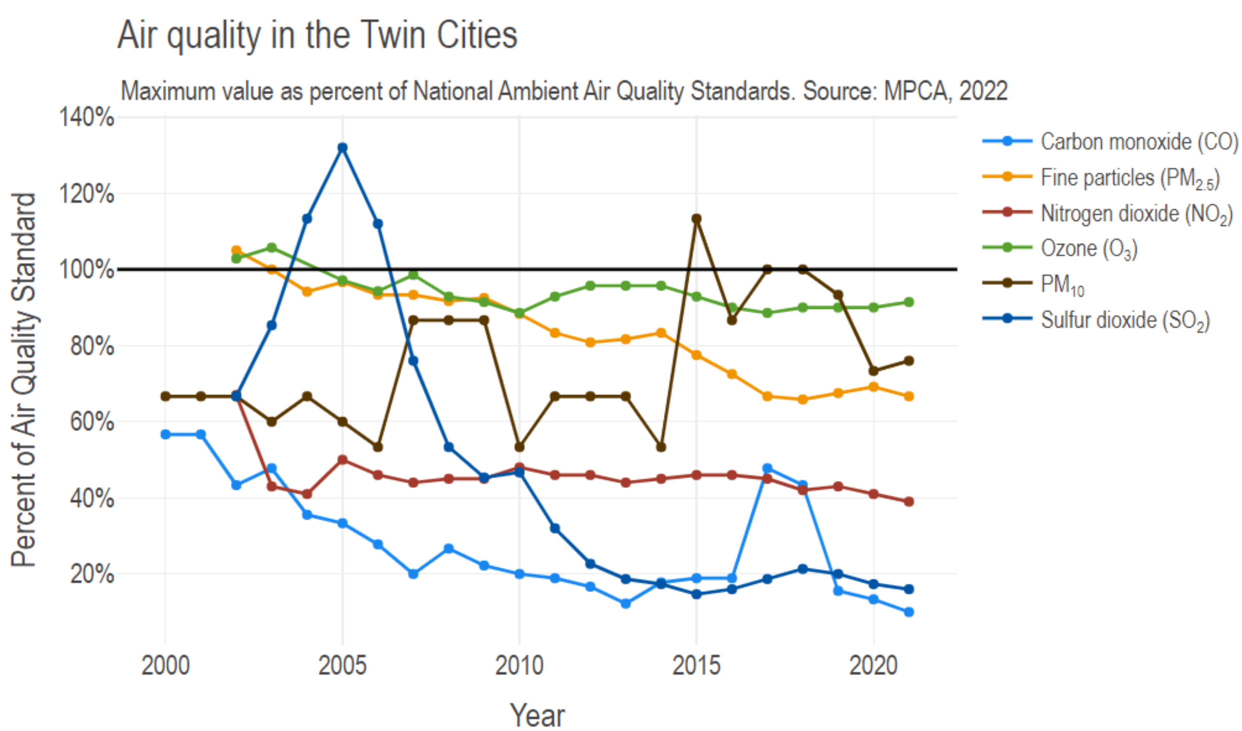
- Particulate matter (currently $PM_{2.5}$ and PM_{10})
- Ozone (O_3)
- Nitrogen dioxide (NO_2)
- Sulfur dioxide (SO_2)
- Carbon monoxide (CO)

[9] TBI Household 2021, Met Council transit ridership model, Met Council Regional Travel Demand Model

The EPA developed National Ambient Air Quality Monitoring Standards for each of these criteria pollutants. Primary standards are set to protect public health, while secondary standards are set to protect the environment and public welfare (i.e. visibility, crops, animals, vegetation, and buildings).

As shown in Figure 14, the region is currently in attainment for all the pollutants regulated by the EPA. The figure shows the maximum pollutant level for each year as a percentage of the National Ambient Air Quality Standards from all sources (not just transportation); anything below the solid line means the pollutant is below the standard.

