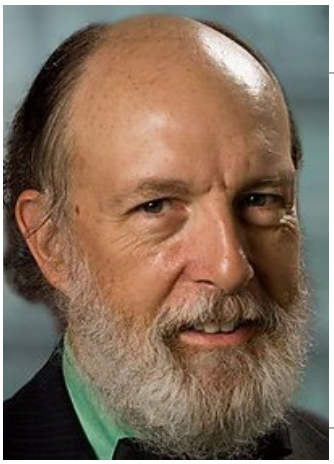
AMERICAN EXPERIMENT

OFF THE RAILS: MINNESOTA TRANSPORTATION AFTER COVID-19

Transportation agencies' misguided agenda ignores transit reality at a steep cost to users and the state.

RANDAL O'TOOLE



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JANUARY 2023

OFF THE RAILS:
Minnesota Transportation after COVID-19

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Executive Summary

The pandemic has permanently changed American transportation habits in many ways. Dramatic changes in travel habits dictate a shift in priorities among highways, transit, air travel, Amtrak, walking, and cycling. Minnesota transportation agencies need to take account for these changes if they are to provide safe, efficient, equitable, and environmentally sensitive service to transportation users. This report will review each major mode of transportation, examining trends that were taking place before the pandemic, how each responded to the pandemic, and how they are likely to fare as the pandemic transitions to the new normal that is likely to exist in the future. Based on this analysis, the report offers key recommendations on how to best align Minnesota's transportation policy with this new normal.

Transit needs to reinvent itself to survive

The biggest changes affect urban transit, which was already declining before the pandemic began. Transit ridership depends on a concentration of downtown jobs, but the pandemic has led many employers to move out of downtown and others to adopt a hybrid-work model in which employees only work downtown two to three days a week. Transit also depends on reasonably dense neighborhoods outside of downtowns that allow people easy access to transit routes, but the pandemic has led many people to move to exurban locations far from convenient transit lines. Finally, transit also depends on an aura of safety, but a combination of transit crime, which was increasing even before the pandemic, and a fear of infectious diseases has demolished that aura.

Due to these factors, transit has been the slowest mode of travel to recover from the pandemic, and it is unlikely that it will ever capture more than 75 percent of the ridership it carried in 2019. In terms of dollars per passenger-mile, transit was the most heavily subsidized form of passenger travel before the pandemic. Looking forward, transit will never fully recover the already diminishing ridership it had before the pandemic. If transit is to survive without increasing those subsidies still further, it must totally reinvent itself.

Among other things, this means that the infrastructure that has already been built for the Southwest light-rail line should be modified to make it a Southwest bus-rapid transit line. Buses are far less expensive and more flexible than light rail. Once they reach the end of a dedicated busway, they can enter city streets to serve many neighborhoods, while light rail is confined only to expensive rail lines. Metro Transit should also cease planning a Bottineau light-rail line and instead consider a Bottineau bus-rapid transit route using existing roads rather than brand-new infrastructure.

The crime problem on light rail must be fixed

Metro Transit must also fix the problem of crime on its light-rail lines. Nationally, light rail (including Diesel-powered light rail) sees more crimes per billion passenger-miles than any other form of transit, and the Twin Cities' light-rail system sees more crimes per billion passenger-miles than any other light-rail system. The main reason light rail is so attractive to potential criminals is the lack of rigorous fare enforcement. The solution is to put fences and turnstiles around every light-rail stop and not allow people inside unless they have paid their fares.

Transit routes need to shift to new job centers

More broadly, Metro Transit should redesign its transit routes so that it can better serve major job centers other than downtown Minneapolis and downtown St. Paul. Most job centers, such as the Mall of America, are at the junctions of two freeways. One possible redesign would be to identify, say, ten job centers and then run express buses from each job center to every other job center, with local buses radiating away from every job center. While the

current transit system provides relatively fast service only to the two downtowns, this redesign could provide fast service to centers throughout the region.

While such a redesign could make transit more useful to more people, it is also time to concede that public transit is, at best, third-class transportation. It is slow, inconvenient, and expensive both for users and for taxpayers. Researchers at the University of Minnesota Accessibility Observatory calculate that the typical resident of the Twin Cities region can reach more than twice as many jobs in a 20-minute auto drive than a 60-minute transit trip. Moreover, residents can reach more jobs on a bicycle in trips of any time period than similar-timed trips on transit. Redesigning transit routes will help, but even in the urban area with the best transit in the country, New York, both cars and bicycles outperform transit.

More post-pandemic driving demands closer attention to congestion relief and traffic safety

The next-most important changes in transportation habits affect motor vehicles and highways. Driving in Minnesota was growing slowly before the pandemic, and, if anything, the pandemic will accelerate that growth. Of all modes of travel, driving has been fastest to recover, ranging between 90 and 101 percent of pre-pandemic vehicle-miles since June 2021.

More people working at home means fewer people driving during the morning rush hour. But people who work at home don't drive less than people who commute to work; if anything, they drive more, often running errands or work-related trips at midday and in the afternoons. The pandemic also accelerated the use of on-line shopping, which increased the number of heavy trucks on intercity highways and delivery trucks on urban streets. All these changes will add to per capita vehicle-miles of travel.

It is time to concede that efforts to solve congestion, pollution, and other urban problems by reducing the amount people drive have failed. Many American cities have been making such efforts for more than 50 years, including expanding transit service, building bike routes, and discouraging driving by allowing roads to become more congested. Despite these efforts, driving has continued to increase while transit and intercity passenger train ridership have declined, especially when measured on a per capita basis.

The better approach is to recognize that people are going to drive because it is fast and convenient, relative to the alternatives. Therefore, the state should elevate traffic mobility and safety to a top priority. This means the state should prioritize congestion relief, which not only wastes people's time, it wastes fuel and emits millions of tons of greenhouse gases into the atmosphere each year. Low-cost ways of reducing congestion include traffic signal coordination, fixing specific bottlenecks, and better road pricing.

More people driving also means the state cannot let up on efforts to improve traffic safety. Minnesota enjoyed a decline in traffic fatalities from 510 in 2007 to 361 in 2014. But since then, fatalities have crept up again, reaching 381 in 2018. Perhaps most worrisome, fatalities leaped to 488 in 2021, more than any year since 2007, despite the reduced amount of driving due to the pandemic.

In 2017, Minneapolis adopted a Vision Zero plan which aims to reduce fatalities to zero. Unfortunately, Vision Zero is based largely on the simplistic notion that speed is the main factor involved in fatalities, and so Minneapolis reduced speed limits throughout the city. The reality is far more complex, and what the Twin Cities needs is a more robust data-driven safety plan that focuses on where accidents are taking place and uses more rigorous before-and-after or with-and-without studies to determine how streets can be redesigned to (1) reduce those accidents and (2) maintain the flow of travel for all modes of transportation. For example, most bicycle accidents take place at intersections, yet the addition of bike lanes to streets rarely improves intersection safety. At the same time, adding bike lanes can increase traffic congestion and, as a result, increase emissions. Most pedestrian accidents take place at night, so slowing speeds during the day doesn't much improve pedestrian safety.

Improve equity by supporting auto ownership

Adjusting to lower demand for transit does not mean giving up on making access to transportation more equitable. Currently, many social justice advocates are pushing for more transit subsidies to help low-income transit riders. But this is highly inequitable because less than 4 percent of low-income workers in Minnesota and less than 8 percent in the Twin Cities area were taking transit to work in 2019, but all of them must pay the regressive sales taxes used to support transit. In addition, focusing on transit subsidies is effectively saying that low-income people should use third-class transportation while almost everyone else gets to use first-class transportation, which is hardly just.

Numerous studies have found that one of the best ways to help people out of poverty is to help them get an automobile. About 7 million low-income households in the United States lack access to an automobile, and if the number in Minnesota is proportional to the state's population, then about 120,000 Minnesota households lack an automobile. For most, the main obstacle to auto ownership is not the cost of buying or operating the vehicle but the cost of finance, as banks can charge 20 to 25 percent for used-car loans to people with poor or no credit ratings. A program of offering low-interest loans to help people buy a car would help reduce poverty at little cost to taxpayers.

Environmental progress can continue as more people drive

Though more people will be driving, that does not mean the success in reducing its environmental impact cannot continue. The total impact of driving should continue to be more and more environmentally friendly. Most of the air pollution associated with driving—carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds, lead, and particulates—has been eliminated not by reducing driving but by making automobiles cleaner. According to the Environmental Protection Agency, the total of all these pollutants from highway vehicles has declined by 90 percent since 1970 even though the miles of driving have nearly tripled.

Greenhouse gases can also be greatly reduced, without trying to reduce driving, by making automobiles that are more energy efficient. The average energy cost per vehicle-mile has already dropped by 50 percent since 1970, yet there is still more room for improvement. This would partly come from electric vehicles, but more importantly from vehicles that are lighter, less wind-resistant, and with more efficient power plants. Those who believe that greenhouse gases are important should focus on encouraging people to buy more fuel-efficient cars rather than on reducing per capita driving.

Instead of expanding Amtrak, eliminate barriers to new intercity bus services

Intercity travel within Minnesota is mostly by automobile, secondarily by bus, and next by air. An insignificant amount is by Amtrak. In 2021, Congress gave Amtrak several billion dollars to expand service, and Amtrak will ask states such as Minnesota to agree to subsidize the operating costs of such services. Yet Amtrak is a high-cost provider of transportation that can't effectively compete against buses or air travel in any corridor.

Minnesota is the historic home of Greyhound Lines and the headquarters for one of the nation's largest regional bus companies, Jefferson Lines. Any intercity corridor that could benefit from one or two Amtrak trains a day would benefit even more from several buses per day. Rather than subsidize a functionally obsolete form of travel, Minnesota should ensure that any barriers to new bus services are eliminated.

Recommendations

Transit

- The Southwest light-rail line is proving to be outrageously expensive for the small benefit it will provide. Originally projected to cost $1.25 billion, more than either the Hiawatha or Green line, that cost has more than doubled to $2.75 billion, yet it is projected to carry fewer riders than either the Hiawatha or Green lines. Metro Transit should modify the project into a dedicated busway, which will cost less, allow

for more flexibility because buses can serve many areas after leaving the busway, and provide greater capacity to move people. If that extra capacity isn't needed for buses, the busway should also be used as a tollway for other motor vehicles.

- Plans for the Bottineau and other proposed light-rail lines should be replaced with plans for bus-rapid transit lines. Because there are probably no corridors in Minnesota where demand for transit will ever make full use of dedicated busways, these and other future bus-rapid transit lines should use lanes shared with other vehicles. Those lanes could be general purpose lanes, high-occupancy vehicle lanes, or high-occupancy/toll lanes.

- The Northstar commuter-rail line is an embarrassing and expensive failure. The line carried barely half the predicted number of riders after it opened in 2009 and pre-COVID fares covered just 15 percent of operating costs in 2019. Metro Transit should shut down Northstar as soon as possible and, to the extent that it is needed at all, replace it with buses.

- As the infrastructure for the existing blue and green light-rail lines wears out, Metro Transit should replace it with bus-rapid transit or other bus services. The cost of replacing worn-out rail infrastructure can be almost as great as the original construction cost. Considering that post-pandemic transit ridership will be considerably less than before the pandemic, paying for such replacement definitely will not be worthwhile.

- To better serve Twin Cities workers who don't work in downtown Minneapolis or downtown St. Paul, Metro Transit should revamp its bus system to serve multiple hubs with multiple spokes. Since only about 10 percent of the region's workers work in downtown Minneapolis and downtown St. Paul, a multiple hub-and-spoke system with express buses from every hub to every other hub and local buses radiating away from each of the hubs will provide better service to more people than the current system of just two hubs.

Safety

- MnDOT should build upon data collected by the National Highway Traffic Safety Commission to develop a data-driven system of identifying safety issues on state and local highways, roads, and streets. "Vision Zero" programs address traffic safety mainly by focusing on speed limits, but traffic safety is much more complicated than just speeds. A data-driven system will help state and local transportation agencies to redesign existing roads to improve their safety.

- Such redesigns may include improving street lighting at night to reduce pedestrian fatalities, improving intersection designs to reduce bicycle fatalities, and turning local streets into bicycle boulevards so bicycle riders have safe, alternate routes to arterials and collectors.

Congestion

- After safety, MnDOT should make cost-effective congestion reduction its top priority. Cost-effective practices may include traffic signal coordination, redesign of transportation bottlenecks, and implementation of variable-priced tolls or other user fees.

Low-income Subsidies

- Advocates of transportation equity need to refocus their efforts away from subsidies to transit, which few low-income people use, to providing low-interest loans to low-income people buying cars. Such loans can help people out of poverty by giving them access to far more economic resources than they can reach on mass transit.

Environment

- The state should address environmental problems associated with transportation by programs aimed at reducing the environmental cost of motor vehicles, not by trying to reduce people's use of those vehicles. Past efforts to reduce driving have failed miserably, while efforts to reduce the environmental cost of driving have been highly successful.

Intercity Travel

- Minnesota should reject proposals by Amtrak to help fund increased passenger train services, which are unfair competition to existing bus companies and airlines. Most routes where Amtrak has proposed such state-funded service are already served by buses that offer more frequent service at lower fares than Amtrak. Many are also served by airlines that offer much faster service.

Transportation Financing

- Minnesota should find better ways to fund transportation out of user fees, which will result in better infrastructure maintenance and discourage expensive megaprojects that provide few transportation benefits. This primarily means ending the diversion of highway user fees to transit. User fees should be dedicated to the transportation system that generated those fees; highway user fees should not go to transit any more than transit fares should be spent on highways (except dedicated busways).