Figure 14: Maximum air pollutant values as percent of National Ambient Air Quality Standards



As shown in the chart, pollutant levels have generally trended downward since 2000 except for PM_{10}. Not all emissions come from transportation sources. Some decreases are due to changes in things such as energy production, building practices, and land use changes. Other changes are due to things beyond the region's control, such as the weather and wildfires. But regional transportation decisions do play a part in minimizing air pollution. Examples of transportation-related changes that might decrease pollutant levels include decreased vehicle travel, changes in vehicle emissions technology, and growing use of alternative fuel sources.

While Minnesota Pollution Control Agency measures of observed air pollutant levels include all sources (including non-transportation sources), the Metropolitan Council can use an EPA model called Mobile Vehicles Emissions Simulation to estimate pollutants specifically from vehicle emissions. The Mobile Vehicles Emissions Simulation model takes information from the Regional Travel Demand Model about vehicle miles traveled and vehicle speeds to estimate pollutants. This connection with the Regional Travel Demand Model also allows Mobile Vehicles Emissions Simulation to forecast how these emissions might change under different transportation scenarios.

The table below shows the results of emission modeling for criterion air pollutants for the base year of 2025. (Note: Volatile Organic Compounds and Oxides of Nitrogen are included since they are precursors of Ozone). It also compares the base year emissions with modeling for the no-build scenario and the current revenue scenario. The table shows dramatic decreases in emissions between the 2025 base year and the 2050 no-build. These differences are largely due to assumptions of increased fuel efficiency and cleaner burning combustion engines over the next 30 years. These decreases also include forecasts of increasing proportions of electric vehicles. Emissions in the build scenario are slightly higher compared to the No Build scenario due to a small increase in vehicle miles traveled. These emissions increases are very small – each is under one-half of 1%.

Table 10: Forecasted increases in air pollutant emissions due to mobile sources[10]

Performance measure	Base year	2050 – no-build	2050 – current revenue scenario	% change base/no build	% change no build/current revenue
Particulate matter – 2.5	1,125	572	573	-49%	0.20%
Particulate matter – 10	1,257	646	647	-49%	0.20%
Carbon monoxide (CO)	685,332	269,371	270,048	-61%	0.25%
Nitrogen dioxide (NO_2)	4,294	1,096	1,096	-74%	0.01%
Sulfur dioxide (SO_2)	296	212	213	-28%	0.19%
Volatile organic compounds (VOC)	56,425	30,315	30,315	-46%	0.00%
Oxides of nitrogen (NOx)	45,020	13,442	13,470	-70%	0.21%

Goal: Our region is dynamic and resilient

The measures under this objective look at the transportation infrastructure's ability to withstand and recover from natural or human-caused disruptions. Performance measures for this goal also look at whether the region's transportation infrastructure meets users' need for predictable and reliable travel times.

[Placeholder for sections on infrastructure vulnerability to extreme heat, infrastructure vulnerability to flooding, and critical bridges]

Congestion and reliability

System reliability measures how dependable travel times are on different days. Reliability acknowledges that congestion is not the only thing that affects users. Inconsistent travel times can also cause problems for travelers. Travel time reliability is a measure of the ratio of vehicle miles traveled on the highway system that incur longer than normal travel times to vehicle miles travel that experience normal travel times. A higher percentage means more consistent travel times and less delay; a lower

[10] Met Council Regional Travel Demand Model, EPA Model

percentage means more inconsistent travel times and increased delay. Table 11 shows recent travel time reliability measures from MnDOT and compares them to the federal performance measure target.

Table 11: Travel time reliability[11]

Performance measure	Statewide target	2018	2019	2020	2021	2022
Percent of person miles traveled that are considered reliable (Metro area)	> 90%	75.0%	74.4%	98%	92.5%	91.7%

Travel time reliability increased significantly after the COVID-19 pandemic. Between 2019 to 2020, travel time reliability jumped from 74% to 98%, within the statewide target. This increase occurred as fewer people made peak period commuting trips at the beginning of the COVID-19 pandemic. This number began to creep back down after COVID-19; however, as of 2022 travel time reliability is still well-above pre-COVID levels. It will be important to keep monitoring this over the coming years to see the longer-term post-COVID trends.