- Minnesota should accelerate the move to replace fuel taxes with mileage-based user fees that preserve privacy while providing funding for roads. Local governments can piggy-back on such programs, thus relieving local taxpayers of the need to subsidize roads.

- To the extent that Minnesota continues to subsidize any transportation, it should do so in a way that mimics user fees, for example, by making subsidies to transit proportional to the user fees transit agencies collect or by giving transportation vouchers to low-income people. This will make transportation providers more responsive to users and less responsive to political fads and whims. ■

Introduction

Major events such as a pandemic are often said to "change everything." But, as historian Stephen Davies observes, a major pandemic generally does not "introduce something novel."[1] Instead, "it accelerates and magnifies trends and processes that were already well under way."[2] It can also bring "a final stop to processes that were already exhausted."[3]

Trends accelerated by the COVID-19 pandemic include increasing numbers of people working at home; the dispersion of jobs away from downtowns; the dispersion of residences into suburban and exurban areas; and increased online shopping. All these trends have significant implications for transportation policies and programs implemented by MnDOT, the Twin Cities Metropolitan Council, and city and county transportation departments.

Together, these trends will produce a *new normal* that will be different in many ways from what was considered normal before the pandemic. While there are still uncertainties, as the *Economist* magazine points out, "the New Normal is already here."[4] In the case of transportation, this means that things like remote working and remote shopping have permanently shifted travel patterns.

Unfortunately, the pandemic also accelerated Congressional spending on insignificant and even obsolete forms of transportation in the futile hope that such spending will produce some kind of social benefit. In the three COVID relief bills passed by Congress in April 2020, December 2020, and March 2021, 65 percent of the money allocated to the Department of Transportation was dedicated to transit.[5] Yet transit carried less than 0.9 percent of passenger travel before the pandemic and less than 0.5 percent during the pandemic.[6] Another 3.5 percent went to Amtrak, which carried 0.1 percent of passenger travel before the pandemic and 0.07 percent during the pandemic.[7] Although freight supply-chain difficulties proved to be one of the biggest problems of the pandemic, none of the money in the COVID relief bills went to freight systems.

Highways carry more than 87 percent of passenger travel and close to 40 percent of all ton-miles of freight. Amtrak and transit together carried less than 1 percent of passenger travel, and virtually no freight, before the pandemic.[8] Yet the "new money" (as opposed to reauthorization of existing funds) that Congress included for transit and Amtrak in the Infrastructure, Investment, and Jobs Act of 2021 was almost as much—$105 billion—as the $110 billion it gave to roads and bridges.[9]

"Minnesota agencies will need to assess the effects of the pandemic on transportation to ensure that federal, state, and local funds are not wasted."

Most of the infrastructure money will be passed to state and local transportation agencies using either formulas or competitive grants. Minnesota agencies will need to assess the effects of the pandemic on transportation to ensure that federal, state, and local funds are not wasted. This report aims to show how this can be done. To do so, the report will review each major mode of transportation, examining trends that were taking place before the pandemic, how each responded to the pandemic, and how they are likely to fare as the pandemic transitions to the new normal that is likely to exist in the future. ■

Minnesota's Transportation Mix

Passenger transportation in the United States can be divided into seven major modes: automobiles (including motorcycles), airlines, intercity trains, urban transit (including rail and bus), non-transit buses, walking, and cycling. The Department of Transportation publishes fairly reliable information about the first four, while less is known about the last three.[10] Auto and urban transit data can be broken down by state; others cannot.

Freight transportation is just as important as passenger transport and there are five major modes: rail, truck, water, pipeline, and air. The Department of Transportation publishes data about each of these, though none are broken down by state.[11]

The data show that automobile is by far the dominant form of travel, carrying more than 80 percent of passenger-miles in 2019. When buses, including both transit and non-transit buses, are counted, highways move close to 87 percent of all passenger-miles.[12] Airlines carried more than 12 percent of passenger-miles. Rail and bus transit carried less than 0.9 percent, walking and cycling together 0.7 percent, and Amtrak 0.1 percent.[13]

Because of the difficulty in breaking down air and Amtrak passenger miles by state, it isn't possible to make a chart similar to Figure 1 for just Minnesota. If such a chart could be made, however, it would show automobiles are an even more dominant form of travel in Minnesota than in the U.S. as a whole. Per capita auto travel in Minnesota is about 8 percent more than the national average.[14] Per capita transit passenger-miles are about half of the national average.[15] Per capita Amtrak travel is also lower than the national average. Unless Minnesotans fly significantly more than other Americans, autos provide close to 84 percent of all passenger travel in the state.

Not only did autos and airlines carry the vast majority of passenger transport in 2019, both had been growing while transit and Amtrak had been declining. Figure 2 shows that, in the six years before 2019, nationwide air travel had grown by 26 percent and auto travel had grown by 8 percent. Travel by urban transit had declined 5 percent and Amtrak passenger miles had declined by 3 percent. Walking and cycling significantly increased between 1995 and 2009, but the growth rate for walking slowed and cycling slightly declined since then.

It is possible to make a chart similar to Figure 2 for Minnesota using air travel in and out of the Minneapolis-St. Paul airport as a proxy for total air travel and travel on the Amtrak *Empire Builder* as a proxy for Minnesota intercity rail travel. The results, shown in Figure 3, indicate that air travel grew by 16 percent and highway travel by 7 percent, while transit declined by 11 percent and Amtrak by 4 percent.

The pandemic drastically affected nationwide passenger transportation, but different modes

responded differently. At the height of lockdowns in April 2020, Figure 4 shows Amtrak and air travel were less than 10 percent of pre-pandemic levels across the U.S., while transit was less than 20 percent. Driving, however, declined by only 40 percent. Driving was also fastest to recover, reaching 102 percent in June 2021. Domestic air travel reached 90 percent in July 2021 and has mostly hovered between 85 and 95 percent since then. Amtrak did not exceed 75 percent until November 2021. Transit has been slowest to recover, barely reaching more than 60 percent of pre-pandemic levels in March, June, and August 2022, and in those months high transit ridership was at least partly due to unusually high fuel prices.[16]

A chart similar to Figure 4 for Minnesota is necessarily a little more approximate as it has to rely on proxies for air travel and Amtrak. However, as Figure 5 shows, the patterns are similar.

According to the Department of Transportation, in 2019, trucks carried 44 percent of all domestic ton-miles of freight, railroads 30 percent, pipelines 18 percent, water 10 percent, and air 0.3 percent (Figure 6).[17] Air freight is much more costly than ground shipments, so the value of goods shipped by air must be higher. Similarly, shipping by truck costs more than shipping by rail, so the value of goods shipped by truck must be higher. About 75 percent of all shipping costs went to truck transportation, 13 percent to rail, 6 percent to pipelines, 4 percent to air, and 3 percent to water.[18]

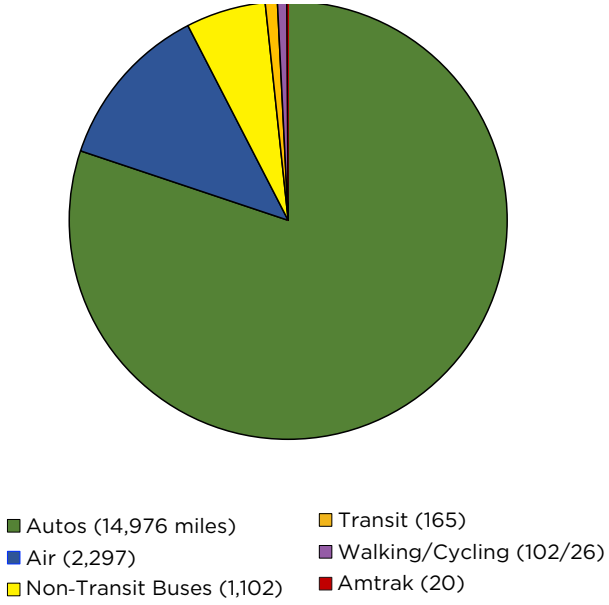
Based on DOT estimates, shippers spent $564 billion on freight in 2019.[19] In the same year, Americans spent about $1.4 trillion on passenger transportation.[20] Strictly speaking, then, shipping of freight isn't as valuable as passenger transport, but it is just as vital to our daily lives and in some respects perhaps more so: people can stay at home but require deliveries of food and other goods to survive. State and local transportation officials need to take this into account when developing transportation policies and plans.

Rail shipping declined in both 2019 and 2020. The 2019 decline was partly due to the decline in shipments of coal from mines to U.S. power plants. The 2020 decline was partly due to the pandemic. The Department of Transportation has not estimated truck shipping by month, but it estimates that total shipping reached pre-pandemic levels by January 2021 and was even higher in January 2022.[21]

FIGURE 1

U.S. Passenger Travel in 2019

(passenger-miles per capita)



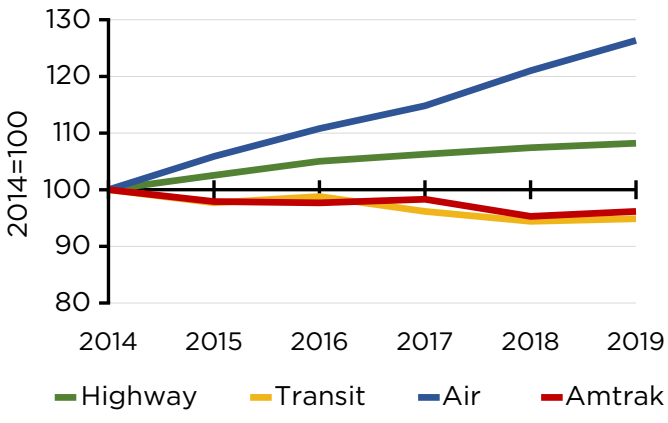
Walking/cycling are based on 2017 estimates; all else on 2019 numbers.

Note: Autos include motorcycles, cars, pickups, vans, and SUVs.

Source: National Transportation Statistics table 1-40; and U.S. Census Bureau, Population Estimates.

FIGURE 2

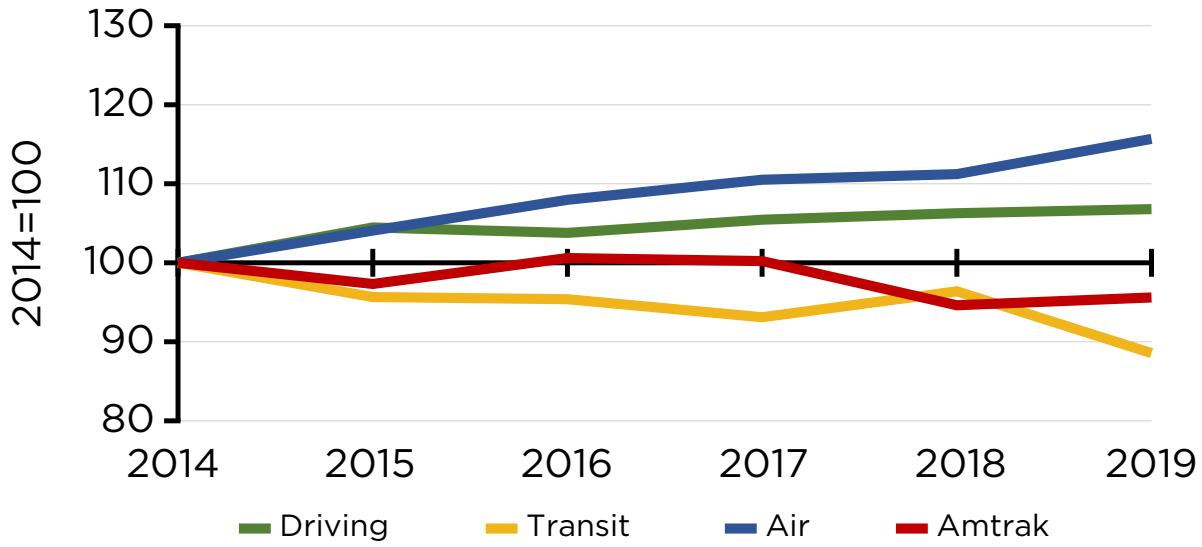
U.S. Passenger Trends



Source: National Transportation Statistics table 1-40.

FIGURE 3

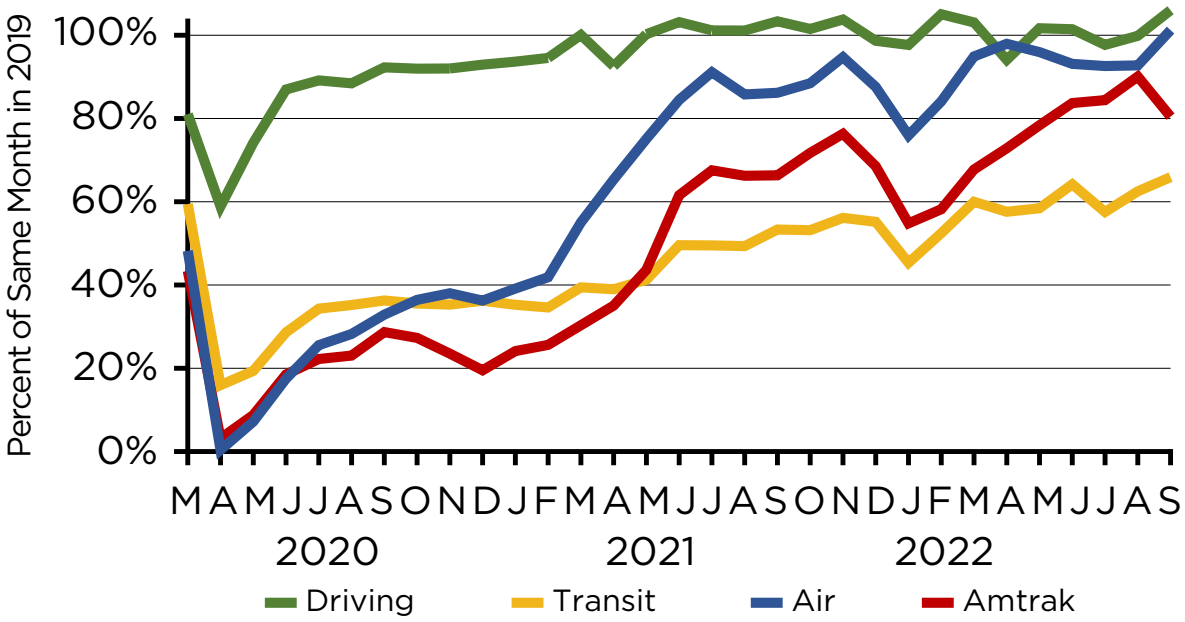
Minnesota Passenger Trends



Sources: Highway vehicle miles from Highway Statistics (Washington: Federal Highway Administration, various), table VM-2. Transit passenger-miles are from *National Transit Database Historical Time Series* (Washington: Federal Transit Administration, 2021), table TS2.1. Air travel and Amtrak travel in Minnesota cannot be accurately calculated. As proxies, I used air passenger-miles in and out of Minneapolis-St. Paul Airport from Bureau of Transportation Statistics, 2022, https://www.transtats.bts.gov/Data_Elements.aspx?Data=3 and annual ridership for the *Empire Builder*, the only Amtrak train currently service Minnesota, from Monthly Performance Reports for the relevant fiscal years.

FIGURE 4

Pandemic Passenger Travel in the U.S.



Note: Only domestic air travel is included in the data.

Sources: Miles of driving from Traffic Volume Trends, Federal Highway Administration; air from Bureau of Transportation Statistics; Amtrak from Monthly Performance Reports; transit from National Transit Database.

FIGURE 5

Pandemic Passenger Travel in Minnesota

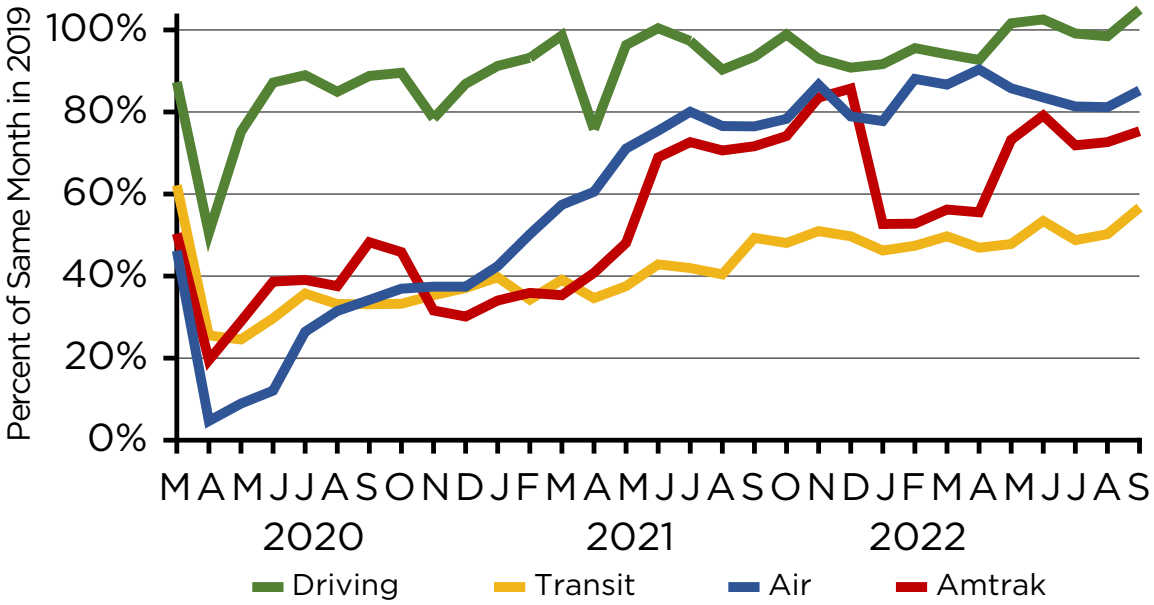


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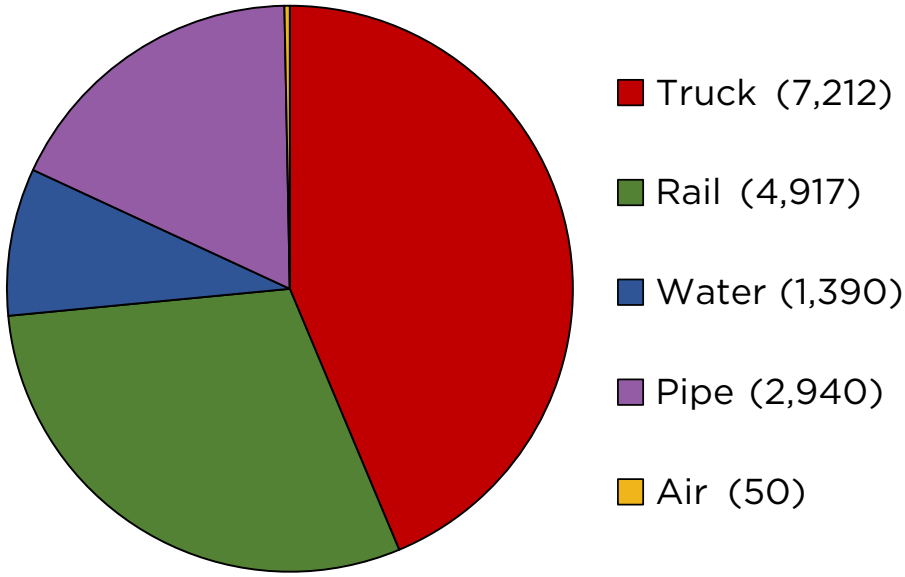
FIGURE 6

U.S. Freight Shipments in 2018

(ton-miles per capita)



Source: National Transportation Statistics, table 1-50.

Urban Transit

Urban transit is a political heavyweight and a transportation flyweight. It carried less than 0.9 percent of passenger travel and no freight in 2019, and its share of passenger travel dropped to 0.5 percent in 2020. Yet it historically has received about 15 percent of federal Department of Transportation funds.[22] When Congress handed out COVID relief funds in 2020 and 2021, transit got 65 percent of the dollars given to the Department of Transportation.[23] It also received 14 percent of the new transportation funds in the Infrastructure Investment and Jobs Act.[24]

This isn't enough for transit advocates, who think transit should get as much money as highways even though highways carry almost a hundred times as many passenger-miles and infinitely more freight than transit.[25]

In 2019, Minnesota transit agencies spent more than $1.0 billion on operations, capital replacement, and capital improvement, of which only 12 percent was recovered in transit fares.[26] In 2020, expenditures grew to more than $1.25 billion, yet fares covered only 4 percent of these costs.[27]

A History of Decline

At least some of these subsidies are given out by Congress and state and local governments in the forlorn hope that transit will be able to attract people out of their cars, thereby reducing congestion and pollution. Yet, thanks to Henry Ford's mass-produced automobiles, transit has been in decline since 1920, when it carried nearly 300 trips per urban resident.[28] At that time, a plurality and, in some cities, a majority of jobs were in downtown areas, and hub-and-spoke transit systems provided a convenient way for people to get to downtown factories and offices.

Since then, most people bought cars and most jobs moved out of downtowns. Transit ridership declined to just 62 trips per urban resident per year in 1964, when Congress passed the Urban Mass Transit Act.[29]

Up until that time, the transit industry was mostly private and even public transit agencies were expected to pay all operating costs and at least some capital costs out of fare revenues. The 1964 law promised federal capital subsidies to public transit agencies, which led to rapid state or municipal takeover of private transit companies. This takeover was typically accompanied by local operating subsidies, turning transit from marginally profitable to a highly unprofitable industry practically overnight.[30]

Public takeover was followed by a staggering decline in worker productivity. Before 1964, transit typically carried around 60,000 passengers per

operating employee each year.[31] By 1993, this had fallen below 30,000 and in 2019 stood at just 23,000.[32] "It's uncommon to find such a rapid productivity decline in any industry," remarked economist Charles Lave.[33]

In the years following 1964, federal, state, and local taxpayers subsidized transit to the tune of well over $1.5 trillion (in today's dollars), yet transit trips per urban resident continued to decline.[34] By 2019, transit carried just 37 trips per urban resident, falling to 22 in 2020. Minnesota transit agencies carried under 24 trips per urban resident in 2019, falling to 12 in 2020.[35]

The Inferiority of Transit

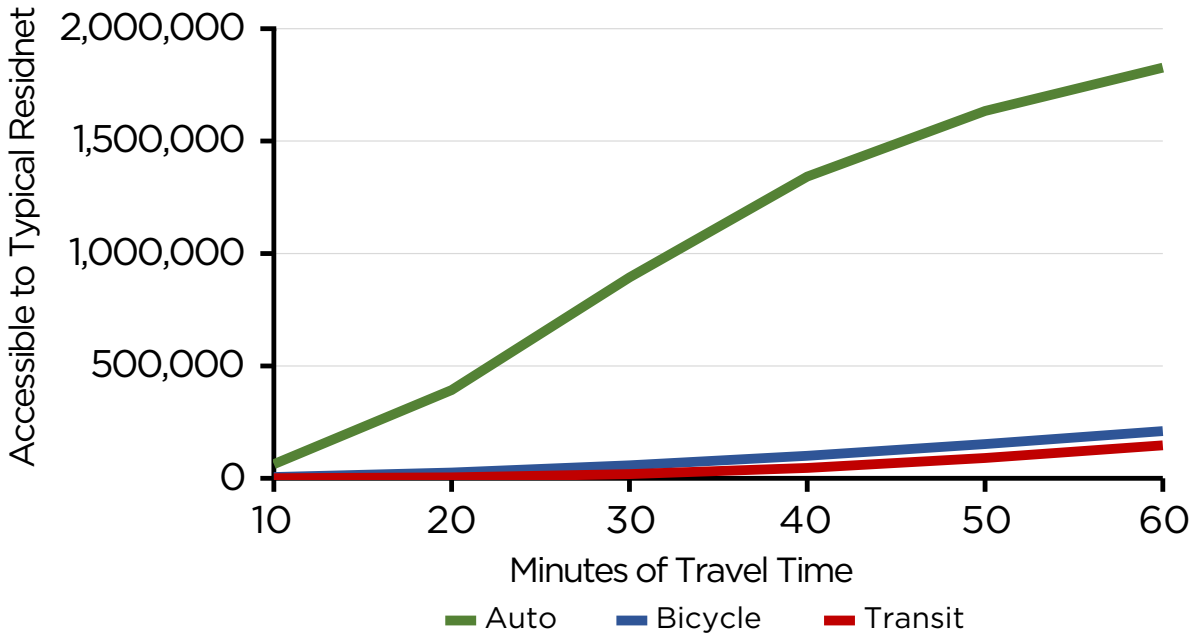
Transit ridership has declined despite subsidies because it is distinctly inferior to its competition, being slow, inconvenient, and expensive. The University of Minnesota's Accessibility Observatory estimates that, in 2019, the typical resident of the Minneapolis-St. Paul urban area could reach nearly 400,000 jobs in a 20-minute auto drive but fewer than 5,000 jobs in 20-minute transit trip and fewer than 150,000 jobs in a 60-minute transit trip (Figure 7).[36] Transit is so slow that bicycle riders in the Twin Cities can reach over 20,000 more jobs than transit in 20 minutes and nearly 40,000 more jobs in 30 minutes.[37] Even riders that limit trips to lower stress separated bike lanes and slow residential streets can reach more jobs in 30 minutes than transit.

In contrast to its inferior service, transit is the most expensive of the major modes of travel in the U.S. In 2019, Minnesota transit agencies spent an average of $1.48 per passenger-mile on operations alone.[38] Capital spending added at least another 54 cents per passenger-mile.[39] Even after subsidies, fares averaged 29 cents per passenger-mile.[40] By comparison, Americans spend only about 25 cents a passenger-mile buying, operating, and insuring automobiles, and people can considerably reduce that by buying used cars that are more fuel-efficient than average.[41]

Transit is what economists call an *inferior good*, meaning that demand decreases as incomes rise.

FIGURE 7

Twin Cities Urban Area Job Accessibility



Source: University of Minnesota Accessibility Observatory.

Over the past 75 years, the number of automobiles per household and per driver has steadily grown, causing transit's market to shrink. To counter this, many transit agencies have built expensive rail lines in an attempt to offer what appears to be a higher quality of service. But the number of high-income riders attracted away from their automobiles has been exceeded by the number of low-income riders who buy cars and free themselves from being dependent on transit's inferior service, leading to a decline in national transit ridership from 2014 to 2019.

The Effects of the Pandemic

One of the main problems with expensive transportation projects that take years to plan and build is that the world can change between the time plans are set and the project opens. For transit, more than any other mode of travel, the pandemic was such a world-changing event.