One regional measure of congestion is the weekday delay per capita. The Regional Travel Demand model provides a way to forecast this delay by looking at the automobile travel time for each forecasted trip and comparing that to the trip time if there was no congestion (for example, posted speed limits). The difference between these congested travel times and free travel times is the weekday delay. Adding those delays up by each person gives us the delay for each traveler.

Table 12 below compares median delay per automobile traveler using the Regional Travel Demand Model for the three scenarios. The median is the mid-point of traveler's delay in the forecasts, in other words, the point where half of the travelers have a lower delay and half of the travelers experience higher delay.

Table 12: Forecasted automobile delay per traveler[12]

Performance measure	Base year	2050 – no-build	2050 – current revenue
Median weekday delay per traveler (in minutes)	9.29	10.04	9.57

The table shows some small changes in the median delay per travel across the scenarios. Median delay per travels goes up from 9 and a half minutes in base year to just over 10 minutes in the no build. This increase is due to increased population (and, consequently, more trips) in 2050 under the same transportation system. This median delay goes down slightly in the current revenue scenario, but these changes are small since the current revenue adds relatively little new capacity to the highway system.

[11] MnDOT
[12] Met Council Regional Travel Demand Model

Goal: We lead on addressing climate change

These measures will be used to evaluate how well our transportation decisions minimize our region's contribution to climate change. This includes policies that increase confidence in zero emissions transportation options and decrease vehicle miles traveled.

Greenhouse gas emissions

The transportation sector is the largest contributor to regional greenhouse gas emissions. According to the Metropolitan Council's Greenhouse Gas Inventory, the transportation sector accounts for about 22% of the region's total greenhouse gas emissions in 2021.[13] This includes emissions from cars, motorcycles, trains, buses, and airplanes. Shipping via trains and trucks also generate emissions.

As with vehicles emissions modeling, the Metropolitan Council uses the Motor Vehicle Emissions Simulator model, in conjunction with Regional Travel Demand Model, to forecast how our transportation investment strategy will change greenhouse gas emissions. Table 14 shows the results of greenhouse gas emission modeling for the base year of 2022 and how those emissions are forecasted to change by year 2050 under minimal transportation investments (no build) and under our planned transportation investment scenario (current revenue scenario)

Table 13: Forecasted greenhouse gas emissions[14]

Performance measure	Base year	2050 – no build	2050 – current revenue	% change base/no build	% change no build/current revenue
Greenhouse gas equivalents	65,235,093	46,852,294	46,941,161	-28%	0.19%

As with the mobile air pollutant emission forecasts, greenhouse gas equivalent emissions are forecasted to go down between the base year and the 2050 no build. These changes are due to forecast assumptions of more efficient vehicles and increased adoption of electric vehicles. The current revenue scenario is forecasted to see slightly higher greenhouse gas emissions (under one-quarter of 1%) due to slightly higher vehicle miles traveled.

Vehicle miles traveled

Vehicle miles traveled typically rise with population increases. If typical travel behavior remains the same, more people in a region means more vehicle miles traveled. Without changes to the transportation system and travel behavior, regional vehicle miles traveled historically goes up over time with population growth.

Vehicle miles traveled per capita accounts for population growth by dividing the total vehicle miles traveled by the population. This filters out the effects of population growth on vehicle miles and highlights how vehicle travel goes up or down due to changes in travel behavior, such as people making fewer trips, commuters making shorter trips, or people switching from driving alone in a vehicle to other modes (for example, transit, bikes, etc.).

Figure 15 shows average weekday vehicle miles traveled per capita remained constant around 25 miles per day for much of the early 2000's. In 2020, however, vehicle miles traveled per capita dropped dramatically to just over 20 miles per day as people reduced their trips and stayed home due to COVID-19. Beginning in 2021, vehicle miles traveled per capita began to trend up and by 2022 vehicle miles

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[13] Metropolitan Council, "Greenhouse Gas Inventory," March 2024.
[14] Met Council Regional Travel Demand Model, EPA Model

traveled per capita was nearly 23 miles. It is uncertain when or if vehicle miles traveled per capita will return to its pre-COVID levels. Some travel behaviors, such as telecommuting, will likely persist in the long-term.