The pandemic accelerated trends that had been reducing transit ridership, including the dispersion of jobs away from downtowns and the decentralization of housing. But it super-accelerated a trend that few transit agencies considered much of a threat: remote working or telecommuting. The number of people working at home exceeded the number taking transit to work for the first time in 2017, but the growth of telecommuting had been slow up to that point.[42] However, the onset of the pandemic caused the number of people working at home to explode from 6 percent in 2019 to 35 percent in May 2020.[43]

Transit was especially hurt by the rise in telecommuting, probably because many telecommuters were formerly downtown office workers who made up the core of transit's market. According to Census Bureau data, increased telecommuting in 2021 reduced the number of Minnesotans driving to work by 16 percent and carpooling by 15 percent, but it reduced the number of transit commuters by 60 percent.[44]

People are going back to work now, but many downtown employers will allow their employees to work at home two to three days a week, which will continue to depress transit ridership. The most authoritative estimate is that, on any given workday after the pandemic, around 20 percent of people will be working from home instead of just 5 percent before the pandemic.[45]

As of July 2022, statewide transit ridership in Minnesota was less than 48 percent of ridership in July 2019. Metro Transit's Northstar commuter trains were the worst off, carrying less than 10 percent of pre-pandemic riders. Light-rail ridership was just under 50 percent and buses were 54 percent of pre-pandemic levels.[46]

Why Transit Will Never Recover

Transit will never recover the already-diminishing ridership it had before the pandemic. First, an increase in telecommuting from 5 to 20 percent will reduce transit ridership by at least 15 percent, and probably much more if 2021's experience is any indication. Second, increased telecommuting means less traffic congestion.[47] As Anthony Downs noted in his book, *Stuck in Traffic*, many people ride transit mainly to avoid congestion, and anything that reduces congestion is likely to attract some of those people back to driving to work.[48]

Third, many employers are leaving downtowns. Target, Minnesota's largest employer, has terminated its lease on nearly a million square feet of downtown Minneapolis office space, allowing employees to work at home or moving them to the suburb of Brooklyn Park.[49] Similarly, Old Republic Title is moving out of its twelve-story office building in downtown Minneapolis and into new offices in Minnetonka.[50] Since transit's core market is taking commuters to downtown jobs, the dispersion of those jobs hurts transit.

Coincident with the pandemic, the George Floyd protests destroyed an estimated $550 million worth of property in the Twin Cities.[51] This has also discouraged people from coming downtown. One measure of this is restaurant reservations: as of the end of May 2022, reservations in Minneapolis remain 50 to 60 percent below pre-pandemic levels. This compares with a national average of 5 percent and a Minnesota average of about 20 to 30 percent below pre-pandemic reservations. Minneapolis restaurants are having the slowest recovery of any of the 46 cities tracked by OpenTable.com.[52] This is just one

more indication that downtown Minneapolis will not easily recover, which means a permanent reduction in transit ridership.

Fourth, many part-time commuters are moving to suburban and exurban locations where they can find affordable homes with room for an office. The Census Bureau's 2021 population estimates revealed that both Hennepin and Ramsey counties lost population while all the suburban counties in the Twin Cities area gained population.[53] Even if such workers do commute to an office two to three days a week, their remote locations make them less likely to take transit to work.

Fifth, surveys consistently show that 10 to 15 percent of Americans say that they expect to permanently change their lifestyles due to the pandemic.[54] One way of doing that is by avoiding crowded transit vehicles that, recent research has proven, helped to spread the coronavirus.[55] Since masks don't protect the wearer as much as they protect others from any diseases the wearer may have, even wearing masks won't keep people safe if others on board the bus or train aren't wearing masks.

Finally, more people will avoid transit due to the threat of crime. Transit crime was rising even before the pandemic, and while it declined in 2020, it didn't decline as much as transit ridership, so people still riding transit were at greater risk of becoming victims.

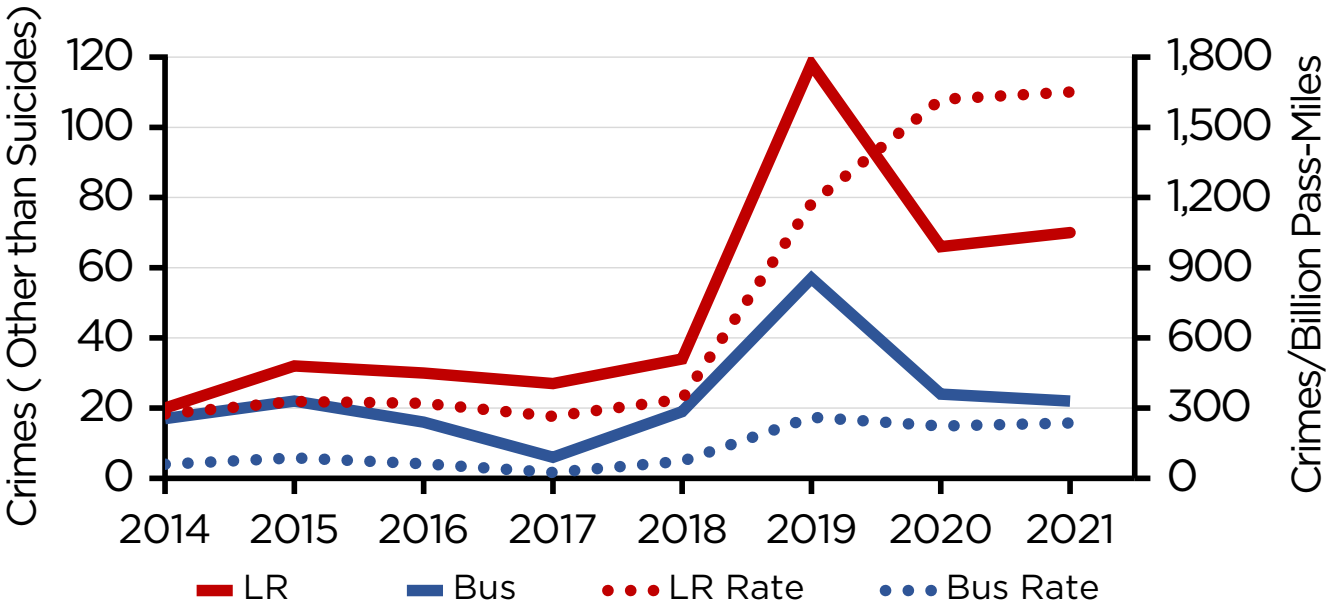
For all these reasons, Metro Transit will be fortunate if ridership ever again reaches 75 percent of 2019 numbers. Plans for light-rail lines, bus-rapid transit, and other improvements should all be re-evaluated in light of lower ridership.

Light Rail and Crime

Nationally, light-rail has proven more attractive to crime than any other form of transit. According to a Department of Transportation database, over the eight years from 2014 to 2021, light rail experienced 97 crimes (not counting suicides) per billion-passenger miles, which was at least twice the rate of any other form of transit except for trolley buses.[56] Trolley buses are found in only five cities and 86 percent of trolley-bus crimes took place in just one of

FIGURE 8

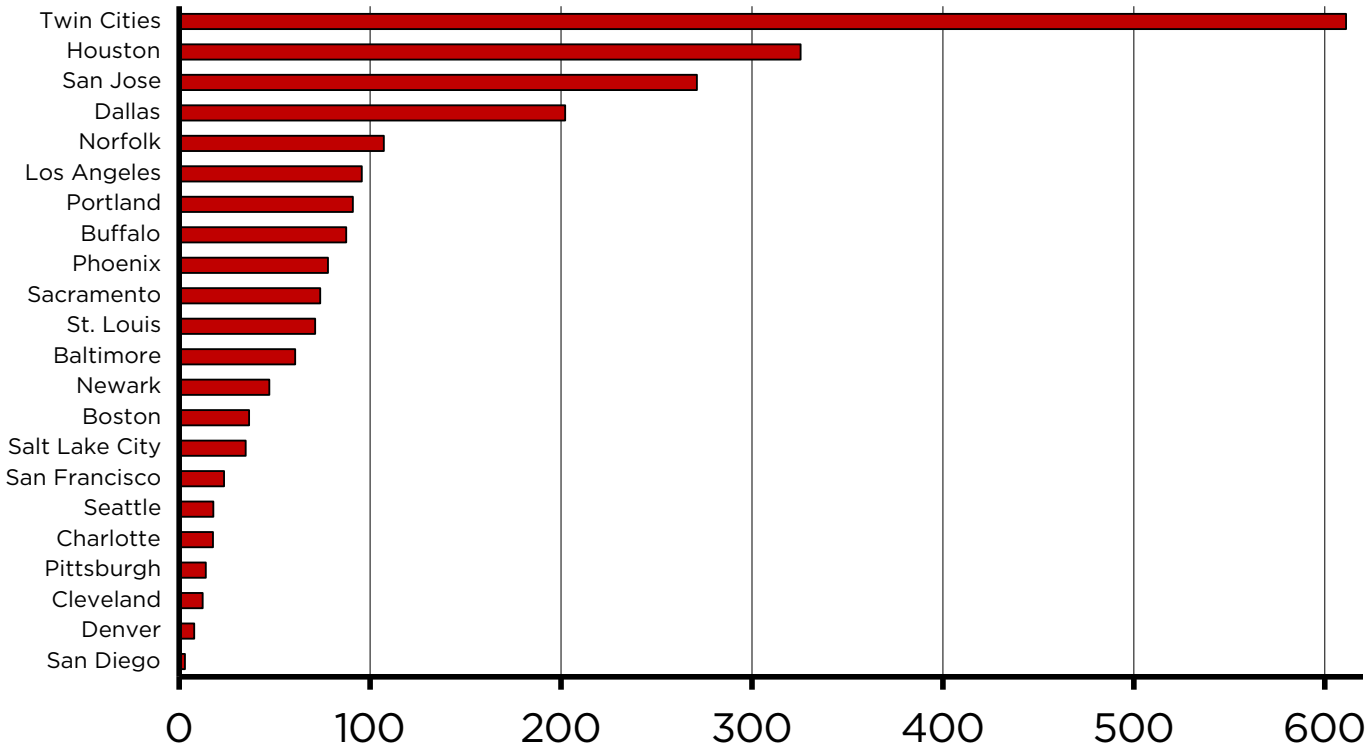
Twin Cities Transit Crimes & Crime Rates



Source: Safety and Security Database, Federal Transit Administration.

FIGURE 9

Light-Rail Crimes Per Billion Passenger Miles, 2014 to 2021



Source: "Major Safety Events," U.S. Department of Transportation, https://data.transportation.gov/Public-Transit/Major-Safety-Events/9ivb-8ae9/data

those cities—San Francisco—while trolley buses in the other four cities are much safer than light rail.[57]

Of all light-rail systems, the most dangerous by far is the one in the Twin Cities. Between 2014 and 2021, Figure 9 shows Metro Transit's light-rail experienced more than 600 crimes per billion passenger miles, six times the national rate.[58] Crime is so common that some light-rail drivers say they are "scared to come to work."[59] If drivers, who are in a separate compartment from light-rail passengers, are afraid of being mugged, certainly passengers are as well.

The main reason why light rail suffers the highest amount of transit crime is fare enforcement, or a lack of it. While heavy-rail lines have turnstiles requiring people to pay fares before boarding the trains, and most bus systems require drivers to enforce fare payment, light rail has no turnstiles and only sporadic fare enforcement by on-board fare inspectors. Under the "broken-windows" hypothesis, enforcement of minor crimes such as fare evasion will discourage more serious crimes. San Francisco also does not require drivers to collect fares on its trolley buses, which helps explain high crime rates on that system.

Metro Transit is attempting to address the crime issue through a police work group that is attempting to increase the perception of safety without creating a perception of racism and inequities.

It appears likely that the group will propose an increased presence of "authority figures," whether fare enforcement officers, or community service officers, on trains and buses to create a "greater sense of safety."[60] In other words, the agency wants to increase the costs of services that are already heavily subsidized. Yet even if an increased number of officials could reduce crime by half, Metro Transit's light rail would still be the second-most dangerous in the country.

Redesign Bus System to Serve More Hubs

Metro Transit can address at least one of these problems by revamping its bus system to serve more hubs than just downtown Minneapolis and downtown St. Paul. More people commute from one suburb to another than to downtowns, yet the suburbs are poorly connected by Twin Cities transit systems. A few bus lines, such as those operated by the Minnesota Valley Transit Authority, connect suburbs, but those lines are often infrequent and slow. For example, a bus between Apple Valley and Rosemount operates only once per hour and takes 25 minutes for a five-mile trip that would take less than 10 minutes by automobile and under 25 minutes by bicycle.[61]

Most job centers, such as the Mall of America, are at the junctions of two freeways. One possible redesign would be to identify, say, ten job centers and then run non-stop buses from each job center to every other job center, with local buses radiating away from every job center. While the current transit system provides relatively fast service only to the two downtowns, this redesign could provide fast service to centers throughout the region.

Considering lower ridership, the environmental and social equity arguments for subsidizing transit are no longer valid if they ever were. In 2019, the average car used about 2,900 British thermal units (BTUs) of energy and emitted about 200 grams of carbon dioxide per passenger-mile.[62] At the same time, transit in Minnesota used almost 5,000 BTUs and emitted 330 grams of carbon dioxide for every passenger-mile it carried while Twin Cities transit used 4,800 BTUs and emitted almost 320 grams per passenger-mile.[63] In 2020, cars if anything became cleaner and more energy-efficient while transit's energy consumption and emissions per passenger-mile increased by 70 percent.[64]

"Of all light-rail systems, the most dangerous by far is the one in the Twin Cities. Between 2014 and 2021, Metro Transit's light-rail experienced more than 600 crimes per billion passenger miles, six times the national rate."

Nor are subsidies to transit equitable. Census data reveal that, in 2019, less than 5 percent of Minnesota workers who earned under $25,000 a year and just 7 percent of Twin Cities workers earning that amount took transit to work.[65] Since the taxes that support transit are regressive, this means that well over 90 percent of low-income workers are disproportionately paying for transit rides they aren't taking. Considering that Minnesota transit commuting declined by more than 60 percent in 2021, this inequity has no doubt grown worse.

Considering transit's high environmental costs and social inequities, continued subsidies to transit at historic rates are highly questionable. Minnesota needs to review these subsidies and ensure that taxpayer dollars are not being wasted in the false hope that transit will ever again be as important as it was in the 1920s. ■

Light-Rail Myths and Realities

To persuade people to support expensive light-rail lines, transit agencies have promoted a number of myths that are easily disproven. Here are a few of those myths.

Myth 1: Light rail is modern. Streetcar technology was perfected in 1888.[66] It was rendered obsolete in 1927, when Twin Coach developed the first buses that were both less expensive to buy and less expensive to operate, per seat-mile, than streetcars.[67] Within a decade, private streetcar companies in more than 500 American cities completely replaced their streetcars with buses.[68] The main difference between light rail and streetcars is that light-rail cars can be coupled together in trains of two to four cars, but buses are still more advanced because they can go on any street, not just where rails are located.

Myth 2: American streetcar systems were destroyed by a General Motors-led conspiracy. In 1937, General Motors purchased an interest in several streetcar companies to encourage them to buy its buses. Years later, an attorney named Bradford Snell claimed that General Motors' goal was to replace streetcars with inferior buses to force Americans to buy cars and start driving.[69] Numerous academic scholars have debunked Snell's claims.[70] General Motors' only goal was to capture market share from Twin Coach, not to destroy transit systems.

Myth 3: Light rail is high-capacity transit. A three-car light-rail train can carry about 450 people, which sounds like a lot compared to an articulated bus, which can carry only about 100. However, for safety reasons, light-rail lines can move only about 20 trains or about 9,000 people per hour. Several bus-rapid transit lines around the world can move more than 250 buses per hour, or nearly three times as many people on the same amount of land as a light-rail line. The American Public Transportation Association agrees: according to its transit glossary, the "light" in light rail refers to the fact that it has a "light volume traffic capacity."[71]

Myth 4: Light rail is cost-effective. When Congress began funding light-rail systems in 1991, it required transit agencies to find that light rail was a cost-effective form of transit.[72] Since then, every light-rail project has implicitly if not explicitly claimed to be cost-effective, but none of them are. Instead, light-rail construction costs have spiraled out of control, increasing from an average of about $35 million a mile (about $100 million per mile in today's dollars) in the 1980s to nearly $280 million a mile today.[73] Considering that buses can do everything light rail can do for a fraction of the cost, buses are far more cost-effective.

Myth 5: Light rail attracts economic development. Despite transit agency claims that light rail promotes new development, close reviews reveal that most such development received subsidies such as tax breaks, tax-increment financing, below-market land sales, and direct grants to developers.[74] Other developments would have been built even without the light rail. As one literature review published by the Federal Transit Administration concluded, "Urban rail transit investments rarely 'create' new growth, but more typically redistribute growth that would have taken place without the investment."[75]

Myth 6: Light rail attracts new riders who wouldn't ride a bus. In the ten years before 2019, Los Angeles opened 62 miles of new light-rail lines and gained 13.6 million new light-rail riders a year. However, in the same period it lost 183.0 million bus riders, a ratio of 13 lost bus riders for every new rail rider. Charlotte, Minneapolis-St. Paul, Portland, St. Louis, and several other cities have recently opened light-rail lines and also ended up losing more bus riders than they gained rail riders.[76]

"On average, light rail kills almost 16 people per billion passenger-miles. The only transit mode that is more dangerous is called hybrid rail, which is essentially Diesel-powered light rail."

Myth 7: Light rail is safe. The fatality rate for light-rail riders is low, but most light-rail fatalities are people who aren't on the trains. Such fatalities are always blamed on the victims, but putting 300,000-pound trains in the same streets as 150-pound pedestrians and 3,000-pound cars is asking for trouble. On average, light rail kills almost 16 people per billion passenger-miles.[77] The only transit mode that is more dangerous is called *hybrid rail*, which is essentially Diesel-powered light rail. Urban roads, meanwhile, kill only 5 people per billion passenger-miles and urban freeways kill fewer than 3 people per billion passenger-miles.[78] This makes light rail one of the most dangerous forms of transportation a city can build. ■

The Twin Cities' Rail Transit Debacles

Metro Transit has its own rail transit follies, expending large amounts of money for few transportation benefits. According to the Federal Transit Administration, the Hiawatha light-rail line was originally projected to cost $244 million but ended up costing $697 million—and that's not counting the $20 million Metro Transit forced Xcel Energy to spend relocating utilities.[79] The FTA also says that Hiawatha ridership fell 28 percent short of expectations.[80]

Rather than relieve traffic congestion as its proponents promised, the Hiawatha line made congestion worse. The line parallels Hiawatha Avenue, whose traffic signals were optimized to minimize congestion. But light-rail cars were given priority over other vehicles when crossing streets that crossed Hiawatha. This disrupted traffic signals on Hiawatha and added 20 minutes or more to people's travel times between Bloomington and Minneapolis.[81]

"This is not a sinister plot to make traffic as miserable as possible and move everybody onto the train," claimed a representative of MnDOT in 2004.[82] But it turned out that it was. During the light-rail planning process, consultants warned that giving light-rail trains priority at traffic signals would disrupt traffic on Hiawatha Avenue. But MnDOT officials decided to do it anyway, saying, "We needed to give an advantage to the transit."[83] After complaints from motorists, MnDOT tried to fix the problem but concluded it was unable to do so.[84]

Unlike the Hiawatha light rail, the Green Line between Minneapolis and St. Paul didn't have a large cost overrun, and ridership even proved to be a little higher than projected.[85] However, the line did almost nothing to increase overall ridership, suggesting that all or nearly all riders of this line were previously taking buses.

Before the Green Line, an express bus connected downtown Minneapolis with downtown St. Paul in 25 to 30 minutes.[86] This bus was cancelled when the Green Line opened, yet the Green Line takes 39 minutes to get from Nicollet Mall to St. Paul's Central Station.[87] Over its entire length, the line averages just 14 miles per hour.

The opening of the Green Line in 2014 led to a large increase in light-rail ridership, but a large decrease in bus ridership, partially attributable to cancellation of the express bus route. By 2017, Figure 10 shows total Twin Cities bus and rail ridership was almost exactly the same as it had been in 2013, the year before the Green Line opened, and total ridership fell further in 2018 and 2019 as bus ridership continued to decline.[88] Despite the new line, by 2019 only 5.3 percent of the region's workers were taking transit to work, which was less than before the Hiawatha line opened.[89]

According to the FTA, the Northstar commuter-rail line cost 16 percent more than projected and carried barely half the predicted number of riders after it opened in 2009.[90] In 2008, Twin Cities transit carried 94.8 million riders; in 2010, after Northstar opened, it carried only 91.7 million. While Northstar ridership grew from 710,426 trips in 2010 to 787,241 trips in 2013, it stagnated in this range and served less than 768,000 trips in 2019.[91]

In 2019, Northstar fares covered just 15 percent of operating costs, declining to 3 percent in 2020. Operating subsidies averaged more than $19 per trip in 2019, rising to nearly $100 in 2020.[92] These subsidies seem particularly inequitable considering that commuter-rail riders tend to earn considerably

higher incomes than other transit riders.

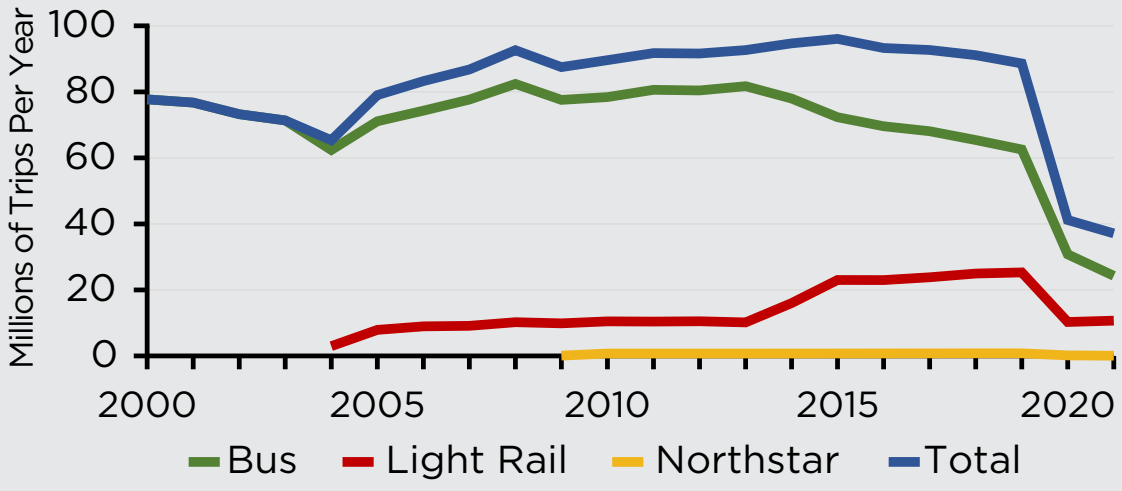
Concern over equity issues led the Metropolitan Council to adopt a "Regional Transit Equity" plan in 2014. First, it would build a light-rail line to Eden Prairie, one of the wealthiest suburbs in the region, whose cost was projected to be $1.25 billion in 2011 and whose projected cost rose to $1.6 billion by 2014.[93] Second, it would spend a few million dollars building up to 200 bus shelters in low-income neighborhoods. Apparently, "equity" means rail transit for the rich and bus shelters for the poor.[94]

Today, the projected cost of the Southwest light-rail line to Eden Prairie has grown to $2.74 billion, more than double the 2011 cost projection made.[95] According to a recent audit from the Minnesota Legislative Auditor, more than $500 million of that amount remains unfunded.[96] The cost overrun alone is expected to be more than the total cost of either the Hiawatha or Green line. The Southwest line is also expected to open nine years later than originally projected.[97] For all that money, the line is projected to carry fewer than 20,000 riders per day in its opening year.[98] This is considerably less than the 26,574 carried by the Hiawatha line in its first full year of operation.[99] Taking the effects of the pandemic into account, actual ridership is likely to be much lower.

Metro Transit attributes the higher costs to problems with drilling a tunnel.[100] The Minnesota legislature directed the Minnesota Legislative Auditor to perform an audit which encourages the auditor to address seventeen questions about the Southwest Line.[101] Some questions were explored in the recent audit and others will be addressed later. But none of this addresses the fundamental problem: light rail is the wrong technology when buses are less expensive, more flexible, can be just as attractive to riders, and can move more people per hour than light rail. ■

FIGURE 10

Twin Cities Bus and Rail Ridership



Source: National Transit Database Historical Time Series, table TS2.1.

Motor Vehicles and Highways

In April 2020, at the height of pandemic-related lockdowns, Minnesota driving declined by 37 percent from the previous April.[102] This compares with a 75 percent decline in Minnesota transit ridership and even greater declines in Amtrak and air travel.[103] By June 2020, when other modes were still carrying under 40 percent of pre-pandemic numbers, Minnesota driving had recovered to nearly 90 percent of June 2019.[104]

Resilient Transportation

The pandemic has underscored the need to emphasize institutions and technologies that are resilient in the face of unexpected events.[105] It has further shown that motor vehicles and highways are the most resilient form of transportation we have. Unlike all forms of mass transportation, the operations and maintenance costs of highways are low and can even be deferred a year or two in times of crisis.

In contrast to transit agencies, state highway departments didn't demand or receive huge subsidies from Congress for the highways to remain open.[106] In addition, users of personal vehicles have fewer worries about infectious diseases and crime than mass transportation riders. The Centers for Disease Control even advised people returning to work to walk, bicycle, or drive rather than take transit.[107]

Unlike railroads and other fixed-guideway systems, highways usually have alternate routes that can be used if one route is closed for some reason such as a fire, tornado, or other disaster. Highways are also more flexible and can be used by everything from pedestrians and bicycles to 75-foot-long combination trucks.

The dictionary defines *resilient* as "capable of withstanding shock without permanent deformation" and "tending to recover from or adjust easily to misfortune or change."[108] The resiliency of highways is demonstrated by the fact that driving declined less and rebounded fastest during the pandemic.

With the possible exception of bicycling, driving and possibly domestic air travel are likely to be the only forms of travel that increase after the pandemic, relative to pre-pandemic levels. Studies show that people working at home drive less during rush hours but drive more miles overall.[109] Fears of infectious diseases will make many people reluctant to use any form of mass transportation, leading them to substitute driving for short airline, train,

and bus trips. The growth of on-line shopping has also increased the number of trucks on interstate highways and city streets.

The Failure of Efforts to Reduce Driving

This prospective increase in driving makes a mockery of past efforts to solve pollution, congestion, safety, and other problems by attracting people out of their cars. In 1970, when Americans drove about 1.1 trillion miles, the average car got only 13.5 miles per gallon, close to 54,000 people died in traffic accidents, and air pollution darkened urban skies and made breathing unhealthy for millions.[110] Many states and cities responded by adopting policies aimed at discouraging driving, including spending large amounts on urban transit and halting construction of new roads on the theory that new roads merely encouraged more driving.