Figure 15: Average daily VMT per capita

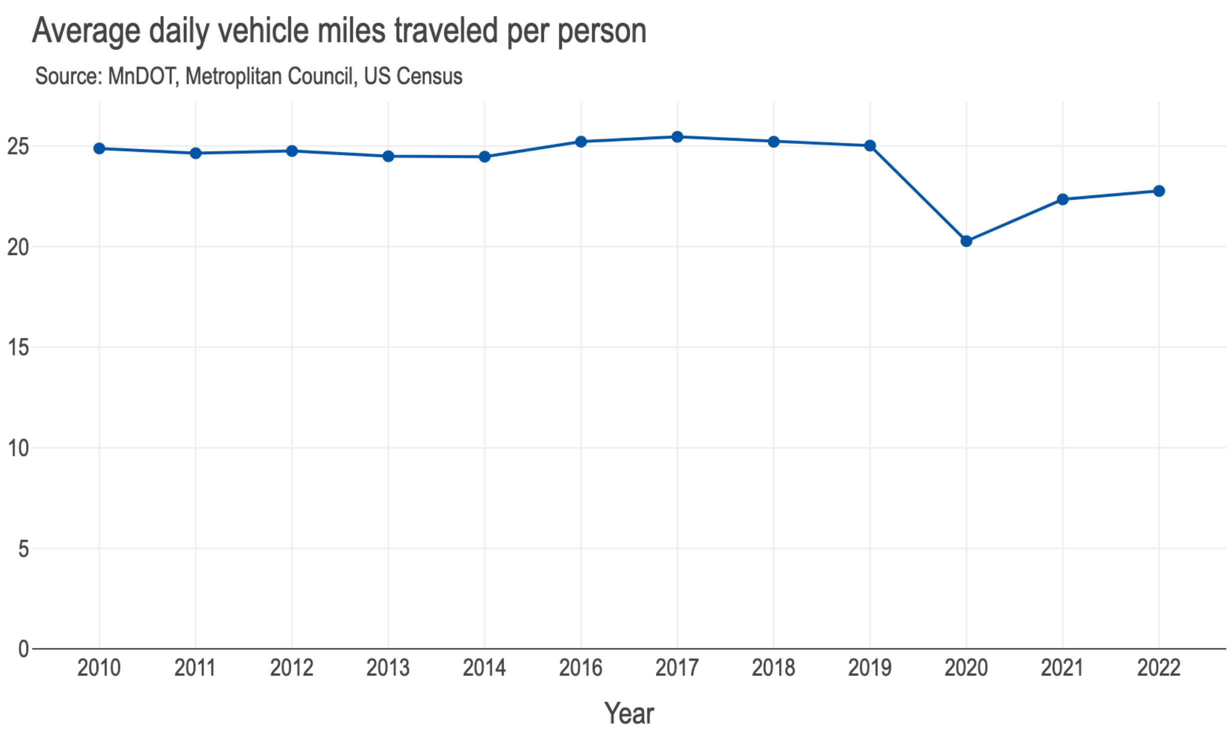


Table 14 includes forecasts from the Regional Travel Demand Model that show that vehicle miles traveled per capita is forecasted to change going from the base year to the no build year. Since the transportation network remains the same between the two scenarios, this decrease likely reflects demographic changes such as an aging population or smaller households. The current revenue scenario vehicle miles traveled per capita goes up slightly (about 0.3 %) compared to the no build; however, vehicle miles traveled per capita in the current revenue scenario is still lower than the base year.