These efforts failed miserably. By 2019, Americans had tripled their driving to 3.3 trillion miles.[111] Despite this, the costs of driving had declined. Thanks to better designs and technologies, the average car got better than 26 miles per gallon, traffic fatalities had fallen to 36,000, and the total tons of highway-related toxic pollution (carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds, particulate matter, and ammonia) had declined by nearly 88 percent.[112]

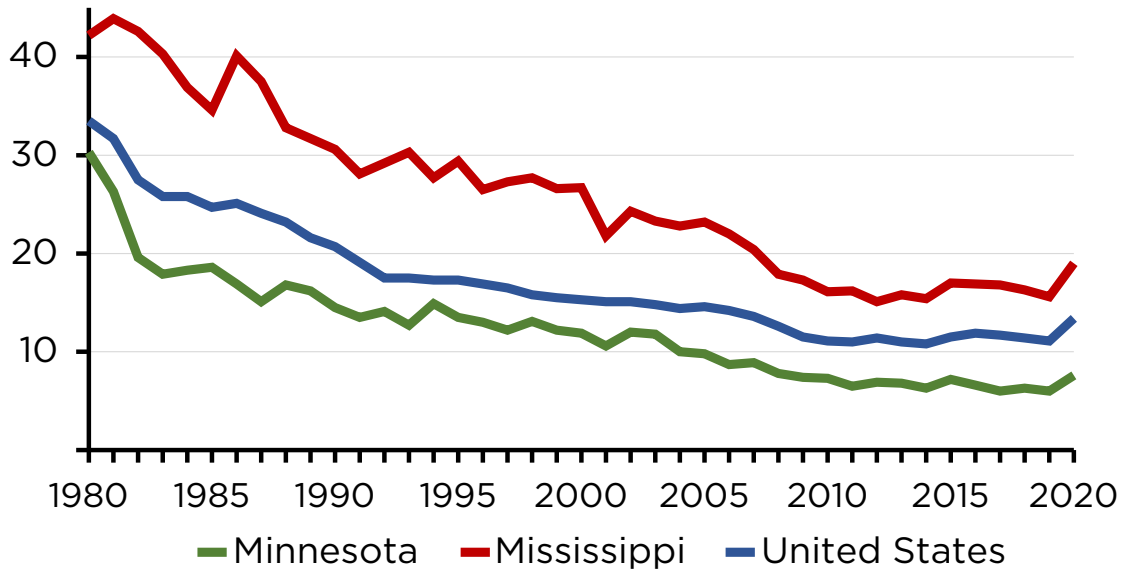
This demonstrates that the way to reduce the costs of driving is to make better cars and highways, not try to discourage driving. Given that people are going to drive, the appropriate policy for the Minnesota Department of Transportation, Metropolitan Council, and other transportation agencies is to work to make that driving as safe, efficient, equitable, and environmentally sensitive as possible.

Making Highways and Streets Safe

Between 1980 and 2011, nationwide highway fatalities declined by 36 percent.[113] In the decade

FIGURE 11

Traffic Fatalities Per Billion Vehicle-Miles



Source: Tables FI-1/FI-20 and VM-2 in Highway Statistics for the years between 1980 and 2020.

since then, however, they increased by 32 percent.[114] Minnesota fatalities declined 43 percent from 863 in 1980 to 368 in 2011 and remained at this lower level until 2020.[115] However, vehicle fatalities sharply increased from 394 in 2020 to 488 in 2021.[116] This represents a 24 percent increase, which is far higher than the 11 percent increase across the U.S. The increase in 2021 is disturbing and likely due to a combination of COVID-related driving changes and reduced policing and enforcement in the wake of riots and civil unrest following the murder of George Floyd. As Minneapolis reports, "very reckless driving" consistently accounted for a little over 30 percent of fatal crashes in the city from 2017 to 2019, but then jumped to over 60 percent in 2020 and then reached 80 percent in 2021.[117]

Minnesota has long enjoyed lower highway fatality rates than the United States as a whole (Figure 11). In the ten years before the pandemic, U.S. traffic accidents killed about 11 to 12 people per billion vehicle miles, while the rate in Minnesota was around 6 to 7.5.[118] This pattern dates back to at least 1967, the earliest year data is available. This is partly because more than in many other states, a higher share of driving in Minnesota is on urban roads, which tend to be safer than rural roads. It is also because a higher share of Minnesota driving is on freeways, which tend to be the safest roads. But it may also be because Minnesota drivers are more cautious or more patient than drivers in states with traditionally high fatality rates, such as Mississippi and South Carolina.

Although urban roads tend to be safer than rural roads, nearly all the increase in fatality rates over the last decade have been on urban roads. Between 2010 and 2020, rural fatalities in Minnesota declined from 287 to 240, while urban fatalities grew from 124 to 153.[119] This may be partly due to an increase in distracted driving. A contributing factor, however, is that many state and local transportation agencies are focusing on anti-automobile fads rather than a data-driven process aimed at making roads safer.

Traffic engineers once relied on *before-and-after* or *with-and-without* studies to determine what road and street designs were safest. A before-and-after study compares traffic flows, safety, and other data before and after modifying a road with such things as a traffic light, crosswalk, or converting two-way traffic to one-way flows. A with-and-without study compares two similar roads, one of which has an improvement such as a traffic light and the other of which does not. Today, however, transportation planners rarely do such studies, instead relying on fads, most of which seemed more aimed at reducing driving than increasing safety.[120]

For example, Minneapolis and other cities have responded by adopting "Vision Zero" plans that call for reducing pedestrian and cycling fatalities by emphasizing reductions in speed limits and street designs that force vehicles to slow down. These plans are largely based on the simplistic notion that speed is the main factor responsible for traffic fatalities. Minneapolis, for example, has reduced overall speed limits.[121] On streets identified as being particularly dangerous, it has introduced new designs, such as narrower lanes and bump-outs at crosswalks, to force traffic to slow down, without doing the rigorous before-and-after or with-and-without studies necessary to determine whether these practices actually increase safety.[122] In many cases, they create an illusion of safety that actually can make streets more dangerous.

The city's Vision Zero plan calls for doing such before-and-after studies to monitor the impact of the changes it makes to street designs.[123] The studies it has done, however, are not rigorous and the city is clearly misinterpreting them to justify its programs. For example, the city did a before-and-after study of marking bike areas at intersections with green paint in order to alert auto drivers that bicycles might be present. Their representation suggests the study supported this practice by highlighting the finding that "Crashes per year decreased after installation of green pavement markings in four of the ten intersections." What the study failed to mention is that crashes per year significantly increased in the other six intersections. When all ten were considered together, crashes per year increased by 21 percent after installing the green markings, possibly because the markings gave bicycle riders an unrealistic illusion of safety.[124] Instead of acknowledging the possibility

that the green markings may make roads less safe, the study refers to this change as a "small increase" which could be due to the volume of bicyclists increasing.

These steps haven't worked. Pedestrian fatalities were 29 percent higher in Minneapolis and 36 percent higher in all urban areas across Minnesota in 2016-2020 compared to 2006-2010.[125] Minneapolis also saw more pedestrian deaths in 2021 than any year since 1998.[126] In that same period, rural pedestrian fatalities declined by 11 percent even though there hasn't been a widespread reduction of rural speed limits in Minnesota. Other American cities that adopted Vision Zero have also seen an increase in pedestrian and other traffic fatalities.[127]

Instead of relying on oversimplifications, Minnesota needs to develop a robust data-driven process for identifying and correcting dangerous roadway designs. For example, from 2006 to 2020, data show that less than a third of Minneapolis pedestrian fatalities happen in daylight. Of the fatalities that were not in daylight, nearly half took place away from intersections.[128] This suggests that a lot of pedestrian fatalities are due to risky behavior on the part of the pedestrians. Rather than focusing on the behavior of auto drivers, Minneapolis and other Minnesota cities would do better by installing improved lighting and designing streets to encourage pedestrians to cross at designated corners where drivers are most likely to be looking for pedestrians.

In contrast, over the same period, half of Minneapolis cycling fatalities take place in daylight and over 75 percent occur at intersections.[129] Installing bicycle lanes on arterial and collector streets between intersections doesn't prevent accidents at intersections and may actually make matters worse by giving cyclists an illusion of safety.[130] A better alternative is to turn local streets paralleling the arterials and collectors into *bicycle boulevards* (which Minneapolis calls *neighborhood greenways*) that give cyclists a safe alternative to riding on busy streets.[131] Where those boulevards intersect busy streets, redesigning intersections to improve cycling safety makes more sense than bike lanes.[132]

Instead of focusing on one factor—vehicle speeds—as Vision Zero largely does, transportation planners need to learn a lesson from the airline industry. After several fatal airline crashes in the 1990s, airlines, pilots' unions, and airplane manufacturers developed a data-driven incident reporting system that was aimed at fixing problems, not on finding people to blame for the problems. The result is that there have been no fatal commercial airline crashes in the United States since 2009.[133] The National Highway Traffic Safety Administration already has a database, known as the Fatality and Injury Reporting System Tool (FIRST), that is largely ignored by many local transportation planners.[134] Minnesota transportation agencies should use and enhance this system to identify and solve real safety problems.

Reducing Traffic Congestion

Traffic congestion is one of the greatest forms of waste in America. The Texas Transportation Institute estimates that congestion cost $190 billion in 2019.[135] This includes $20 million in costs to trucks, but the American Transportation Research Institute estimates that congestion cost for truckers was an additional $54 billion.[136] Unlike other wasteful programs in which some people benefit while others lose, congestion is a deadweight loss that benefits no one. Congestion declined during the pandemic, but even if 20 percent of workers continue to telecommute after the pandemic, it will eventually increase again as population increases and people who were avoiding rush hour traffic respond to less traffic by driving more during peak times.

Congestion in 2019 or even 2020 had massively increased over the previous three decades. According to the Texas Transportation Institute, the number of hours the average Twin Cities auto commuter wasted sitting in traffic grew from 12 in 1982 to 59 in 2019. While it declined to 32 hours in 2020, that's still 167 percent more than in 1982.[137]

A major reason why congestion has increased is that transportation agencies have stopped trying to prevent congestion. As MnDOT admits, "Since 2010, MnDOT's strategy has shifted from reducing congestion toward providing alternatives to congested travel." As a result, the agency "expects

congestion to remain the same or increase."[138]

Minnesota's *20-Year State Highway Investment Program: 2018–2037* includes almost no money for highway expansion or congestion relief. In particular, after 2024, the plan allocates zero dollars to Twin Cities or Minnesota mobility improvements. It justifies this by claiming that in the Twin Cities, "congestion remains relatively flat," implying no funds are needed.[139] It admits that "travel time reliability [is] likely to decrease" yet offers no solutions other than a few express lanes and "spot mobility improvements."

Not content to do nothing about congestion, the Metropolitan Council has a policy of making it worse by giving transit priority over other travel.[140] For example, one of the most cost-effective ways of reducing congestion is to coordinate traffic signals to minimize stops. Instead, the Metropolitan Council wants to give transit priority over traffic signals, which forces more frequent stops for everyone else. Since transit carried just 1 percent of passenger travel and just 5 percent of workers to their jobs in 2019, both of which declined in 2020, this means the council is valuing a handful of transit riders' time over everyone else's.

There are several ways to cost-effectively reduce congestion. One major problem unique to highways is that they are the only resource whose throughput declines when demand increases. A typical freeway lane can move approximately 2,000 vehicles per hour at freeway speeds. If more than that number of vehicles tries to use the lane, speeds slow. With slower speeds, potential throughput can decline below 1,000 vehicles per hour. At the times of day when they are needed most, freeways are only half as productive as they can be.

The solution to this is to somehow limit the number of vehicles on the roads to no more than their capacity. That's the theory behind ramp metering, which limits the number of vehicles entering a freeway during any given time period. However, ramp meters fail to completely prevent congestion because they do not prevent cars from entering a freeway that is already full.

A MnDOT study concluded that "ramp metering is a cost-effective investment of public funds for the Twin Cities area." However, it is only cost effective because the costs are so low; the benefits are also low. The study found that ramp metering of Twin Cities freeways saved about 2.6 million hours of delay per year in 2000.[141] That sounds like a lot, but the Texas Transportation Institute's annual urban mobility report found that Twin Cities highways suffered nearly 69 million hours of traffic delays in 2000, which means ramp meters reduced the region's congestion by less than 4 percent.[142]

Another study of Twin Cities ramp meters found that, when the times spent waiting to enter freeways at metered entrances is added, ramp meters "may not improve [overall] trip travel times."[143] The authors of that study also argue that ramp metering can be inequitable because it mainly benefits high-income workers who live the furthest from city centers.[144]

A far superior alternative to ramp metering is road pricing: just as airlines and hotels charge more during peak seasons, roads could cost more to use during peak periods of the day. While this might also be thought to be inequitable, it isn't. Unlike the regressive taxes used to pay for transit, road pricing isn't regressive because people only pay for what they use. The revenues from road pricing can also be used to relieve bottlenecks or build new capacity, thus keeping fees down.

MnDOT has taken a step in the right direction by introducing E-ZPass lanes that charge tolls to low-occupancy vehicles during rush hours.[145] So long as fees are set to ensure the lanes never become congested, this benefits the users of those lanes and may take traffic off unpriced lanes. But a pricing system for all lanes would benefit everyone.

Congestion can also be relieved by fixing transportation bottlenecks. According to the American Transportation Research Institute, which studies problems with freight transportation, the Twin Cities has two major bottlenecks at the intersections of I-35E with I-94 and I-35W with I-494.[146] In 2019, rush-hour speeds in these bottlenecks were reduced to 35 to 36 miles per hour.[147]

To its credit, MnDOT is rebuilding the inefficient cloverleaf intersection of I-35W and I-494 into a turbine interchange, which will allow greater

throughput.[148] Unfortunately, the project was preceded by at least 20 years of planning before actual construction began.[149] MnDOT should make similar improvements at other bottleneck intersections but not take as much time to plan the projects.

Eventually, Minnesota may need to consider expansion of the existing freeway network. One possibility is to finish construction of a new ring road outside the current I-94/I-494/I-694 ring. Ring roads are valuable in providing suburb-to-suburb transport, and since most jobs and most people are in the suburbs, they can greatly reduce transport costs. Provided new roads are paid for with user fees, they are an efficient mode of transportation.

Sadly, the anti-freeway mentality that has gripped the urban planning profession has taken potential highway expansions off the table. A group of planners called the Congress for the New Urbanism has founded a "freeway-fighters network" that opposes new construction on the grounds that it simply "induces" more driving.[150] The induced-demand argument has become almost an article of religion—one academic group calls it a "gospel."[151] Yet it is in fact a totally bizarre argument.