Table 14: Forecasted vehicle miles traveled (VMT) per capita[15]

Performance measure	Base year	2050 – no build	2050 – current revenue	% Change base/no build	% Change no build/current revenue
Vehicle miles traveled per capita	25.2	23.9	23.9	-5.1%	0.3%

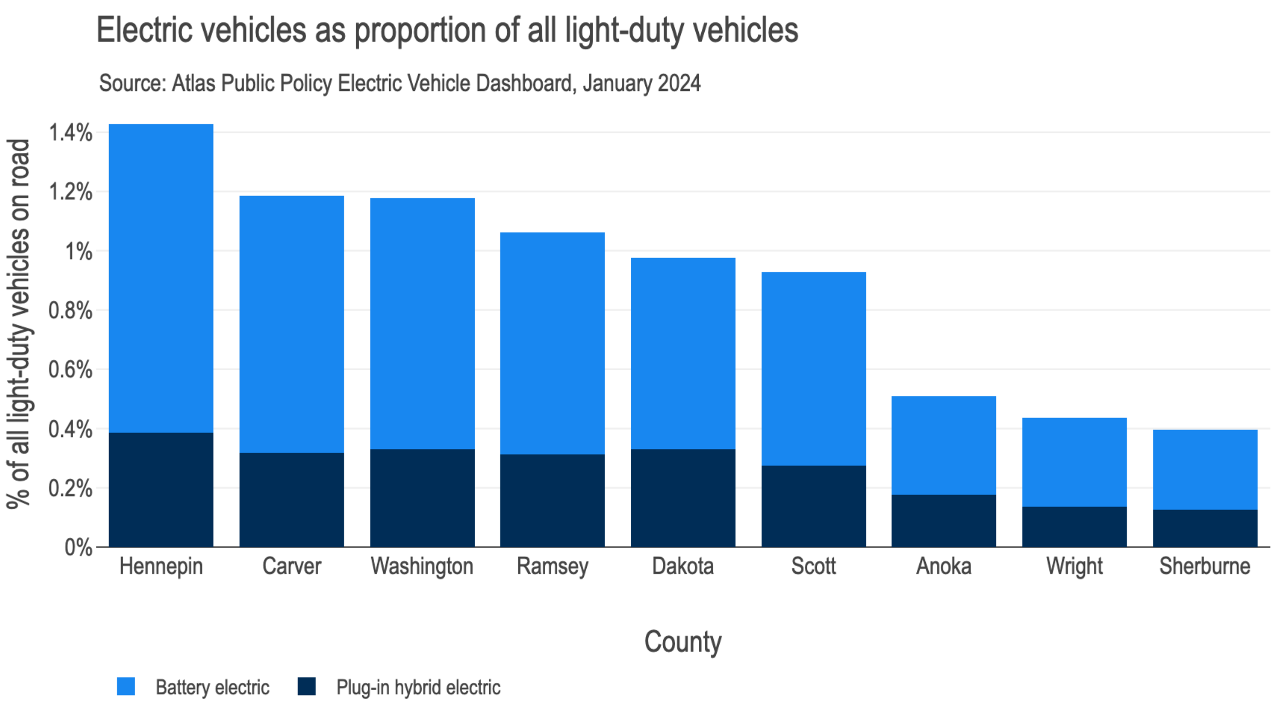
Electric vehicles

Electric and hybrid vehicles are still a small portion of light duty vehicles, but their usage appears to be growing in the last few years. Figure 16 shows the current percentage of light-duty vehicles in the Twin Cities metropolitan planning organization area that are fully electric or hybrid. Across the nine counties,