The purpose of building new infrastructure is to generate new economic activity. No telecommunications company would expand its cell phone network, no airline would buy more planes, no railroad would build more tracks if they didn't expect such expansions to generate new business. If building new highways generates more driving, that means more people are accessing more jobs and other economic opportunities than before, which is a good thing. Apparently, to the New Urban planners, it is better to build expensive rail transit lines that don't carry more people than the buses they replace than it is to build highways that increase mobility.

Of course, new roads do not automatically mean more driving. U.S. Route 50 in Nevada is sometimes called the "loneliest road in America" because so few people drive on it. Turning it from a two-lane to a four-lane road is not going to generate more driving. If expanding a freeway in the Twin Cities area leads to more driving, that is not so much "induced demand" as it is a release of demand that had been repressed by congestion.

A new ring road around the Twin Cities may not be the best solution to congestion, but neither it nor other freeway expansions should be arbitrarily ruled out. The people who oppose freeway expansions often point to China's 23,000 miles of high-speed rail as an example the U.S. should emulate. But they never mention that China has more than 100,000 miles of freeways—50 percent more than the U.S.[152] Nor do they mention that Beijing has seven ring roads, and many other Chinese cities have three to five.[153]

Unlike China's high-speed rail lines, which put the country deeply in debt, the freeways are paying for themselves out of tolls. Minnesota should not build more freeways just because China has more freeways, but it should build more freeways for the same reasons that China has built them: because they induce more economic activity and build wealth for the state.

Improving Transportation Equity

As noted above, some transit advocates argue that transportation equity can be achieved by increasing subsidies to transit. But since less than 10 percent of low-income workers take transit to work, this is a poor solution. As also noted above, transit is third-class transportation, as both autos and bicycles can reach more jobs in a given time period than transit.

In 2019, the Twin Cities was the sixteenth-largest urban area in the nation, yet the University of Minnesota's 2019 accessibility studies found that Twin Cities residents can reach more jobs in a 30-minute auto trip than residents of all but three other urban areas, New York, Los Angeles, and Dallas-Ft. Worth.[154] The average Twin Cities resident can also reach 48 times as many jobs in a 30-minute auto trip as a 30-minute transit trip.[155]

True transportation equity can best be achieved by increasing auto ownership. Based on the 2017 *National Household Travel Survey*, about 7 million low-income households lack access to an automobile. The biggest barrier to auto ownership is not the cost of operating a car but the finance charges involved in buying a car: good used cars might sell for a few

thousand dollars, but banks will charge 20 to 25 percent interest for used-car loans to customers with poor or no credit ratings.[156]

In 1998, a non-profit group in Wisconsin began offering low-interest and even zero-interest loans of up to $4,000 to help low-income people buy a car. The group found that 85 percent of the people who bought cars ended up with better and higher paying jobs.[157] The group's low-interest loan program was emulated by non-profits in more than a dozen other states, all of which reported similar results: after acquiring a car, people in poverty were able to get out of poverty.[158]

Some of the non-profit groups that offer or offered low-interest loans to low-income auto buyers relied on government grants to support their programs, while others relied on private donations. Either way, people who are truly concerned about social justice, and not merely using that issue to justify more subsidies to transit, should advocate for increased auto ownership among low-income people.

Reducing Environmental Costs

Since toxic pollutants from automobiles have been nearly eliminated, the main environmental objection to autos today is greenhouse gases. Yet greenhouse gas emissions have also been reduced. In 1970, the average car on the road emitted more than 650 grams of carbon dioxide per vehicle-mile and nearly 350 per passenger-mile. By 2019, this had fallen by more than 50 percent to about 300 per vehicle-mile and less than 200 per passenger-mile.[159]

In recent years, the decline in emissions has exceeded the growth in driving (Figure 12). In 2004, U.S. passenger vehicles (cars and light trucks) emitted more than 1.15 million tons of carbon-dioxide equivalent. In 2019, they emitted just 1.06 million tons, a 9 percent reduction despite a 7 percent increase in miles of driving.[160] We can expect this declining emissions trend to continue. Although cars are twice as energy efficient today as they were 50 years ago, much more can be done. Manufacturers, for example, are just beginning to make autos more aerodynamic by adding an underbody cover, which can significantly improve fuel economy.[161] Such covers could also be retrofitted onto existing cars.

Unfortunately, Minnesota is now embarking on regulatory policies to mandate a California-style low carbon fuel standard. State fuel mandates are not an effective path to improve the environment. As American Experiment's report on this policy shows, the policy would increase fuel prices on Minnesota families by 29 to 54 cents per gallon under various scenarios.[162] This cost would be three times higher than the value of the reduction in carbon emissions based on the metric the Obama administration used to measure the social cost of carbon.

To the extent state and local governments can play a role in reducing vehicle emissions, they can save tens of millions of tons of greenhouse gas emissions each year by taking steps to relieve traffic congestion rather than relying on the existing failed policies of attempting to reduce auto driving.[163] This means, in part, addressing how efforts to reduce auto driving often increases emissions by increasing congestion. For instance, Hennepin County reconstructed Washington Avenue between Hennepin Avenue and Fifth Avenue South to reduce the number of general lanes from six to four in order to provide two lanes for bicycles. Yet, they did this despite their own engineering study which showed the project would significantly increase traffic congestion and, as a result, increase both fuel consumption and air pollution.[164]

The Future of Motor Vehicles

Advocates of light rail, high-speed rail, hyperloop, personal rapid transit, mag-lev, and other fixed guideway systems ignore one crucial fact: the United States has more than 4 million miles of roads, allowing people in motor vehicles to reach just about anywhere.[165] These roads also cost far less to build than other fixed-guideway systems, normally costing about $2.5 million to $20 million per lane-mile compared with $100 million or more per route-mile for high-speed rail or light-rail.[166] Annual road maintenance costs are also far lower.

In general, new modes of transportation are much more likely to succeed if they don't require construction of all-new infrastructure. Automobiles

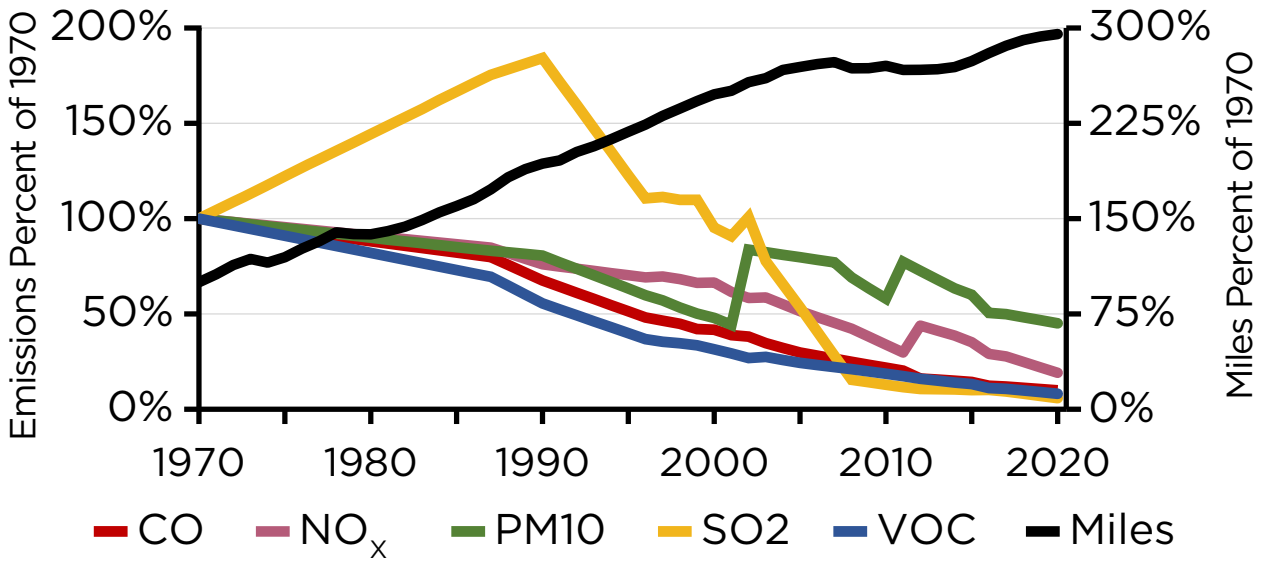
were successful because in 1900, even before 99 percent of Americans could afford one, the United States already had 2.3 million miles of roads. Interstate highways with limited access and four-stacked interchanges came only after millions of Americans were driving and paying for new roads out of gas taxes. Similarly, air travel was successful because initially airplanes could land in any open field. Massive airports with jetways, restaurants, and automated baggage facilities came only after millions of Americans were flying and could pay for such infrastructure out of ticket fees.

Based on this, the next new transportation technology will not be high-speed rail or mag-lev but autonomous cars. Currently, 48 different companies have permits to test autonomous vehicles in California, and some companies including Volvo are testing them elsewhere and so don't have California permits.[167] All of these companies are assuming that their vehicles will use the existing road network mixed with human-driven vehicles. As the software for such vehicles is perfected, they will be introduced and eventually dominate the highway system.

This makes it practically certain that motor vehicles and highways will become even more dominant in the future than they are today. Minnesota transportation agencies need to plan for that dominance and stop pretending that motor vehicles can be ignored or engineered away. ■

FIGURE 12

Highway Air Pollution and Miles of Driving



CO=carbon monoxide; NOx=nitrogen oxides; PM10=particulate matter; SO2=sulfur dioxide; VOC=volatile organic compounds; Miles=total miles of driving.

Source: Environmental Protection Agency, National Tier One CAPS Trends.

Intercity Travel

Intercity travel declined even more than urban travel during the pandemic. As of July 2022, domestic air passenger-miles had recovered to 92 percent of pre-pandemic levels, while Amtrak was 84 percent.[168] Data about intercity buses is sparse, but one report says that "some routes" had recovered to 80 percent of pre-pandemic riders by the end of 2021.[169]

The Infrastructure Investment and Jobs Act included $12 billion for grants to states to start passenger train service outside of the Boston-to-Washington corridor.[170] To be eligible for these grants, states will be required to fund most or all the operating losses for such trains. Among other places, Amtrak is hoping that Minnesota will help fund service between St. Paul and Duluth, St. Paul and Eau Claire, and increased service between St. Paul and Chicago.[171]

Yet even if $100 billion in grants were available, passenger trains would not put a serious dent into intercity highway and air travel. Just as transit is inferior to driving in the cities, passenger trains are inferior to air and bus travel: they are slow, can only go where rails go, and are far more expensive.

In 2019, Amtrak collected $2.3 billion in ticket fares and carried 6.5 billion passenger miles, for average fares (including ticket and food & beverage revenues) of 37.5 cents per passenger-mile.[172] Airfares in that year averaged just 18.6 cents per passenger-mile, nearly half of Amtrak fares.[173] On top of this, federal and state subsidies to Amtrak averaged 38.2 cents a passenger-mile in 2019.[174] Subsidies to air travel average just 1 cent per passenger-mile.[175] Moving a passenger one mile on Amtrak cost almost four times as much as by air. No government agency estimates average intercity bus fares, but they are probably around 15 cents per passenger-mile, and subsidies to buses are also very low, consisting mainly of a discount on federal fuel taxes.

As a result, Amtrak faces formidable competition on any route it might choose. For example, currently there are as many as 27 non-stop flights a day between Minneapolis-St. Paul and Chicago, with fares beginning at $89. There are also at least four buses a day with fares starting at $30. Amtrak's lowest fare is $58. Amtrak won't be able to compete with the airlines on either speed or frequency and it won't be able to compete with buses on price.

Similarly, there are currently at least six nonstop flights a day between Minneapolis and Duluth with fares starting at $99. There are also up to 8 buses a

day with fares starting at $9. Some of the buses take less than 3 hours, whereas the last time that Amtrak served this route it required 3 hours and 45 minutes. Amtrak won't be able to compete with the buses on price and it won't be able to compete with either buses or planes on speed or frequency.

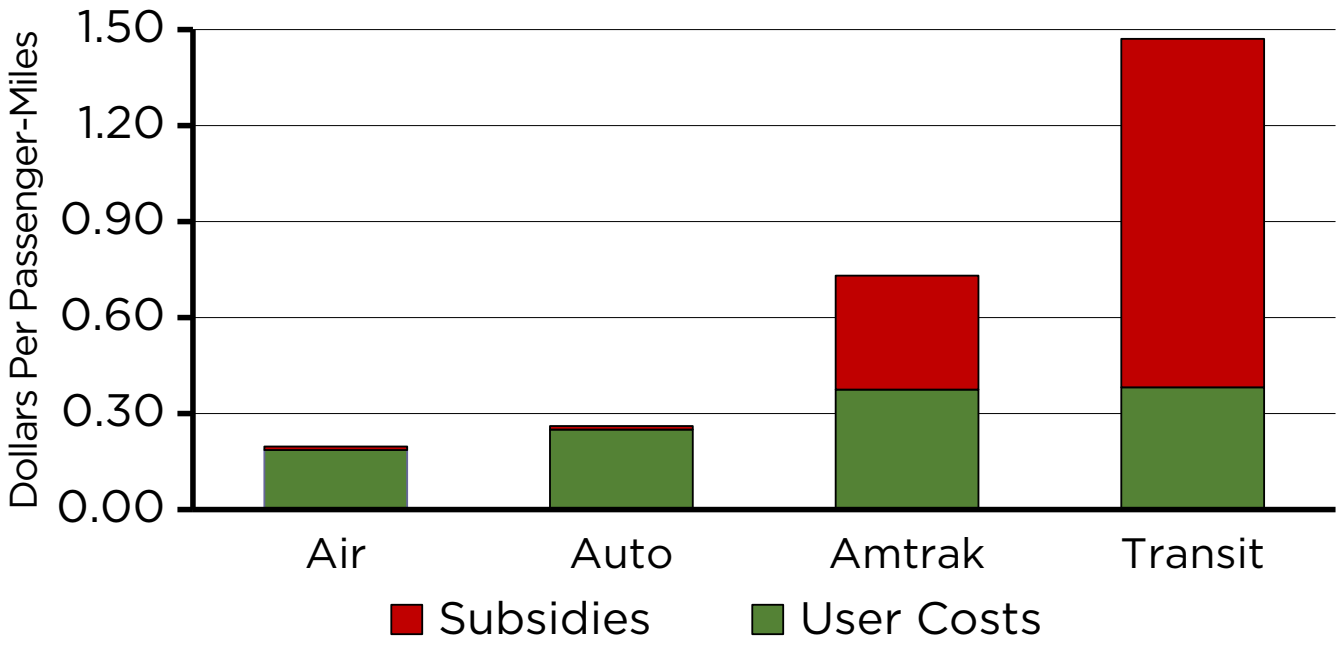
Prior to the pandemic, Amtrak claimed that its passenger trains nearly broke even in 2019 and expected to actually earn a profit in 2020.[176] However, it was able to make this claim only by counting subsidies from the states as "passenger revenues" and by ignoring depreciation, the second-largest operating cost on its financial return.[177] Correcting for these slippery accounting practices reduced its apparent net earnings from -$30 million to -$1.1 billion.