[15] Met Council Regional Travel Demand Model

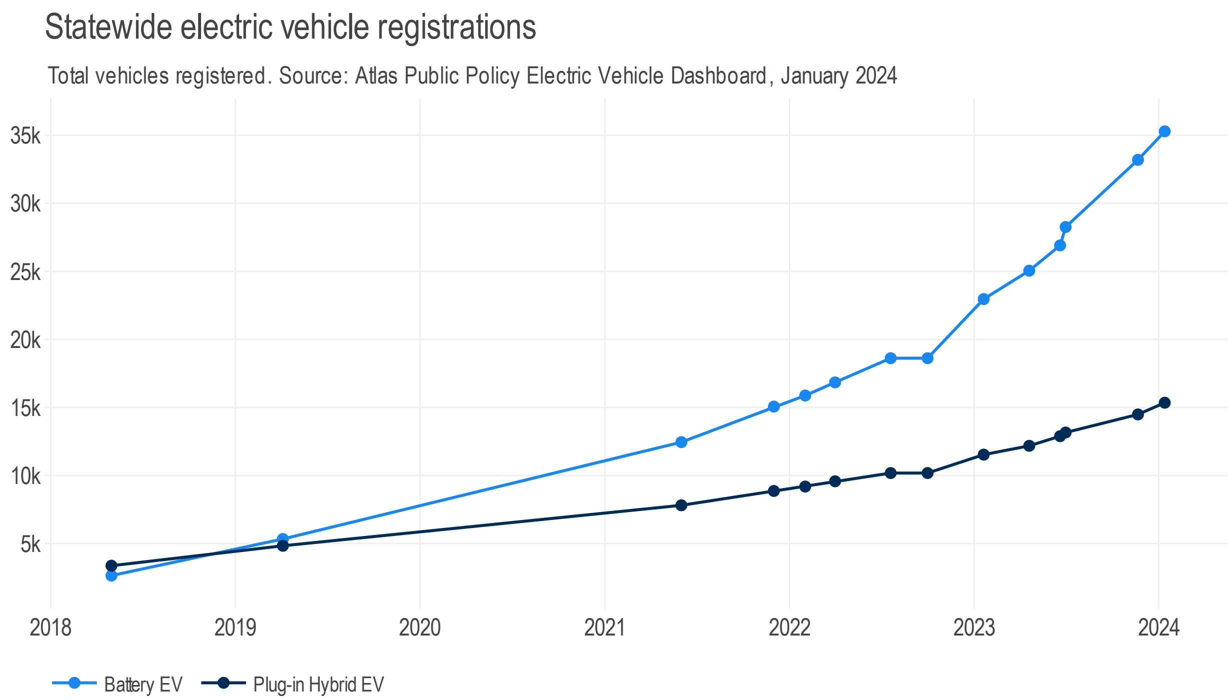
the percentage of hybrid or fully electric vehicles ranges from about %1.4 (Hennepin County) to around 0.4% (Sherburne County).

Figure 16: Electric vehicles as a percent of all-light duty vehicles, Twin Cities metropolitan planning organization counties



While still a small portion of overall personal vehicles, electric vehicle market share of newer vehicles has begun to pick up recently. Statewide registration of battery and plug-in hybrid electric vehicles grew rapidly over the last five years. The total number of registered battery electric vehicles increased nearly seven times, from over 5,300 in 2019 to over 35,000 in 2024. During this same period, plug-in hybrids nearly tripled, from 4,888 to 11,500.

Figure 17: Statewide electric vehicle registrations



Electric vehicles' share of statewide new vehicles (see table below) have risen substantially over the last several years, although they are still trending below MnDOT's goals of 60% by 2030 and 100% by 2035.

Table 15: Electric vehicle share of new vehicle sale[16]

Performance measures	2018	2019	2020	2021	2022	2022
Electric vehicle share of new vehicle sales	0.77%	0.95%	1.15%	1.75%	3.74%	5.16%

[16] MnDOT, EValuateMN – Atlas Public Policy

Goal: We protect and restore natural systems

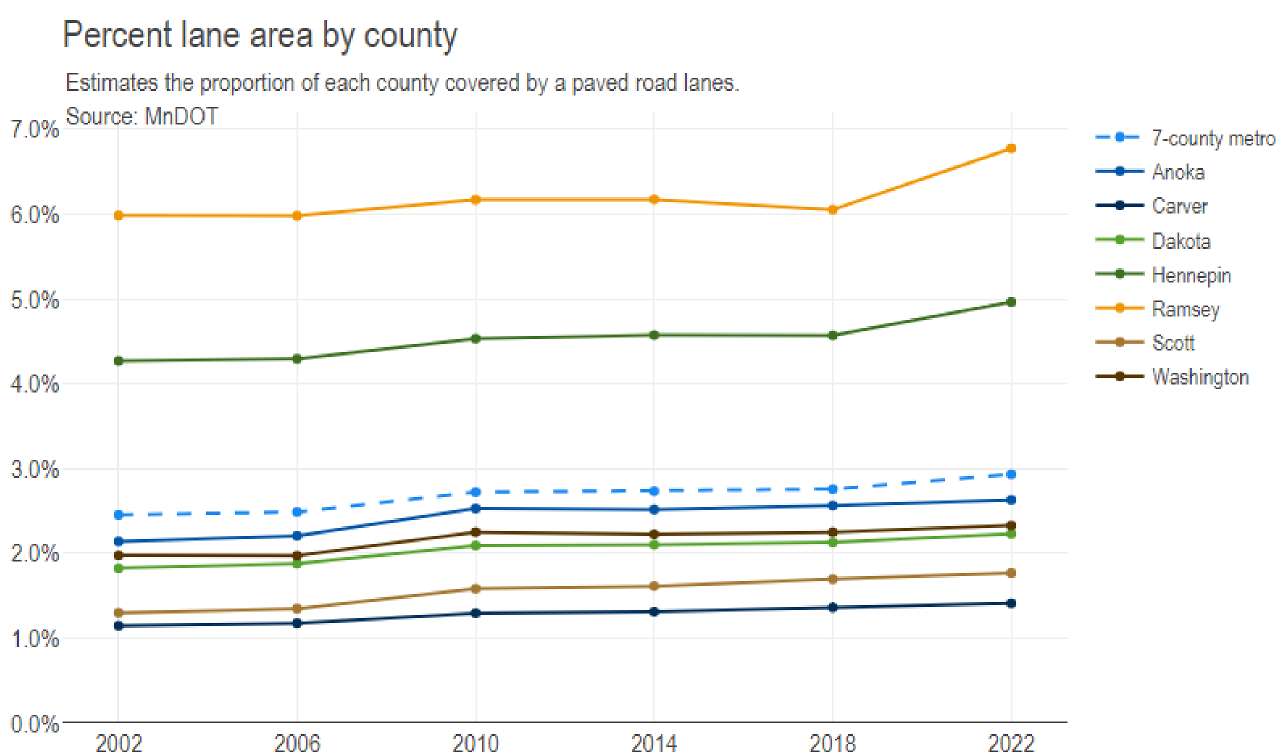
This goal aims to limit the transportation system's impact on natural systems such as water, vegetations, and habitats. One feature of the transportation system with a big impact on these resources is impervious surfaces.

Impervious surfaces

Paving over surfaces creates several adverse effects. Impervious surfaces prevent water from filtering into the ground either by directing it into storm drains and/or concentrating it into runoff, which increases how fast water flows into rivers and streams. This reduction of infiltration and increase in runoff can affect water quality and the risk of flooding[17]. Impervious surfaces can also trap heat, which is worsened where more impervious surfaces are present, creating the "urban heat islands". This warming effect is made more concerning as temperatures rise due to climate change.

As of 2022, about 2.73% of the region's land area is covered by impervious surfaces used for paved roads. This number is even higher in more urbanized counties such as Ramsey and Hennepin counties (6% and 4.5%, respectively). This number has gone up gradually over time as new facilities are built. Barring any future removal or roads or major changes in their design, these percentages will continue to increase over time as new the region builds more transportation infrastructure.

Figure 18: Percent lane area by county



[17] MN Department of Natural Resources, "Hydrology: Impervious Surfaces" (webpage), accessed June 2024.

Potential Measures for Work Plan

As part of its Performance and Evaluation Program, the Metropolitan Council will explore new measures that might be accomplished through future work programs, new research, and increased partnerships with other agencies and community groups. A robust performance and evaluation system needs to constantly evolve. Shifts such as technological innovation and environmental change will create the need for new evaluation measures. Innovations in research and data availability will open opportunities to measure things the Metropolitan Council have not been available to study.

Potential measures for future exploration include:

- Research into where transportation redundancy is needed to minimize the impacts of system disruptions.
- An inventory of compliance with the Americans with Disabilities Act (ADA) on public rights-of-way.
- A study of transportation stormwater conveyance systems.
- An examination of public perceptions about the safety of the region’s transportation network.
- A project evaluating how well the transportation systems connects different communities, and where investments can be made to improve connectivity in places that are geographically isolated.

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