Amtrak's current five-year plan has given up on the pretense that it will ever cover its costs. The plan assumes that state subsidies (which it counts as passenger revenues) will increase from $234 million in 2019 to $533 million in 2027. Like other Amtrak statements, the plan ignores depreciation, which was $926 million in 2020.[178] Even with these generous assumptions, the plan projects that Amtrak will lose more than a billion dollars a year.[179] Deducting the state subsidies and adding depreciation increases this to nearly $2.5 billion a year.

Rather than provide heavy subsidies to a functionally obsolete form of travel, Minnesota should allow bus companies and airlines to provide the travel needs that people can't provide for themselves by driving their cars. ■

FIGURE 13

2019 Tranport User Fees & Subsidies



Source: Auto user costs from National Income and Product Accounts, Bureau of Economic Analysis, table 2.5.5; highway subsidies calculated from Highway Statistics 2019, tables HF-10 and VM-1. Transit fares and subsidies calculated from 2019 National Transit Database, Service, Operating Expenses, Capital Expenses, and Fares spreadsheets. Airline fares and subsidies calculated from National Transportation Statistics tables 1-40, 3-20, 3-32, and 3-35. Amtrak fares and subsidies calculated from Monthly Performance Report FY 2019.

Transportation Finance

In 2019, moving people by urban transit cost far more than by automobile and moving people by Amtrak cost far more than by air (Figure 13). The pandemic greatly increased these differences, pushing transit subsidies to more than $2 per passenger-mile and Amtrak subsidies to nearly $1.70 per passenger-mile, compared with 14 cents per passenger-mile for air travel and 1 cent per passenger-mile for auto travel.[180]

From the time when advocates of the Erie Canal proposed that the state of New York should pay for its construction, Americans have debated whether transportation should be paid for by its users or by taxpayers. Two centuries of experience have clearly demonstrated that user fees are the better way for several reasons.

First, funding transportation out of user fees imposes a discipline on transportation agencies that keeps them from spending wildly on projects with very little benefit. Considering that buses can do everything light rail does for less money, the Hiawatha light-rail line was questionable enough when it was projected to cost $244 million and carry 37,000 riders per day.[181] Now Metro Transit is building a light-rail line costing $2.75 billion that is projected to carry fewer than 20,000 riders per day. Even more expensive projects are being built in Boston, Honolulu, Los Angeles, and other cities. Apparently, no cost is too high and no ridership projections are too low to convince transit agencies not to build a rail project. Funding transit out of user fees would fix this.

Second, infrastructure funded out of user fees tends to be maintained in better condition than infrastructure funded out of taxpayer dollars. Politicians prefer to fund "ribbons, not brooms," i.e., to fund glitzy new projects rather than to maintain old ones. Nationally, only 2.0 percent of highway bridges that are funded out of tolls are rated in poor condition, while 9.4 percent of local highway bridges, which are funded mainly out of general funds, are rated poor.[182]

Third, user fees impose a discipline on users and user expectations. Many passenger train advocates argue that trains that allow people to get up and wander around are better than planes that cram people into narrow seats with little leg room. But trains can do that only because half the costs are paid by the government. Airlines once provided large lounges for first-class and even, in some cases, coach passengers, but passengers revealed by their ticket-buying habits that most would prefer spending less and putting up with a little discomfort, while those who wanted more room were free to pay first-class

fares themselves.[183]

Finally, user fees are a better way of dealing with periods of peak demand than congestion. Airlines, hotels, and other service industries charge more during peak periods. Even some transit agencies, such as the Washington, DC Metrorail system, charge more during peak periods. Charging more for roads during peak periods would prevent traffic slowdowns that reduce road throughputs, effectively doubling the capacity of the road to move people during rush hour.

At various times in the past, nearly all transportation has been paid for mainly out of user fees. Today, politicians are celebrated for throwing money at transportation without regard to the benefits it provides. Returning to a system of user fees will save taxpayers money and actually provide better transportation facilities and services.

Until 2006, Minnesota state highways were paid for mainly out of fuel taxes and vehicle-registration fees, which were dedicated mainly to such roads. Paying for roads out of fuel taxes made sense in the 1920s, when traffic was light and we didn't have technologies to cost-effectively charge tolls. Today, while fuel taxes are a user fee, they are a poor way of paying for roads for several reasons.

First, unlike sales, income, or property taxes, they don't automatically adjust for inflation. Second, they don't adjust for the fact that automobiles today are twice as fuel-efficient as 50 years ago, and don't work for electric vehicles at all. Third, fuel taxes mainly go to the states, while local governments in Minnesota collectively spend close to $3 billion a year subsidizing roads out of general funds, property taxes, and other non-user fees.[184]

Finally, fuel taxes do nothing to fix congestion. While prices such as airfares and hotel rates vary during periods of low and high demand, fuel taxes are the same whether people drive on busy city highways during rush hour or on remote country roads on weekends.

In recent years, Minnesota has provided several hundred million dollars per year of additional highway funding out of sales taxes on motor vehicles, vehicle parts, and vehicle leasing.[185] As a user fee, this is even less effective than fuel taxes. In general, the test of a good user fee is whether it provides useful signals to users and producers to let them know the cost of and demand for the goods or services they are using and providing. The motor vehicle sales tax fails this test. This may have been a good political solution to ensure roads receive adequate funding. However, there are better long-term solutions.

While fuel taxes and vehicle-registration fees are a better way of paying for roads than general funds, an even better way would be to charge people for each mile they drive. This is now technologically possible thanks to transponders and GPS devices rather than expensive and delay-producing tollbooths. Oregon has implemented a per-mile fee system that guarantees user privacy.[186]

A mileage-based fee system corrects all of the problems with fuel taxes. Most importantly, it can provide instant signals to users regarding highway costs and precise signals to transportation agencies about transportation demands and needs. As states implement such systems, local governments can piggy-back onto them to pay for their roads rather than paying for them out of general funds. Minnesota conducted a small experiment with such a system a decade ago but needs to take steps to implement it on a larger scale.[187]

Airlines and intercity buses pay for themselves out of user fees. Airports are paid for mainly out of airline ticket fees. Most of America's freight systems are paid for out of user fees. Amtrak should also be required to fund itself out of user fees and to eliminate routes that cannot be so funded.

Urban transit was once funded almost entirely out of user fees. Subsidies to transit have resulted in a huge loss of worker productivity and huge profits to construction companies building unnecessary infrastructure. Ending subsidies would force transit providers to focus on providing services where there is a genuine need and demand, not to every suburb where every driveway has two or three cars.

If subsidies must be continued, they should be designed to mimic user fees. For example, subsidies to transit agencies should be proportional to the user fees they collect. This will force agencies to focus on user needs. ■

Conclusions and Recommendations

Highways and motor vehicles were the dominant form of transportation in Minnesota before the pandemic and will be even more dominant after. No amount of funding for urban transit is going to change that. Airlines were the dominant form of commercial intercity passenger transport before the pandemic and will be even more dominant in a post-pandemic world. No amount of funding for Amtrak is going to change that.

Instead of fighting consumer preferences and transportation trends, Minnesota transportation agencies need to make sure that the transportation people use is safe, efficient, equitable, and environmentally sensitive. In particular, this report makes the following recommendations.

Transit

- The Southwest light-rail line is proving to be outrageously expensive for the small benefit it will provide. Metro Transit should modify the project into a dedicated busway, which will cost less, allow for more flexibility because buses can serve many areas by leaving the busway, and provide greater capacity to move people. If that extra capacity isn't needed for buses, the busway could also be used as a tollway for other motor vehicles.
- Plans for the Bottineau and other proposed light-rail lines should be replaced with plans for bus-rapid transit lines. Because there are probably no corridors in Minnesota where demand for transit will ever make full use of dedicated busways, these and other future bus-rapid transit lines should use lanes shared with other vehicles. Those lanes could be general purpose lanes, high-occupancy vehicle lanes, or high-occupancy/toll lanes.
- The Northstar commuter-rail line is an embarrassing and expensive failure. Metro Transit should shut down the line as soon as possible and, to the extent that it is needed at all, replace it with buses.
- As the infrastructure for the existing blue and green light-rail lines wears out, Metro Transit should replace it with bus-rapid transit or other bus services. The cost of replacing worn-out rail infrastructure can be almost as great as the original construction cost. Considering that post-pandemic transit ridership will be considerably less than before the pandemic, paying for such replacement definitely will not be worthwhile.
- To better serve Twin Cities workers who don't work in downtown Minneapolis or downtown St. Paul, Metro Transit should revamp its bus system to serve multiple hubs with multiple spokes. Since only about 10 percent of the region's workers work in downtown Minneapolis and downtown

St. Paul, a multiple hub-and-spoke system with express buses from every hub to every other hub and local buses radiating away from each of the hubs will provide better service to more people than the current system of just two hubs.

Safety

- MnDOT should build upon data collected by the National Highway Traffic Safety Commission to develop a data-driven system of identifying safety issues on state and local highways, roads, and streets. "Vision Zero" programs address traffic safety mainly by focusing on speed limits, but traffic safety is much more complicated than just speeds. A data-driven system will help state and local transportation agencies to redesign existing roads to improve their safety.
- Such redesigns may include improving street lighting at night to reduce pedestrian fatalities, improving intersection designs to reduce bicycle fatalities, and turning local streets into bicycle boulevards so bicycle riders have safe, alternate routes to arterials and collectors.

Congestion

- After safety, MnDOT should make cost-effective congestion reduction its top priority. Cost-effective practices may include traffic signal coordination, redesign of transportation bottlenecks, and implementation of variable-priced tolls or other user fees.

Low-Income Subsidies

- Advocates of transportation equity need to refocus their efforts away from subsidies to transit, which few low-income people use, to providing low-interest loans to low-income people buying cars. Such loans can help people out of poverty by giving them access to far more economic resources than they can reach on mass transit.

Environment

- The state should address environmental problems associated with transportation by programs aimed at reducing the environmental cost of motor vehicles, not by trying to reduce people's use of those vehicles. Past efforts to reduce driving have failed miserably, while efforts to reduce the environmental cost of driving have been highly successful.

Intercity Travel

- Minnesota should reject proposals by Amtrak to help fund increased passenger train services, which are unfair competition to existing bus companies and airlines. Most routes where Amtrak has proposed such state-funded service are already served by buses that offer more frequent service at lower fares than Amtrak. Many are also served by airlines that offer much faster service, often at competitive fares.

Transportation Finance

- Rather than fund transportation out of general funds, Minnesota should find better ways to fund transportation out of user fees, which will result in better infrastructure maintenance and discourage expensive megaprojects that provide few transportation benefits. User fees should be dedicated to the transportation system that generated those fees; highway user fees should not go to transit any more than transit fares should be spent on highways (except dedicated busways).
- For highways, Minnesota should accelerate the replacement of fuel taxes with mileage-based user fees that preserve privacy while providing funding for roads. Local governments can piggy-back on such programs, thus relieving local taxpayers of the need to subsidize roads.
- To the extent that Minnesota continues to subsidize any transportation, it should do so in a way that mimics user fees, for example, by making subsidies to transit proportional to the user fees transit agencies collect or by giving transportation vouchers to low-income people. This will make transportation providers more responsive to users and less responsive to political fads and whims. ■

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11. Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-50 (2022), at https://cms7.bts.dot.gov/topics/national-transportation-statistics.

12. *See* Randal O'Toole, *The Mystery of the Missing Motorcoach Miles* (Thoreau Institute, 2020): p. 4, available at https://ti.org/pdfs/APB60.pdf. The Department of Transportation's estimate of 360 billion non-transit bus passenger-miles may be too high. Separate estimates of school bus and motorcoach passenger-miles add up to less than 70 billion, and the only other bus transport would be airport and hotel buses. I estimate that 120 billion, or about 400 miles per capita, is a more realistic number. Intercity buses, a subset of motorcoaches, appear to have carried around 18 to 20 billion passenger-miles in 2019.

13. Department of Transportation estimates of walking and cycling are made only every five years, with the last estimate being made in 2017. These estimates count only walking and cycling with specific destinations such as work, school, or shops, not walking and cycling for exercise or recreation. This seems unfair since some driving and other transport is primarily for recreation, but adding recreational walking and cycling would not change the final total much.

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